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FIRST-YEAR RETENTION OF STUDENTS WITH DISABILITIES IN HIGHER  
EDUCATION

Megan Matesic

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A dissertation proposal submitted in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy  
Department of Higher Education, Leadership, Management and Policy

Seton Hall University  
2020

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COLLEGE OF EDUCATION AND HUMAN SERVICES  
SETON HALL UNIVERSITY

**APPROVAL FOR SUCCESSFUL DEFENSE**

**Megan Matesic** has successfully defended and made the required modifications to the text of the doctoral dissertation for the Ph.D. during this **Spring Semester 2020**.

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## DEDICATION

*This dissertation is dedicated to all of my previous students. Their ability to dream of the impossible and make it come true inspired me to continue reaching for my own dreams.*

## ACKNOWLEDGEMENTS

Completing the coursework and writing this dissertation has taken years of hard work and dedication. However, I would have never been able to accomplish these goals without the support of my committee, family, and friends.

I would first like to thank my committee, whose encouragement and assistance throughout all the stages of my dissertation helped me succeed. I am extremely thankful for Dr. Rong Chen, my dissertation mentor, who believed in me and my abilities since the beginning. As her student, graduate assistant, and mentee, I was able to become a better writer, researcher, and higher education professional. I am truly appreciative of her endless support and encouragement that helped me pursue a topic and conduct a study that meant so much to me. I would not be where I am today, professionally or academically, without her. I am also thankful for Dr. Robert Kelchen, who provided me with such helpful and insightful feedback throughout the entire dissertation process. His suggestions greatly contributed to the structure and design of my study. Finally, I am thankful for Dr. Cindy Poore-Pariseau, who continuously inspires me to advocate for students with disabilities. Her guidance throughout my internship and this dissertation truly motivated me to keep going. Furthermore, her feedback and extensive knowledge on the topic always encouraged me to be concise of my word choice and write a dissertation I am proud of. I feel very fortunate that I had the opportunity to work with such a wonderful and talented committee.

I am forever grateful for my family who never stopped believing in me throughout these last four years. I would like to especially thank my parents whose endless love, support, and motivation helped me the most throughout this journey. I would not be the person I am today without them. I would also like to thank my brother, Domenic, and my sister-in-law, Jenn, whose

own personal achievements inspired me to reach for my own dreams. Finally, I would like to thank my grandparents who have always loved and supported me during every part of my life.

I am extremely thankful for the friends who have been there for me throughout this entire process. Their continuous support, encouragement, and patience kept me motivated, especially during the challenging times. They are also some of the best listeners that I know, even if they did not always understand what I was talking about. I am truly grateful for their friendship because I would not have been able to accomplish any of my goals without each and every one of them. Finally, I would also like to thank all the faculty, students, and administrators who I had the pleasure to work with in the College of Education and Human Services at Seton Hall University. They made my first step into the world of higher education an easy one and I will always be grateful for their support.

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## **ABSTRACT**

In the last few decades, students with disabilities are one of the more recently discriminated minority groups to work towards equality in higher education. At least 11% of undergraduates, or two million students, have disclosed a disability in postsecondary education and this number continues to grow every year. Despite this growing enrollment, students with disabilities are not retaining or graduating at the same rate as their peers without disabilities. This could be due to the way they integrate in the social and academic systems of college, which has been proven to be an important predictor of retention. Therefore, the purpose of this study was to examine the relationship between a student's disability type and their first-year retention, as well as what factors may contribute to their retention. This study was also conducted to determine whether having a disability or not, and whether positive social and academic integration influences a student's retention to their second year of college. Furthermore, this study was developed to provide various stakeholders within the K-12 and postsecondary sectors guidance on how to assist students with disabilities while they are transitioning into their first year of college in order to help them retain to their second year.

The samples used within this study were from the National Center for Education Statistics (NCES) Beginning Postsecondary Students Longitudinal Study (BPS 12/14). The samples included students with and without disabilities who first started their postsecondary education during the 2011-2012 academic year. The data that was used in this study was collected during the end of their first academic year in 2012 and then again at the end of their third academic year in 2014. Only students who attended 4-year public or private degree-granting institutions were included in the total sample. Furthermore, only students who indicated

that they had a disability on the survey were included in the sub-sample of students with disabilities.

A logistic regression model with fixed effects was conducted for only the sub-sample of students with disabilities to determine if there was a relationship between disability type and retention, while controlling for all other student-level variables. The same model also examined whether there was a relationship between social/academic integration factors and first-year retention for students with disabilities. A series of interaction effects tests that included students with and without disabilities were run to determine if the relationship between retention and social/academic integration was different across the two populations. Multicollinearity was checked through the variance inflation factor (VIF) values, as well as through correlation matrices, and missing data was handled through multiple imputation. Finally, linear probability models were also run after each logistic regression in order to include the weight to ensure that results did not oversample the student-level factors and were representative of the sample.

The findings of this study indicated that lower socioeconomic status, middle socioeconomic status, learning disabilities, and the social integration factor of positive feelings of belonging are all significant predictors of first-year retention for students with disabilities. However, none of the predictors in the interaction effects tests were significant. This indicates that the relationship between the positive social/academic integration variables and retaining from the first year of college to the second is the same across students with and without disabilities.

*Key Words:* Students with Disabilities, Retention, Social Integration, Academic Integration, Postsecondary Education

## **CHAPTER I INTRODUCTION**

There are currently 56.7 million people who have a disability in the United States, with about half reporting their disability as severe (U.S. Census Bureau Public Information Office, 2016). A disability is defined by the Americans with Disabilities Act (ADA) as amended in 2008 “as a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record of such an impairment, or a person who is perceived by others as having such an impairment” (U.S. Department of Justice, “Introduction to the ADA,” n.d., para. 2). Although the ADA Amendments Act of 2008 does not specifically state all the included impairments, disabilities are generally categorized into physical, visual, auditory, cognitive, neurological, speech, and other. Individuals may have one of these impairments or a variety of them and their condition can vary from moderate to mild. Furthermore, an individual can be born with a disability or they can acquire one later in life. A number of impairments are also considered “invisible” disabilities, such as learning, psychological, and certain health impairments.

Although individuals with disabilities have not always been protected, starting in the 1970s laws have been passed to provide civil rights to this specific population of citizens. Specifically, the ADA as amended in 2008 and Section 504 of the Rehabilitation Act helps protect individuals with disabilities from discrimination and provides them with an equal access to an education. However, the law changes substantially when they graduate from high school and transition to college. In the K-12 sector, schools are required and responsible for identifying and evaluating students with disabilities, as well as providing them with the appropriate accommodations under the Individuals with Disabilities Education Act (IDEA). However, once students graduate from high school it is solely their responsibility to self-identify as an individual

with a disability. Students also need to provide the appropriate documentation that details the impact of their disability and how it limits one or more major life activities to receive the appropriate and reasonable accommodations. Those who are defined as having a disability under the law as “a person who has a history or record of such an impairment or a person who is perceived by others as having such an impairment” (U.S. Department of Justice, “Introduction to the ADA,” n.d., para. 2) are also protected from discrimination. However, individuals who have a “record of a disability” are eligible for appropriate accommodations in college, but those who are “regarded as having a disability” cannot receive accommodations (Equip for Equality, 2018).

Only within the last few decades have students with disabilities, one of the minority groups experiencing discrimination, begun to work towards equality in higher education (Steele & Wolanin, 2004). At least 11% of undergraduates, or 2 million students, have disclosed a disability in postsecondary education, and this number continues to grow every year (National Center for Education Statistics [NCES], “Fast Facts,” 2016). Furthermore, this percentage only accounts for the number of students who have self-reported having a disability. There may be many more students in colleges and universities throughout the United States who have a disability but have not applied for accommodations or self-identified with their institution or the Office of Disability Services for a variety of reasons. Therefore, although there has been research on this unique population of students, it is difficult to account for all the individuals who have a disability in college (Newman & Madaus, 2015).

### **Problem Statement**

According to the NCES report Children and Youth with Disabilities (2018), 6.7 million, or 13%, of all public-school students receive special education services. Recently, national policies and acts have emphasized the importance of enhancing the outcomes of this specific

population of students. The 2004 reauthorization of the Individuals with Disabilities Education Act (IDEA) now requires all public schools to develop post-graduation goals for students with disabilities for employment, independent living, and education or training. Therefore, one of the main factors of the recent reauthorization of IDEA is to provide students access and participation in higher education through a smooth transition from high school to college (Sanford et al., 2011). Benefits of college and degree completion have been proven through higher wages and employment rates (Newman et al., 2011; Trostel, 2015; Ma, Pender, and Welch, 2016; McFarland et al., 2019).

Although IDEA may be providing access and transitional assistance to higher education for students with disabilities, high schools and educators cannot supply support once students graduate from high school. Furthermore, the percentage of students with disabilities in college does not match the general population, with only 60% of students with disabilities enrolled in a postsecondary institution within eight years of leaving high school compared to 67.4% of the general population (Newman et al., 2011). Students in this population are also not graduating at the same rate as they are enrolling, nor at the same rate as their non-disabled peers. According to Newman et al. (2011), 52% of the general population of students without disabilities graduated from postsecondary institutions compared to 41% of students with disabilities. Furthermore, when looking at only 4-year institutions 57% of the general population graduated compared to only 34% of students with disabilities (Newman et al., 2011). The gap between the percentage of students with disabilities enrolling in college and their graduation rate, as well as the gap between the graduation rates across the two populations is highly alarming. It is clear that something is affecting this population of students between the time of enrollment and their drop-out from higher education. Therefore, it is important to investigate the factors that are impacting

the retention of students with disabilities compared to their non-disabled peers in order to help them persist.

Past research has found multiple factors that are important in predicting retention. Social and academic integration are two aspects of the college experience that are especially important for student retention. Researchers have found that students had a higher likelihood of retaining if they were more positively integrated into the social and academic systems of their institution (Tinto, 1975). Furthermore, many empirical studies have also examined and found a relationship between social and academic integration and retention (Pan et al., 2008; Ullah & Wilson, 2007). National higher education surveys, like the National Survey of Student Engagement, survey students on their integration into college through questions about the effort and time put into their academic coursework, interactions with faculty and staff, and other activities because of the importance of these factors and their relationship to retention. Individual colleges and universities also survey their current students and those who withdrew about their integration to understand why they were or were not retained.

Social and academic integration into college can be vastly different for students from various minorities, including those with disabilities. According to Kim & Aquino (2017), although all students can positively or negatively integrate into their college community, their disabilities may cause additional issues that impact their ability to integrate differently than their non-disabled peers. This population of students often face specific academic and social challenges that can hinder their engagement and integration into college, but they are often overlooked (Quaye & Harper, 2015). Students with disabilities have also been found to be at greater risk of not socially adapting and adjusting to college in order to form an institutional attachment or commitment (Adams & Proctor, 2010). Therefore, since integration has been



found to predict retention and students with disabilities can have trouble integrating into college, it is important to understand how these factors are related to retention specifically for this population. Moreover, there are few studies that specifically examine this topic using quantitative data.

The first year of college is critical for all students and their retention to graduation. For many students, the first year of college paves the way for the rest of their postsecondary and academic career (Allen & Robbins, 2008; van der Zanden et al., 2018). Research has demonstrated that the majority of student dropouts occur between the first and second year of college (Singell & Waddell, 2010; Vander Schee, 2011). Furthermore, students who complete their first year and return to college their second year have been found to be more likely to persist to degree completion (Horn & Carroll, 1998). Meanwhile, students who are at risk for not being retained into their second year have been found to be less likely to graduate in five years (Singell & Waddell, 2010). Many students who do leave after their first year also never return to the same or a similar institution. Instead, they either drop out of higher education altogether or enroll at a 2-year college. Singell & Waddell (2010) found that 48.2% of the most at-risk students who left a 4-year institution never returned and 43.2% enrolled at 2-year colleges, while only 8.5% re-enrolled in another 4-year institution. Therefore, since coming back to college after the first year is so important for students' success in college and students without disabilities are not graduating at the same rate as the general population, it is necessary to first determine the first-year retention rates of this minority population. It is also important to understand the factors that promote or impede this group of students' retention compared to their non-disabled peers in order to make their educational experience more accessible so they are more able to persist.

Furthermore, student retention until graduation is important because it provides many benefits to students with disabilities and society as a whole. First, it has been found that employment and earnings are significantly better for those who have a college degree (Leppel, 2002). Those with college degrees have higher employment rates than those with only a high school diploma (NCES “Fast Facts: Employment Rates of College Graduates,” 2016). Specifically, 83% of students with disabilities were employed with a college degree or certificate, compared to 58% who did not have a degree (Newman et al., 2011). Average hourly wages were also higher for those with a disability and a degree, \$12.50 per hour, compared to those who had only had some postsecondary education, \$9.80 per hour (Newman et al., 2011). With nearly 1 in 4 American adults reporting that they have at least one disability, it is important that these individuals have the opportunity and access to attend college and graduate in order to receive the benefits of a degree.

Retaining more students in college to eventually earn a degree is beneficial to society as a whole as well. According to Watts (2001), there are several social benefits of earning a college degree at the public and individual levels. These benefits include “decreased reliance on public assistance, increased tax revenues, lower demands on the criminal justice system, greater civic participation, better health status through improved lifestyle choices, improved parenting skills, increased entrepreneurial activity, and increased access to and use of computers and the Internet” (Watts, 2001, p. 9). Therefore, if more students are retained in college and eventually graduate, then society will continuously improve and everyone benefits. These personal and societal benefits also demonstrate the importance of retention from the first year to the second year and then through college in order to obtain a degree for all students who want one, including those

with disabilities. It is, thus, clearly important to understand why students with disabilities are not graduating by examining their first-year retention rates in order to close the retention gap.

Although retention in higher education is important and more students with disabilities are enrolling, there is a limited amount of research on this population of students. There are also many significant gaps in the research that has been produced throughout the last few years. First, many studies did not use a national dataset. Instead, research was collected using a very small sample size or only from one university or college (Kranke et al., 2013; Herbert et al., 2014; Thomas-Ebanks, 2014). With these limitations, it is difficult to generalize the results of these studies to the entire population of college students with disabilities. Second, researchers did not compare students with disabilities to those without disabilities (Abreau et al., 2017; Herbert et al., 2014; Kranke et al.; Mamiseishvili and Koch, 2011; and Thomas-Ebanks, 2014). It is important to understand the similarities and differences between these two groups through normative comparisons to specifically address accessibility needs in order to help students with disabilities with college retention. Finally, many studies only examined students with one type of disability instead of the entire population or comparing different types of disabilities (Abreu et al., 2017; Kranke et al., 2013). Examining the factors that predict retention for this population could reveal many important findings. Results from this study might, thus, improve retention rates for students with disabilities, including those with different types of disabilities.

### **Purpose Statement**

The purpose of this study is to understand (1) whether the type of disability relates to the first-year retention rate among the population of students with disabilities; (2) how academic and social integration activities may contribute to first-year retention rates differently across students

with disabilities; and (3) what other factors are uniquely related to first-year retention rates among students with and without disabilities.

### **Research Questions**

This study will answer the following questions:

1. Among students with disabilities, how is disability type related to first-year retention?
2. Do the types of academic and social integration matter in predicting first-year retention among students with disabilities?
3. How do various factors contribute to student retention when comparing students with and without disabilities? In particular, do positive social and academic integration activities relate to first-year student retention differently across the two student populations?

### **Brief Theoretical Framework and Research Model**

There have been many theories and studies examining the factors that relate to a student's retention in higher education. Retention, which is vastly different than persistence, is an organizational phenomenon that focuses on student retention in one college or university, rather than transferring to other institutions, to complete their degree (Renn & Reason, 2013). Retention from the first year of college to the second has also been found to be important in increasing a student's chance of graduating, thus, retention is used as an outcome variable within this study (Horn & Carroll, 1998; Singell & Waddell, 2010). One of the most widely used and popular theories on student retention is Tinto's Model of Voluntary Student Departure. Within this theory, Tinto (1975) stated that pre-college characteristics, college experiences through social and academic integration, and goals and commitments are the factors that predict a student's retention or dropout from higher education. However, there were also many empirical and theoretical concerns about how this model focused solely on White male students (Braxton,

Shaw Sullivan, & Johnson, 1997; Kith & Love, 2000; Rendon, Jalomo, & Nora, 2000; Tierney, 1999; Tierney, 2000).

One of the ways Tinto's model can be improved is by utilizing Nevitt Sanford's Challenge and Support Theory to compensate for the shortcomings. Within his theory, cycles of differentiation and integration and balancing support and challenge in a college environment are two foundational concepts in student development (Sanford, 1962). Sanford (1962) also posited that for a student to fully develop and grow during college they needed the right balance of challenge and support. The amount of challenge a student can handle is dependent on the support available. If there is too much challenge and not enough support, students may regress to less adaptive behaviors, ignore the challenge, or try to escape the challenge. Although if there is not enough challenge, then students may feel too safe and are not able to fully develop. All students in higher education face challenges and receive supports, but these factors may be different for various populations of students, including those with disabilities.

By utilizing both Tinto's Model of Voluntary Student Departure and Sanford's Challenge and Support Theory, I have created a conceptual model to guide this study. This will help me examine the factors that relate to and can predict retention for this unique population of students. This model is based on students' pre-college characteristics, the ones students bring into college like gender and race, disability type, college experiences with integration into the academic and social systems, including the support they receive, and other factors, like major field, grade-point average, and financial aid. Through this conceptual model, I am using a new approach of examining student retention by integrating support and disability type into the framework. A more detailed discussion of the theories that ground this study and the creation of the model, as well as my rationale for it, are found in Chapter II.

For this conceptual model, independent variables will be tested using logistic regression with fixed effects against the dependent variable of whether or not a student was retained into their second year. I will examine their retention as an entire population of students with disabilities compared to those without disabilities, as well as conduct a within-group investigation. This will help me understand what academic and social integration variables from this model predict retention for students with disabilities compared to the general population. It will also help me understand if the disability type relates to a student's retention in higher education. A more detailed discussion of my research and data methods is found in Chapter III.

### **Significance of the Study**

Through this quantitative study, various education stakeholders and policy makers will be able to better understand the retention rates of students with disabilities compared to their non-disabled peers in higher education, as well as the factors that relate to their retention or drop-out. The results of this study will benefit multiple audiences and stakeholders in both the K-12 and higher education sectors who can work to close this gap. Teachers and counselors in high school can use this research to help ease the transition from high school to college for students with disabilities. They can prepare this population for what they might expect and how to overcome the barriers they may face once they are in a college or university setting. Faculty and staff in a postsecondary institution can also use this knowledge to better assist this unique population of students. Understanding the characteristics of students with disabilities and the challenges they encounter can help academic advisors, disability coordinators, and professors guide these students to graduation. Furthermore, policy makers and higher education institutions may wish to revise and update current policies and regulations to promote retention and provide these students with positive college outcomes based on the results of this study. The response of these

decision makers will have important consequences as more and more students with disabilities begin to enroll in college in the coming years.

### **Organization of the Dissertation**

This study is organized into five chapters. Chapter I introduces the topic of students with disabilities in higher education, as well as the purpose and significance of this study. Chapter II reviews the theoretical frameworks and conceptual model that guide this study in more detail. Furthermore, Chapter II provides a comprehensive literature review of the various factors found to predict student retention based on empirical studies, with a special focus on students with disabilities. Chapter III provides the methodology and quantitative research design of the study, which includes the data source, sample, and methods. Chapters IV and V include the findings of the data analysis and the conclusions, implications, and future research directions based on these findings.

## **CHAPTER II**

### **A REVIEW OF THE LITERATURE**

To understand the relationship between first-year retention for students with disabilities and their social and academic integration, this chapter focuses on reviewing and examining the literature on this topic along with a theoretical framework. First, I discuss the history of individuals with disabilities to understand the various laws that have granted them equal rights in the United States. These laws are important because they have led to enrollment of students with disabilities in higher education. Second, I explain the two theoretical models underlying this study: Tinto's Model of Voluntary Student Departure (1975) and Sanford's Challenge and Support Theory (1962), as well as the conceptual framework based on these two theories. Next, I will review the relevant literature that justifies the use of the variables I plan to use within this study. Finally, I will discuss the limitations of previous research and explain how this study will overcome them to produce new findings.

#### **History of Individuals with Disabilities**

Although the Civil Rights Act was passed in 1963 and provided equal rights for many minority groups in the United States, this act did not include individuals with disabilities. Furthermore, this marginalized minority did not have basic equal rights or protection against discrimination for most of American history. About five decades ago, the laws finally began to change to grant them equal rights. These laws included access to enrollment and assistance in higher education in the United States. Therefore, before discussing the current literature on students with disabilities, it is vital to understand the history of individuals with disabilities and how they came to have accessibility rights in higher education today. Throughout the first section of the literature review, I will discuss the history of the civil rights laws that have impacted individuals with disabilities and how they apply to higher education today.



## **Laws Protecting Individuals with Disabilities**

The road to protecting individuals with disabilities from discrimination and granting them equal rights was long and difficult. Section 504 of the Rehabilitation Act, which started in 1972 and finally went into effect in 1977, was the first piece of legislation that changed civil rights for this marginalized population within the United States. Section 504 led to the ADA of 1990 and eventually the ADA Amendments Act of 2008. These laws are monumental because they provided basic equal rights for individuals with disabilities for the first time in American history. They also allowed individuals with disabilities to be viewed as one class or minority group, rather than differentiated by specific disabilities.

**Section 504 of the Rehabilitation Act of 1973.** In January 1972, Senator Hubert Humphrey proposed forbidding discrimination against individuals with disabilities in all federal assisted programs by amending Title VI of the Civil Rights Act of 1964 (Weber, 1994). Although this amendment never passed, it was the first step to civil rights for this population. Congress then began amending a pending reauthorization of a rehabilitation law to include prohibiting discrimination against individuals with disabilities. After three failed tries, because the reauthorization was considered too expensive, a bill was finally signed in 1973. However, drafting and promulgating section 504 regulations was difficult because for the first time they were defining what non-discrimination meant for this unique population. Therefore, it was a long process that lasted from 1974 to 1977 before the regulations were finalized and signed. During this time, individuals with disabilities filed a lawsuit in federal court and organized and conducted eight sit-ins at various Departments of Health Education (the department responsible for creating the regulations across the country), with the longest one lasting 28-days in San Francisco. Finally, Section 504 officially went into effect on June 3, 1977 (Weber, 1994).

Section 504 was the first law to protect individuals with disabilities from discrimination in any program or activity that receives financial assistance from the government even if it is not a federal or state organization (U.S. Department of Education, n.d.). Therefore, this was a highly important first step in the fight against discrimination of individuals with disabilities. Section 504 also created access for students with disabilities in both the K-12 and postsecondary sectors, because it included public school districts, higher education institutions, and other education agencies that receive federal financial assistance. Furthermore, because of Section 504, all K-12 school districts in the United States are required to provide a free appropriate education (FAPE) to every qualified student with a disability (U.S. Department of Education, n.d.). They are also required to identify and evaluate students with disabilities, as well as provide the appropriate services and accommodations. Although the regulations are slightly different for higher education, Section 504 ensures that qualified postsecondary students with disabilities are not discriminated against within any postsecondary institution that receives federal financial assistance. This was the first law that provided equal access for this minority group within higher education.

**Americans with Disabilities Act.** Although it took a few years, the road to the ADA was a quicker and easier process because of Section 504. Furthermore, while Section 504 prohibited discrimination against individuals with disabilities in many ways where federal assistance was involved, it did not protect this population in employment situations or accommodations in the private sector. On July 26, 1990, the ADA was signed into law by President George H.W. Bush in order to provide more rights for individuals with disabilities (U.S. Department of Justice, “Introduction to the ADA,” n.d.). This law was essentially modeled after the Civil Rights Act of 1964 and Section 504 to be an equal opportunity piece of legislation for this population.

According to the United States Department of Justice Civil Rights Division, “the ADA is one of America’s most comprehensive pieces of civil rights legislation that prohibits discrimination and guarantees that people with disabilities have the same opportunities as everyone else to participate in the mainstream of American life — to enjoy employment opportunities, to purchase goods and services, and to participate in State and local government programs and services (U.S. Department of Justice, “Introduction to the ADA”, n.d., para. 1).”

The ADA prohibits discrimination in all areas of public life for individuals with disabilities. ADA regulations cover employment, public services in states and local government, public accommodations and privately-operated services, telecommunications, transportation, and other areas (“An Overview of the Americans with Disabilities Act”, 2017). The ADA also impacts K-12 and postsecondary education greatly by providing students with disabilities equal rights to an education. However, many Supreme Court decisions were based on different interpretations of the ADA that have made it difficult for an individual to prove that their impairment was a “disability.” In response, the ADA Amendments Act of 2008 was signed into law. The ADA Amendments Act of 2008 revised many of the previous Supreme Court decisions where individuals were not able to prove their disability. It also changed the focus to whether an individual was discriminated against, instead of whether the person fits into the definition of having a disability.

### **Section 504 and the Americans with Disabilities Act within Higher Education**

Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, and the Americans with Disabilities Act Amendments Act of 2008 gave individuals with disabilities the ability to enroll and attend postsecondary education. These laws established protections for this minority group, “including mandating that postsecondary education

institutions remove barriers for, eliminate discrimination against, and facilitate inclusion of students with disabilities” (Meeks & Jain, 2016, p. 16). These laws also provided individuals the ability to sue if they were discriminated against. Furthermore, because the ADA Amendments Act extended what is considered a disability more individuals were eligible for disability protection, which in turn allowed more students to be eligible for disability accommodations in higher education.

Every K-12 school district and nearly every postsecondary institution in the United States is subject to Section 504 and Title II of the ADA of 1990. Although private postsecondary institutions that do not receive federal financial assistance are not required to follow Section 504 and Title II, they are subject to Title III of the ADA, which prohibits discrimination by private entities (U.S. Department of Education, 2011). Therefore, these laws require all higher education institutions to provide reasonable accommodations so students with disabilities can access the campus environment and demonstrate their knowledge the same way students without disabilities can (Meeks & Jain, 2016). Educational accommodations are not allowed to fundamentally alter or lower an institution’s or program’s standards. Rather, they provide equal access to higher education that these individuals did not have in the past.

Although Section 504 and the ADA protects students with disabilities in all educational sectors from discrimination, the laws are different for K-12 and postsecondary institutions. In the K-12 sector, students are guaranteed a free appropriate public education and the school is required to advocate for them. However, once students graduate from high school and are in higher education, they are responsible for advocating for themselves if they want to receive accommodations. First, these students must meet the definition of a disability, as stipulated by the ADA Amendments Act. This includes any impairment that substantially limits a major life

activity even if a student uses “mitigating measures” like auxiliary aides, except for eyeglasses (Meeks & Jain, 2016). Chronic illnesses are considered a disability eligible for accommodations as well, but only if the illness limits a major life activity that is also related to their ability to function in the college environment (Meeks & Jain, 2016). Under the ADA Amendments Act, individuals who have a “record of” a disability are also qualified for reasonable and appropriate accommodations (Equip for Equality, 2018). However, although individuals who are “regarded as” an individual with a disability are covered under the ADA’s definition and can sue for discrimination, they are not eligible for accommodations (Meeks & Jain, 2016).

College students with disabilities then must provide recent documentation that details the impact of their disability. The requirements for the type of documentation students provide may be set by the institution as long as it complies with Section 504 and Title II. Therefore, documentation guidelines may vary from college to college. While some institutions accept Individualized Education Plans from an individual’s K-12 institution, others may not and instead only accept recent documentation from doctors or testing agencies (U.S. Department of Education, 2011). Once students complete these steps and are approved by a higher education institution’s Office of Disability Services, they can receive accommodations from the institution. However, many students do not know how to advocate for themselves in this way, cannot afford testing to provide documentation, or do not want to go through this process. Thus, there are many students with disabilities in postsecondary education, but not all are registered with a documented disability.

Individuals with disabilities, especially students in postsecondary education, have come a long way since the passing of Section 504 of the Rehabilitation Act in 1977. Furthermore, these laws have substantially helped this unique population of individuals receive rights equal to those

without disabilities. Section 504 and the ADA have also allowed individuals with disabilities to enroll in and be successful in colleges and universities. These laws provide accommodations that provide students with equal access to programs and activities within the college environment that they did not have prior to 1977. However, students with disabilities may still struggle with the transition and integration into higher education in ways that may differ from students without disabilities, such as not being able to participate in extra-curricular activities due to a lack of accommodations.

### **Theoretical Framework**

It is important to ground a quantitative study within a theoretical framework using specific models. Throughout this next section, I will discuss the variety of dropout and persistence theories in higher education and the two models that I will ground this study in, which are Tinto's Model of Voluntary Student Departure (1975) and Sanford's Challenge and Support Theory (1962). I have also created a conceptual model based on these two theories to guide this research. Before I discuss this framework and the conceptual model, I will first explain the differences between persistence and retention in this section. I will also justify the use of retention over persistence.

Although the terms persistence and retention are used interchangeably, it is incorrect and confusing to do so (Renn & Reason, 2013). Therefore, it is important to define the difference between these terms before identifying the theories within higher education. According to Reason (2009), "retention is an organizational phenomenon—colleges and universities retain students...persistence on the other hand, is an individual phenomenon—students persist to a goal" (p. 660). While students may be retained in one postsecondary institution, persistence to degree completion is usually the main goal of college students and can include multiple

institutions as long as they eventually receive their degree. However, student retention from the first year of college to the next has been found very important for their continued retention and eventual graduation (Tinto, 1993; Tinto, 1996). Students who complete their first year and return to college the next year are more likely to persist to degree completion than those who stop-out or drop-out (Horn & Carroll, 1998; Singell & Waddell, 2010). The majority of students also drop out between the first and second year of college (Singell & Waddell, 2010). This further demonstrates the importance of examining first-year retention rates.

Retention is important for all students, institutions, and society as a whole. Retention leads to a better chance of graduating and a college degree has been found to increase employment and earnings (Leppel, 2002). The employment rate and earnings have also been found to be higher specifically for students with disabilities that have a degree compared to those who do not (Newman et al., 2011). Retention is, thus, very important for students with disabilities and their families. Furthermore, nearly 1 in 4 American adults have been reported as having at least one disability (CDC: Morbidity and Mortality Weekly Report, 2018). As this number continues to rise, it is important that individuals with disabilities have the opportunity and access to attend college and graduate in order to increase their likelihood of employment and generate a more sustainable economy for the United States. Therefore, I will use first-year retention rates, rather than persistence, since the purpose of this study is to understand the integration, challenges, and supports students with disabilities experience in college that impact their goals of continuing within their original institution. Although I will be using retention within this study, both terms will still be used throughout the following literature review because I am examining a mixture of studies that investigated persistence or retention.

There have been many theories and studies examining the factors that impact a student's retention in or dropout from higher education. These theoretical models have come from a variety of views, but some retention studies have relied on solely psychological views that highlighted the students' motivation and abilities (Tinto, 1993). Many of these psychological studies focused on students' personal attributes and characteristics that they bring with them to college (Berger et al., 2012; Habley et al., 2012; Spady, 1970, 1971; Tinto, 1993, 2006). These characteristics can help shape a student's academic ability or influence their academic motivation, which then influences their possible departure from higher education. Within these types of theories, student departure is mainly a reflection of a student's psychological response to the college environment and is caused by a student's own personal willingness or ability to persist (Chen, 2008). However, since the psychological perspective of student persistence only accounts for internal characteristics, it fails to consider the important role of external factors (Tinto, 1992).

As new trends have emerged, theoretical models on student retention have been more recently classified as sociological, organizational, economical, and interactionalist. Sociological theories argue that the social attributes of the individual, institution, and society influences persistence or dropout. They also state that social and cultural capital and social stratification are more significant in predicting persistence than individual abilities. Although sociological theories overcome some of the issues that psychological theories had, they often overemphasize the role of external forces and do not take into account the psychological institutional factors (Chen, 2008). Organizational theories focus on the influence organizational attributes of higher education institutions have on a student's persistence or dropout. They provide a framework for understanding persistence throughout college and universities with different characteristics.



However, they are less developed and have not been tested in many empirical studies (Chen, 2008). Tinto (1992) also criticized these types of theories for not including lower-level institution factors, like peer and faculty interactions that could possibly moderate the organizational effects of behavior. Models and theories of persistence based on an economic perspective are a more recent trend. Through human capital theory and supply and demand theory, economic models of student persistence treat higher education as an investment for students to have a better future that is worth the tuition, fees, and possible debt. Financial factors of institutions, including financial aid and tuition, can, thus, influence a student's decision to persist or drop out (Chen, 2008).

Another economic conceptual framework and theoretical model to consider is one developed by Chen (2008). This inclusive framework examines how student aid policies can impact dropout risks and rates. Although it is an economic framework, Chen (2008) found it important to consider psychological, sociological, organizational, interactionist, and other economic theories, as well as the issues of debt aversion, liquidity constraints, and price elasticity. Therefore, Chen's framework included eight important constructs for independent variables that come from a variety of factors which can impact a student's dropout. This framework also considers the fact that the college population is heterogeneous and a student's income and racial or ethnic background may influence how they respond to financial aid. Furthermore, it examines whether these income and racial differences are significant enough to decrease the gaps in student dropout risk over time (Chen, 2008). It is, thus, important to not only consider the impact financial aid can have on a student's persistence in higher education, but also how their background differences can influence persistence as well.

Finally, interactionalist theories integrate psychological, social, and organizational theories to understand student departure or persistence. These theories also treat the dropout process as an interaction between the students and the environment (Tinto, 1993). Tinto's Model of Voluntary Student Departure (1975) was one of the more complete and complex interactionalist theories that integrated various factors from other theories through a longitudinal process of interactions. Interactionalist theories can, thus, provide a more inclusive and comprehensive view predicting a student's dropout or persistence behavior. However, the lack of economic factors and only some empirical support for certain factors within these types of theories does create weaknesses in their ability to predict persistence. Accounting for and overcoming these weaknesses allows for researchers to continue to utilize these types of theories today. Therefore, to examine retention of students with disabilities in higher education I will use two theories to ground this study: Tinto's Model of Voluntary Student Departure (1975) and Sanford's Challenge and Support Theory (1962).

### **Tinto's Model of Voluntary Student Departure**

One of the most widely used and comprehensive theories is Tinto's Model of Voluntary Student Departure (1975). Tinto developed and built his model using the roots of Durkheim's theory of suicide, Spady's Undergraduate Dropout Process Model, and the economic factors of the cost and benefits of a college degree. According to Tinto (1975), "these different conceptual frameworks are applied to a model of dropout that seeks to explain dropout from institutions of higher education, not one that seeks to explain dropout in the system of higher educational institutions. It is, then, an institutional rather than a systems model of dropout" (p. 91). Therefore, utilizing this theory to ground this study is reasonable since I am examining students' retention from their first year of enrollment at an institution to the next. Furthermore, retention is

an organizational or institutional phenomenon compared to persistence which is an individual phenomenon.

Tinto's Model of Voluntary Student Departure is based on three dimensions that are related to and can help predict students' dropout or retention within an institution. These include pre-college characteristics, commitments and goals, and institutional experiences. Pre-college characteristics are measured by a student's high school experience, family background, socioeconomic status, demographic, and community factors. Pre-college factors within this model also include gender, race, ability, ethnicity, first-generation status, and high school grade-point average. Commitments and goals are measured by a student's educational and career expectations, as well as if these expectations involve any specific institutional component. This includes both the level and intensity of expectation, which "helps specify the psychological orientations the individual brings with him into the college setting—orientations that are important predictors of the manner in which individuals interact in the college environment" (Tinto, 1975, p 93). Therefore, a student who has a goal of completing a master's or doctoral degree is more likely to be retained than one who only expects to earn an associate's or bachelor's degree.

However, Tinto (1975) also stated that individual characteristics, prior experiences, and commitments are not enough to understand retention in college. According to Tinto (1975), "one must view dropout from college as the outcome of a longitudinal process of interactions between the individual and the institution (peers, faculty, administration, etc.) in which he is registered. Assuming unchanging external conditions, dropout is taken to be the result of the individual's experiences in the academic and social systems of the college" (p. 103). Therefore, it is also important to consider students' academic achievement and intellectual development measured by

grade-point averages in order to understand their experiences in the academic system. A student's experience in the social system of a college includes the frequency of interaction with faculty, staff, and peers, and involvement and satisfaction in extracurricular or social activities.

Within this theory, Tinto (1975) also stated that students were more likely to be successful, persist in college, and attain a degree if they are socially and academically integrated into the institution's environment. Students' experiences in their social and academic college systems leads them to integration into the environment and possibly to modify their commitment to retention within their institution and their goal of graduation. Therefore, integration is defined as the extent to which students become a part of their college community. Within Tinto's model, he stressed the importance of the relationship between a student's academic and social integration and their commitment to college in order to be retained and not drop out. Therefore, it is important to include integration factors within this study.

Tinto (1975) stated that since colleges include both academic and social systems it is vital to distinguish between them in order to understand their relationship to persistence and voluntary dropouts. Within this model, academic integration is a student's perception of their experiences in their academic system, which is measured by their grades and intellectual development (Tinto, 1975). According to Tinto (1975), grades "relates more directly to the meeting of certain explicit standards of the academic system, and the latter (intellectual development) pertains more to the individual's identification with the norms of the academic system" (p. 104). Furthermore, although grades and intellectual development are important on their own, they are also related to one another and correlate to a student's persistence both separately and together.

Through the development of his model, Tinto examined many previous studies that found grade-point average to be the most important factor in predicting student persistence (Ammons,

1971; Astin, 1972; Blanchfield, 1971; Coker, 1968; Greive, 1970; Jaffe & Adams, 1970; Kamens, 1971; Mock & Yonge, 1969). Other studies Tinto reviewed also discussed the importance of intellectual development in relation to student persistence (Bayer, 1968; Daniel, 1963; Faunce, 1966; Trent & Medsker, 1968; Rose & Elton, 1966; Sarnoff & Raphael, 1955; Spady, 1971). Certain studies found that students who persisted were the ones who valued their college education because they were gaining knowledge and ideas instead of viewing it as merely a pathway to obtaining a job. The degree of congruence between a student's intellectual development and their campus' intellectual climate was also found important in persistence.

Within Tinto's model (1975), social integration includes students' perceptions of their interactions with faculty, staff, and peers, as well as their involvement in extracurricular activities. Tinto found in previous studies that students' perceptions of their social integration, including interactions and their "social fit," are directly related to persistence (Pervin et al., 1966; Rootman, 1972; Scott, 1971; Spady, 1971). Tinto also found that having supportive and sufficient friendships, which lead to social integration, was more associated with staying in college than congruence with the social climate of the institution. Furthermore, since social and academic integration are related, Tinto posited that social interaction with friends or peers could either enhance or hinder a student's academic integration. A lack of social interaction can lead a student to drop out, but excessive social interaction can cause dismissal if it interferes too much with academic integration.

Through his research and development of his theory, Tinto (1975) discovered that a student's participation in extracurricular activities does not hinder their grades or intellectual development. Furthermore, past research found that participation in extracurricular activities is associated with a student's persistence in college (Bemis 1962; Chase, 1970; Goble, 1956;

Spady, 1971; Stone, 1965; Wolford, 1964). Extracurricular activities can even provide rewards that enhance a student's commitment to their college, which can further increase the probability of their retention. Tinto also found, through previous studies, that a student's interaction and relationship with faculty is directly related to their retention (Centra & Rock, 1971; Gamson, 1966; Gekoski & Schwartz, 1961; Spady, 1971; Vreeland & Bidwell, 1966). This relationship not only enhances their social interactions and commitment to their college but can also increase their academic integration. Therefore, Tinto (1975) found that while peer interactions and relationships related directly to social integration, extracurricular activities and faculty relationships are associated with commitment to an institution.

Tinto's model (1975) demonstrates that positive integration into both the academic and social systems can lead to a commitment to stay in college, but a negative or lack of integration can influence a student's decision to leave college. He found that "integration into the academic system of the college most directly affects goal commitment, whereas behaviors in the social system most directly relate to a person's institutional commitment" (Tinto, 1975, p. 110). Furthermore, even though Tinto stated the importance of distinguishing the difference between academic and social integration, he also discussed their reciprocal relationship to one another. Integrating too much into one system, could lead to a decline in the other. According to Tinto (1975), "other things being equal, the higher the degree of integration of the individual into the college systems, the greater will be his commitment to the specific institution and to the goal of college completion" (p. 96). Given their importance, I will utilize both academic and social integration factors when examining students' retention.

Although Tinto's Model of Voluntary Student Departure has been widely used for years, reviewers have expressed many empirical and theoretical concerns about his model (Braxton,

Shaw Sullivan, & Johnson, 1997; Kith & Love, 2000; Rendon, Jalomo, & Nora, 2000; Tierney, 1999; Tierney, 2000). Therefore, it is important to fully consider these concerns in order to utilize this theory to ground this study. Tinto's model mainly focused on only the experiences of white, non-disabled, and male students. He did not consider the perspective of minority groups and their integration into higher education, which can be vastly different from the White male perspective. Many researchers have shown that students academically and socially integrate into higher education in different ways (Kith & Love, 2000; Rendon, Jalomo, & Nora, 2000; Tierney, 1999; Tierney, 2000). This includes the minority population of students with disabilities. This unique population of students have had different life experiences compared to their non-disabled peers. Therefore, although Tinto's model may account for some of their persistence or departure, other factors must be accounted for as well.

### **Sanford's Challenge and Support Theory**

One of the ways Tinto's model can be improved is by utilizing Nevitt Sanford's Challenge and Support Theory (1962) to compensate for the critiques. Sanford was one of the first researchers to develop a theory that involved a relationship between the college environment and a student's life transitions. This transition phase between late adolescence to young adulthood, which occurs at the same time as the transition from high school to college, is a highly important time period for all students, including those with disabilities. This transition period often includes students integrating both academically and socially into their college, which is one of the main dimensions of Tinto's model (1975). Furthermore, within Sanford's theory (1962; 1966) cycles of differentiation and integration and balancing support and challenge in a college environment are two foundational concepts in student development.

The first foundational concept of student development in Sanford's theory (1962) involves the cycles of differentiation and integration. Differentiation occurs when students understand themselves as unique individuals, while integration happens when students recognize themselves as members of various groups (Patten et al., 2016). Through this process, students learn about their own characteristics and begin to understand how their personality shapes their identity. Individuals with disabilities can see themselves as unique individuals with different strengths, abilities, and weaknesses with or without their disability in mind. They can also see themselves as members of various groups as they integrate into college, including but not limited to peers with similar disabilities. This concept of Sanford's theory is similar to Tinto's dimension of integration. Therefore, as students integrate into college, they learn who they are individually and as members of different academic and social groups. This further demonstrates the importance of integration into the academic and social systems of college.

Sanford's second foundational concept includes the balance of challenge and support. Sanford (1962) also posited that for a student to fully develop and grow during college they needed the right balance of challenge and support. Sanford (1962) stated that challenges occurred when individuals did not have the skills, knowledge, or attitude to cope or overcome them. Meanwhile, supports in the environment are the factors that help individuals overcome challenges to become successful. Through further development of his theory, Sanford stated that readiness, challenge, and support were the three developmental conditions. Furthermore, he was "one of the first developmental theorists to focus on the idea of student development as a function of person-environment interaction, he contended that individuals cannot exhibit certain behaviors until they are ready to do so" (Patten et al., 2016, p. 36).



According to Sanford (1966), the amount of challenge a student can handle is also dependent of the support available. If there is too much challenge and not enough support, students may regress to less adaptive behaviors, ignore the challenge, or try to escape the challenge. Although if there is not enough challenge, then students may feel too safe and do not develop. These challenges and supports depend not only on the student and their development, but the environment they are in and the people in their lives. All students in higher education face challenges and receive supports, but they may be different for various groups of students depending on their race, gender, abilities, age, and more. This is especially true for students with disabilities who face many challenges different from their non-disabled peers. Furthermore, if college environments do not provide the supports, or if students do not use or experience the supports, then the challenges they experience may be too great to overcome. This can cause many different negative outcomes. Although not specifically stated in his theory, one of these negative outcomes can include students dropping out of college to escape their challenges if they do not have enough support or have too many challenges. Therefore, it is important to examine students' support and challenges in order to understand the relationship of this factor to their retention.

### **Conceptual Framework**

The conceptual framework developed for this study is based on Tinto's Model of Voluntary Student Departure (1975) and Sanford's Challenges and Supports Theory (1962). Utilizing both models can provide an understanding of the experience of students with disabilities in higher education during their first year of college. This experience can then provide a deeper comprehension of their college outcome and retention to their second year. Tinto's model (1975) emphasized the importance of three dimensions that relate to and can

predict retention, which includes pre-college characteristics, goals and commitments, and academic and social integration. Through research and development of his model, Tinto found that the variables within these dimensions are related to a student either dropping out or being retained. Furthermore, through integrating factors of psychological, sociological, and organizational theories, Tinto's theory accounts for all the characteristics of individuals, society, the institution, and the environment that could influence or predict retention.

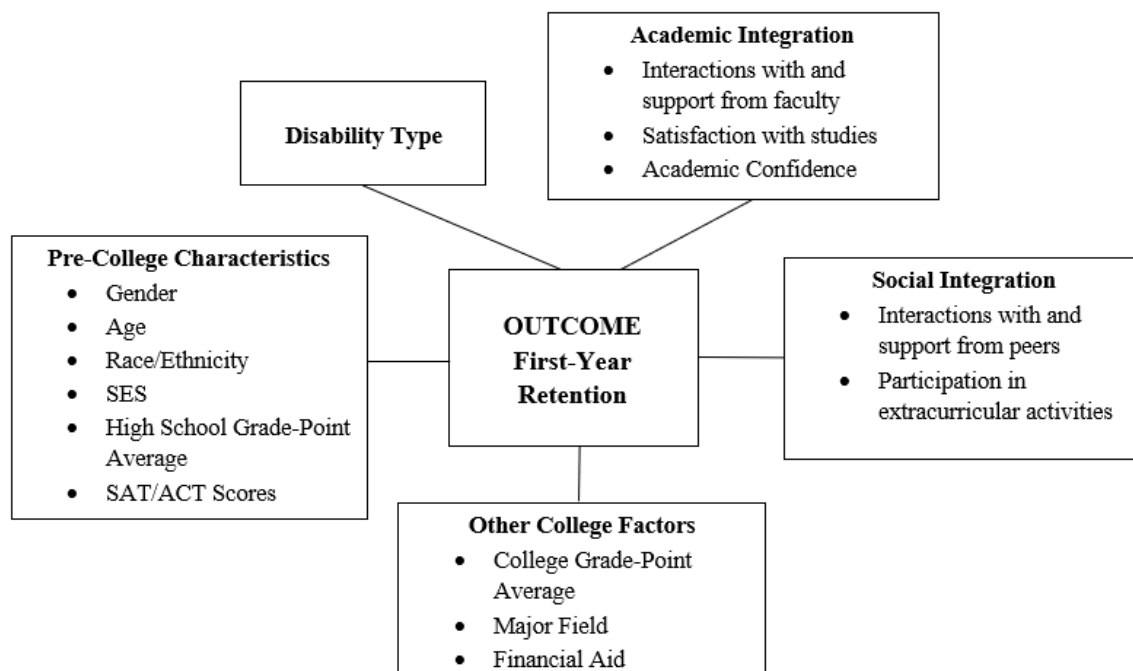
Tinto's theory has been widely used by many researchers as a theoretical framework in understanding dropouts, persistence, and retention. According to Liu (2002), Tinto's theory has often been cited as the main theory to explain student dropout and retention. However, there have also been a number of concerns about Tinto's theory. It has been criticized for not including economic factors in its model, as well as the fact that it mainly focused on the experiences of only White male students (Chen, 2008; Kith & Love, 2000; Rendon, Jalomo, & Nora, 2000; Tierney, 1999; Tierney, 2000). Even with these concerns, Tinto's theory has still been considered a beneficial and relevant theory to utilize within a retention study and has been used specifically within studies examining students with disabilities (Duquette, 2000; Mamiseishvili & Koch, 2011), including this dissertation. Tinto's theory has also been widely tested and is considered a classic theory to use when examining dropout or persistence behaviors (Braxton, 2000; Braxton et al., 2011). In this study, I will add economic factors to the conceptual model to address that particular weakness and criticism. Therefore, I have chosen Tinto's Model of Voluntary Student Departure, despite the concerns, because it focuses on students' family background, pre-college characteristics, integration into college, and how integration of those factors relates to students' retention in their first year.

Furthermore, all students integrate into college both socially and academically, but the way they integrate, the challenges they face, and the supports they receive may be different for each student. This is especially true for students with disabilities who may have additional challenges that their non-disabled peers do not face, as well as different supports. In Tinto's Model of Voluntary Student Departure (1975), he discussed the important influences of peer, family, and faculty support on a student's integration into their college and their chances of retention or dropout. He found that the quality of family relationships and parents' college expectations of their children were the most important factors of family background. He also found that peer support can be vital in how a student performs academically, whether negatively or positively. Finally, faculty support was found to be highly important for students to successfully integrate into the academic system, as well as a student's commitment to their college and goals.

Sanford's theory focused on the supports students receive and how they can help them overcome challenges and develop as a student. This foundational concept is similar to Tinto's dimension of social support that has been found to be positively associated with a student's ability to successfully integrate and stay in college. Therefore, since students with disabilities receive and need additional supports, and face additional challenges, compared to the general population, I also chose to utilize Sanford's Challenge and Support Theory (1962; 1966), because of its focus on these variables and how they relate to student retention. The addition of Sanford's theory also takes into the perspective of students from a marginalized group, which is often cited as lacking in Tinto's model. Utilizing both Tinto's Model of Voluntary Student Departure (1975) and Sanford's Challenge and Support Theory (1962; 1966) to ground this study

will help examine the factors related to the retention of students with disabilities in higher education.

Applying both Tinto's Model of Voluntary Student Departure (1975) and Sanford's Challenge and Support Theory (1962; 1966), I created a similar model (Figure 2-1) to combine both theories to hypothesize the factors that will predict students with disabilities' first-year retention compared to students without disabilities, as well as compare the various disability types to each other. This model is based on students' pre-college characteristics (gender, age, race/ethnicity, SES, and academic preparation), academic integration, social integration, disability type, college grade-point average, major field, and financial aid. I will then test whether these variables then influence a student's retention. For this model, I will specifically be looking how these variables predict the end goal of students retaining from their first year to their second year. To explain the use of this conceptual model and the factors within it, I will review the relevant literature that justifies the use of these variables within this study.



**Figure 2-1.** Conceptual Model adopted from Tinto's Model of Voluntary Student Departure (1975) and Sanford's Challenge and Support Theory (1962; 1966)

## **Factors Influencing Students' Retention in Higher Education**

There have been many studies and past research on the various factors that influence students' retention in higher education. These include pre-college characteristics and social and academic integration. Although there is a limited amount of research on students with disabilities in higher education, there are some studies that shed light on their experience in college and their outcomes. Therefore, the following review will analyze a mixture of studies solely focused on students with disabilities, as well as studies that focus on the general population, and the factors related to their retention in higher education. Since individuals with disabilities are a part of the entire student population, they are also a part of studies on the general postsecondary student body. It is also important to understand how some of these factors, like social and academic integration, relates specifically to them and their experience in higher education even if the study does not examine their retention. Therefore, throughout this section, I will justify the use of the variables in this study through a discussion of current data and past research.

### **Pre-College Characteristics and Student Retention**

Tinto's Model of Voluntary Student Departure (1975) stated that one of the main dimensions that is related to and can predict retention is pre-college characteristics. Pre-college characteristics include gender, age, race and ethnicity, socioeconomic status, a student's high school academic preparation measured through grade-point average, and SAT or ACT scores. Students enter college with these important pre-college characteristics that directly or indirectly influence their college performance and experience (Tinto, 1975). Furthermore, Tinto explained that these variables impact students' development of their higher education expectations and commitments, which are both highly important in predicting their view of their college experience and persistence. Reviewing the past literature on these pre-college characteristics and

their relationship to college retention and success for all students is highly important to understand why they need to be included within this study. Furthermore, including specific research on students with disabilities and their pre-college characteristics to further examine this relationship is important as well.

## **Gender**

Throughout the last few decades, women have been enrolling, persisting, and graduating at higher rates in higher education than men have. In 2017, 56.5% of women were enrolled in a degree-granting institution compared to 43.5% of men, and 61% of bachelor's degrees were awarded to females compared to 39% awarded to males (NCES: Digest of Education Statistics on Enrollment, 2017; NCES: Digest of Education Statistics on Degrees, 2017). Researchers and theorists have been investigating gender and its influence on retention for decades. This includes studies on both the general student population and on students with disabilities. However, past research has revealed a mix of results and findings. Some studies have found no significant differences between gender and retention or graduation rates. Pritchard & Wilson (2003) ran multiple regressions and found that gender did not significantly influence persistence for undergraduate students at a Midwestern university. In a more recent study on students in remedial courses compared to those not in remedial courses, Stewart, Lim, & Kim (2015) also found that gender did not have a significant effect on persistence.

Past research has also found that gender is related to retention only in a few simple models. Specifically, Reason (2001) found that gender was only a significant predictor in a simple model of dropout behavior, but gender was no longer significant in multivariate models. St. John et al. (2001) had similar findings when gender was no longer a significant predictor of persistence because institutional variables were added. In a more recent study on the persistence

to graduation rates of students with disabilities, Herbert et al. (2014) discovered that gender was only significantly associated with degree completion in their first two models but was no longer significant in the third and final model. Therefore, these studies demonstrate that some interaction is occurring between these variables, so more research is needed on gender's influence on retention.

Although there have been studies that have found gender to not be significant, there are some findings that demonstrate the importance of gender for students with disabilities. Pingry O'Neill, Markward, & French (2012) found that the odds of a woman with a disability graduating are 1.5 times larger than those of a man with an identical disability. Another study on students with disabilities that utilized a national dataset and logistic regression analysis, also found that being female increased a student's likelihood of persisting to their second year of college (Mamiseishvili & Koch, 2011). This literature demonstrates that there are mixed results on gender and its influence on student retention and graduation. However, although more women are enrolling in and graduating from postsecondary institutions, most studies have found that gender does not have a relationship with retention when other factors are included in the model. This suggests the need to investigate further, especially for those with disabilities.

### **Age**

Age has also been considered as another predictor of student persistence. This is due to the fact that the age of an undergraduate college student is becoming more diverse. Furthermore, traditional and non-traditional students may experience college differently because of their age. Most adult students are enrolled part-time rather than full-time, unlike their undergraduate peers. For adult students, home, family, and work responsibilities could also present stressful situations that traditional students do not always face. However, adult students may be better at dealing

with these stresses because they are older and generally have superior time-management and coping skills compared to traditionally aged students (Forbus, Newbold, & Mehta, 2011). Past research has, thus, investigated the influence of being a traditional student under 23 years old versus being an adult student on persistence and graduation rates.

Studies have found mixed results on the relationship between age and retention throughout the last few decades. Murtaugh, Burns, & Shuster (1999) found that, for students at Oregon State University, retention rates decreased when age was increased. This finding implies that the older a student was, the less likely they were to be retained at a specific institution. More recently, Wohlgemuth et al. (2007) used logistic regression and discovered that age had no significant relationship to retention or graduation rates. Little to no significance on the influence of age has also been found for transfer students and their retention in higher education (Gao et al., 2002; Koker and Hendel 2003; Luo et al., 2007). Studies have also researched how age influences persistence for students with disabilities. Using a national dataset, Mamiseishvili & Koch (2011) discovered that age was negatively related to persistence for this particular population of students. In their study, the older a student with disabilities was, the less likely they were to persist to their second year of college. Although age seems to have a negative influence on retention for students with disabilities, more studies have found that age does not have a relationship for a student's retention in general. This mix of results demonstrates the importance of further investigation.

### **Race and Ethnicity**

Throughout the last few decades, the U.S. population has become more racially and ethnically diverse. Consequently, higher education undergraduate student bodies have also become more diverse. According to Espinosa et al. (2019), the percentage of undergraduate



students of color has increased from 29.6% in 1996 to 45.2% in 2016. This increase in diversity has made examining race and ethnicity in higher education studies very important. Therefore, research has indicated that race and ethnicity are another significant predictor of college retention and graduation. Many studies and theorists have investigated the relationship between race and ethnicity and college persistence. Recently, most studies have found that particular races and ethnicities do not have the same retention rates as others. Minority students often have lower persistence and graduation rates when compared to their peers (D'Lima, Winsler, & Kitsantas, 2014). NCES recently reported that Asian first-time, full-time undergraduate students had the highest 6-year graduation rates at 4-year institutions (74%). This is followed by White students (64%), students who reported two or more races (60%), and Hispanic students (54%). Pacific Islander (51%), Black (40%), and American Indian or Alaska Native (39%) students had the lowest graduation rates, respectively (NCES: Indicator 23: Postsecondary Graduation Rates, 2019).

Although NCES reported specifically which races and ethnicities had the highest rates of graduation, past research has found mixed results when it comes to the relationship between persistence and race or ethnicity. Mamiseishvili & Koch (2011) found that for students with disabilities, being female and African American significantly increased the likelihood of a student persisting from their first year of college to their second year. In a more recent study, Herbert et al. (2014) originally found that race and ethnicity were significantly associated with bachelor's degree completion for students with disabilities. However, in their third and final model, when other variables were held constant, this demographic characteristic no longer had a significant relationship with degree completion. Stewart, Lim, & Kim (2015) found that out of all the races and ethnicities Asian and Pacific-Islander students were the most likely to persist in

postsecondary education. African American students were the next group most likely to persist followed by White and finally American Indian or Alaska Native students. This mix of literature and the increasing diversity of race in higher education demonstrates the importance of understanding how race and ethnicity can influence retention for all students, including those with disabilities.

### **Socioeconomic Status**

Research and data have indicated that socioeconomic status, measured by family income and parental level of education, is another pre-college characteristic that can influence student retention. Individuals from lower socioeconomic classes are often less likely to attend postsecondary institutions compared to those from middle and upper classes. Furthermore, those who do attend are even less likely to graduate and obtain a degree. Specifically, 60% of students from high-SES backgrounds graduated by the time they were 26 compared to only 14% of those from low-SES backgrounds (Kena et al., 2015). These low college graduation rates remain despite the fact that 58% of students from low-SES backgrounds expected to graduate from college when they were high school sophomores and many were also academically prepared (Kena et al. 2015; Bjorklund-Young, 2016). Therefore, although students from low SES families intend to graduate, they are not always able to due to financial or economic strain.

Despite the low enrollment and graduation rates of students from low-SES backgrounds, research on the influence of SES, as measured by family income, on persistence is mixed. In 1973, Astin found that the level of family income was not directly related to a student dropping out of college. More recently, Westrick et al. (2015) revealed that, compared to ACT scores and high school grades, SES was a weak predictor of college academic performance and retention. However, Olbrecht et al. (2016) found that a student's likelihood of persisting to their second

year increased when their family had more money to contribute to their educational expenses. First-generation students, which are defined as individuals whose parents have no college experience and are also considered low-SES, have been found to have lower enrollment and graduation rates compared to their peers whose parents do have college experience (Cataldi, Bennett, Chen, & Simone, 2018). These mixed results, thus, provide justification for further investigation of the relationship between socioeconomic status and retention.

### **High School Grade-Point Average**

Being prepared for college through high school academics is important for all students. Therefore, high school grade-point average (GPA), has also been researched to understand its relationship to college retention and success. Past research has found high school GPA to be one of the strongest predictors of academic achievement in college, which can then help predict retention (Hoffman & Lowitzi, 2005; Livingston, 2007). However, there have been issues with using GPA as a measure of high school preparation. This is due to the fact that high school grading varies across the nation and high school curriculums can be very different as well. Some high schools may challenge their students more than other schools who may give out good grades without an academic push, which can make measuring GPAs inconsistent. Despite these issues, studies have found that high school GPA is a good indicator of success and retention in higher education.

High school GPA has been found to be one of the strongest predictors of retention and graduation rates in decades of past studies. Astin (1987) found that a student with an A average in high school was seven times more likely to graduate college than a student with a C average. Using stepwise multiple regression analysis, Tross et al. (2000) discovered that high school GPA was the most significant predictor of retention in their final model and accounted for 25% of the

variance. More recently, Westrick et al. (2015) found that high school GPA was a significant predictor of academic performance in both the first and second year of college. They also found that a student's high school GPA was a significant predictor of their second- and third-year retention in college. Therefore, since it has been found that GPA has a significant and often positive relationship with retention it is clearly important to further examine it for students with disabilities.

### **SAT and ACT Scores**

Another pre-college characteristic that has been often linked to retention and persistence in college is a student's SAT or ACT scores. However, past research has been mixed, with both positive and negative relationship results. In older research, both the SAT and ACT have been found to be significant predictors of retention in college (Astin, 1987; Tross et al., 2000; Tracy & Robbins, 2006). Therefore, it has often been included as a predictor variable in retention and persistence studies. More recently, Westrick et al. (2015) specifically found that ACT composite scores were significant predictors of academic performance in the first and second year of college, as well as retention until the beginning of the third year. Shaw (2015) found that SAT scores were able to predict first-year college GPA and cumulative grade-point averages. Shaw (2015) also found that higher SAT scores were related to higher retention rates for each year of college and 4-year graduation rates. However, this study was done by the College Board in order to validate the admissions test and possible bias should be kept in mind while reviewing their results.

Past studies have also found that admission tests scores do not always relate to or predict retention. Saunders-Scott, Braley, & Spidahl (2017) investigated traditional and non-traditional factors and compared their relationships to academic success and retention in college. Although

they found that ACT scores were able to predict college GPA, the scores were not able to predict retention as well as the non-traditional factors. Furthermore, high school GPA was also a better predictor of college GPA than ACT scores, which demonstrates that other factors may be superior to admission test scores (Saunders-Scott, Braley, & Spidahl, 2017). Bowen, Chingos, & McPherson (2009) also reported that high school grades were a better predictor of 4- and 6-year graduation rates than SAT scores. Stewart, Lim, and Kim (2015) originally found that ACT scores had a positive, but weak, correlation with college persistence. However, they also found that ACT scores no longer predicted persistence as well as high school and college GPAs when other variables were entered into a stepwise multiple regression analysis. Therefore, since there have been mixed results on whether college admission test scores, like the SAT and the ACT, have a predictive relationship to college retention, it is important to examine these variables in a study that includes students with disabilities.

### **Integration and Student Retention**

As Tinto (1975) posited within his model, integration into the social and academic systems of college is significantly related to retention. The more positively integrated a student is the more committed they will be to their institution and the greater their chances of retention. Therefore, many researchers have utilized Tinto's theory and investigated the influence integration has on retention for many different types of students. Although there have been mixed results, it is important to review this literature to understand how integration is related to retention in past research. Since students with disabilities are often included with the student population of many of these studies, it is also important to examine this research before looking at literature specific to this study's population.

Past research has found mixed results when investigating the relationship between academic and social integration and retention. Some studies have found that academic integration had a stronger relationship with retention when compared to social integration. Specifically, Munro (1981), using a national longitudinal dataset, found that academic integration had a stronger effect on a student's decision to drop out through their institutional commitment than social integration. More recent studies also found that academic integration had a stronger influence directly on retention than social integration. Utilizing the Beginning Postsecondary Survey 04/09, Ishitani (2016) found that academic integration was significant for retention. However, Ishitani (2016) also discovered that academic integration was only important for first-year retention, which included participation in study groups, meeting with academic advisors, and talking with faculty. There is also been past research that has investigated the importance of social integration. Jones (2010) found that social integration had a strong and positive relationship to institutional commitment specifically for women. A stronger institutional commitment then influences a student's decision to stay at that institution.

Although some studies have found the importance of either academic or social integration, past research has also found that integration into both college systems is significantly related to retention. Beil et al. (2000) found that both academic and social integration were strongly related to a student's commitment to their institution, which can directly influence retention. In a more recent study using one institution's data, Woosley & Miller (2009) found that both academic and social integration could predict retention when they were the only variables added to the model. However, when institutional commitment was added, social integration was no longer significant, which suggests that it may be related to retention but not directly. Although social integration was no longer found to have a direct relationship, Woosley & Miller

(2009) stated that social integration influences a student's institutional commitment and their sense of belonging, which can then influence a student's decision to stay or leave college.

Academic integration, on the other hand, has a more direct relationship with retention regardless of institutional commitment.

Furthermore, other studies have also found an important relationship between integration and retention. Leppel (2002) found that all male and female students were more likely to persist the more they were integrated into the social and academic systems of their college. Using the Beginning Postsecondary Students Longitudinal Study, Blecher (2006) also found that academic integration and social integration were two out of six of the variables that had the strongest relationship to 6-year persistence. Therefore, through Tinto's theory and the past research reviewed, it is clear that both academic and social integration can have an influence on student retention. The mixed results of the studies reviewed also demonstrates the importance of future research on integration to understand how it influences different populations of students.

### **Social Integration for Students with Disabilities**

Social integration, through interactions with peers and participating in extracurricular activities, is just as important for influencing retention for students with disabilities as it is for their peers without disabilities. Positive interactions with peers, roommates, and friends has been found to give students with disabilities the support they need to apply and utilize accommodations that help them in the academic setting, as well as to feel connected and a part of their college campus. However, negative interactions with various groups of people can also be detrimental to this population's integration into the higher education system (Hong, 2015; Timmerman & Mulvihill, 2015; Fitchen et al. 2014). As found by Tinto (1975), this can cause students to drop out of college and not persist until graduation. Furthermore, participating in

extracurricular activities can help students feel like a part of their university, which can improve their institutional commitment and retention. It is then clearly important to review the studies that have looked into students with disabilities' interactions with peers and involvement in extracurricular activities and how it relates to their experience in college.

**Peer Perceptions and Relationships.** Tinto (1975) stated that students need to integrate into their institution's social community in order to successfully persist to graduation. Another aspect of this social integration includes students' perceptions of their interactions with peers. Several studies have examined the relationships between students with disabilities and their peers (Hong, 2015; Fitchen et al., 2014, Timmerman & Mulvihill, 2015). Although there have been mixed findings, they are still valuable in understanding the impact peer interactions have on students with disabilities' experiences in higher education. Similar to the relationships between faculty and students, many studies have found that supportive peers and roommates are important for success within higher education for students with disabilities. Furthermore, negative perceptions from peers can impact students' self-value and their choice to share their disability and receive accommodations. These various perceptions can greatly impact a student with disabilities' experience in college, including their persistence and success.

Many students with disabilities face negative perceptions from their non-disabled peers that causes challenges for them to socially integrate into higher education. Past research has found that social stigmatization can be a major stressor for students with disabilities (Hong, 2015). Students often feel that they are resented by their peers for receiving accommodations and "special treatment" from their professors because they do not understand why they need the assistance or their disability. Therefore, many do not tell their friends about their disability or utilize their accommodations because their fear of social stigmatization outweighed their



estimation of the benefits of any help they would receive (Hong, 2015). Without receiving and utilizing accommodations students may not do well or succeed in their classes, which can then greatly influence their retention in their institution. Therefore, it is important that individuals with disabilities feel accepted by their peers both inside and outside the classroom.

Positive experiences with peers and friends can provide students with the support and confidence they need to be successful to be retained in college. Similar to faculty and staff supports, having peers who understand students with disabilities and their impairment is vital to their social integration into their postsecondary institution. Past research has demonstrated that students with disabilities are more successful in college if they have positive experiences with peers, friends, and roommates. These positive experiences with peers often includes assistance in classes and an understanding of the need for their accommodations, which can then lead to retention (Timmerman & Mulvihill, 2015). Studies have also found that campus social alienation from peers is negatively related to students' intent to graduate. Without social alienation and with more positive peer interactions, Fitchen et al. (2014) found that students were more likely to have high intentions and goals of graduating. Therefore, having positive interactions and relationships with peers can help students with disabilities socially integrate into college, which can then influence their retention.

**Involvement in Extracurricular Activities.** Another aspect of social integration is students' involvement in extracurricular activities on their college campus (Tinto, 1975). Along with interacting with peers, involvement in extracurricular activities is important for students in order for them to become a part of their college community to develop a commitment to their institution. Therefore, students can either integrate negatively or positively into the social aspects and activities of their postsecondary institution. This integration then impacts their retention and

success within higher education. However, involvement in extracurricular activities can be a challenge for many students with disabilities depending on their campus, their disability, the activities, and their peers. The added challenge of their disability can also create a barrier for students to be able to actually participate in activities.

Past research has found that a major social barrier for students with disabilities, especially those with visual impairments, was a lack of campus activity participation (Reed & Curtis, 2012). Furthermore, these students sometimes cannot even participate in some extracurricular activities because of a lack of planning and accommodation for disabilities. They also feel that they do not have the same opportunities for extracurricular activities as their non-disabled peers because of their impairment (Reed & Curtis, 2012). So, although these students may want to participate in extracurricular activities, they are not able to because of their disability, as well as the lack of planning by the university and peers to accommodate them. Therefore, many students with disabilities never participate in any social activities on their college campus (Mamiseishvili & Koch, 2011). This could be a major issue for their social integration and retention in higher education. Tinto (1975) found that involvement in extracurricular activities increased a student's commitment to their institution, which can then increase their likelihood of staying in college. It is, thus, important that students with disabilities are able to actually participate in extracurricular activities.

Past research and theories have demonstrated the importance of social integration and support through interactions with peers, as well as participation in extracurricular activities. Positive interactions with peers influences a student's integration into college, which can predict their retention. Support from peers has also been found to assist students with disabilities in college and can impact their experiences. Participation in extracurricular activities also increases

a student's commitment to college as well and has no negative effect on their retention.

However, students with disabilities often do not participate in these activities or cannot due to a lack of accommodation for their impairment. It is clear then that social integration has an impact on students, including those with disabilities, and it is important to examine these variables and their relationship to retention in higher education.

### **Academic Integration for Students with Disabilities**

Within Tinto's Model of Voluntary Student Departure (1975), he also stated that the more students were integrated into the academic system of their institution the less likely they were to drop out. Through the review of studies on integration for the general population, it was also clear that academic integration always has a direct and important relationship with retention. Furthermore, in more recent research, Tinto (2010) found that academic support was highly significant during a student's critical first year of college as well. This academic support often comes from faculty members and a student's relationship with them. However, relationship with faculty can often be different and more important for students with disabilities compared to their non-disabled peers, which can then influence their retention (Barnard et al. 2008; Denhart, 2008; Hong, 2015; Kranke et al., 2013; Thompson-Ebanks, 2014). It is important then to understand how academic integration, through faculty relationships and support, specifically relates to student retention for students with disabilities.

**Faculty Perceptions and Relationships.** Relationships with faculty has been found to be one of the most important aspects of social and academic integration into college, which leads to persistence, degree completion, and success (Walpole, 2003; Umbach & Wawrzynski, 2005). Therefore, several studies have examined the relationship between faculty and students with disabilities (Denhart, 2008; Hong, 2015; Kranke et al., 2013; Thompson-Ebanks, 2014). This has

also been found to be the most common topic in qualitative studies on college students with disabilities (Kutscher and Tuckwiller, 2018). Studies have found that faculty attitudes towards students with disabilities are just as important as any environmental barriers (Barnard et al. 2008). However, many students with disabilities often feel that their higher education professors do not understand them or their disability. This can delay their choice to request accommodations for classes. It also makes it harder for these students to create positive relationships with their professors. Negative faculty perceptions can, thus, lead to lower grades, switching majors, and delayed graduation, as well as cause students to consider dropping out of college (Kranke et al., 2013).

Past research has found that students with disabilities feel that they are greatly misunderstood by their faculty as stupid and lazy individuals who are incapable of being in class (Denhart, 2008). They also often feel that professors do not understand their disabilities and believe they are less capable than their non-disabled peers and, thus, are treated differently (Denhart, 2008; Hong, 2015). Furthermore, students, especially those with learning disabilities, tend to work harder and longer on assignments than their non-disabled peers and peers with other disabilities, but professors are unable to see their potential and misunderstand their intelligence due to their impairment. Some students even reported feeling humiliated and judged in private or public by their professors. Past research has found that the negative attitude and perceptions students with disabilities encounter from their faculty greatly impact their experiences in college, as well as their self-worth and value. The way faculty see them can then become a barrier to students' success and growth, which greatly impacts both their social and academic integration into college (Denhart 2008; Hong, 2015).

Faculty perceptions of students with disabilities has also been found as a specific reason for students to voluntarily withdraw from college, which further demonstrates the importance of faculty and their impact on retention. Not being able to disclose their disability to their professor in fear of being mistreated or embarrassed resulted in students leaving their university because they could not get the assistance they needed. Furthermore, research has shown that students with disabilities were not retained, because they felt inadequate or felt like they did not belong to their university due to marginalization and discrimination by their professors (Thompson-Ebanks, 2014). Therefore, faculty perceptions of a student with disabilities impacts not only their experience in college, but their sense of belonging and can, thus, impact their decision to leave.

Faculty perceptions may even directly impact a student's choice to disclose their disability to their university. Without disclosing their disability, students cannot receive accommodations or assistance from their disability support services office, which can greatly affect their college experience and success. Past research has found that students with disabilities specifically did not disclose their disability, and receive accommodations that could have greatly helped them, because of the fear of what their professors might think (Kranke et al., 2013). Other students felt that once they informed their professors of their accommodations it greatly changed their professors' perceptions of them. Therefore, they then avoided using their accommodations until absolutely necessary or did not use them at all (Hong, 2015). Not receiving or using accommodations can greatly affect students' ability in classes and their GPA, which has been found to influence their retention and increase their chances of dropping out (Abreu et al., 2017).

Having a positive experience with faculty can change a student with disabilities' experience and integration into higher education as well. Students who tend to have positive experiences with their professors are often the ones who actually disclose their disability and

utilize their accommodations (Kranke et al., 2013). Having accepting and understanding professors allows students to feel like they can talk to their professor about their disability without judgement. This then helps students establish better relationships with their faculty, as well as create an environment where they are not worried about utilizing their accommodations. Past research has also found that having faculty mentors can be a substantial benefit to a student with disabilities success in college. These mentors can help students navigate through college, develop self-advocacy skills, and become a positive support so students with disabilities will stay until graduation (Timmerman & Mulvihill, 2015). As positive faculty interactions have been found to be so important, it is a vital support for all students, and especially for those with disabilities to not drop out and stay in college.

### **Other Factors and Student Retention**

#### **College Grade Point-Average**

Tinto (1975) found that college grades were a student's most vital and significant variable in predicting persistence. This has also been found in past research on higher education and students' retention and graduation rates. Students who have a higher GPA in each term and a higher cumulative college GPA are less likely to repeat courses and are more likely to graduate, especially on time (Yeu & Fu, 2016). Raju & Schumacker (2015), using decision tree and logistic regression models found that first-semester college GPA was one of the most important predictors of retention that leads to graduation. Students with a higher GPA had higher graduation rates, while those with a lower GPA had lower graduation rates and a higher chance of dropping out. Furthermore, Westrick et al. (2015) found that college academic performance, measured by GPA, was the strongest predictor of second- and third-year persistence.

Since college GPA is one of the most significant predictors of retention and graduation, there have been a few studies on students with disabilities that investigate GPA and its relationship to retention for this population. Through examining the persistence rates of students with disabilities using the Beginning Postsecondary Students Longitudinal Study, Mamiseishvili & Koch (2011) found that first-year GPA was one of the few variables that significantly related to persistence in their final model. Although their academic integration variable was not a significant predictor, they found that a student's GPA in their first year of college was strongly related to a student persisting to the second year or not. This demonstrates the clear importance of a student's grades in college, especially for those with disabilities. In a more recent study, Herbert et al. (2014) found that for students who were seeking assistance from the Office of Disability Support Services, their college GPA was strongly related to degree completion. After testing three models, GPA was the only variable that was still positively related to graduation with all other variables held constant for students who had a disability and used the Office of Disability Support Services. Therefore, it is clear that GPA is an important predictor of retention leading to graduation for all students, including those with disabilities.

### **Major Field**

Studies have examined the relationship between a student's major choice and their success in higher education. According to Smart & Umbach (2007), John Holland's person-environment fit theory of vocational choice has been used more frequently on studies examining college students' interests, abilities, and attitudes based on their major choice. When applied in the higher education context, Holland's theory states that a person's personality influences their major and career choice based on their patterns of interests, abilities, and attitudes. According to Holland, people can be classified into one of six personality types: artistic, conventional,

enterprising, investigative, realistic, and social (Holland, 1966; Holland, 1997). Within higher education, there are then six academic environments that corresponds to each of the personality types. Furthermore, students will be more satisfied with their educational experience and have more stability and achievement if their personality and major are compatible (Smart & Umbach, 2007).

Past research has also found that family expectations, personal career expectations, and early interests in a certain field can influence students to decide on a certain major (Leppel, 2001; Gandhi-Lee et al., 2017). Leppel (2001) investigated the influence of major on freshmen's persistence from their first year to their second year. She found that, for all students, undecided majors had low persistence and academic performance rates. Female students were more likely to persist to their second year if they were education or health majors, but they had lower persistence rates if they were business majors or in majors that did not have a specific professional outcome. Male students were more likely to persist if they were business majors and less likely to persist if they were education majors (Leppel, 2001). However, Leppel (2001) also found that female business majors and male education majors had some of the highest predicted performance levels. Leppel (2001) concluded that this demonstrates how students do not always leave because of academic performance. Therefore, a student's major can influence retention as much as or even more than their academic achievement.

John et al. (2004) also found that a student's major can influence persistence in college while investigating major and race. They discovered that White students were less likely to persist to their second year if they were undecided or in a social science major compared to other White students. However, African American students who were undecided did not have a significant difference in persistence compared to other African American freshmen. African



American sophomores were more likely to persist if they were in health, business, or engineering and computer science majors. For White students, major became less important for persistence after their freshmen year (John et al., 2004). Therefore, they concluded that African American students placed greater value on majors that could provide them with an economic return after graduation, compared to their White peers, which also influenced their retention. The findings of these theoretical and empirical studies on the relationship between a student's major choice and their experience in higher education demonstrates that this relationship needs to be examined further, especially for students with disabilities.

### **Financial Aid**

Financial or student aid is another aspect of the college experience that many have investigated to understand its relationship with persistence or retention. However, past research has found mixed results. Some studies report that financial aid can impact where students decide to attend college and if they will stay until graduation. Meanwhile, others have found that financial aid may draw students to an institution, but it may not be enough to retain them. Furthermore, there have also been mixed results on whether financial aid has a direct relationship with persistence or not. Some studies have found that financial aid and specific types of aid have a positive influence on persistence, but others have found a negative or non-significant relationship.

Past research has found that lowering the cost of college through grants, financial aid, or loans can have a positive influence on a student's access, persistence, and completion of higher education (Dynarski & Scott-Clayton, 2013). Jackson & Reynolds (2013), using the Beginning Postsecondary Student survey, found that for both African American and White students loans enhanced their persistence and graduation rates. Stewart, Lim, & Kim (2015) also found a direct

relationship between financial aid and persistence. Specifically, first-time students who received loans were more like to persist than those who did not. Greater reliance on loans has been found to have a relationship with higher persistence as well (Gross et al., 2015). However, some researchers have found that certain types of financial aid or loans have a significant influence, while others do not. Using both the Beginning Postsecondary Student survey and the National Postsecondary Student Aid Study, Chen & DesJardins (2010) discovered that subsidized loans had a significant and positive influence on persistence, but unsubsidized loans did not. Furthermore, Jones-White et al. (2013) found that merit aid increased persistence and graduation, while loan aid influenced students to transfer to another institution or to drop out completely.

Although research has demonstrated the positive influence financial aid can have on persistence, many studies have also found that financial aid has a negative or non-significant relationship with persistence. Dowd (2004) discovered that loans may have a positive influence on persistence, but they do not influence degree completion. Therefore, loans may help students persist to their next year but not actually attain the degree in the end. This is especially problematic since students now have to pay back all of these loans without the potentially better job and income they would have received with the degree. Furthermore, Kim (2007) found that low-income first-year students also had a lower chance for degree completion because of their loan debt. Since low-income students are generally the ones to take out need-based loans to enroll in and persist through college, this can be a significant issue. It is clear, from these mixed findings on financial aid, that more research needs to be done in this area, and specifically regarding retention of students with disabilities in higher education. Furthermore, since the past research is inconsistent it is also important to include the amount of each type of aid a student can receive in order to determine the relationship between each aid type and retention.

## **Disability Type**

Many studies examining individuals with disabilities in higher education have specifically looked at the type of disability and its relationship to a student's experience, persistence, and graduation. Investigating only one or two types of a disability gives insight into the experiences of those individuals separate from the whole population. These studies often compared certain groups of disabilities to others, as well, in order to understand if their disability played a role in their college experience. However, every disability and every individual with one is different and it is important to understand their transition and integration into postsecondary education as individuals. Therefore, it is important to review these studies to examine their similarities and differences.

Quite a few studies look specifically at students with non-apparent disabilities. These disabilities often include psychological or mental and learning impairments, which can be very different from apparent disabilities such as physical impairments. Since peers and faculty cannot see these types of disabilities, it is very important to examine their experiences and compare them to students with apparent disabilities and students without disabilities. Research has found that students with non-apparent disabilities often worry what their professors and peers will think about them more often than others because they cannot see or always understand their disability. These students also feared that they will be treated differently because others cannot see their disability and, thus, may not believe they have one (Kranke et al., 2013). This worry and fear gives these students an added stressor that impaired their academic performances to the point where they later needed to ask for classroom accommodations when they did not think they originally needed them.

Furthermore, research has found that there are differences when comparing students with psychological and learning disabilities. Students with psychological disabilities were less likely to graduate than their peers with learning disabilities and had different barriers within college as well (McEwan & Downie, 2013). These barriers stemmed from a lack of experience with the disability and with the disability support system, which is most likely because many psychological disabilities start later in life. Graduation rates for students with non-apparent disabilities have also been found to differ from the rates of those with apparent disabilities. Pingry O'Neill, Markward, & French (2012) found that students with learning disabilities were only half as likely to graduate and students with psychological disabilities were only one-third as likely to graduate compared to those with physical disabilities.

Although many studies have looked at non-apparent disabilities, there is some research on more apparent disabilities. Through this past research, it has been found that students with visual disabilities experience many social and academic integration barriers that differ from their peers with other impairments and without disabilities (Reed & Curtis, 2012). Students with visual impairments face social barriers that include a severe lack of understanding and prejudice from their non-disabled peers. They also often feel that they cannot always contribute to group work with peers in classes or that other students felt this way, which can become a barrier to their academic success. Many of these students are also not always able to participate in extracurricular activities because of their impairment or a lack of accommodations. All of these barriers then lead to feelings of isolation on campus and a lower sense of belonging to their college, which impacts their retention (Reed & Curtis, 2012; Tinto, 1975). Therefore, it is clear that integration is important for all students with disabilities, including those with apparent disabilities.

The differences and similarities these studies highlight among students with specific disabilities demonstrates the importance of understanding their experience and retention in higher education. Examining and comparing their retention as separate groups of different disability types, as well as a combined population of students with disabilities, will provide more insight into who is retained, who is not retained, and why. Past research has demonstrated that those with non-apparent disabilities are more likely to struggle with their academic and social integration. They are also less likely to graduate compared to their peers with apparent disabilities and those without disabilities. However, some students with apparent disabilities, like visual impairments, also struggle to integrate into college. It is clear then that it is vital to investigate what is happening using current data to what factors can predict retention based on integration through a within-group analysis.

### **Limitations of Previous Studies**

There is a lack of studies specifically investigating students with disabilities in postsecondary education. According to Pena (2014), only 1% of articles in top-tier higher education journals are about students with disabilities. This can explain why there were a limited amount of studies to review on their experience and retention in postsecondary institutions. Furthermore, within this small percentage of studies there are significant gaps and limitations in the literature that need to be addressed. First of all, most studies on students with disabilities did not use a national dataset. Instead, some researchers collected qualitative data from a very small sample size (Kranke et al., 2013). Although results from qualitative studies and data can provide an insight into the experiences of students with disabilities, they do not provide predictive findings. Other studies were quantitative and had a bigger sample but were significantly limited in that they collected data from only one university or college (Herbert et al., 2014; Thomas-

Ebanks, 2014). Therefore, none of these studies were able to generalize their results to the entire population of students with disabilities. Understanding the first-year retention rate of this specific minority is important in helping to close the gap within the next few years. This will be especially significant as more students with disabilities continue to enroll in higher education.

There have been a few studies on students with disabilities that used a national dataset, but they have many limitations and gaps within them. One study in particular that examined first-to-second-year persistence of students with disabilities used a national dataset (Mamiseishvili & Koch, 2011). However, this study was completed in 2011 and it is now already nine years old. In 2008, a new law for individuals with disabilities, the ADA Amendments Act, was passed. Mamiseishvili & Koch (2011) used the Beginning Postsecondary Students (BPS) longitudinal survey with the 2004 entering class for their research. Thus, over 15 years later, it is outdated, and has many limitations. For example, their study analyzed data for a smaller population of students with disabilities than is currently enrolled in higher education today. Therefore, a study similar to theirs using a more current population of students with disabilities that started college after the law was passed may have different results.

Another major limitation of past research is that many of the studies on students with disabilities had no comparison group of students without disabilities (Abreu et al., 2017; Herbert et al., 2014; Kranke et al.; Mamiseishvili and Koch, 2011; and Thomas-Ebanks, 2014). It is essential to examine the variables that are related to retention for students with disabilities compared to their non-disabled peers. This would provide normative comparisons and could present further insight into why students with disabilities are or are not being retained in their original institution of higher education. A few of the studies did, however, suggest they would use a comparison group for future research on students with disabilities (Lombardi, Murray, &

Gerdes, 2012 and Mamiseishvili and Koch, 2011). With this study, I aim to fill the gap in understanding the differences and similarities between these two groups.

A final and major limitation of previous research is that many studies only examined one type of disability, such as learning, psychiatric, or non-apparent (Abreu et al., 2017; Kranke et al., 2013), instead of looking at the entire population and then subcategories of the various disabilities. Only investigating the college experience of one type of disability severely limits these studies. They are not able to generalize their results to the entire population of students with disabilities, let alone to the population of students with that specific disability because of the small sample sizes. Understanding the factors that affect retention for this population as a whole and then for groups within the population is highly important. Thus, the results of this study have the potential to inform future education policies and help improve retention rates for the minority, as well as the subgroups within it.

### **Summary**

Individuals with disabilities have come a long way since the passing of Section 504 of the Rehabilitation Act of 1973 and the acts that followed. Since then more and more students with disabilities have been enrolling in postsecondary education. This increase in enrollment, as well as the positive outcomes that can come from a college degree for students and their families, make it important to understand the unique experience of students with disabilities in higher education and the factors that relate to their retention. However, research on this population is limited and the studies that have been done have significant gaps within them. Many past studies did not use a national dataset or had small sample sizes. They also did not use comparison groups of students without disabilities or examined only one or two types of disability. Therefore, more research is needed to examine the retention rates of students with disabilities in higher education.

Tinto's Model of Voluntary Student Departure (1975) and Sanford's Theory of Challenge and Support (1962) demonstrated the importance of certain variables that can predict a student's retention in higher education. Therefore, I have utilized both of these theories within the literature review and for the creation of the conceptual framework used in this study. Pre-college characteristics, social and academic integration, disability type, college GPA, major field, and financial aid are all significantly related to a student either dropping out or staying within their postsecondary institution. This review of the past research has proven the significance of these variables for all students, including those with disabilities. Therefore, it is important to examine retention utilizing these variables to understand their relationship.

Pre-college characteristics include a student's gender, age, race or ethnicity, socioeconomic status, high school academic preparation measured, and college admission scores. This review of the past research has revealed mixed results of how these characteristics influence retention. For example, gender has not always been found to be significant in final models testing retention and persistence. However, in some studies being female has been directly linked to a better chance of retention and graduating college. It has also been found that age can influence retention and the older a student is the less likely they are to stay in college for a variety of reasons. Although race and ethnicity have been investigated for decades, there have been many mixed results on whether these characteristics have a relationship to retention as well. This includes studies specifically on students with disabilities. Socioeconomic status, measured by family income and first-generation status, are additional characteristics that can influence retention, but they do not always do so. These mixed results demonstrate the importance of further investigating their relationship with retention, especially for students with disabilities. High school academic preparation, as measured by GPA, has often been found to be one of the



strongest predictors of retention and is, thus, important to include. Finally, college admissions scores, like the SAT and ACT, have shown mixed results, with studies reporting either significant or non-significant relationships. Therefore, it is important to include these factors within this study as well.

This literature review demonstrated that positively integrating into the social and academic systems at colleges increases the chances of retention for students with and without disabilities. Social integration includes the student's perception of interaction and support with peers, as well as participation in extracurricular activities. Relationships with peers can either have a positive or negative influence on a student's integration and retention in higher education. Participation in extracurricular activities can increase a student's commitment to their college, but those with disabilities are not always able to participate. Furthermore, research has also shown that academic integration, as measured by interactions with faculty, can be a stronger predictor of student retention than social integration. For students with disabilities, having supportive and positive relationships with faculty and staff helps increase their commitment to college. Meanwhile, negative interactions with these stakeholders can ruin a student's college experience so badly that their chances of dropping out increase. Therefore, since social and academic integration are so important for students with and without disabilities it is also important to include these factors within this study for further investigation.

The literature review also demonstrated that there are other factors that can influence a student's retention in higher education, such as college GPA, major field, financial aid, and disability type. College GPA has been found to be one of the most significant predictors of retention. Students with and without disabilities who have a higher GPA are less likely to drop out than their peers with a lower GPA. Furthermore, research on major fields has found that a

student's major choice can influence their experience in higher education. Research on the relationship between retention and financial aid has been mixed. Throughout various studies, loans have been found to increase or decrease a student's chance of retention. Finally, the type of disability has also been found to influence a student's retention in higher education. Research has demonstrated that students with certain disabilities have different college experiences that can influence if they are more likely to graduate or be retained than others. For example, students with apparent disabilities are more likely to graduate compared to those with non-apparent disabilities. Therefore, it is clearly important to further examine how these factors influence the retention of students with and without disabilities in this study.

This literature review has demonstrated how pre-college characteristics, social and academic integration, college GPA, major field, financial aid, and disability type can relate to student retention. Therefore, it is clearly important to examine these variables specifically for students with disabilities to predict their first-year retention rate. The differences and similarities among the different types of disabilities, as well as compared to students without disabilities, highlights the importance of examining and comparing the retention of these populations. The next chapter provides an outline of the methodology and research design. This will include the population, the sample, variables, data analysis, and limitations of this study.

### **CHAPTER III**

## **RESEARCH DESIGN AND METHODOLOGY**

This chapter focuses on the research design and methodology of this study, which includes the population and sample, the data collection instruments, procedures for data analysis, and limitations. First, I state my problem statement, purpose, research questions, and conceptual model. Next, I discuss my rationale for the use of the data sources, population, and sample within this study. Third, I explain and define the variables in my model, which includes how I recode them. Fourth, I discuss the study's research design and analysis, including the variance inflation factor (VIF) values and the missing data within the sample. Finally, I define the limitations of the study.

### **Problem Statement**

Research has demonstrated that the first year in college is critical for students because it paves the way for the rest of their college experience leading to graduation. Furthermore, retention until graduation greatly benefits both students and society as a whole. A 4-year college degree provides individuals with a higher chance of finding a job and earning more in average salary (Leppel, 2002; Newman et al., 2011). This is true for individuals with disabilities as well, who are continuously enrolling in college. However, the retention and graduation rates for this population of students are not the same as the rate for their peers without disabilities. This could be due to the way they integrate in the social and academic systems of college, which has been proven to be an important predictor of retention (Tinto, 1975). Although there are some studies on students with disabilities in higher education, the research on the factors that can predict their retention, like social and academic integration, is limited.

## **Purpose**

Using a national dataset, the main purpose of this study was to examine the relationship between a student's disability type and their first-year retention, as well as determine what factors may contribute to their retention. Furthermore, this study was also conducted to determine whether having a disability or not, and whether positive social and academic integration influences a student's retention to their second year of college.

## **Research Questions**

This study answered the following questions:

1. Among students with disabilities, how is disability type related to first-year retention?
2. Do the types of academic and social integration matter in predicting first-year retention among students with disabilities?
3. How do various factors contribute to student retention when comparing students with and without disabilities? In particular, do positive social and academic integration activities relate to first-year student retention differently across the two student populations?

## **Conceptual Model**

The following conceptual model (Figure 3-1) based on the theoretical framework and literature review of student retention in higher education guided this study. The model demonstrates a hypothetical relationship for how pre-college characteristics (gender, age, race/ethnicity, SES, high school grade-point average, and SAT/ACT scores), disability type, academic integration (interactions with faculty, satisfaction with studies, and academic confidence), social integration (interactions with peers and participation in extracurricular activities), college GPA, major field, and financial aid may predict a student's first-year retention rate.

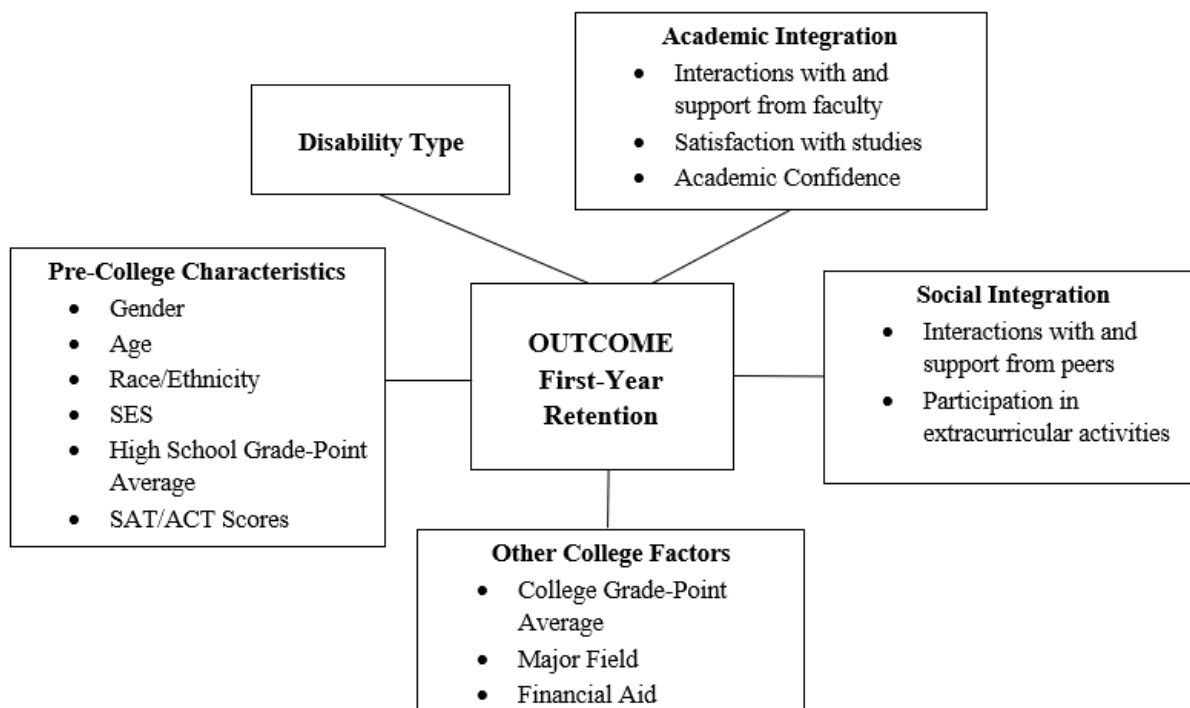


Figure 3-1. Conceptual Model

## Data Source and Sample

### Beginning Postsecondary Students Longitudinal Study

The Beginning Postsecondary Students Longitudinal Study (BPS) from the National Center for Education Statistics (NCES) was used for this quantitative study. BPS is one of many NCES surveys first created in 1990 to develop nationally representative data that answers education and policy issues. According to NCES, “the study collects data on student persistence in, and completion of, postsecondary education programs, their transition to employment, demographic characteristics, and changes over time in their goals, marital status, income, and debt, among other indicators” (NCES: About BPS, n.d., para 1). BPS surveys students during their path throughout higher education, which includes surveying them at the end of their first, third, and sixth year. It helps to answer many questions about why students drop out, persist, are retained, or complete college, as well as specific questions about their experience in higher education.

The cohort of students in the most recent Beginning Postsecondary Students Longitudinal Study was the data utilized for this study. BPS creates its cohort from the National Postsecondary Aid Study (NPSAS), which collects a large nationally representative sample of postsecondary students and institutions for financial data. The latest BPS survey includes students who first started their postsecondary education during the 2011-2012 academic year. They then surveyed them again in 2014 and 2017. Although the data for the last survey in 2017 is available, only the first two surveys were used for this analysis. This specific cohort includes 24,770 first-time beginning students from over 7,000 2-year and 4-year institutions. To be included in the cohort, students needed to be enrolled in an eligible institution in the United States.

I decided to use the BPS Longitudinal Study, instead of other nationally based surveys, for a number of reasons. First, the latest BPS survey includes about 25,000 students from institutions all over the United States. This large population size provided me with enough students with disabilities to include within the sample to compare to the general student body. The large sample also had enough variation within disability type in order to compare different student disability types and their retention rates in higher education. I was able to generalize my results to the students and institutions throughout the United States as well. Furthermore, the survey asks students if they have a specific type of disability during their first year in college. This provided a sample of students who have a disability that may have developed earlier or later on in life. This is different from other national surveys, such as the Educational Longitudinal Survey which asks parents if their 10th grader has a disability and, thus, does not include individuals whose disability may have developed after that time period. Therefore, BPS provides more comprehensive survey data for studying students with disabilities.

Second, using the BPS Longitudinal Study helped me examine student retention and the factors that predict retention for students with disabilities. BPS includes many pre-college characteristics, social and academic integration, and retention variables used in this study. The survey allowed the use of these various variables in the analysis for the different comparison groups. Furthermore, according to Hill et al. (2016), “the primary purpose of BPS is to contribute to a better understanding of how these factors relate to three key postsecondary outcomes: persistence, degree attainment, and employment” (p. 25). BPS has been used numerous times for other retention or persistence studies, as well as specifically for students with disabilities (Mamiseishvili & Koch, 2011). Therefore, BPS was the best survey to use to examine the first-year retention rate of students with disabilities.

In 2016, before the third wave of interviews, NCES evaluated the methodology and data procedures of the BPS Longitudinal Study (Hill et al., 2016). Through this report, they thoroughly explained the sample design, interview design and data collection, administrative data sources, data file processing and preparation, and weighting and variance estimation. NCES also stated that they used many quality control procedures throughout the student interview data collection to ensure reliability. These “included frequent monitoring of recorded interviews, a help desk to assist sample members who had questions about the study or completion of the web interview, quality circle meetings to facilitate communication among staff members, and debriefing meetings to identify areas of success and potential improvement” (Hill et al., 2016, p. 42-43). The BPS staff also processed the data collected using procedures similar to previous NCES studies, and executed various examinations and quality control checks. This included examining all variables with missing data and substitution of specific values (Hill et al., 2016).

Therefore, the data procedures, collection, and analysis of the BPS was validated and demonstrated to be reliable by NCES.

### **Population and Sample**

The target samples for this study included first-time beginning students with disabilities and first-time beginning students without disabilities attending 4-year public or private bachelor-degree granting institutions in the United States. Since I used the BPS 12/14 survey, the samples included students who started in the 2011-2012 academic year. According to NCES, 24,770 students responded to the BPS Longitudinal Study. Out of all of these responses, 14,220 degree-seeking students started at a 4-year institution in 2011-2012. Furthermore, 90.18% of those enrolled in a 4-year institution stated that they did not have a long-term disability or condition. A long-term disability or condition includes hearing impairments, blindness or vision impairments, a disability that substantially limits one or more basic physical activities, difficulty concentrating, remembering, or making decisions, and learning disabilities. Meanwhile, 9.82% of students in 4-year institutions stated that they did have a long-term disability or condition: 2.31% were enrolled in public 4-year institutions, 2.09% in private not-for-profit institutions, and 5.42% in private for-profit institutions.

According to the NCES report “Fast Facts” (2016), 11% of students enrolled in postsecondary institutions have a disability. Therefore, the sample from the BPS Longitudinal Study was fairly representative to the current population of students with self-identified disabilities. There has also been an increase of enrollment of students with disabilities since the previous BPS survey that was first administered in 2003-2004. In 2003, only about 8% of students enrolled in a 4-year postsecondary institution self-identified as having a disability



(Aquino, 2016). Therefore, there has been a 1.8% increase of students with a disability at 4-year public and private institutions.

Furthermore, within the sample of students with disabilities there are sub-samples or sub-groups of students with different disabilities. Table 3-1 breaks down the percentages of these different types of disabilities that students reported. However, it is important to keep in mind that this table only includes students who stated they have a disability on the survey and are enrolled in a 4-year institution.

**Table 3-1**  
*(Disability Types of Students in 4-year Institutions)*

<b>Disability Type</b>	<b>Percentage of Students</b>
Hearing Impairment	5.27%
Blind or Vision Impairment	4.65%
Speech or Language Impairment	0.72%
Orthopedic or Mobility Impairment	7.08%
Specific Learning Disability or Dyslexia	6.58%
Attention Deficit Disorder (ADD)	19.53%
Health Impairment or Problem	3.00%
Mental, Emotional, or Psychiatric Condition	12.73%
Depression	18.53%
Developmental Disability	0.93%
Brain Injury	2.29%
Other	18.24%
SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).	

The different disability types were then combined into four groups because the sub-group percentages were too small within the 9.82% of students with disabilities. Since the literature demonstrated the significant differences between apparent and non-apparent disabilities, as well as the significant variances within the types of non-apparent disabilities including learning and psychological disabilities, I used those as the sub-population groups. Apparent disabilities, which 19.13% of students with disabilities have, included hearing, blindness/visual impairment,

speech/language impairment, orthopedic/mobility impairment, and developmental disability. Non-apparent learning disabilities, which 28.44% of the students with disabilities have, included learning disability/dyslexia, Attention Deficit Disorder, brain injury, and developmental disability. Non-apparent psychological disabilities, which 31.23% of the students with disabilities have, included mental/emotional/psychiatric condition and depression. Finally, other disabilities, which 21.20% of the students with disabilities have, included health impairment or problem, and other. Health impairment, which is different than psychological disabilities, includes chronic or acute health issues such as Lupus or epilepsy. Since a disability due to a health condition can be apparent or non-apparent, it is included in the other category.

## **Variables**

### **Dependent Variable**

**First-Year Retention.** Retention refers to students continuing their education in the same institution in which they originally enrolled (Renn & Reason, 2013). It has been found that retaining to the second year leads to a better chance of graduating with a college degree, which can increase an individual's employment and earnings (Horn & Carroll, 1998; Leppel, 2002). Retention is, thus, an important outcome variable to examine for various groups of students. The literature review demonstrated that certain factors, like positive social and academic integration and goals and commitments, can have a positive relationship with retention for students with disabilities (Denhart, 2008; Hong, 2015; Kranke et al., 2013; Thompson-Ebanks, 2014; Timmerman & Mulvihill, 2015; Reed & Curtis, 2012; Fitchen et al., 2014; Herbert et al., 2014). It also demonstrated that a type of disability can have an impact on student retention in higher education (Kranke et al., 2013; McEwan & Downie, 2013; Pingry O'Neill, Markward, & French, 2012).

The outcome variable highlights students' retention into their second year of college, which is the 2012-2013 academic year. To measure first-year retention, a survey question from the BPS Longitudinal Study that asked about retention at the first institution attended was identified and used for this study. Table 3-2 explains the first-year retention variable.

**Table 3-2**  
*(Dependent Variable for the Model)*

Variable	Definition
First-Year Retention  BPS: PROUTF2	A categorical variable measured by the student's response to if they received a degree or certificate, were still enrolled, not enrolled, transferred, or left without return at the first institution attended in 2012-2013. The variable was recoded into a dummy coded dichotomous variable of 1 for <b>retained</b> (attained a bachelor's degree; attained associate degree; attained certificate; and no degree, still enrolled) and 0 for <b>not retained</b> (no degree, not enrolled; no degree, transferred; and no degree, left without return).

### Independent Variables

Based on the past literature, many factors have been found to predict a student's retention within postsecondary education. Therefore, multiple independent variables were included within this study to analyze how they are related to students with and without disabilities first-year retention in 4-year institutions. These variables include pre-college characteristics (gender, age, race/ethnicity, SES, high school grade-point average, and SAT/ACT scores), disability type, academic integration (interactions with faculty, satisfaction with studies, and academic confidence), social integration (interactions with and support from peers, satisfaction with social experience, and feelings of belonging), and other college factors (college GPA, major field, and financial aid).

**Pre-College Characteristics.** Past research has found that certain factors, such as pre-college characteristics, financial issues, institutional characteristics, parents' background,

socioeconomic status, and more, can contribute to student retention in higher education (Bean, 1980, 1982; Bean & Metzner, 1985; Berger et al., 2012; Habley et al., 2012; Pascarella & Terenzini, 1980; Spady, 1970, 1971; Tinto, 1975, 1993, 2006). Based on the theoretical framework and literature review, I have included several of these variables in the study. Therefore, a student's pre-college characteristics, such as gender, age, race/ethnicity, socioeconomic status, pre-academic preparation measured by high school GPA, and SAT and ACT scores, are important to examine and include in the analysis. Table 3-3 explains these pre-college characteristics and definitions.

**Table 3-3**  
(*Independent Variables for the Model: Pre-College Characteristics*)

<b>Variable</b>	<b>Definition</b>
Gender BPS: GENDER	A dummy coded dichotomous variable measured by the student's gender as either female or male. <b>Male</b> was recoded as 0 and <b>female</b> was recoded as 1.
Age BPS: AGE	A continuous variable that was dummy coded into a dummy dichotomous variable. Ages 18-23 were recoded as 1 for <b>traditional aged student</b> and ages 24 and older were recoded as 0 for <b>non-traditional aged student</b> .
Race/Ethnicity BPS: RACE	A categorical variable measured by the student's race/ethnicity. BPS has seven categories (American Indian/Alaska Native, Asian, Black/African American, Hispanic/Latino, More than one race, Native Hawaiian/other Pacific Islander, and White) that were recoded into five dummy coded dichotomous variables of <b>Asian</b> , <b>Black/African American</b> , <b>Hispanic/Latino</b> , <b>Other</b> (American/Indian/Alaska Native, more than one race, and Native Hawaiian/Other Pacific Islander), and <b>White</b> . A race coding of White was the reference group.
Socioeconomic Status BPS: INCGRP	A categorical variable measured by the student's income group. BPS has four categories (low, low middle, high middle, and high) that were recoded into three dummy coded dichotomous variables of <b>low</b> , <b>middle</b> (low middle and high middle), and <b>high</b> . A SES coding of high was the reference group.
High School GPA BPS: HSGPA	A categorical variable measured by the student's high school GPA. BPS has seven categories that were recoded into one dummy coded dichotomous variable. GPA categories of 2.4 or lower contain grades

	from D- to B- and GPA categories of 2.5 or higher contained grades from B- to A. Since a grade of B- or higher is usually considered good in high school, a GPA of 2.5 to 4.0 was recoded as 0 for <b>high HS GPA</b> . Meanwhile, a GPA of 0.5 to 2.4 was recoded as 1 for <b>low HS GPA</b> .
SAT Scores BPS: TESATDER	A continuous variable indicating the student's SAT 1 combined score, obtained from the combined SAT 1 verbal and math scores or the ACT composite score, which was converted to an estimated SAT score.

**Disability Type.** Disability type has been linked to a student's success in higher education for both students with apparent and non-apparent disabilities. Studies have found that students with non-apparent disabilities, such as learning, cognitive, and psychological, are less likely to graduate than those with apparent disabilities (Pingry O'Neill, Markward, & French, 2012). This is often because faculty, staff, and peers cannot see their disability so they do not always believe that the student has one, which can then affect their integration and experience in higher education (Kranke et al., 2013). Studies have also looked at specific types of disabilities within apparent and non- apparent because it is important to understand the individual experiences and success in higher education for each type. Within non-apparent disabilities, those with psychological disabilities are less likely to graduate than those with learning disabilities (McEwan & Downie, 2013) and only one-third as likely to graduate as those with physical disabilities (Pingry O'Neill, Markward, & French, 2012). These studies found that this lower success rate was often because students with psychological disabilities had different barriers than those with learning and other more apparent disabilities. Therefore, it is important to further examine the retention of students with learning and psychological disabilities separately in order to understand what helps their retention.

Past research has also examined students with specific apparent disabilities. Studies have found that students with apparent disabilities may experience more social and academic

integration barriers compared to their peers with different disabilities and those without (Reed & Curtis, 2012). These barriers then led to feelings of isolation and a lower sense of belonging, which can lead to lower retention rates. This demonstrates that it is important to not only understand the retention of students with non-apparent disabilities, but those with apparent disabilities as well. Furthermore, based on this past research it is important to code the variables separately in order to examine the integration and retention of the various disability types. Since these previous studies have demonstrated the differences between learning and psychological disabilities, I coded these two non-apparent disability types separately so I could examine the retention rates of each group. I also coded the apparent disabilities separate from the non-apparent as well. This allowed the evaluation of each group's retention, as well as the creation of more equal sample sizes. Therefore, the disability variables have been coded into four different sub-groups of apparent disabilities, non-apparent learning disabilities, non-apparent psychological disabilities, and other disabilities.

It is also important to note that these are self-identified disabilities, which means that students identified on BPS that they have the disability and no information has been supplied by their institution. Unlike in the K-12 sector, students in higher education must self-identify as an individual with a disability and supply the appropriate documentation that details how their disability impacts a major life activity. Students are not required to self-identify, but they must do so in order to receive reasonable accommodations from their university's Office of Disability Services. However, self-identifying as having a disability on the BPS survey does not mean that these individuals have also self-identified with their institution's office of disabilities. These students may not be receiving any accommodations or support from their university. Table 3-4 explains these independent variables including the different disability types and their definitions.

**Table 3-4**  
*(Independent Variables for the Model: Disability Type)*

<b>Variable</b>	<b>Definition</b>
Disability  BPS: DISTYPES	A categorical variable that indicates a student's main type of disability or impairment. BPS has twelve categories that include: hearing impairment, blindness or visual impairment, speech or language impairment, orthopedic or mobility impairment, specific learning disability or Dyslexia, Attention Deficit Disorder (ADD), health impairment or problem, mental emotional, psychiatric condition, depression, developmental disability, brain injury, or other. This variable was recoded into a dummy coded dichotomous variable of having a disability or not. All twelve disability categories were recoded as 1 for <b>disability</b> .
Disability Groups  BPS: DISTYPES	A categorical variable that indicates a student's main type of disability or impairment. BPS has twelve categories that include: hearing impairment, blindness or visual impairment, speech or language impairment, orthopedic or mobility impairment, specific learning disability or Dyslexia, Attention Deficit Disorder (ADD), health impairment or problem, mental emotional, psychiatric condition, depression, developmental disability, brain injury, or other. This variable was recoded into four dummy coded dichotomous variables including <b>apparent disabilities</b> (hearing impairment, blindness or visual impairment, speech or language impairment, orthopedic or mobility impairment, and developmental disability), <b>non-apparent learning disabilities</b> (specific learning disability or Dyslexia, Attention Deficit Disorder (ADD), brain injury, or developmental), <b>non-apparent psychological disabilities</b> (mental emotional, psychiatric condition, and depression), and <b>other disabilities</b> (health impairment or problem and other). Other disabilities was the reference group.

**Social Integration.** In order to successfully be retained in higher education, students need to positively integrate into their social system at college (Blecher, 2006; Jones 2010; Leppel, 2002; Tinto, 1975; Woosley & Miller, 2009). Students' social integration is often defined by the perceptions of their interactions with peers and friends at college. It also includes students' involvement in extracurricular activities and their satisfaction with their social environment (Tinto, 1975). Furthermore, support from friends and peers has been found to be important for a student's development and success in higher education (Sanford, 1962). Social integration has also been found to be important for students with disabilities (Hong, 2015;

Fitchen et al., 2014; Reed & Curtis, 2012; Mamiseishvili & Koch, 2011; Timmerman & Mulvihill, 2015). These factors are, thus, important in predicting a student's retention in higher education and needed to be included within this study.

However, BPS no longer has a social integration index variable in their latest survey. Their original social integration variable in the 2004 dataset was a continuous variable derived from the average of how often a student had attended fine arts activities, participated in school clubs, or participated in intramural or varsity sports. None of these types of social integration factors are in the current BPS dataset. Therefore, I used new variables in the current BPS dataset that demonstrated social integration. These were the variables that best matched what was found in the literature review on social integration.

Although there is no variable for involvement in extracurricular activities in the BPS variables available, the "feeling like a part of the institution" and "satisfaction with social experience" variables were used instead. When students participate in extracurricular activities, they often feel like a part of their university and have a better social experience, which means they are more likely to commit to their institution (Tinto, 1975). Furthermore, students with disabilities often have the difficulty of not feeling like they are part of their university, are not able to participate in extracurricular activities, or have a negative social experience due to their impairment, which can influence their retention and success in higher education (Reed & Curtis, 2012; Mamiseishvili & Koch, 2011). Interactions with peers have also been found to be important for all students' retention, including those with disabilities (Hong, 2015; Timmerman & Mulvihill, 2015; Tinto, 1975). Furthermore, past research and theories have demonstrated that support from college peers can influence a student's development and, thus, success in higher education (Sanford, 1962).



All of the independent variables used for social integration were based on a 5-point Likert scale that ranged from “strongly disagree” to “strongly agree,” with “neither agree nor disagree” in the middle. All “strongly agree” and “agree” answers were coded as positive responses, “neither agree nor disagree” was coded as neutral responses, and all “disagree” and “strongly disagree” were coded as negative responses. Since the literature demonstrated that being integrated into the social construct of college and interacting with peers was better for retention, it made the most sense to code both of the agree responses as positive and both of the disagree responses as negative. Furthermore, the support from peers variable specifically asked if students’ peers encouraged them to stay in college and, thus, the positive nature of this question further demonstrated why it made sense to code the response as positive or negative. I kept the “neither agree nor disagree” answer as neutral since students may have not had any experience with that type of social integration yet, but it is still important to not discredit their response.

Students also had the option of choosing different answers for each question and did not always choose the same Likert point for each question. Therefore, they could have strongly agreed with having peer interactions, but strongly disagreed with their satisfaction with the social experience while also stating that they had neutral feelings of belonging. Due to the nature of the possible answer choices being different, it was not plausible to combine the variables into positive, neutral, and negative social integration variables. Furthermore, previous studies have already examined how social integration as a whole can predict student retention using the BPS dataset (Aquino, 2016; Mamiseishvili & Koch, 2011). It is important to now examine how these different social integration variables can predict retention for students with disabilities as separate variables. Table 3-5 explains these independent variables including social integration and their definitions.

**Table 3-5**  
*(Independent Variables for the Model: Social Integration)*

<b>Variable</b>	<b>Definition</b>
<p>Felt like a part of the institution</p> <p>BPS: BELONG</p>	<p>A categorical variable measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) that asks students whether they felt like a part of the institution in 2012. The variable was recoded into three dummy dichotomous variables of <b>negative feelings of belonging</b> (strongly disagree and somewhat disagree), <b>neutral feelings of belonging</b> (neither disagree or agree), and <b>positive feelings of belonging</b> (somewhat agree and strongly agree). The variable “negative feelings of belonging” was the reference group.</p>
<p>Satisfaction with social experiences</p> <p>BPS: SOCSATIS</p>	<p>A categorical variable measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) that asks students whether they had satisfaction with social experiences in 2012. The variable was recoded into three dummy dichotomous variables of <b>not satisfied with social experience</b> (strongly disagree and somewhat disagree), <b>neutral satisfaction with social experience</b> (neither disagree or agree), and <b>positive satisfaction with social experience</b> (somewhat agree and strongly agree). The variable “negative satisfaction with social experience” was the reference group.</p>
<p>Student/Peer Interactions</p> <p>BPS: PEERINT</p>	<p>A categorical variable measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) that asks students whether they had any other student interactions in 2012. The variable was recoded into three dummy dichotomous variables of <b>no peer interaction</b> (strongly disagree and somewhat disagree), <b>neutral peer interaction</b> (neither disagree or agree), and <b>high peer interaction</b> (somewhat agree and strongly agree). The variable “no peer interaction” was the reference group.</p>
<p>Support from college peers</p> <p>BPS: FSSUPP12</p>	<p>A categorical variable measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) that asks students whether their friends from college encouraged them to stay in college. The variable was recoded into three dummy dichotomous variables of <b>negative peer support</b> (strongly disagree and somewhat disagree), <b>neutral peer support</b> (neither disagree or agree), and <b>positive peer support</b> (somewhat agree and strongly agree). The variable “negative peer support” was the reference group.</p>

**Academic Integration.** Similar to social integration, in order for a student to successfully be retained in higher education they need to positively integrate into their academic system at

their college (Bleecher, 2006; Ishitani, 2016; Leppel, 2002; Tinto, 1975; Tinto, 2010; Woosley & Miller, 2009). This includes interacting with faculty outside of class and building a positive relationship with them. Support from faculty has also been found to specifically help students with disabilities (Denhart, 2008; Hong, 2015; Thompson-Ebanks, 2014; Kranke et al., 2013; Abreu et al., 2017). Tinto (1975) also found that a student's intellectual development and valuing a college education through the idea of gaining knowledge was also significant in predicting retention. Unfortunately, students with disabilities do not always feel that they are intellectually capable of being in college once they start taking classes, which can greatly hinder their success and retention (Denhart, 2008; Thompson-Ebanks, 2014). Furthermore, academic integration has often been found to be more important in predicting retention than social integration for all students (Munro, 1981; Ishitani, 2016; Jones, 2010). It is important to understand the relationship between academic integration and student retention.

However, BPS no longer has an academic integration index variable in their latest survey. Their original academic integration variable in the 2004 dataset was a continuous variable derived from the average of how often a student participated in study groups, met with an academic advisor, talked with faculty about academic matters outside of class, and had social interactions with faculty. The only similar academic integration variable in the 2012 BPS dataset is faculty interactions, but in the 2004 dataset all of the faculty interaction variables were based on informal meetings. Therefore, I used new variables in the current BPS dataset that demonstrated academic integration. These variables were the ones that best matched what was found in the literature review on academic integration.

Since interactions and relationships with faculty have been found to be so important for all students, including those with disabilities, it is significant to include such a variable to

examine academic integration. However, intellectual development is harder to determine using variables within a secondary data source. Instead, I used the variables “satisfaction with studies” and “academic confidence.” Since intellectual development has been found to demonstrate whether a student values their college education through their confidence in gaining knowledge, it makes sense to include whether a student was satisfied with their studies or not (Tinto, 1975). A student’s latest “academic confidence” in 2012 can also indicate their intellectual development through their confidence in their knowledge and, thus, predict retention.

All of the independent variables used for academic integration were based on a 5-point Likert scale that ranged from “strongly disagree” to “strongly agree,” with “neither agree nor disagree” in the middle. All “strongly agree” and “agree” answers were coded as positive responses, “neither agree nor disagree” was coded as a neutral response, and all “disagree” and “strongly disagree” were coded as negative responses. Since the literature demonstrated that being integrated into the academic construct of college and interacting with faculty was better for retention, it made the most sense to code both of the “agree” responses as positive and both of the “disagree” responses as negative. Furthermore, the academic confidence variable specifically asked about their self-assurance in their academic success and, thus, the positive nature of this question further demonstrated why it made sense to code it as positive or negative. I kept the “neither agree nor disagree” answer as neutral since students may have not had any experience with that type of academic integration yet, but it is still important to not discredit their response.

Students also had the option of choosing different answers for each question and did not always choose the same Likert point for each question. Therefore, they could have strongly agreed with having faculty interactions, but strongly disagreed with confidence in their academic success while also stating that they had neutral feelings of satisfaction with their studies. Due to

the nature of the possible responses being different, it was not plausible to combine the variables into positive, neutral, and negative social integration variables. Furthermore, previous studies have already examined how academic integration as a whole can predict student retention using the BPS dataset (Aquino, 2016; Mamiseishvili & Koch, 2011). I will now examine how these different academic integration variables can predict retention for students with disabilities as separate variables. Table 3-6 explains these independent variables including academic integration and their definitions.

**Table 3-6**  
*(Independent Variables for the Model: Academic Integration)*

Variable	Definition
Faculty Interactions BPS: FACULTY	A categorical variable measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) that asks students whether they had any faculty interactions in 2012. The variable was recoded into three dummy dichotomous variables of <b>no faculty interaction</b> (strongly disagree and somewhat disagree), <b>neutral faculty interaction</b> (neither disagree or agree), and <b>high faculty interaction</b> (somewhat agree and strongly agree). The variable “no faculty interaction” was the reference group.
Satisfaction with studies BPS: ACDSATIS	A categorical variable measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) that asks students about their satisfaction with their studies. The variable was recoded into three dummy dichotomous variables of <b>not satisfied with studies</b> (strongly disagree and somewhat disagree), <b>neutral satisfaction with studies</b> (neither disagree or agree), and <b>satisfied with studies</b> (somewhat agree and strongly agree). The variable “not satisfied with studies” was the reference group.
Academic Confidence BPS: CURCONF	A categorical variable measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) that asks students about their confidence in academic success in 2012. The variable was recoded into three dummy dichotomous variables of <b>low academic confidence</b> (strongly disagree and somewhat disagree), <b>neutral academic confidence</b> (neither disagree or agree), and <b>high academic confidence</b> (somewhat agree and strongly agree). The variable “low academic confidence” was the reference group.

**Other College Factors.** The last three factors associated with a student's experience in college that can influence their retention are cumulative GPA, major field, and financial aid. Tinto found that the most significant predictor of retention was a student's GPA. This was also found in many previous studies on the general population as well as those that focused particularly on students with disabilities (Yeu & Fu, 2016; Raju & Schumacker, 2015; Westrick et al., 2015; Herbert et al., 2014; Mamiseishvili & Koch, 2011). Major field has been found to influence retention as well. Students in certain majors are more likely to persist than others, especially based on gender and race and ethnicity (Leppel, 2001; John et al., 2004). Furthermore, since a student is more likely to have a better college experience if their personality is compatible with their major choice, this variable has been coded based on Holland's Theory (1966, 1997) used in a study by Smart & Umbach (2007). Utilizing four out of the six personality types in their own study, Smart & Umbach (2007) found that academic environments influence a student's progress in college "because of the distinctive attitudes, interests, and competencies that are reinforced and rewarded by faculty members in the respective academic departments" (p. 191). Since support from faculty is important for students with disabilities, major choice has, thus, been coded into five different categories based on these four personality types of investigative, social, artistic, and enterprising, as well as other majors.

Financial aid is another factor that has been found to have mixed results on whether it influences retention or not. Some studies have found that financial aid, and specifically subsidized loans, have a significant and positive influence on persistence (Stewart, Lim, & Kim, 2015; Chen & DesJardins, 2010). Meanwhile, other research has found a non-significant or negative influence from unsubsidized loans (Dowd, 2004; Kim, 2007). Since the different types of loans have had various influences on retention, it was also important to include each type of

loan in the analysis. Furthermore, it is significant to investigate the relationship all of these factors have on retention for students with disabilities. Table 3-7 explains these independent variables and their definitions.

**Table 3-7**  
(Independent Variables for the Model: Other College Factors)

Variable	Definition
Cumulative Grade-Point Average  BPS: GPA	A continuous variable that indicates a student's cumulative GPA during their first year in college in the 2011-2012 academic year. This variable was normalized on a 4.0 scale.
Major Field  BPS: MAJORS23	<p>A categorical variable that indicates the student's major or field of study in 2011-2012. BPS has 24 categories that includes Undecided; Computer and information sciences; Engineering and engineering technology; Biological and physical science, science tech; Mathematics; Agriculture and natural resources; General studies and other; Social sciences; Psychology; Humanities; History; Personal and consumer services; Manufacturing, construction, repair, transportation; Military technology and protective services; Health care fields; Business; Education; Architecture; Communications; Public administration and human services; Design and applied arts; Law and legal studies; Library sciences; and Theology and religious vocations.</p> <p>The variable was recoded into 5 dummy dichotomous variables based on Holland's Person-Fit Theory. The re-coded variables were <b>investigative majors</b> (Computer and information sciences, Engineering and engineering technology, Biological and physical science, science tech, Mathematics, and Military technology and protective services), <b>artistic majors</b> (Humanities, Design and applied arts, and Architecture), <b>social majors</b> (Social sciences, Psychology, History, Personal and consumer services, Health care fields, Education, Library sciences, and Theology and religious vocations), <b>enterprising majors</b> (Business, Communications, Public administration and human services, and Law and legal studies), and <b>other majors</b> (General studies and other, Undecided, Agriculture and natural resources, and Manufacturing, construction, repair, transportation). The variable "social majors" was the reference group.</p>
Financial Aid: Direct Loans  BPS: STSUB12	A continuous variable that indicates the amount of Direct Subsidized Loans a student received during the 2011-2012 academic year. The variable was log transformed.

Financial Aid: Direct Loans  BPS: STUNS12	A continuous variable that indicates the amount of Direct Unsubsidized Loans a student received during the 2011-2012 academic year. The variable was log transformed.
Financial Aid: Federal  BPS: TFEDWRK	A continuous variable that indicates the total amount of federal work-study a student received during the 2011-2012 academic year. This variable was log transformed.
Financial Aid: Federal Grants  BPS: PELL12	A continuous variable that indicates the amount of Pell grant funds a student received during the 2011-2012 academic year. The variable was log transformed.

### **Research Design**

The purpose of this study was to investigate whether social and academic integration factors are related to the first-year retention rate of students with disabilities compared to their peers without disabilities and compared to within disability type, while controlling for other factors. Therefore, this study utilized a quantitative, logistic regression design to examine the relationship between retention and social and academic integration factors, as well as disability type, from the BPS Longitudinal Study. The main purpose for using a logistic regression research design is to describe and test “hypotheses about relationships between a categorical outcome variable and one or more categorical or continuous predictor variables” (Peng, Lee, & Ingersoll, 2002, p. 4). Since the outcome variable of this study was a dichotomous categorical variable of whether or not a student was retained in their first institution, I used this analysis for all three of the research questions.

### **Data Analysis**

Before conducting descriptive statistics (frequencies) and using inferential statistics (logistic regression with fixed effects) to answer the three research questions, I needed to



implement data management. This included data recoding and handling missing data. First, I recoded some of the variables in the study, which includes the dependent variable, the control variables, and the independent variables, to create dichotomous categorical variables for each variable I mentioned in the previous section. Before and after recoding the variables, I also ran descriptive statistics to ensure that I correctly recoded the variables. Next, I log transformed the financial aid variables that included the direct subsidized and unsubsidized loans, federal work-study, and Pell grant funds. It is important to log transform any continuous variables that may have a skewed distribution, such as those involving money. I also normalized the college GPA variable on a 4.0 scale. Since the original college GPA was on a 400-point scale, I divided the GPA variable by 100 to create a new GPA variable on the 4.0 scale. Finally, I ran a test on the variance inflation factor (VIF) values to check for multicollinearity. Since I included multiple predictors in the models, it was important to check for multicollinearity because predictors that are highly correlated can cause issues in predicting the regression coefficients.

Table 3-8 presents the variance inflation factor (VIF) values for all of the predictor values. If a VIF value is 10 or higher, then multicollinearity can be a problem with predicting the regression coefficients. Table 4-5 demonstrates that the VIF values for the predictor variables used in this study ranged from 1.05 to 4.45. Therefore, there are no multicollinearity problems within this dataset, since all of the VIF values of the variables are below 10. This means that none of the variables within this study are highly correlated with each other. Therefore, none of these variables will impact the logistic regression analysis.

Three correlations were also run in order to further ensure that certain sets of variables were not highly correlated with each other. This analysis also helped to explain if any of the variables within certain groups were measuring the same factor. The more closely a correlation

approaches 1.0, the stronger the relationship, and a correlation of 1.0 demonstrates a perfect relationship between the two variables (Witte & Witte, 2015). A correlation of 0 demonstrates no correlation and a correlation below 0.29 is usually considered a low degree of correlation. Meanwhile, a correlation between 0.30 and 0.49 is often considered a moderate degree of correlation and a correlation above 0.50 is usually considered a high correlation. Therefore, a correlation was conducted for the social integration variables, the academic integration variables, and the financial aid variables with the weight included for each.

All three correlation matrices demonstrated that there were no major issues with multicollinearity for these three sets of variables. For the social integration and academic integration variables, all the correlations were below 0.8. Most of the social integration variables had no degree or a low degree of correlation, only 14 had a moderate degree of correlation, and 8 had a high degree of correlation. Most of the academic integration variables also had a low degree of correlation, only 12 had a moderate degree of correlation, and 5 had a high degree of correlation. Furthermore, all of the correlations for the financial aid variables were below 0.6. Almost all of the correlations for the financial aid variables were low degrees of correlation, except for one that had a moderate degree and one that had a high degree of correlation. Since all of these correlations did not approach 1.0, there is not a major multicollinearity issue between the social integration variables, the academic integration variables, and the financial aid variables. Therefore, these variables will not cause any problems in the logistic regression analysis.

**Table 3-8**  
*(Variance Inflation Factor (VIF) Values for all Independent Variables)*

<b>Variable</b>	<b>VIF</b>
<b>Pre-College Characteristics</b>	
Female	1.12
Traditional Age	1.08
Asian	1.08
Black/African American	1.27
Hispanic/Latino	1.22
Other	1.05
Low SES	2.72
Middle SES	1.93
Low High-School GPA	1.18
SAT/ACT Scores	1.36
<b>Disability Type</b>	
Apparent Disabilities	1.78
Learning Disabilities	2.49
Psychological Disabilities	2.31
<b>Social Integration</b>	
Neutral feelings of belonging	2.68
Positive feelings of belonging	4.13
Neutral satisfaction with social experience	2.27
Satisfied with social experience	3.43
Neutral peer interaction	3.29
High peer interaction	4.12
Neutral peer support	3.40
Positive peer support	3.69
<b>Academic Integration</b>	
Neutral faculty interaction	3.02
High faculty interaction	3.82
Neutral satisfaction with studies	2.11
Satisfied with studies	3.09
Neutral academic confidence	2.11
High academic confidence	2.89
<b>Other College Factors</b>	
GPA	1.24
Investigative Majors	1.46
Artistic Majors	1.25
Enterprising Majors	1.32
Other Majors	1.23
Direct Subsidized Loans (logged)	2.30
Direct Unsubsidized Loans (logged)	1.87
Federal Work-Study (logged)	1.09
Pell Grant Funds (logged)	2.08

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).

Next, I had to handle any missing cases in the sample. Missing data can threaten a study's internal and external validity (Crominger & Douglas, 2005) and so it is important to deal with any variables that have missing cases. There are multiple ways to handle missing data, including listwise deletion, pairwise deletion, and single imputation. However, all of these approaches have limitations. Listwise deletion can decrease the statistical power of a study and diverge the full sample if there are too many missing cases because it simply deletes any cases from the sample that has missing information (Crominger & Douglas, 2005). Pairwise deletion overcomes some of these issues by using all of the data in the analysis, but it also has its own disadvantages. While utilizing pairwise deletion, there is no way to compute standard errors and it is possible that the coefficient of determination can exceed 100% (Allison, 2001; Crominger & Douglas, 2005). Therefore, it was not logical to use either listwise or pairwise deletion for this study.

Single imputation is an alternative to both listwise and pairwise deletion because it estimates a single value for the missing cases using the mean or relationships of the available data. According to Crominger & Douglas (2005), when using single imputation there is a possibility that the standard error of the estimated variables will be too small and will need to be adjusted. Therefore, the method of multiple imputation to handle missing cases was used for this study. This method is recommended by Allison (2001) and Crominger & Douglas (2005) when more than 3% of cases are missing. In multiple imputation, missing values are estimated from a distribution of plausible values and then one value is randomly selected in each imputation (Crominger & Douglas, 2005). According to Crominger & Douglas (2005), then "the researcher creates a number of imputed datasets and...performs analysis of interests on each dataset. Parameter estimates can then be combined across each of these analyses to yield better estimates and a picture of the variability of these estimates among the various imputed datasets"

(p. 40). The advantages of this method are that it can be applied to any data or model, can be done using software such as Stata, and it incorporates uncertainty in observed data (Allison, 2001; Crominger & Douglas, 2005).

According to Bryan, Cooney, and Elliott (2019), NCES handled some of the missing values in the restricted dataset through imputation. Therefore, only 3 of the independent variables in the model used within this study had missing values, with a range of 4% to 22% missing. These variables included college GPA, high school GPA, and SAT/ACT scores. They had missing percentages of 4%, 9%, and 22%, respectively. Therefore, multiple imputation was used when dealing with missing values in the sample. Twenty-five imputations were run while conducting the multiple imputation. In the past, using less imputations was suggested for handling missing data. However, it is now recommended that researchers use many imputations when multiple imputation is used (Graham, Olchowski, & Gilreath, 2007).

**Descriptive Analysis.** I used descriptive statistics to describe the sample characteristics. I generated the means, standard deviations, frequencies, and percentages for all the variables included in the study. This provided the demographic, pre-college, integration, and disability characteristics of all the students within the sample.

**Logistic Regression Analysis with Fixed Effects Model.** To answer all three of the research questions within this study, I ran a few logistic regression analyses with a fixed effects model. As stated previously, a logistic regression analysis is best used to understand how one or more independent variables can predict a dichotomous outcome. Since all three of the research questions involve the outcome of whether a student was retained in their original institution or not, it made the most sense to use a logistic regression analysis for each. Utilizing logistic

regression analysis helped determine if there was a relationship between students with disabilities, their social and academic integration, and first-year retention.

I also used a fixed effects model in order to control for all institutional-level factors within this study. Since the students in the population are nested within different types of institutions, variations across the characteristics of their institutions could influence their behavior in college and, thus, influence their retention (Clark et al., 2015; Huang, 2016). These characteristics include the institution's Carnegie Classification, selectivity, the region it is located in, professor quality, school culture, particularly towards students with disabilities, and more. However, not all of these institutional-level factors can be observed or measured through the BPS dataset. A fixed-effects model will control and account for every observable and unobservable institutional-level factor that can influence retention (Allison, 2009). This will help capture all the differences across institutions for the entire population of students.

Furthermore, using a fixed effects model in all the logistic regression analysis instead of other models, such as random effects, was the best method for this study. Unobserved differences in a random effects model are treated as random variables that are uncorrelated with other covariates (Allison, 2009). However, the unobserved institutional characteristics, such as a school's culture towards students with disabilities and their accommodations, can influence a student's retention in ways that need to be accounted for. Since the students in this population also come from thousands of different institutions across the nation with many unobserved institutional characteristics that may relate to student retention, using a random effects model will not work in this study. Within a fixed effects model, the unobserved variables can have associations with the observed variables, which allows for control of the effects of the unobserved variables (Allison, 2009). Within this study, institutional characteristics that may be

related to student retention, observable or unobservable, will be controlled for in this approach. Furthermore, since all institutional variability is accounted for in a fixed effects model then omitted variable bias at the institutional level is reduced (Huang, 2016). A fixed effects model within each logistic regression, was thus, the best method for this study and population.

Although a fixed effects model accounts for both observed and unobserved institutional-level characteristics, I was not able to analyze how institutional-level factors influence the retention of students with disabilities compared to those without disabilities. However, I was mainly interested in how student-level characteristics, like social and academic integration, influence retention for this population. Since the focus of this study was on these characteristics, rather than institutional-level factors, using a fixed effects model was appropriate and makes the most sense. This allowed me to control and account for all the observable and unobservable factors that influence retention without actually including each factor as an independent variable in the model.

When conducting a logistic regression model with fixed effects using Stata software, a weight variable cannot be included. Therefore, I also ran a linear probability model with fixed effects after each logistic regression model. This helped me understand if including the weight variable had impacted any of the predictors in the model. Including a weight variable is also necessary in order to ensure the results do not oversample the student-level factors and are instead representative of the population (Thomas & Heck, 2001; Thomas, Heck, & Bauer, 2005). Linear probability model is another analytic approach that is appropriate to use when the outcome variable is binary. Although some predicted probabilities may fall outside the 0-1 interval, using a linear probability model to include the weight variable made sense for this study (Caudill, 1988).

To answer the first and second research question, “among students with disabilities, how is disability type related to first-year retention,” and “do the types of academic and social integration matter in predicting first-year retention among students with disabilities,” I ran a logistic regression analysis with fixed effects with all of the variables included in the model. I examined whether the different disability type variables can predict first-year retention for the sample of students with disabilities and if social or academic integration matter in this prediction, while controlling for all other factors. This helped determine whether a certain disability has a statistically significant relationship to retention. It also helped compare the retention predictability between the different types of disabilities. Furthermore, this analysis only included the sample of students with disabilities and helped determine if any of the social or academic integration variables predicted the first-year retention rate for this sample.

I ran two more logistic regressions with fixed effects to answer the last research question, “how do various factors contribute to student retention when comparing students with and without disabilities? In particular, do social and academic integration activities relate to first-year student retention differently across the two student populations?” For this analysis, I included both samples of students with and students without disabilities using interaction effects. Since the literature demonstrated that students with disabilities may experience social and academic integration differently than their peers without disabilities, it is important to consider the possible significant interaction effect between these covariates. Therefore, I ran the two logistic regressions with separate interaction effects to examine if the interactions influence retention. The first tested whether there was an interaction effect between positive social integration and disability or not. The second then tested whether there was an interaction effect between positive academic integration and disability or not. This helped determine if any of the social or academic



integration variables influenced the retention of two groups of students differently, which can help policy makers determine what interventions will be effective in reducing the possible retention gap.

Before running these logistic regressions, I created interaction terms for the two sets of variables (social integration/disability and academic integration/disability) to help measure how integration interacts with having a disability. Four of the new terms included interactions between the positive social integration variables (positive feelings of belonging, satisfied with social experience, high peer interaction, and positive peer support) and the disability or not variable. The other three new terms included interactions between the positive academic integration variables (positive faculty interaction, satisfied with studies, and high academic confidence) and the disability or not variable. Before running the analysis, it was expected that the positive social integration and disability variables, as well as the positive academic integration and disability variables, would have an interaction effect on retention of students with disability. Based on the literature reviewed, students with disabilities who had a more positive social and academic integration are more likely to be retained. Furthermore, faculty are more likely to have the most influence on a student with disabilities' retention because this has been found often in past research.

### **Limitations**

There are several limitations within this study that need to be addressed. First, it is important to note that the number of students with disabilities may not have been fully accounted for due to the self-identification nature of higher education. In K-12, students with disabilities are identified and advocated for by parents, teachers, and others around them. It is essentially the school's job to identify these students and provide them with the assistance and tools they need

to succeed. However, once students graduate high school and enter higher education, they must self-identity and self-advocate. This means that they must provide their institution with documentation that details the impact of their disability in order to receive assistance or accommodations. In a similar manner, students who have identified on the BPS survey that they have a disability have chosen to do so on their own accord while completing the survey. Some of these students may have not identified as having a disability with their institution and, thus, are not receiving accommodations that could help their retention in college. There also may be students who have a disability but did not identify this on the BPS survey. Therefore, there may be a number of students who have a disability, but who were not included within the sample for this study, which could be a significant limitation. Students were also only able to choose one type of disability on the BPS survey. However, there are a number of individuals who have multiple disabilities and not accounting for that and their retention is another significant limitation of the study.

Another limitation is the use of a secondary data source instead of collecting my own primary data. This does not account for the specific and individual experiences students with disabilities have in college that may influence their retention. Since the impact and influence of a disability can be different for each student who has one, this can be a significant limitation. Some students may have more support or knowledge of their disability, while others may have a more limited experience. However, there are many studies that have used primary data to investigate the experiences and barriers of this population. A national dataset also provides a very large population and sample size, which helps generalize the results to all students with disabilities, no matter their disability or institution type. Therefore, the results of this study will greatly help both institutions and students with disabilities across the nation.

A final limitation to this study is the limited number of variables available in the BPS survey. Although BPS has a variety of and a large number of variables, it did not have certain factors that directly relate to social and academic integration based on this study's theoretical framework and conceptual model. Although these factors may have been captured through the institutional fixed effects, this can be a limitation within the study since the relationship between those factors and retention were not directly examined. These factors include support from faculty and participation in extracurricular activities and clubs. How faculty view students with disabilities and whether they provide support or not can impact their integration into college and retention, as well as whether they utilize accommodations (Denhart, 2008; Hong, 2015; Kranke et al., 2013; Timmerman & Mulvihill, 2015). Involvement in extracurricular activities is an important aspect of socially integrating into a college (Tinto, 1975). However, students with disabilities are not always able to participate in extracurricular activities on their campuses (Reed & Curtis, 2012; Mamiseishvili & Koch, 2011). Certain social and academic integration factors are also difficult to measure with a national dataset. This can include intellectual development, as well as interactions with peers and faculty. Although there are variables for interactions, it is impossible to know how these specific interactions directly influenced a particular student or what occurred during them. Therefore, the variables within the dataset are another limitation that must be accounted for.

### **Summary**

Throughout this chapter, I discussed the study's research design and methodology. I discussed the dataset I used and why it was chosen for this particular study. The population of the dataset and the samples that were derived from it were also explained. Next, the variables included in the study were discussed in detail. This included the dependent variable, the control

variables, and the different groups of independent variables. Throughout this discussion, I explained my rationale for these variables, their definitions, and how they were recoded. The research design was then discussed, which included the data management, descriptive statistics, and logistic regression analysis with a fixed effects model. Finally, limitations of the research were explained. Chapter IV will discuss the results of these analyses in detail.

## **CHAPTER IV RESULTS**

### **Introduction**

This chapter focuses on the results of the research analysis, which answer the three overarching questions of this study: (1) Among students with disabilities, how is disability type related to first-year retention? (2) Do the types of academic and social integration matter in predicting first-year retention among students with disabilities? (3) How do various factors contribute to student retention when comparing students with and without disabilities? In particular, do positive social and academic integration activities relate to first-year student retention differently across the two student populations?

The results are organized into two sections: descriptive and inferential statistical findings. Within the descriptive statistical findings section, the means and standard deviations for all the independent variables are listed. Cross-tabulations of demographic characteristics for students with and without disabilities, as well as within disability groups, are also included in this section. The results of the logistic regression, which answers the first two research questions, are presented in the inferential statistical findings section. Furthermore, the results of the interaction effects analysis, which answers the final research question, are also discussed in this section.

### **Descriptive Statistical Findings**

This study focuses on students enrolled in 4-year institutions for the first time during the 2011-2012 academic year. To comply with NCES standards, all n-values have been rounded up to the nearest 10. Therefore, the sample contains 14,220 students. Out of those 14,220 students, 1,400 students have self-identified as having at least one disability. This accounts for 9.82% of the sample. According to NCES ("Fast Facts," 2016), 11% of students enrolled in postsecondary institutions have a disability. Therefore, the sample within this study is fairly representative of

the current population of students with self-identified disabilities. Meanwhile, 12,820 students out of the 14,220 students do not have a disability, which accounts for 90.18% of the sample.

Tables 4-1 to 4-4 display the descriptive statistics, which include the means and standard deviations of the continuous independent variables, as well as some cross-tabulations. Table 4-1 displays the means and standard deviations of all the continuous variables used within this study for the entire population of degree-seeking students enrolled at 4-year institutions. The mean of student SAT scores was 1010.32 and the mean of their college GPA was 2.92. The mean of student direct subsidized loans was 5.20, direct unsubsidized loans was 5.36, federal work-study was 0.90, and Pell Grant funds was 4.39.

**Table 4-1**  
*(Descriptive Statistics of Continuous Variables)*

<b>All students in 4-year institutions (N = 14,220)</b>		
<b>Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Pre-College Characteristics</b>		
SAT/ACT Scores	1010.32	208.77
<b>Other College Factors</b>		
GPA	2.92	0.90
Direct Subsidized Loans (logged)	5.20	3.83
Direct Unsubsidized Loans (logged)	5.36	3.82
Federal Work-Study (logged)	0.90	2.43
Pell Grant Funds (logged)	4.39	4.08

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).

Table 4-2 displays cross-tabulations that compare the background characteristics among the students with and without disabilities who were enrolled in a 4-year institution. This includes age, gender, ethnicity/race, socioeconomic status, and high school GPA. These cross-tabulations are intended for readers to understand the differences in background characteristics for students with and without disabilities are. This study includes 1,400 students with disabilities, who

account for 9.82% of the sample, and a total of 12,820 students without disabilities, who account for 90.18% of the sample.

Across the two groups, more students without disabilities were traditionally aged students younger than 23 years old. Specifically, 85.19% of students without disabilities were traditionally aged students, while 74.64% of students with disabilities were in this age range. Gender representation was similar across the two groups of students. Among students with disabilities, 57.38% were female, and among students without disabilities 56.19% were female. The race and ethnicity of students with and without disabilities within this sample varied, with the only major differences within the Asian and the other race categories. Among those with self-identified disabilities 56.66% were White, 15.11% were Black or African American, 18.12% were Hispanic or Latino, 2.58% were Asian, and 7.52% were classified as “other.” Meanwhile, among those without disabilities 55.77% were White, 15.91% were Black or African American, 17.60% were Hispanic or Latino, 5.38% were Asian, and 5.34% were classified as “other.” “Other” includes the races American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and more than one race.

About the same amount of students with and without disabilities were in the middle socioeconomic class. However, this was not the case with the lower and higher socioeconomic classes. Specifically, 31.59% of students who self-identified as having a disability and only 24.19% of students without disabilities are within the lower socioeconomic status. This includes those that are dependent and have a family income of less than \$28,000 and those that are independent and have a family income less than \$1,274. However, 47.42% of students with disabilities and 47.76% of students without disabilities are within the middle socioeconomic class with a family income in-between \$28,000 and \$104,823 for dependent students and \$1,274

and \$24,637 for dependent students. Meanwhile, only 20.99% of students with disabilities and 28.05% of students without disabilities were found to be in the higher socioeconomic class. They have a family income of \$104,823 or more for dependent students and \$24,637 or more for independent students.

More students with self-identified disabilities were also found to have a lower high school GPA than students without a disability. Among this group, 35.32% had a high school grade point average of 2.4 or lower. Meanwhile, only 21.31% of students without disabilities had a low high school GPA. Among students with disabilities, 64.68% had a high school GPA of 2.5 or higher. Furthermore, more students without disabilities had a higher high school GPA. Among these students, 78.69% had a grade point average of 2.5 or higher.

**Table 4-2**  
*(Background Characteristics of all Students with and without Disabilities)*

<b>Variable</b>	<b>% With Disability</b> (N=1,400)	<b>% Without Disability</b> (N=12,820)
<b>Age</b>		
Traditional Age	74.64	85.19
Non-Traditional Age	25.36	14.81
<b>Gender</b>		
Female	57.38	56.19
Male	42.62	43.81
<b>Ethnicity/Race</b>		
Asian	2.58	5.38
Black/African American	15.11	15.91
Hispanic/Latino	18.12	17.60
Other	7.52	5.34
White	56.66	55.77
<b>Socioeconomic Status</b>		
Low SES	31.59	24.29
Middle SES	47.42	47.76
High SES	20.99	28.05
<b>High School Grade-Point Average</b>		
Low HS GPA	35.32	21.31
High HS GPA	64.68	78.69

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).



Table 4-3 displays cross-tabulations that compare the background characteristics of only students with disabilities, by their disability type. The background characteristics include age, gender, race/ethnicity, socioeconomic status, and high school grade point average. This cross-tabulations is intended for readers understand the differences in background characteristics for students with different disability types. Furthermore, disability type was grouped into four different categories. Apparent disabilities were students with a hearing impairment, a blindness or language impairment, a speech or language impairment, an orthopedic or mobility impairment, or a developmental impairment. There were 270 students with an apparent disability in the sample. Non-apparent disabilities were separated into two different categories that included learning and psychological disabilities. Learning disabilities were students with a specific learning disability or dyslexia, attention deficit disorder, or a brain injury. There were 400 students with a learning disability in the sample. Psychological disabilities were students with a mental, emotional, or psychological condition or depression. There were 430 students with a psychological disability in the sample. Other disabilities were students with a health impairment or problem or if they selected “other disability” that was not previously listed. Health impairments include long-term health conditions, such as an autoimmune disease, that differ from psychological impairments. There were 300 students with other disabilities in the sample. Although most of the background characteristics breakdowns are similar between the four disability groups, there were some interesting differences which are noted below.

For students with apparent disabilities, a majority of them are in the traditional age range. Specifically, 62.17% were 23 years old or younger. The gender of this group of students is nearly equal since 52.81% were female and 47.19% were male. Most of the students with apparent disabilities, 49.81%, were White. For the remainder of the race/ethnicity breakdown, 0.75% were

Asian, 22.10% were Black or African American, 20.60% were Hispanic or Latino, and 6.74% were in the “other” race category. This was the highest percentage of Black or African American students throughout all four disability groups. Furthermore, a majority of these students are within the middle socioeconomic class with 47.19% of students with apparent disabilities in the middle SES class. Meanwhile, 32.21% are in the lower socioeconomic class and 20.60% are in the higher socioeconomic class. More students with apparent disabilities had a higher high school grade point average than a lower one. Specifically, 65.92% had a high school GPA of 2.5 or higher.

For students with learning disabilities, more than three-fourths, 84.38%, were within the traditional age range. However, the gender of this group of students was essentially equal since 49.62% were female and 50.38% were male. More than half of the students, 66.25%, with learning disabilities were White. This was the largest percentage of White students throughout all four disability groups. Meanwhile, 1.26% were Asian, 11.34% were Black or African American, 13.85% were Hispanic or Latino, and 7.30% were in the other race category. 51.64% of the students within this disability type were in the middle socioeconomic class, while 23.93% were in the lower SES class and 24.43% were in the higher SES class. Interestingly, 61.71% of the students with learning disabilities had a high school grade point average of 2.5 or higher.

For students with psychological disabilities, 72.25% were within the traditional age range of 23 years old or younger. Interestingly, 66.06% of these students were female. This was the highest percentage of female students within the four disability groups. Almost one-third of this group, 59.17%, was White. For the remainder of the race/ethnicity breakdown, 3.44% were Asian, 12.16% were Black or African American, 16.74% were Hispanic or Latino, and 8.49% were in the “other” race category. Similar to the other disability groups, almost half of the

students with psychological disabilities were within the middle socioeconomic class. Specifically, 34.40% were in the low SES class, 46.10% were in the middle SES class, and 19.50% were in the high SES class. Two-thirds of the students with psychological disabilities, 70.87%, had a high school grade point average of 2.5 or higher. Interestingly, this was the highest percentage of high H.S. GPA within the four disability groups.

For students within the other disability group, 76.35% were within the traditional age range of 23 years of younger. Slightly more of these students were female than male. Specifically, 59.12% were female compared to the 40.88% that were male. Similar to students in the apparent disability group, almost half of these students, 46.28%, were White. For the remainder of the race/ethnicity breakdown, 4.73% were Asian, 18.24% were Black or African American, 23.65% were Hispanic or Latino, and 7.09% were in the “other” race category. This was the highest percentage of Hispanic or Latino and Asian students within the four disability groups. The percentage of students with “other” disabilities in the low socioeconomic and middle socioeconomic classes are similar, with 37.16% in the low SES and 43.92% in the middle SES. Meanwhile, only 18.92% were in the high socioeconomic class. Similar to the apparent disabilities and learning disabilities groups, 64.19% of students with other disabilities had a high school grade point average of 2.5 or higher.

**Table 4-3**  
*(Background Characteristics of only Students with different Disability types)*

<b>Variable</b>	<b>% Apparent Disabilities (N=270)</b>	<b>% Learning Disabilities (N=400)</b>	<b>% Psychological Disabilities (N=430)</b>	<b>% Other Disabilities (N=300)</b>
<b>Age</b>				
Traditional Age	62.17	84.38	72.25	76.35
Non-Traditional Age	37.83	15.62	27.75	23.65
<b>Gender</b>				
Female	52.81	49.62	66.06	59.12
Male	47.19	50.38	33.94	40.88

<b>Ethnicity/Race</b>				
Asian	0.75	1.26	3.44	4.73
Black/African American	22.10	11.34	12.16	18.24
Hispanic/Latino	20.60	13.85	16.74	23.65
Other	6.74	7.30	8.49	7.09
White	49.81	66.25	59.17	46.28
<b>Socioeconomic Status</b>				
Low SES	32.21	23.93	34.40	37.16
Middle SES	47.19	51.64	46.10	43.92
High SES	20.60	24.43	19.50	18.92
<b>High School GPA</b>				
Low HS GPA	34.08	38.29	29.13	35.81
High HS GPA	65.92	61.71	70.87	64.19

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SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).

Table 4-4 presents the cross-tabulations that compare the social and academic integration factors among the students with and without disabilities who were enrolled in a 4-year institution. The social integration factors include feelings of belonging, satisfaction with social experience, peer interaction, and peer support. The academic integration factors include faculty interaction, satisfaction with studies, and academic confidence. Each integration factor includes negative, neutral, and positive responses.

The percentages for the social integration factors are fairly similar across the two groups of students, with the positive or high social integration factors having the highest percentages. However, for each positive social integration factor, students without disabilities have a higher percentage of positive responses compared to the group of students with disabilities. Among students without disabilities, 78.65% reported positive feelings of belonging, but only 68.55% of students with disabilities reported the same. Likewise, 75.47% of students without disabilities also reported satisfaction with their social experience, while only 67.41% of those without disabilities were satisfied. Furthermore, there is a similar pattern of percentages for peer interaction and support. Among student without disabilities, 85.51% reported high peer

interactions and 77.13% reported positive peer support. Meanwhile, among students with disabilities, only 78.15% had high peer interactions and 66.91% had positive peer support.

The percentages for the academic integration factors are also fairly similar across the two groups of students with the positive or high academic integration factors having the highest percentages. Similar to the social factors, for each positive academic integration factor students without disabilities have a higher percentage of the positive responses compared to the group of students with disabilities. Among students without disabilities, 86.24% reported high faculty interactions, but only 77.65% of students with disabilities reported the same. Likewise, 80.33% of students without disabilities also reported satisfaction with their studies, while only 68.70% of those without disabilities were satisfied. Among student without disabilities, 87.39% reported high academic confidence. Meanwhile, among students with disabilities, only 74.57% had high academic confidence.

**Table 4-4**  
*(Cross Tabulations of Integration for Students with and without Disabilities)*

	<b>% With Disability</b>	<b>% Without Disability</b>
<b>Variable</b>	<b>(N=1,400)</b>	<b>(N=12,820)</b>
<b>Social Integration</b>		
Negative feelings of belonging	15.69	9.25
Neutral feelings of belonging	15.76	12.10
Positive feelings of belonging	68.55	78.65
Not satisfied with social experience	16.40	11.63
Neutral satisfaction with social experience	16.19	12.89
Satisfied with social experience	67.41	75.47
Low peer interaction	7.38	4.28
Neutral peer interaction	14.47	10.21
High peer interaction	78.15	85.51
Low peer support	11.60	6.72
Neutral peer support	21.49	16.15
Positive peer support	66.91	77.12

**Academic Integration**

Low faculty interaction	9.24	5.27
Neutral faculty interaction	13.11	8.49
High faculty interaction	77.65	86.24
Not satisfied with studies	18.05	10.21
Neutral satisfaction with studies	13.25	9.46
Satisfied with studies	68.70	80.33
Low academic confidence	14.68	6.52
Neutral academic confidence	10.74	6.08
High academic confidence	74.57	87.39

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).

**Inferential Statistical Findings****Logistic Regression with Fixed Effects: Students with Disabilities Only**

In order to answer the first and second research questions, I ran a logistic regression analysis with fixed effects to examine the relationship of disability type with social and academic integration on the likelihood of retention to the second year of college for only students with a disability. This model also included the pre-college characteristics and other college factors mentioned earlier in Chapter III. Table 4.5 presents the odds ratio, significance level, and standard error for each variable included in the model. P values lower than 0.001, 0.01, and 0.05 are considered significant. Furthermore, the odds ratio indicates the positive or negative relationship of each independent variable with the outcome variable of retention.

The pre-college characteristics in the model included gender, age, race and ethnicity, socioeconomic status, high school GPA, and SAT or ACT scores. The only pre-college characteristics that were significant were socioeconomic status. The odds of retention to the second year of college are 54% lower for a student with a disability in the lower socioeconomic class compared to a student with a disability in the higher socioeconomic class (OR=0.46,  $p<0.05$ ). Furthermore, the odds of retention for a student with a disability in the middle

socioeconomic class to their second year are 60% lower than a student with a disability in the higher socioeconomic class (OR=0.40,  $p<0.01$ ). Gender, age, race and ethnicity, high school grade-point-average, and SAT or ACT scores were not significant predictors of first-year retention for students with disabilities.

The disability type variables included in the model were apparent disabilities, learning disabilities, and psychological disabilities. These variables were the key factors involved in answering the first research question of this study. Through the analysis, learning and psychological disabilities were found to be significant. This indicates that there is a difference in retention across students with different disability types, even while controlling for all other predictors. The odds of retention for a student with a learning disability to their second year of college are 53% lower than those for a student with an “other” type of disability (OR=0.47;  $p<0.01$ ). Furthermore, the odds of retention for a student with a psychological disability are 52% lower than those for a student with an “other” type of disability (OR=0.48;  $p<0.01$ ). Apparent disabilities were not found to be a significant predictor of first-year retention in the model.

The social integration variables included in the model were neutral feelings of belonging, positive feelings of belonging, neutral satisfaction with the social experience, satisfied with the social experience, neutral peer interaction, high peer interaction, neutral peer support, and positive peer support. These variables, along with the academic integration variables, were the key factors involved in answering the second research question of this study. However, only two of the social integration variables were found to be significant predictors of retention for students with disabilities. The odds of retention for a student with a disability to their second year were 2.98 times higher if they had positive feelings of belonging compared to a student who did not (OR=2.98;  $p<0.01$ ). Furthermore, the odds of retention for a student were 2.27 times higher if

they had neutral satisfaction with their social experience compared to a student who had a negative satisfaction with their social experience ( $OR=2.27$ ;  $p<0.05$ ). The lower P value indicates that neutral satisfaction with their social experience is only marginally significant. Neutral feelings of belonging, satisfied with the social experience, neutral peer interaction, high peer interaction, neutral peer support, and positive peer support were not significant predictors of first-year retention for students with disabilities.

The academic integration variables included in the model were neutral faculty interaction, high faculty interaction, neutral satisfaction with their studies, satisfied with their studies, neutral academic confidence, and high academic confidence. These variables, along with the social integration variables, were the key factors involved in answering the second research question of this study. However, only one variable was found to be a marginally significant predictor of retention for students with disabilities. The odds of retention for a student with a disability to their second year were 58% lower if they had a neutral faculty interaction compared to a student who had a negative faculty interaction ( $OR=0.42$ ;  $p<0.05$ ). High faculty interaction, neutral satisfaction with their studies, satisfied with their studies, neutral academic confidence, and high academic confidence were not significant predictors of first-year retention for students with disabilities.

The other college factor variables included GPA, major choice, direct subsidized and unsubsidized loans, federal work-study, and Pell grant funds. However, only one college factor variable was found to be a significant predictor of retention. For every one-point increase in GPA, a student with a disability's odds of retention to their second year increased by 87% ( $OR=1.87$ ;  $p<0.001$ ). Major choice, direct subsidized and unsubsidized loans, federal work-study, and Pell grant funds were not significant predictors of first-year retention in the model.



**Table 4-5. Retention of Students with Disabilities**  
*(Logistic Regression Analysis with Institutional Fixed Effects)*

Variable	Odds Ratio	Significance	Standard Error
<b>Pre-College Characteristics</b>			
Female	1.42		0.19
Traditional Age	1.03		0.24
Asian	1.83		0.76
Black/African American	0.84		0.29
Hispanic/Latino	1.36		0.27
Other	0.89		0.34
Low SES	0.46	*	0.31
Middle SES	0.40	**	0.28
Low High-School GPA	0.81		0.20
SAT/ACT Scores	1.00		0.001
<b>Disability Type</b>			
Apparent Disabilities	0.59		0.27
Learning Disabilities	0.47	**	0.28
Psychological Disabilities	0.48	**	0.27
<b>Social Integration</b>			
Neutral feelings of belonging	1.83		0.37
Positive feelings of belonging	2.98	**	0.38
Neutral satisfaction with social experience	2.27	*	0.36
Satisfied with social experience	2.04		0.37
Neutral peer interaction	1.31		0.44
High peer interaction	0.72		0.44
Neutral peer support	0.72		0.32
Positive peer support	0.87		0.30
<b>Academic Integration</b>			
Neutral faculty interaction	0.42	*	0.43
High faculty interaction	0.60		0.40
Neutral satisfaction with studies	1.21		0.35
Satisfied with studies	1.72		0.33
Neutral academic confidence	0.85		0.42
High academic confidence	1.83		0.36
<b>Other College Factors</b>			
GPA	1.87	***	0.11
Investigative Majors	1.63		0.26
Artistic Majors	1.47		0.32
Enterprising Majors	1.53		0.27
Other Majors	1.02		0.46
Direct Subsidized Loans (logged)	1.05		0.05
Direct Unsubsidized Loans (logged)	1.04		0.04
Federal Work-Study (logged)	0.95		0.06
Pell Grant Funds (logged)	1.04		0.03

NOTE: Significance \*\*\*P<0.001; \*\*P<0.01; \*P<0.05

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).

### **Linear Probability Model with the Weight Variable: Students with Disabilities Only**

Since the Stata software does not allow inclusion of a weight variable in a logistic regression with fixed effects, I ran a linear probability model with fixed effects for only students with a disability after the logistic regression model. Running the linear probability model helped determine whether the findings from the logistic regression analysis stayed similar with the weight included. As mentioned in Chapter III, this is important in order to ensure that the results are not oversampled and instead accurately represent the population. Table 4-6 presents the results of the linear probability model and includes the coefficient, significance level, and standard error. The coefficients in the table represent the change in the probability of student retention for a one-unit change in each predictor variable, while holding the rest of the variables constant.

The results from the linear probability model are similar to some, but not all, of the findings from the logistic regression model. The significance and the effect of socioeconomic status, learning disabilities, and positive feelings of belonging were similar in both models. However, psychological disabilities, neutral feelings of belonging, neutral faculty interaction, and GPA are no longer significant in the linear probability model. The group of students with psychological disabilities is the largest one within the sub-population of students with disabilities. Therefore, these students may have been oversampled, and once the weight was added to the model to account for this oversampling, these four variables were no longer significant in predicting the retention of students with disabilities. Having an apparent disability was also found to be marginally significant in the linear probability model, but not in the logistic regression model. Therefore, both models consistently show that the factors socioeconomic status, learning disabilities, and positive feelings of belonging are significant.

**Table 4-6. Retention of Students with Disabilities**  
*(Linear Probability Model Analysis with Institutional Fixed Effects)*

Variable	Coefficient	Significance	Standard Error
<b>Pre-College Characteristics</b>			
Female	-0.001		0.06
Traditional Age	-0.05		0.06
Asian	0.17		0.24
Black/African American	0.05		0.07
Hispanic/Latino	0.05		0.09
Other	0.06		0.11
Low SES	-0.30	**	0.10
Middle SES	-0.22	*	0.10
Low High-School GPA	-0.15		0.08
SAT/ACT Scores	0.0001		0.0001
<b>Disability Type</b>			
Apparent Disabilities	-0.17	*	0.08
Learning Disabilities	-0.20	**	0.08
Psychological Disabilities	-0.14		0.08
Social Integration			
Neutral feelings of belonging	0.16		0.12
Positive feelings of belonging	0.26	*	0.13
Neutral satisfaction with social experience	0.08		0.12
Satisfied with social experience	0.05		0.10
Neutral peer interaction	0.06		0.11
High peer interaction	-0.9		0.11
Neutral peer support	0.03		0.09
Positive peer support	0.10		0.09
<b>Academic Integration</b>			
Neutral faculty interaction	-0.11		0.12
High faculty interaction	-0.08		0.11
Neutral satisfaction with studies	0.12		0.10
Satisfied with studies	0.11		0.10
Neutral academic confidence	-0.15		0.12
High academic confidence	0.08		0.10
<b>Other College Factors</b>			
GPA	0.07		0.03
Investigative Majors	0.06		0.08
Artistic Majors	-0.03		0.10
Enterprising Majors	0.03		0.08
Other Majors	-0.05		0.11
Direct Subsidized Loans (logged)	0.02		0.01
Direct Unsubsidized Loans (logged)	0.001		0.01
Federal Work-Study (logged)	0.0002		0.02
Pell Grant Funds (logged)	0.01		0.01

NOTE: Significance \*\*\*P<0.001; \*\*P<0.01; \*P<0.05

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).

### **Interaction Effects: Full Sample of Students**

In order to answer the last research question, I ran two logistic regression models with fixed effects that included the interaction effect variables for all the students with and without a disability. These interaction effect tests examined the significance of positive social integration and positive academic integration on a student's likelihood of retention from their first to second year in college. Furthermore, these models included the entire population of students with and without disabilities in order to compare how the social and academic integration variables influenced the retention of the two groups of students differently. As mentioned in Chapter III, I created interaction terms for the two sets of variables to measure how social and academic integration interact with having a disability before running the analysis. I then ran the interaction effects using both the logistic regression and linear probability models with fixed effects in order to determine if adding a weight changes any of the results. These models also included all of the independent variables in order to control for them. However, it is important to note that I did not differentiate the disability types within these models because the small categories would make the interaction effect tests unreliable. Instead, I used the disability variable that included all disability types in order to create a larger category. Tables 4-7 and 4-8 display the results of each of the interaction terms and include the odds ratio or coefficient, significance, and standard errors. Table 4-7 presents the findings of the social integration interaction terms, while Table 4-8 presents the findings of the academic integration interaction terms.

The interaction tests in both the logistic regression and linear probability models were not significant for any of the interaction terms. This indicates that the relationship between the positive social integration variables and retention from the first year to the second year of college is the same across students with and without disabilities. Furthermore, it also indicates that the

relationship between the positive academic integration variables and retention from the first year to the second year of college is the same across students with and without disabilities. Although it was expected that the positive integration variables, especially those involving the faculty, would have some interaction effect on retention, this was not the case in any of the models.

**Table 4-7. Retention of All Students.**

*(Positive Social Interaction Variables Tested for First-Year Retention Model)*

Variable	Logistic Regression			Linear Probability Model		
	Odds Ratio	Significance	Standard Error	Coefficient	Significance	Standard Error
Disability*Belong	1.43		0.20	0.04		0.06
Disability*Socio Experience	0.90		0.20	-0.001		0.06
Disability*Peer Interaction	0.99		0.21	-0.02		0.07
Disability*Peer Support	1.17		0.16	0.02		0.05

NOTE: Significance \*\*\*P<0.001; \*\*P<0.01; \*P<0.05

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).

**Table 4-8. Retention of All Students.**

*(Positive Academic Interaction Variables Tested for First-Year Retention Model)*

Variable	Logistic Regression			Linear Probability Model		
	Odds Ratio	Significance	Standard Error	Coefficient	Significance	Standard Error
Disability*Faculty	1.01		0.21	-0.09		0.05
Disability*Study Satisfaction	1.01		0.19	0.03		0.06
Disability*Academic Confidence	1.40		0.19	0.11		0.06

NOTE: Significance \*\*\*P<0.001; \*\*P<0.01; \*P<0.05

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2012/14 Beginning Postsecondary Students Longitudinal Study (BPS:12/14).

## Summary

Throughout this chapter, I discussed the descriptive and inferential statistical findings that answered the three research questions within this study. I explained the analysis and models used within the study, as well as presented the results for both the descriptive and inferential analyses.

This study attempted to find the variables related to the first-year retention of students with disabilities. Furthermore, it examined how the social and academic integration factors related to student retention differently when comparing students with and without disabilities. The logistic regression results of this study indicated that socioeconomic status, having a learning or psychological disability, neutral and positive feelings of belonging, neutral faculty interaction, and college GPA influenced the likelihood of retention for a student with a disability. However, once the weight was included in the linear probability model, the results indicated that only socioeconomic status, having a learning disability, and positive feelings of belonging constantly influenced the likelihood of retention. Additionally, having an apparent disability also influenced the likelihood of retention in the linear probability model. The findings from the interaction effects tests indicated that the relationship between the positive social and academic integration variables and retention from the first year to the second year of college is the same across students with and without disabilities. The final chapter will thoroughly explain the interpretation of these findings and present implications for policies and future research.

## **CHAPTER V**

### **CONCLUSIONS AND IMPLICATIONS**

The number of students with disabilities in higher education has been steadily increasing over the last few decades. NCES (“Fast Facts,” 2016) reported that 11% of students with disclosed disabilities are currently enrolled in a postsecondary institution. Furthermore, nearly every 2-year and 4-year degree-granting institution in the United States has reported enrolling students with disabilities (Raue & Lewis, 2011). Although this population of students is nationally represented in higher education, the research on them has been very limited. According to Pena (2014), only 1% of higher education articles in top-tier journals are on students with disabilities. This limited amount of research on a growing population is detrimental for understanding how to help students with disabilities succeed in higher education.

The first year of college has been found to be important for all students because it paves the way to their academic success and eventual graduation (Allen & Robbins, 2008; van der Zanden et al., 2018). However, the research that has been done on students with disabilities has demonstrated that they do not always experience retention or graduate at the same rate as their non-disabled peers. According to Newman et al. (2011), only 34% of students with disabilities in a 4-year institution were able to persist until graduation, while 57% of students with disabilities graduated. Their lower retention and graduation rates are often due to their lower social and academic integration into college. Both academic and social integration have been found significant for all students’ retention (Leppel, 2002; Blecher, 2006). However, students with disabilities are not always able to integrate academically or socially in the same manner as their peers (Hong, 2015; Timmerman & Milvihill, 2015; Fitchen et al., 2014; Barnard et al., 2008; Denhart, 2008; Kranke et al., 2013). This can, thus, impact their retention in and graduation from college. Furthermore, college retention and receiving a degree are important for students with

disabilities because it can lead to more employment opportunities and higher wages afterwards (Newman et al., 2011).

Therefore, this study attempted to add to the limited amount of research on students with disabilities in higher education. It sought to examine the first-year retention of students with disabilities in order to understand what factors help them with or deter them from retention. Guided by Tinto's Model of Voluntary Student Departure (1975) and Sanford's Challenge and Support Theory (1962) as the conceptual framework, this study specifically investigated the social and academic integration factors that may have influenced the retention of students with disabilities and students without disabilities differently. Therefore, the conceptual model in this study included student-level factors that were used as the framework for the logistic regression models using fixed effects. This quantitative study was created to help K-12 and postsecondary educators understand how to better assist students with disabilities in their transition to and experiences in their first year of college. Furthermore, it was designed to also assist policy makers and higher education institutions revise and update policies to promote retention for this population of students. The following research questions guided this study: (1) Among students with disabilities, how is disability type related to first-year retention? (2) Do the types of academic and social integration matter in predicting the first-year retention among students with disabilities? (3) How do various factors contribute to student retention when comparing students with and without disabilities? In particular, do positive social and academic integration activities relate to first-year student retention differently across the two student populations?

The sample from this study is from the from the Beginning Postsecondary Students Longitudinal Study (BPS:12/14) collected by NCES. Of the original 24,770 students identified in the BPS dataset, 14,220 were used within this study with 12,820 of those students not having a



disability and 1,400 reporting that they have a disability. This study utilized a logistic regression model with fixed effects to examine the relationship between disability type and academic and social integration with first-year retention, controlling for all relevant student-level variables. Multiple imputation was used to account for all missing values. Furthermore, fixed effects was utilized to control all institutional-level characteristics. This study also included separate interaction effects tests to determine the variation in positive social integration and positive academic integration differences in retention for students with and without disabilities. Finally, linear probability models were run after each logistic regression to determine if including a weight changed the results.

### **Summary of Findings**

The logistic regression with fixed effects was conducted for only the population of students with disabilities in order to answer the first two research questions. However, the results found that only certain predictors in the model were related to first-year retention. For pre-college characteristics, only socioeconomic status predicted retention. The findings specified that students with disabilities who are from a low or middle socioeconomic class have a lower likelihood of retention than those from a higher socioeconomic class. This is consistent with past research that found that students from lower socioeconomic classes and whose parents made less money to contribute to their educational expenses were less likely to persist and graduate compared to their peers from higher socioeconomic classes (Kena et al., 2015; Bjorklund-Young, 2016; Olbrecht et al., 2016; Cataldi, Bennett, & Chen, 2018).

The rest of the pre-college characteristics findings from the logistic regression were not found significant in predicting retention for students with disabilities. The findings from this study are consistent with some of the literature, but not all of it. Many studies found that gender

was not significant, especially in more complicated models with many predictors included, which is consistent with this study's results (Pritchard & Wilson, 2003; Stewart, Lim, & Kim, 2015; Reason, 2001; Herbert et al., 2014). However, contrary to this study's results, past research found that women with disabilities were more likely to persist and graduate (Pingry O'Neill, Markwark, & French, 2012; Mamiseishvili & Koch, 2011). Age was also not found significant within this study, but previous studies using an older version of the same dataset have found that age was negatively related to persistence for students with disabilities (Mamiseishvili & Koch, 2011). Although there were mixed findings from past research on race and ethnicity's relationship to retention, persistence, and graduation, this study found no significance for any of these predictors. This contradicts the past research that found differences in the relationship between a student's race or ethnicity and their retention (D'Lima, Winsler & Kitsantas, 2014; Astin & Oseguera, 2005; Berkner, He, & Cattaldi, 2002; Leppel, 2002; Mamiseishvili & Koch, 2011). Finally, high school GPA and SAT or ACT scores were not found significant within this study. Most of the previous literature found that high school GPA is one of the best predictors of retention, which strongly contradicts the current findings (Hoffman & Lowitz, 2005; Livingston, 2007; Tross et al., 2000; Westrick et al., 2015). However, the research on the relationship of SAT and ACT scores to retention is mixed and these scores were not always found to be significant (Saunders-Scott, Braley, & Spidahl, 2017; Bowen, Chingos, & McPherson, 2009; Stewart, Lim, and Kim, 2015). Although these pre-college characteristics may have been significant in a simpler model, since other predictor variables were held constant in the current model, these variables were non-significant for students with disabilities.

Looking at the different disability types, learning and psychological disabilities were found negatively related to retention in the logistic regression model. This is consistent with past

research that found that students with non-apparent disabilities have less likelihood of retention and graduate compared to their peers with apparent disabilities (Kranke et al., 2013; Pingry O'Neill, Markward, & French, 2012). However, in the linear probability model with the weight included the significance of psychological disabilities does not hold once the oversampling is accounted for. Therefore, only learning disabilities is constantly significant in both models and found to be negatively related to retention compared to the other types of disabilities. This contradicts some past research that found that students with psychological disabilities were less likely to graduate than their peers with learning disabilities (McEwan & Downie, 2013). However, it is consistent with research that found that students with learning disabilities are only half as likely to graduate as those with physical disabilities (Pingry O'Neill, Markward, & French, 2012).

Only a couple of the social integration variables were significant in the logistic regression model. Positive feelings of belonging and neutral satisfaction with social experience were positively related to retention for students with disabilities. However, in the linear probability model with the weight included, the significance of the neutral satisfaction with social experience does not hold once the oversampling is accounted for. Positive feelings of belonging is the only social integration variable that is constantly significant in both models. Since that was the only social integration variable that is significant, the results of this study seem to contradict past research on the importance of interaction with and support from peers for students with disabilities. However, belonging to an institution can include interactions with peers and involvement in extracurricular activities and so this finding does support past research on the importance of social integration for students with disabilities (Hong, 2015; Timmerman & Mulvihill, 2015; Fitchen et al., 2014; Reed & Curtis, 2012).

The only academic integration variable that was significant in the logistic regression model was neutral faculty interaction. Within this model, neutral faculty interaction had a negative relationship to the first-year retention rate for students with disabilities. However, in the linear probability model with the weight included the significance of the neutral faculty interaction does not hold once the oversampling is accounted for. This highly contradicts the past research that found the importance and significance of academic integration, especially faculty interaction and support, for students with disabilities (Denhart, 2008; Hong, 2015; Kranke et al., 2013; Thompson-Ebanks, 2014; Timmerman & Mulvihill, 2015).

Although most of the social and academic integration variables were not significant for the retention of students with disabilities, this could be due to the type of variables that were included in the model. In older BPS datasets, there were specific social and academic integration variables. However, these variables no longer exist in the current BPS dataset used in this study, and instead the variables that best matched the previous research were used. Perhaps if I had included different variables, or if BPS 12/14 still had the social and academic integration variable, there would have been more significant relationships found. Furthermore, past research has demonstrated the importance of integration into one of the institutional constructs over the other. Finding that only a social integration variable of a sense of belonging held significant in the current models is consistent with past research that found that only social integration had a positive and strong relationship with institutional commitment, which can then influence a student's decision to stay or leave (Woosley & Miller, 2009; Jones, 2010). Therefore, this study further demonstrates the significance of integration into the social over the academic construct of college and especially for students with disabilities.

The only predictor that was significant for the other college factors was college GPA. However, although it was highly significant in the logistic regression model it was no longer significant in the linear probability model with the weight included once the oversampling is accounted for. The original significant finding is consistent with past research that found college GPA to be a significant predictor (Yeu & Fu, 2016; Raju & Schumacker, 2015; Westrick et al., 2015). This is also consistent with past studies that found that college GPA was a strong predictor of retention and graduation for students with disabilities (Mamiseishvili & Koch, 2011; Herbert et al., 2014). However, since GPA is no longer significant once weight is included, the results of this study contradict all previous research. This could be due to the complex model used that held many variables constant. Furthermore, these results demonstrate that none of the other college factors were constantly significant in the models to predict retention. Past research has found significant relationships between major choice and retention or persistence and the results from this study contradict these previous findings (Leppel, 2001; John et al., 2004). Past research on financial aid has been mixed, but often it has been found to have a significant relationship with retention (Dynarski & Scott-Clayton, 2013; Jackson & Reynolds, 2013; Stewart, Lim, & Kim, 2015; Gross et al., 2015; Chen & DesJardins, 2010; Jones-White et al., 2013; Dowd, 2005; Kim, 2007). However, the current findings demonstrate that financial aid does not have a significant relationship with retention for students with disabilities.

The third and final research question examined whether the relationship between having a disability or not and first-year retention rates varied based on positive academic and social integration for all students. However, the results from both the logistic regression model and the linear probability model showed that there were no significant interaction results. Although, it was expected that there would be an interaction effect based on the past research, there was not.

Perhaps, if there were other types of social and academic integration variables available to use then there would have been significant findings.

### **Theoretical Implications and Findings**

The conceptual framework used for the first-year retention rate model included pre-college characteristics, disability type, academic integration, social integration, and other college factors. Past literature, reviewed in Chapter II, has found a relationship between these factors and retention, especially for students with disabilities. Furthermore, utilizing Tinto's Model of Voluntary Student Departure (1975) and Sanford's Challenge and Support Theory (1962) to create the conceptual framework provided an understanding of students with disabilities' experience of their first year in college. Each of these factors can then influence students' with disabilities retention to their second year of college based on this experience.

Tinto's Model of Voluntary Student Departure (1975) focused on the importance of a student's pre-college characteristics and their integration into college, which can then influence their retention. Sanford's Challenge and Support Theory (1962) emphasized the supports students receive and how they can help them overcome challenges in order to develop as a successful college student. The findings from this study add to these theoretical frameworks by demonstrating the significance of feeling like one belongs to their institution for students with disabilities, which then increases their likelihood of retention. This indicates the importance for students with disabilities to successfully integrate into the social construct of their postsecondary institution. The current findings also revealed that only social integration was significant and academic integration was not as important for students with disabilities. However, feelings of belonging can include many aspects of college life, including support from or interaction with peers and faculty and involvement in extracurricular activities.

Furthermore, these theories did not examine the relationship between disability type and retention. However, this study finds a negative relationship between having a learning disability and retention. Students with learning disabilities had a lower likelihood of retaining to their second year compared to their peers with other disability types. Meanwhile, psychological and apparent disability types did not have a significant relationship with retention in both models. Therefore, these results add to the theoretical frameworks by demonstrating the significance of having one disability type over another.

Contrary to the conceptual framework, pre-college characteristics, except for socioeconomic status, and other college factors were not significant predictors of first-year retention for students with disabilities. Although this does not disprove the significance of these factors in Tinto's theories, it may demonstrate that for students with disabilities these factors do not matter in retention when other factors are held constant. Instead, these factors may only be important for students without disabilities' retention in higher education. Furthermore, it may signify that other factors that were not included in this study are more significant for students with disabilities. Therefore, more research may be needed in order to understand why most pre-college characteristics and other college factors were not significant within this study, as well what other factors could be significant.

Furthermore, positive social and academic integration were not found to have an interaction effect on retention when comparing students with and without disabilities. This contradicts the proposed conceptual framework, as well as Tinto's Model of Voluntary Student Departure that emphasized the importance of socially and academically integrating into one's college environment. However, these results may indicate that when looking at the entire population of students with and without disabilities there are no differences between the two

groups in regard to the interaction between their positive social and academic integration and retention. Although social integration was significant only for students with disabilities, it seems that when included in the entire population there are no significant interaction effects. Therefore, there are no differences between the two groups.

## **Implications and Recommendations**

### **Implications for Policy and Practice**

Nearly every college and university in the United States enrolls students with disabilities (Raue & Lewis, 2011). However, this population of students are often thought of as a “forgotten minority” in higher education and their needs are sometimes ignored by faculty and staff. They also face many barriers that often impede their engagement within higher education, which includes academic, social, institutional, physical, and attitudinal (Quaye & Harper, 2015). According to Adams and Proctor (2010), “students with disabilities are more at risk in terms of their overall student adaptation to the college experience, social adjustment, and institutional attachment to college” when compared to students without disabilities (p. 175). As this study also found, students with disabilities were 2.98 times more likely to be retained to their second year if they had positive feelings of belonging, which is an aspect of social integration. Higher education institutions need to do more in order to assist students with disabilities and help them feel like they are a part of their institution and can succeed. Furthermore, it needs to be an institution-wide effort to help students with disabilities remain in school and increase their retention rates.

One of the ways institutions can start to help students with disabilities succeed and feel like they are part of the university is through promoting the Office of Disability Services, the staff within this office, and the accommodations they provide. Several studies have examined the



role and impact of these offices and accommodations on students with disabilities within higher education. Research has found that registering with disability support services and utilizing the accommodations they provide can help students achieve success and persist through college. (Herbert et al., 2014; Timmerman & Milvihill, 2014; Pingry O'Neill, Markward, & French, 2012; Abreu et al., 2017). This office can, thus, guide these students through their transition into college by providing them with support and accommodations to succeed. They can also assist with other aspects of college life that can help them feel like they belong, such as joining clubs, interacting with peers, and participating in extracurricular activities. Since many disability coordinators are trained in specifically helping students with disabilities, they can sometimes be the only person on campus who fully understands a student's abilities and challenges based on their disability. Students have spoken in past studies about how important and crucial a disability specialist was for their success, because they were able to understand their perspective and workload (Denhart, 2008).

However, these students may not be retained without support from the institution and disability offices. According to Hong (2015), "if institutions do not find a way to help students with disabilities access key support services, such as counseling, priority registration, testing accommodations, and self-advocacy interventions, these students are less likely to persist in college and more likely to resort to a premature departure" (p. 223). Although assisting students with disabilities needs to be an institution-wide effort from every office on campus, this help can start with the Office of Disabilities Services. However, many students do not always know about disability services or accommodations and, thus, do not receive the support they are entitled to receive. Only 79% of postsecondary institutions in the United States distribute information and materials that encourage students to self-identity as an individual with disabilities (Raue &

Lewis, 2011). More institutions should be advertising the services and accommodations their Office of Disability Services provides so students are aware of the assistance they could receive. Furthermore, high schools should also be promoting these offices and informing students of the accommodations they could receive at the institutions they apply to. These changes could help students with disabilities be more aware of the Office of Disability Services on their campus in order to receive the help and guidance they need to socially integrate into higher education and, thus, to be retained.

Although faculty interactions were not a significant predictor in this study's final results, faculty could impact how much a student feels they belong to their university. Therefore, interactions should be positive and support from faculty is important for success. Kranke et al. (2013) found that students who chose to disclose their disability to their institution did so because their professors were supportive and understanding. This support occurred before and after students had disclosed their disability and demonstrates the positive outcomes of faculty understanding. The students in this study who had professors that were accepting of them and their disability were able to talk with their professors about their disability without judgement. This helped students establish better relationships with faculty, as well as create an environment where they were not worried about utilizing their accommodations. Furthermore, students interviewed by Timmerman & Mulvihill (2015) had faculty mentors that contributed substantially to their success in college. These mentors helped them navigate through college, develop self-advocacy skills, and were a positive support for each of them. One student even stated that, "what helps the most is the knowledge that her faculty mentor is someone who she knows is there for her and believes in her" (Timmerman & Mulvihill, 2015, p. 1619). Therefore,

positive faculty interactions are important for students with disabilities to feel like they belong at their institution, which in turn can help with their retention to their second year.

There are many various types of disabilities an individual can have, and each one can impact their life differently. Past research has reported that different types of disabilities can influence a student's experience in college as well. This study found that students with learning disabilities are 53% less likely to be retained to their second year of college compared to students with other types of disabilities. Meanwhile, apparent and psychological disabilities did not have any significant effect on retention. According to Raue & Lewis (2011), the most common type of disability that students had in the 2008-2009 academic year was a learning disability with 86% of enrolled students in all institutions having this type of disability. Since a learning disability is the most common disability type within higher education and these students do not have retention rates as high as their peers, it is important for institutions to specifically assist and guide them.

Students with non-apparent disabilities have often been found to struggle more in postsecondary education because their disability is not seen and, thus, not always believed by faculty and peers. This is especially true for students with learning disabilities. One study found that students with learning disabilities often worked harder and longer on assignments, but professors were unable to see their potential and misunderstood their intelligence due to their learning disability. The students felt that they were being treated differently, and their professors did not understand how their disability impacted their studies. The negative attitude and perceptions these students encountered from their faculty impacted their experiences in college, as well as their self-worth and value (Denhart, 2008). Denhart (2008) found that faculty perceptions were crucial to their experiences, while the current study found that these students are less likely to be retained. Therefore, faculty need more training and professional development

on the different types of learning disabilities. This could then help faculty understand these students and how their disability could impact their learning, which will then help them change their teaching styles and techniques in order to better help them succeed.

Many students with learning disabilities have also reported that they take longer to get their assignments and coursework completed, and then feel as though they did not produce worthy products (Denhart, 2008). Students with learning disabilities spoke about how the heavy workload they experienced compared to their non-disabled peers was a major barrier to their academic success. Nine out of eleven of the students interviewed in a study by Denhart (2008) said they worked more on assignments than their peers. Eight felt that even though they worked harder, they did not create a quality product and feared they would be seen as lazy or not academically competent to be in college even though they felt they were. Many of these students also had trouble organizing reading and writing concepts and communicating verbally and in writing. They felt that these were significant barriers that impacted their access and integration into higher education (Denhart, 2008). Although these students originally felt intellectually capable of being in college, these challenges created added barriers for them and made integration difficult.

Through the past research, it is clear that students with learning disabilities are having difficulties within the classroom that could be influencing their low retention rate found within this study. Therefore, postsecondary institutions need to do more for students with these types of disabilities in order to help them succeed. Providing faculty and staff with professional development on learning disabilities in order to help them understand how to teach specifically for these students could be crucial for their success. Providing additional and voluntary tutoring for students with learning disabilities may help them feel more academically prepared for

classes, exams, and papers. Furthermore, online or on-campus workshops on academic strategies for classes and exams, such as different studying or note-taking skills should be provided each semester. Informing students with learning disabilities about the Office of Disability Services so they can apply for the appropriate accommodations will also better ensure their success and retention in college. Finally, high school counselors can better prepare these students for college by teaching them academic skills and tools to mitigate the impact of their functional limitations, as well as provide guidance about accommodations and disability services while they are still in high school. Improved communication between high schools and postsecondary institutions is also needed to ensure a smoother transition into college.

### **Recommendations for Future Research**

This study's findings demonstrate that additional research is needed on students with disabilities in postsecondary education. This study found that students with learning disabilities were less likely to be retained to their second year of college compared to students with other types of disabilities. Therefore, more research is needed on why this specific type of disability has a lower likelihood of retention. Future studies should examine the factors that are associated with retention for students with only learning disabilities. Furthermore, expanding this research to a qualitative design would improve understanding of how their first year of college is different from their peers. A qualitative study could examine these differences from the students' own perspectives. These types of studies could help decrease the retention gap of students with learning disabilities and help them succeed.

The results from this study also found that positive feelings of belonging had a strong and positive relationship to first-year retention. However, the other social and academic integration variables were not found significant even though they were found to be significant in past

research. This indicates that more work needs to be done on the social and academic integration of students with disabilities. Qualitative research should be completed in order to understand from their perspective how they are academically and socially integrating into their college and how that is influencing their institutional commitment and retention. Furthermore, only certain social and academic integration variables were included in the model. Future research could include other variables that may influence a student's integration into college to examine if they have a relationship with first-year retention rates.

Since the interaction effects within this study were also not found significant, future research could continue to compare the integration of students with disabilities with the integration of students without disabilities to see if there are any differences. Furthermore, more research needs to be done on the retention differences between students with and without disabilities. It would also be worthwhile to examine the interaction effects of having a disability or not with the other student-level variables included in this study's model. This could determine other factors that may have an interaction with having a disability and retention, which could then help lower the retention gap for students with disabilities.

This study specifically looked at students with and without disabilities in 4-year institutions. Therefore, future research could use a national dataset to examine the retention of these students within 2-year institutions, as well as compare the retention of students from 4-year and 2-year institutions to see if there are any differences. This study also only examined student-level factors and not institutional-level factors. Although institutional-level factors were controlled for using fixed-effects, future studies could examine what institutional-level factors predict retention for students with disabilities. Since not many student-level factors were

significant in this study, it would be worthwhile to see if any institutional-level factors are significant.

This study only examined the first-year retention rate of students with disabilities in higher education. Now that the latest wave of data has been released, future research should continue to use this national dataset and examine the retention and graduation rates after the second year. This type of future research could indicate that the social and academic integration variables may be more significant when looking at the second-to-third year retention for this population of students. Furthermore, since students with disabilities have been found to have lower graduation rates than their peers it is important to examine whether this is still true within this context. It is also important to understand what factors determine whether these students graduate or not. Furthermore, this study only looked at the retention rates of students with disabilities within a single institution. Future research should examine the first-year persistence rate of students with disabilities to see if there are any differences between their persistence and retention rates. It would also be worthwhile to investigate whether the social and academic integration factors used in this model can predict persistence for this population of students.

The findings from this study also provide suggested topics for future NCES data collection for research evaluating social and academic integration, as well as students with disabilities. Although previous BPS studies had specific academic and integration variables, the most current BPS study does not. The current BPS survey also does not have other factors the literature has shown to be related to integration. These factors include participation in extracurricular activities and clubs, as well as support from faculty. Past research has demonstrated that students with disabilities are not always able to participate in extracurricular activities and including these variables in the survey could allow future researchers to use them

in their model. Furthermore, although the survey included interactions with faculty, it does not have a support from faculty variable. Again, since research has indicated that support from faculty is very important for students with disabilities, it is important to include this variable within the survey to use in future research.

The BPS survey is also limited in its questions on disability type and accommodations. The only disability questions the survey currently asks are about whether a student has a disability and what type of disability they have. The BPS survey should, in the future, include questions on whether students with disabilities have registered their disability with their institution, if they are using accommodations and which ones, and how useful the accommodations have been. This could provide future researchers with factors to examine the relationship between the disability office and accommodations and retention. Students are also only able to select one type of disability on the survey, which limits data collection and the accuracy of results for students with multiple disabilities. According to Newman et al. (2011), 33% of students who enrolled in postsecondary institutions had multiple disabilities within 8 years of leaving high school. Therefore, the BPS survey should include questions for students with multiple disabilities in order for future researchers to examine the influence of more than one disability on retention using a national dataset.

### **Conclusion**

As more students with disabilities enroll in higher education, it is important to understand their retention and experience in college. This study aimed to do that by examining the first-year retention rate of students with disabilities and which social and academic integration factors influenced their retention. The results from this study found that students with learning disabilities were less likely to be retained than their peers with other types of disabilities.



Furthermore, the only social integration variable that mattered in retention was positive feelings of belonging where students with disabilities who had higher feelings of belonging had greater likelihood of retention to their second year of college. Future research on this topic is needed in order to understand in greater depth the experiences of students with disabilities in college and what will help their retention rates compared to those without disabilities. Additional suggestions were also provided on how to expand the NCES BPS survey in order to further investigate students with disabilities and social and academic integration.

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**APPENDIX**  
**INSTITUTIONAL REVIEW BOARD APPROVAL**



May 29, 2019

Dear Ms. Matesic,

The Research Ethics Committee of the Seton Hall University Institutional Review Board office has reviewed your research proposal entitled "First-to-Second-Year Retention of Students with Disabilities in Higher Education" and categorized it as exempt (reflecting the intent of the new federal regulations).

Enclosed for your records is the signed Request for Approval form.

If used, Informed Consent documents and recruitment flyers are no longer stamped.

Thank you for your cooperation.

Sincerely,



Mary F. Ruzicka, Ph.D.  
Professor  
Director, Institutional Review Board

cc: Dr. Rong Chen

Please review Seton Hall University IRB's Policies and Procedures on website (<http://www.provost.shu.edu/IRB>) for more information. Please note the following requirements:

**Adverse Reactions:** If any untoward incidents or adverse reactions should develop as a result of this study, you are required to immediately notify in writing the Seton Hall University IRB Director, your sponsor and any federal regulatory institutions which may oversee this research, such as the OHRP or the FDA. If the problem is serious, approval may be withdrawn pending further review by the IRB.

**Amendments:** If you wish to change **any** aspect of this study, please communicate your request in writing (with revised copies of the protocol and/or informed consent where applicable and the Amendment Form) to the IRB Director. The new procedures cannot be initiated until you receive IRB approval.

Office of Institutional Review Board

Presidents Hall • 400 South Orange Avenue • South Orange, NJ 07079 • Tel: 973.313.6314 • Fax: 973.275.2361 • [www.shu.edu](http://www.shu.edu)

A H O M E F O R T H E M I N D , T H E H E A R T A N D T H E S P I R I T

**REQUEST FOR APPROVAL OF RESEARCH, DEMONSTRATION OR  
RELATED ACTIVITIES INVOLVING HUMAN SUBJECTS**

All material must be typed.

PROJECT TITLE: First-to-Second-Year Retention of Students with Disabilities in Higher Education

H2019.5.2

**CERTIFICATION STATEMENT:**

In making **this application**, I(we) certify that I(we) have read and understand the University's policies and procedures governing research, development, and related activities involving human subjects. I (we) shall comply with the letter and spirit of those policies. I(we) further acknowledge my(our) obligation to (1) obtain written approval of significant deviations from the originally-approved protocol BEFORE making those deviations, and (2) report immediately all adverse effects of the study on the subjects to the Director of the Institutional Review Board, Seton Hall University, South Orange, NJ 07079.

Megan Matesic  
RESEARCHER(S)

Megan Matesic

4/29/2019  
DATE

**\*\*Please print or type out names of all researchers below signature.  
Use separate sheet of paper, if necessary.\*\***

My signature indicates that I have reviewed the attached materials of my student advisee and consider them to meet IRB standards.

Rong Chen  
RESEARCHER'S FACULTY ADVISOR [for student researchers only]

Rong Chen

4/29/2019  
DATE

**\*\*Please print or type out name below signature\*\***

The request for approval submitted by the above researcher(s) was considered by the IRB for Research Involving Human Subjects Research at the May 2019 meeting.

The application was approved ☒ not approved ☐ by the Committee. Special conditions were ☐ were not ☒ set by the IRB. (Any special conditions are described on the reverse side.)

Marcy J. Ruzicka, Ph.D.  
DIRECTOR,  
SETON HALL UNIVERSITY INSTITUTIONAL  
REVIEW BOARD FOR HUMAN SUBJECTS RESEARCH

5/29/19  
DATE