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Inclusive Academic Education & Vocationally-Oriented Transition Predictors' Association With Post-Secondary Outcomes Of Youth With Intellectual And Developmental Disabilities

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INCLUSIVE ACADEMIC EDUCATION & VOCATIONALLY-ORIENTED TRANSITION PREDICTORS' ASSOCIATION WITH POST-SECONDARY OUTCOMES OF YOUTH WITH INTELLECTUAL AND DEVELOPMENTAL DISABILITIES

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Special Education at Virginia Commonwealth University

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ABSTRACT

INCLUSIVE ACADEMIC EDUCATION & VOCATIONALLY-ORIENTED TRANSITION PREDICTORS' ASSOCIATION WITH POST-SECONDARY OUTCOMES OF YOUTH WITH INTELLECTUAL AND DEVELOPMENTAL DISABILITIES

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Despite efforts through legislation to increase the engagement of individuals with intellectual and developmental disabilities (IDD) in competitive integrated employment (CIE) and post-secondary education, outcomes remain poor. However, recent policy has emphasized CIE as a preferred outcome and created new opportunities to engage individuals with IDD in post-secondary education. Likewise, research into the transition of youth with disabilities has revealed several predictors of post-school success including inclusive education and a variety of vocationally-oriented experiences. Previous research had not determined whether students with IDD received both inclusive academic education and vocational transition experiences or how these predictors might interact. The purpose of this study was to examine the association of inclusive academic education and vocational transition experiences (e.g., work experience, internships, career and technical education) on post-secondary outcomes in employment and

education, whether any interaction occurred between the two sets of predictors, and whether these relationships differed for students from historically marginalized racial and ethnic groups. Multiple logistic and linear regression was used on data collected from the High School Longitudinal Study of 2009. Findings showed complex relationships between these sets of variables. Most prominently, inclusively academic education consistently predicted enrollment in post-secondary education. This study provides evidence that both inclusive academic education and vocational transition experience lead to pathways toward post-secondary success for some students. Implications for future research, policy, and practice based on these findings are discussed.

CHAPTER 1: INTRODUCTION

The inclusion of individuals with intellectual and developmental disabilities (IDD) in workplaces and schools remains a key challenge. Despite a focus on research, policy, and practice on integrating individuals with more significant disabilities into all aspects of community life in the decades following emancipation from state institutions in the mid 20th century, employment outcomes today remain poor for those with IDD (Hiersteiner, 2016). Currently, less than 20% of individuals with IDD achieve competitive, integrated employment (CIE) with many unemployed, underemployed, and receiving only subminimum wages in segregated work settings (Winsor, 2016). Similarly, youth and adults with IDD have historically had limited access to postsecondary education (PSE; Liu et al., 2018). While recent legislation has looked to expand college access for those with IDD through model demonstrations across the country, only 28% of youth with IDD enroll in college after graduation (Grigal et al., 2011). Postsecondary outcomes are even more concerning for students with IDD from historically marginalized racial and ethnic groups (Achola & Greene, 2016; Anderson & Smart, 2010; Thoma et al., 2016).

Fortunately, recent studies using national longitudinal data have identified several predictors and pathways to improved postsecondary outcomes in employment and education. One predictor that applies to both employment and post-secondary education is inclusive K-12 education. Other predictors include more specialized transition activities like work experience, vocational education, and internship participation (Carter et al., 2012; Mazzotti et al., 2021).

While there is some debate among researchers over which of these areas requires more urgent attention, there is consensus that students require both inclusive education with rigorous academic instruction, as well as specialized and functional transition preparation (e.g., Ayres et al., 2012; Courtade et al., 2012; Test et al., 2014). However, despite research indicating the importance of inclusive education, there remain a large portion of school-aged students with IDD who continue to receive instruction in highly restrictive and segregated educational settings (Kurth et al., 2014). This is particularly troubling for youth with IDD as it represents not only a barrier to integration in inclusive school communities and more rigorous academic expectations, but also means that many students with IDD miss out on a key research-based predictor of post-school success.

Policy & Legislation Regarding Inclusive Education & CIE

In order to address these persistent barriers, federal legislation in the last two decades has consistently promoted the inclusion of people with IDD in various service delivery systems (i.e., K-12, employment, and higher education). In K-12 education, the inclusion of students with IDD now covers the physical setting where instruction takes place, access to the general education curriculum, and participation in state and district accountability systems. In higher education, recent legislation (e.g., Higher Education Opportunity Act of 2008) has led to an increase in both programming and available funding for individuals with IDD to enroll in higher education. Finally, recent employment policy changes have mandated that the goal of vocational services provided to individuals with disabilities should be specifically on CIE (Workforce Innovation and Opportunity Act, 2014). This federal legislation has also been coupled with efforts at the state level to address post-secondary outcomes for students with IDD. In Virginia, the Joint Legislative Audit and Review Commission (2020) issued a report with several recommendations

related to improving the outcomes for youth with IDD as well as addressing graduation gaps for Black youth with disabilities. The following section will provide a summary of federal legislation promoting inclusive education and post-secondary employment.

No Child Left Behind Act of 2001

NCLB (2001) dramatically shifted education policy and expanded inclusive academic education by ensuring that students with disabilities have access to the general curriculum, as well as ensuring their participation in accountability systems. NCLB (2001) also mandated the use of evidence-based practices for all students and that instruction be delivered by highly-qualified teachers. While some of its requirements for high-stakes takes were controversial throughout its implementation, NCLB (2001) focused on addressing closing achievement gaps for groups of students who had historically underperformed to a much greater degree than previous policy, including students with disabilities. Per NCLB's accountability guidelines, students with significant cognitive disabilities could not be excluded from assessment, and those qualifying as needing alternate methods of assessment cannot exceed 1% of a school or district student population (NCLB, 2001). The Elementary and Secondary Education Act (ESSA; 2015) maintains many of the protections for students with disabilities introduced by NCLB, including participation in accountability standards and a federal commitment to closing achievement gaps. States now have authority to develop implementation plans under ESSA designed to address these gaps in equity and achievement while increasing the quality of instruction and student outcomes after graduation.

Individuals with Disabilities Education Improvement Act of 2004

Special education services provided to school-aged students in K-12 settings are governed by the Individuals with Disabilities Education Improvement Act of 2004. This most

recent reauthorization primarily focused on aligning IDEA (2004) with elements of NCLB such as the use of evidence-based practices and emphasis on academic curricular standards for students. IDEA (2004) maintained many key policies of previous versions of the legislation concerning inclusive education including students' right to a free and appropriate public education (FAPE) and provision of services in the least restrictive environment (LRE). Despite these long-standing inclusive principles in IDEA (2004), interpretation in practice has varied between inclusion advocates arguing for universal full inclusion in typical classrooms (Artiles & Kozleski, 2016) and court precedent that has balanced the merit of more restrictive settings that provide more intensive specially-designed instruction with the opportunity for access to environments and peers without disabilities (Yell, 2015).

IDEA (2004) also provides legislative guidance and requirement for transition planning and services for students with disabilities. These transition requirements were introduced into special education law in the 1997 reauthorization of IDEA, which required that students should receive transition-related content by age 14 and services by age 16. These transition programs required by IDEA (2004) should be individualized based on student strengths and needs, and outline goals for ideal postsecondary outcomes in employment, education and training, and independent living. Thus, IDEA (2004) includes requirements both for ensuring the participation of students with disabilities in the general education curriculum as well as alignment of educational services with long-term vocational outcomes.

Higher Education Opportunity Act of 2008

The Higher Education Opportunity Act of 2008 (HEOA) sought to address gaps in access to higher education opportunities for students with disabilities by creating a new grant to provide for transition and postsecondary programs for students with intellectual disabilities (TPSID).

TPSID is a national demonstration and dissemination project designed to increase college enrollment for individuals with IDD. Initial evaluation of TPSID programs has shown their potential utility as a pathway to competitive employment, especially in those programs that provide inclusive education and specific work experiences (Grigal et al., 2019). Other significant policy amendments introduced by HEOA (2008) included changes to federal financial aid access for youth with IDD and the removal of restrictions for disability benefits recipients. Policies introduced by HEOA (2008) and other disability rights policies such as the Americans with Disabilities Act of 1990 led to an increase in post-secondary enrollment from 3% to 11% over the previous three decades (Madaus et al., 2012).

Workforce Innovation and Opportunity Act of 2014

The Workforce Innovation and Opportunity Act of 2014 (WIOA) reauthorized the Rehabilitation Act of 1973 and made several significant policy changes specific to individuals with disabilities, especially youth transitioning between K-12 education and adulthood (Wehman et al., 2018). First, WIOA (2014) established the focus and goal of all publicly-funded vocational services should be on competitive integrated employment (CIE)—specific language that dismissed segregated vocational alternatives as appropriate outcomes for individuals with IDD. Secondly, WIOA (2014) mandated that state vocational rehabilitation agencies must use 15% of their annual budgets on coordinating and providing Pre-Employment Transition Services (Pre-ETS) to students still enrolled in K-12 education (Taylor et al., 2019). These required Pre-ETS include services in the categories of job exploration counseling, work-based learning, counseling on transition or PSE programs, workplace readiness training, and instruction in self-advocacy (Taylor et al., 2021). Additionally, these funds may be spent on coordination activities such as attending student transition IEP meetings, collaborating with stakeholders to develop internship,

apprenticeship, and summer work experiences, as well as working with schools to coordinate joint activities (Workforce Innovation Technical Assistance Center, 2019).

Evidence Related to School Factors Promoting Positive Postsecondary Outcomes

Research outcomes for adults with IDD are consistently poor across employment, PSE, and community living (e.g., Newman et al., 2011; Roux et al., 2018; Winsor et al., 2016). Following persistent rates of un- and underemployment and engagement in other areas of community life, research and policy in the 1990s began to focus the resources of K-12 special education on improving outcomes for youth with disabilities (Wehman et al., 2018). Given the small number of youth and adults achieving preferred outcomes, much of the transition research literature has examined potential pathways and school-age predictors which could lead to more successful outcomes for individuals with IDD (Carter et al., 2012; Siperstein et al., 2014).

Transition Predictors of Post-School Success

The identification of transition predictors of post-school success has been largely based on research using data from the National Longitudinal Transition Study-2 (NLTS-2; e.g., Newman et al., 2011; Taylor et al., 2020). NLTS-2 data were collected from a national sample of youth who were aged 13 to 16 at the beginning of the study in 2003 and continued to provide data to the NLTS-2 study as they moved from secondary grades into adulthood ten years later. Researchers using NLTS-2 data produced considerable evidence for various secondary experiences and transition activities of students with disabilities. These findings were synthesized in a series of literature reviews and meta-analyses which coalesced into several key predictors of post-school success (Carter et al., 2012; Haber et al., 2016; Mazzotti et al., 2021; Mazzotti et al., 2016; Test et al., 2009). These reviews evaluate the strength of evidence behind various predictors (i.e., none, potential, emerging evidence, and moderate) in the areas of

employment, PSE, and independent living to guide practitioners. Predictors of post-school success can include a diverse array of transition experiences such as paid work prior to graduation, inclusive educational experiences, self-determination instruction, and response prompting, among others (Mazzotti et al., 2021). However, the majority of studies describing predictors of post-school success (e.g., Mazzotti et al., 2021; Mazzotti et al., 2016; Rowe et al., 2021) do not focus specifically on individuals with IDD (Taylor et al., 2020). Therefore, while the predictors of post-school success offer a general framework for transition best practice, it is less certain how these apply to the specific subpopulation of students with IDD.

Inclusive Education as a Predictor

Among the recommended predictors, inclusive K-12 education is one of only a few that predict post-school success across multiple domains at a research-based level of evidence (Mazzotti et al., 2021). However, as noted earlier regarding the predictors as a whole, inclusive education has been identified as a predictor of post-school success for students with disabilities, but few studies explore relationships specific to youth with IDD, and none were uncovered that specifically examined the association between K-12 academic inclusion and postsecondary success of youth with IDD (Taylor et al., 2020). Among the limited research literature focused on the relationship between inclusive education and postschool outcomes for individuals with IDD or a related disability category (e.g., autism spectrum disorder, intellectual disability), most of these studies have presented promising results (e.g., Baer et al., 2011; Chan et al., 2018). However, it is worth noting that Foster and Pearson (2012) did not find a significant relationship between inclusive education and enrollment in PSE when using a more complex propensity score matching design to test for a causal link between inclusive education and enrollment in PSE.

Covariates used in this design included measures of functional cognition, severity of disability (parent report), social skills, and family support for education.

Overview of Study

While the integration of individuals with IDD in various aspects of community life throughout the lifespan is a goal in and of itself, it is important to explore how the earlier experiences of individuals impact their outcomes in adulthood. Inclusive education has been highlighted as a research-based predictor of success in employment and PSE for students with disabilities in general (e.g., Mazzotti et al., 2021). Furthermore, recent research has increasingly highlighted the importance and practicality of rigorous academic instruction for students with IDD as part of effective and comprehensive transition planning (e.g., Courtade et al., 2012; Test, Smith, Carter, 2014). Bronfenbrenner's (1976) Ecological Systems Theory offers a useful approach for examining how students' educational experiences and trajectories are impacted by interactions between individuals, practices, policies, and beliefs nested around a student. Especially given that ecological systems change over time (i.e., chronosystem) based on shifts in policy and cultural attitudes (Bronfenbrenner, 1976), it is important to examine how inclusive education relates to positive adult outcomes, whether these experiences co-occur with other recommended transition practices, and how these relate to the experiences of historically marginalized racial and ethnic groups. Data from the High School Longitudinal Study (HSLS) was used to investigate whether inclusive education predicts employment and enrollment for individuals with IDD and how these variables interact with other predictive relationships.

Statement of the Problem

Many individuals with IDD do not achieve CIE and enrollment in higher education after graduating from high school (Winsor et al., 2018). In studying the pathways and predictors to

CIE and PSE enrollment, several pathways and predictors emerged across the research literature that have been identified earlier and will be discussed at greater length in the following chapters. However, while consensus in the literature supports both rigorously academic, inclusive education and more specialized and vocationally-oriented transition preparation, it is unclear the extent to which students are receiving such a comprehensive program of services, and how that impacts postsecondary outcomes. Furthermore, recent policy in K-12 and higher education, as well as employment has sought to promote major change in many of these areas. As a result, it is currently unclear how inclusive academic education, following policy changes, relates to postsecondary outcomes. Furthermore, while recommended by researchers (e.g., Ayers et al., 2012; Courtade et al., 2012), it is unknown whether students with IDD are currently accessing both inclusive academic education and more robust vocational transition supports, and how that interaction between predictors impacts outcomes. Thus, further research is needed to explore the predictive relationships between inclusive academic education, specialized vocational transition experiences, and post-school outcomes.

Conceptual Framework

Ecological Systems Theory provides a useful framework for analyzing the complex factors that influence a student's education and development (Bronfenbrenner, 1976) and has been used previously in research examining inclusive education (Odom et al., 2004) and self-determination (Shogren, 2013). Given the complicated nature of not only inclusive education itself but also its relation to post-school outcomes, Ecological Systems Theory provides an ideal means of scoping the comprehensive array of factors to offer a rich context for situating this study within the research literature. This framework provides a structure for examining various systems impacting students from direct practices to national and state policies. Likewise, it is

important to better understand the intersection and interaction between critical areas of instruction emphasized in research and practice.

Purpose of the Study

The purpose of this study is to determine how inclusive academic educational factors predict improved postsecondary outcomes in conjunction with other predictors of post-school success. This study builds on previous analyses that examined the longitudinal impact of K-12 and transition experiences of secondary students with IDD, especially inclusive education and specialized pre-employment transition activities that largely utilized data from the NLTS-2 (e.g., Chiang et al., 2012; Foster & Pearson, 2012). Given the passage and implementation of significant legislation (e.g., HEOA, 2008; WIOA, 2014) and publication of practitioner-friendly research on predictors (e.g., Mazzotti et al., 2021), it is important to reexamine the relationship between these factors to ascertain whether policy changes or research-to-practice implementation have influenced these factors individually and in relation to one another. Furthermore, while comprehensive transition programming is recommended, this study will extend the research literature by examining whether students receive both inclusive and rigorous academic instruction and robust vocational transition experiences and programming (e.g., vocational education, internships, work experience) in practice.

Rationale and Significance of the Study

There is significant research literature devoted to examining several important constructs informing this study—transition experiences of students with disabilities, inclusive academic education, pathways to employment for youth, and promoting college enrollment (Wehman et al., 2018). However, significantly less research has explored factors germane to individuals with IDD and their specific characteristics and pathways to achieve similar preferred adult outcomes

(Taylor et al., 2020). Given the persistence of poor outcomes (Winsor et al., 2016) as well as limited access to inclusive education (Kurth et al., 2014), it is important to explore these predictors (i.e., inclusive education and specialized functional transition experiences) not only in isolation but also in conjunction with one another as they are recommended in practice.

In more closely examining the interaction between these predictive transition experiences, this study has the potential to provide more specific guidance to individuals, practitioners, and families about the experiences that are most likely to accomplish their postsecondary goals in employment and enrollment in PSE. Additionally, this study has the potential to inform school and district leadership regarding the organization and prioritization of instructional systems designed to improve state accountability performance related to transition, such as Indicator 14 outcomes. Finally, given the ongoing state and local implementation of key policy mandates such as the provision of Pre-ETS services to school-aged youth through VR, this study has the potential to provide key insights into more effective and impactful use of public funds to achieve CIE.

Research Summary

As mentioned above, previous research conducted in this area has explored several factors relating to transition experiences of youth with IDD, their engagement in inclusive education and robust transition programming, and their relationships with post-secondary outcomes. Many of these studies draw from NLTS-2 data collected on students who attended high school in the early 2000s. Key findings from those studies that used IDD-specific samples—or samples of students included within IDD (i.e., ASD and ID)—include generally positive correlations between inclusive education and employment outcomes (Taylor et al., 2020). Similar studies examining the relationship with PSE were more mixed when controlling

for individual-level covariates related to student ability (Foster & Pearson, 2012). Overall, the research literature recommends that transition-age youth engage in inclusive education as well as other specialized transition experiences like paid work experience, vocational education, and occupational coursework. However, little empirical research has been devoted to examining whether the combination of their recommended transition experiences is happening for youth with IDD. Also, we know that there is little change in the overall rates of CIE for youth with IDD, but there is a gap in the literature examining whether the emphasis on inclusive education and transition evidenced in policy changes in the last two decades has had a significant impact on the relationship between these factors and CIE outcomes. Finally, little research has been devoted to examining the interaction effect between both inclusive academic education and more vocationally-oriented transition activities.

Research Design

In order to address these gaps in the literature, research questions discussed in more detail in chapters 2 and 3 have been developed to examine 1) the extent to which inclusive academic-oriented education predicts postsecondary outcomes, 2) the extent to which vocationally-oriented transition practices predict postsecondary outcomes, 3) how these predictive associations are impacted when controlling for one another, and 4) whether the interaction between inclusion education and vocationally-oriented transition practices predicts postsecondary outcomes. A multiple regression design will be used to determine the association between these categorical (employment status; enrollment in PSE) and continuous variables (earnings; wages) indicating specific types of experiences. Logistic and linear regression has been used extensively in past research to answer questions related to the predictive nature of relationships between specific

transition activities and postsecondary outcomes in employment and education (e.g., Chiang et al., 2012; Simonsen & Neubert, 2012).

Instruments

This study will consist of secondary data analysis from the HSLS data set. The HSLS is a longitudinal survey of more than 23,000 students from 944 schools nationally. The data were collected beginning in the fall of 2009 when participants were in ninth grade and followed those same students through subsequent secondary grades and into the first few years following school exit. This study will use data collected in baseline and follow-up waves including both administrative (i.e., school transcripts, school characteristics) and respondent survey data (e.g., students, parents, teachers, administrators, school counselors).

Summary

This study will apply the Ecological Systems Framework to explore how inclusive academic-oriented education and other transition predictors influence postsecondary outcomes in employment and education. Previous research has indicated that inclusive education positively correlated with outcomes in both these areas for all students. Recommendations from research point to the need for both rigorous inclusive academic instruction and robust functional transition programming. However, it is unclear the extent to which students with IDD are engaging in one or both of these recommended activities. These questions are especially critical in light of the persistently low rates of CIE for individuals with IDD despite numerous policies targeting this issue through several public service sectors (i.e., K-12 education, VR, higher education). Chapter 2 will discuss the research studies examining inclusive academic education and transition to employment. Chapter 3 will outline in greater depth the methodological design used to answer the research questions of this study. Chapter 4 will discuss results of those analyses. Finally,

Chapter 5 will discuss the overall impact of those findings, noted limitations, and the implications for future research, policy, and practice.

CHAPTER 2: LITERATURE REVIEW

Postsecondary outcomes for youth with intellectual and developmental disabilities (IDD) remain poor in all major areas of post-school life. Individuals with IDD lack opportunities to secure and retain employment (Carter et al., 2012; Roux et al., 2018; Wehman et al., 2018), often earning less than minimum wage in segregated work settings (Winsor et al., 2016), resulting in overall rates of competitive integrated employment of less than 20 % (Hiersteiner et al., 2016). Additionally, youth with IDD have limited options to access postsecondary education (PSE) after exiting high school (Grigal, 2016; Liu et al., 2018; Roux et al., 2018). As a result, the focus of much of the research into transition-age students has examined the pathways individuals could follow to achieve those ideal, but rarer successful outcomes in CIE and PSE (Siperstein et al., 2014).

Research in the transition planning of adolescent youth with disabilities has revealed several predictors of success in various areas of postsecondary life, such as employment, education, and independent living (Mazzotti et al. 2021; Test et al, 2009). These predictors of post-school success include a wide variety of both practices and experiences that have been shown to correlate with positive outcomes in one or more of the three areas of post-secondary life. The National Technical Assistance Center on Transition (NTACT; 2019) has organized these predictors by level of evidence. As of this writing, there are no predictors identified as 'evidence-based' in these outcome areas. Of the post-school outcome predictors identified as 'research-based,' four predictors are related to both employment and education—inclusion in

general education, occupational courses, paid work, and vocational education. This study focuses on the one that has been least investigated and most debated—inclusion in general education—as well as those more traditionally vocational transition experiences like previous work, internships, and CTE participation.

NTACT defines the inclusive education predictor as such: "Inclusion in general education requires students with disabilities to have access to general education curriculum and be engaged in regular education classes with peers without disabilities" (NTACT, 2019; Rowe et al., 2014). Inclusion can be operationalized in multiple ways with regard to the physical educational setting—either in a general education classroom or typical school—as well as through intentional efforts to promote interaction between peers with and without disabilities (Yell, 1995). To maintain clarity throughout this study, key terms related to *inclusion*, *inclusive education*, *integration*, *mainstreaming*, and *access to the general education curriculum* are operationally defined in the appendix. As Osgood (2005) points out, these terms have been defined differently by various groups over time, and often interchangeably, but for the sake of clarity within the study, they will be defined individually.

While these terms have been used to describe one or more aspects of *inclusion*, the gradual shift in terminology around the concept also reflects a shift in focus in research, policy, advocacy, and practice. Early research in *inclusion* in the mid to late 20th century following the deinstitutionalization of students with IDD focused primarily on the ethical argument against physical desegregation (e.g., Brown et al., 1991; Sailor, 1988), with *mainstreaming* emerging as an alternative in which students with the most significant disabilities were placed and received educational services in home schools and regular education classrooms (Osgood, 2005). During the 1980s, the focus of *inclusion* advocacy and research shifted from focused on the ethical

considerations for the student to the service delivery model itself. The Regular Education Initiative emerged as a proposed model for integrated not students, but special and general education services and processes (Lilly, 1988). However, REI and other *inclusive education* initiatives were met by fierce criticism among some researchers who accused the movement of losing sight of the purpose of special education and its relation to general education (Fuchs & Fuchs, 1994). In the wake of this controversy, the focus of *inclusion* shifted toward the concept of access to the *general education curriculum*, which resulted in a considerable shift in policy and practice after the passage of the No Child Left Behind Act of 2001, which will be discussed along with other inclusive education policies in a later section.

This debate is far from settled today. While special education refers to a service rather than a place, the place where instruction occurs does matter. We know from research that individuals with IDD learn most effectively in natural environments where skills can be generalized most directly (Neely et al., 2016). However, for transition-age students preparing to enter adulthood, it is unclear whether the "relevant natural environment" should center the general education classroom or the community setting where those skills will be used in adulthood. Historically, students with IDD have been removed from inclusive settings to receive specially designed instruction often in more segregated settings (Kurth et al., 2014). This segregation is often justified by the difference in curricular goals related to transition planning and a focus on life and work skills for students with IDD.

Parallel to the issue of placement itself, there is a debate between whether academic or functional skill instruction should be the primary focus of education for transition-age youth with IDD. Furthermore, while ideal educational programming would include both rigorous inclusive academics and more specialized vocational preparation (Ayers et al., 2011; Courtade et al., 2012)

and acknowledging the individualized nature of special education, it is not clear from the extant research whether students with IDD are receiving robust academic and functional skill instruction. This question remains unanswered.

Theoretical Framework

Given the complexity of discussions surrounding inclusive education and transition practice and policy, as well as how these systems are nested within school and community contexts, Bronfenbrenner's (1976) Ecological Systems Theory provides a useful framework for examining this literature and analyzing findings. The social-ecological lens has previously been used in previous reviews of preschool inclusion (Odom et al., 2004) and self-determination (Shogren, 2013) research. Bronfenbrenner (1976) describes an individual's development occurring within nested systems embedded within one another, each containing contextual factors that influence and are influenced by one another. Identifying these factors and organizing them within this framework allows for more systematic consideration of how inclusive education operates within the broader context of student-teacher-family interactions (micro- and mesosystem), concerning policy and legislation (exosystem), from overarching social and cultural beliefs and attitudes (macrosystem), and within changes over time (chronosystem). Developing a better understanding of how individual, family, school, community, and policy factors influence inclusive education may provide a roadmap to better post-school outcomes, and is critical to addressing this phenomenon in research, policy, and practice. Figure 2.1 shows how factors related to the inclusive education of students and their transition to adulthood operates within many systemic layers from their immediate microsystem to macrosystem trends.

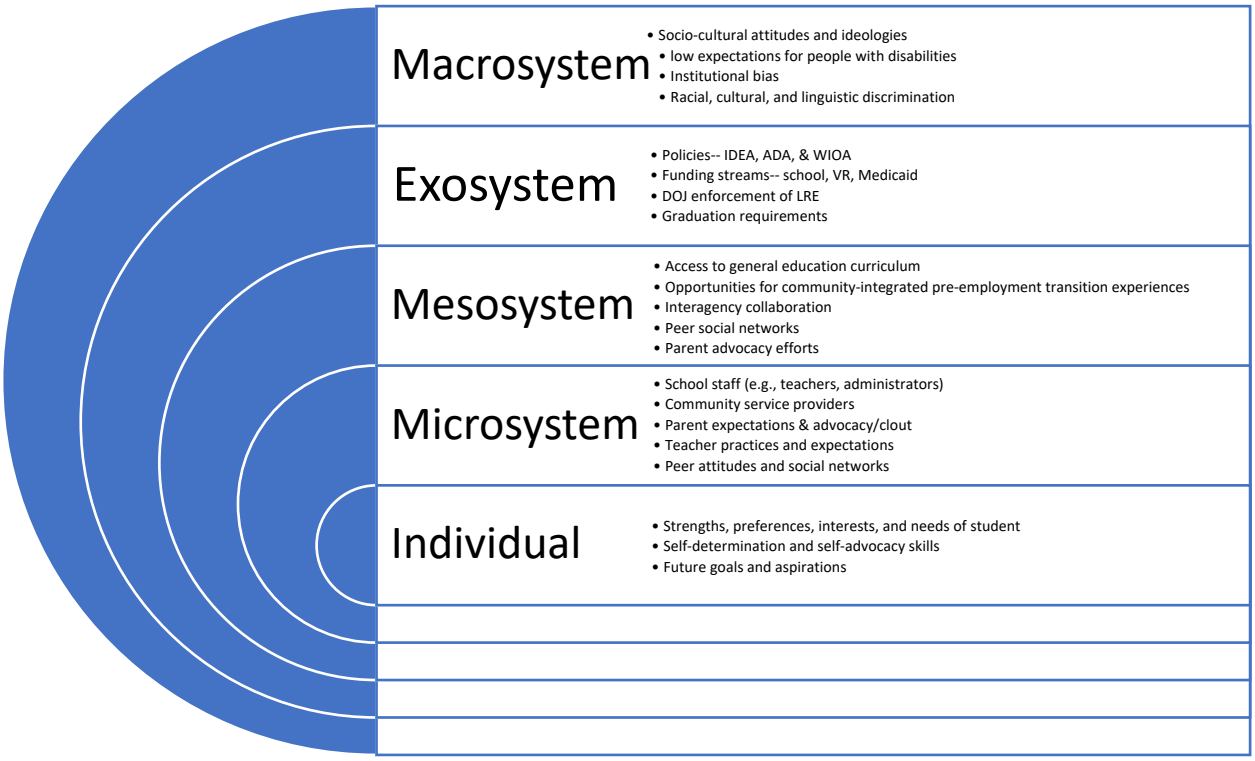

Figure 2.1 *Theoretical Framework*

Ecological systems overview of inclusion

Applying Bronfenbrenner's (1976) Ecological Systems framework is helpful means of situating what we know about inclusive education and the transition to employment and education outcomes. In this section, a brief summary of research and policy at each level of the framework will be provided. Beginning at the individual level at the center of Bronfenbrenner's model, there is little research into malleable individual-level characteristics that have evidence as predictors of positive postsecondary outcomes. One of the few at this level, self-determination is a malleable individual-level skill that has been shown to correspond to better post-school

outcomes in many areas (Mazzotti et al., 2021; Wehmeyer et al., 2012). There has been limited research exploring the extent to which self-determination is promoted by inclusion, but a focus on self-advocacy instruction—a key component of self-determination—is included in transition policy mandates discussed in the following section.

In the microsystem—the next concentric level outside of the individual—the research literature is well developed around strategies that are effective for facilitating different dimensions of inclusive education for students with IDD including academic instruction (e.g., Jimenez & Kemmery, 2013; Spooner et al., 2012) and many aspects of supporting instruction, social behavior, and communication (Wong, et al., 2015). Conversely, we also know that many students with IDD have less well-developed social networks and interactions with peers in learning environments (e.g., Locke et al., 2016). Also, apart from school-related aspects of the microsystems, one of the strongest predictors of post-school success is parental expectations. While it is unclear from the research how parental expectations relate to inclusion, the nature of how educational policy leverages parental due process as a 'check and balance' to local policy implies that these two factors would likely relate to one another.

The mesosystem describes relations between various elements and stakeholders within the microsystem. This a particularly rich area of both research, policy, and practice in both inclusive education and transition due to the emphasis on collaboration (Loiacono & Valenti, 2010) and interagency collaboration (Povenmire-Kirk et al., 2015). These two areas have been a particular focus of recent policy in both education and employment, which will be discussed in more detail in the following section. Requirements for students with disabilities and their access to general education emphasize a focus on collaboration between special and general education

staff, while employment policy mandates have spurred increased interagency collaboration between educational and adult service agencies.

These mandates originate in policy embedded in the exosystem level which contains not only the legislation that governs K-12 education, transition, and adult service provision, but also authorizes funding streams, sets graduation requirements for students at national, state, and local levels, and encompasses litigation and precedents that add more detailed interpretation to key policies. The following section will describe in-depth how these policies and actions have developed over time to inform the two core areas of focus of this study in inclusive education and postsecondary outcomes for individuals with IDD.

Finally, the macrosystem describes the broader socio-cultural attitudes and ideologies specific to youth with IDD and expectations about achievement in educational systems and their capabilities in the workplace and the college campus. This level also includes other systemic and cultural factors such as structural racism and bias that may impact certain groups within their engagement in certain educational or employment systems. Relationships between race, ethnicity, language, and bias as they impact the equity of services delivered by educational and other service systems are complex and merit considerable future research (Skiba et al., 2015).

Transition and Inclusion Education for Students From Historically Marginalized Racial And Cultural Groups

In examining the factors related to this study, it is also important to consider how youth from historically marginalized racial and ethnic groups may experience different school, transition, and adult outcomes related to structural racism within ecological systems that youth inhabit. For example, Artiles and Kozleski (2016) introduce several criticisms of the limitations of the inclusion education movement to consider the impact of advocacy and policy for students

and families from historically marginalized racial and ethnic backgrounds. Racial disproportionality within specific IDD labels such as ASD that confer specialized services has been previously documented in the research literature (e.g., Travers et al., 2014). As a result of these poor outcomes and related probable systemic bias within K-12 and adult service sectors, several researchers (e.g., Thoma et al., 2016; Trainor, 2008) have called for specific efforts to increase the self-determination of students with disabilities from historically marginalized racial and ethnic groups in the transition process to overcome these systemic barriers. Thus, more research is needed specific to the pathway between K-12 education and postsecondary outcomes specific to students from historically marginalized racial and ethnic groups.

In the sections of this chapter that follow, policy and research related to each of these ecological system levels will be examined in detail. In the next section, a chronological overview of policy will be provided in the areas of both inclusive education and postsecondary education and employment. Next, a summary of evidence collected from the National Longitudinal Transition Study (NLTS-2; Newman et al., 2011) will discuss what the research says about the relationship between inclusion and postsecondary outcomes and how each is operationalized within the data structures. Finally, summaries will be provided for both inclusion and postsecondary education and employment based on a scoping review of research and policy.

Inclusive Education Policy

The concept of inclusion for students with IDD has shifted dramatically in educational policy, particularly over the course of the 20th century, as common practices changed from widespread institutionalization to guaranteed access to the general education curriculum with protections under systems of accountability and due process. Today, inclusive education in policy is shaped by three main pieces of legislation—the Individuals with Disabilities Education

Improvement Act of 2014 (IDEA), the Every Student Succeeds Act of 2015 (ESSA), and the Americans with Disabilities Act of 1990 (ADA). ESSA, like its predecessor—the No Child Left Behind Act of 2001 (NCLB)—fundamentally changed federal education policy to ensure that all students were included in accountability measures, including those with disabilities that had been historically excluded. Prior to passage of NCLB, policy regarding the inclusion of students with IDD was significantly limited especially concerning access to the general education curriculum for all students.

Looking back even further to the early to mid-20th century, most individuals with IDD lived in state institutional facilities removed from both schools and communities where basic living conditions were very poor. In 1967, approximately 200,000 people with significant disabilities were housed in these state institutions (U.S. Department of Education, 2007). Beginning in the 1950s, federal legislation began to address issues of educational services for students with disabilities. The Training of Professional Personnel Act of 1959 (PL 86-158) included training provisions for professionals to help educate children with ID. The Community Mental Health Act of 1963 provided federal funding for research centers and community-based facilities for individuals with ID and accelerated a national trend toward deinstitutionalization (U.S. Department of Education, 2007).

The Education for All Handicapped Children Act of 1975 was the first major piece of legislation to confer major rights to a free and appropriate public education for students with disabilities, as well as to assure the rights of those students and their families, to assist states and local education agencies at providing educational services, and to assess and ensure the effectiveness of those services (U.S. Department of Education, 2007). PL 94-142 also included the important concept that students should be educated in their least restrictive environment

(LRE) to the maximum extent possible within general education classrooms with students without disabilities (Brock, 2018). Subsequent reauthorizations of PL 94-142 changed the name to the Individuals with Disabilities Education Act (1990) and added additional key provisions such as the mandate transition services be provided to prepare students for adulthood starting no later than age 16. IDEA 1997 included addition of new provisions including expanding focus on early intervention for children with developmental delays, development of a mediation conflict resolution process for managing disputes between parents and local education agencies (LEA). IDEA will be discussed in greater detail below with a focus on its current provisions based on the most recent reauthorization in 2004.

The passage of the Americans with Disabilities Act of 1990 (ADA; 1990), while focused on the rights of people with disabilities more broadly than strictly issues of education, applies to inclusion in educational spaces as well. Title II regulations require public schools to provide students with disabilities equal opportunities to engage in school activities (not only academic coursework) and that auxiliary aids and services be provided to support this inclusionary access so that communication with students with disabilities is equally effective to their peers without disabilities (U.S. Department of Justice & U.S. Department of Education, N.D.). The responsibility for enforcing ADA Title II regulations falls under the jurisdiction of both the Department of Justice and the Department of Education Office for Civil Rights. This jurisdiction in enforcement of Title II rights also extends to students who receive IDEA services in public elementary and secondary settings.

No Child Left Behind Act of 2001

Education policy shifted dramatically with the introduction of NCLB (2001) which expanded inclusive education perhaps more than any policy preceding it by not only ensuring

that students with disabilities would be included in the general curriculum but also targeting them as one of several underperforming groups for which states and LEAs would be held accountable. Under the NCLB accountability system, all students—including those with disabilities—would participate in the general curriculum and also be assessed on their progress toward mastering academic content standards in accountability systems that evaluated school, district, and state performance. Other key provisions of NCLB include the mandated use of evidence-based practices for all students and the requirement that students receive instruction from highly-qualified teachers.

NCLB (2001) specifically focused on addressing closing achievement gaps for groups of students who had historically underperformed, including students with disabilities. While its provisions for high-stakes testing proved to be controversial among many stakeholder groups (e.g., Darling-Hammond, 2007), the emphasis on holding schools, districts, and states accountable for student achievement introduced clear incentives for not only ensuring that students were included in rigorous academic instruction, but that students benefitted from these educational services. Under NCLB's accountability guidelines, students with significant cognitive disabilities could be assessed using alternate assessment methods. These alternate assessments vary from state to state, but must be approved by the U.S. Department of Education, and can only be used for students who qualify as needing alternate methods of assessment and do not exceed 1% of a school or district student population (NCLB, 2011).

Individuals with Disabilities Education Improvement Act of 2004

The most recent reauthorization of IDEA (2004) largely focused on updating regulations to align with significant policy changes introduced by NCLB. Like NCLB, IDEA (2004) emphasized the importance of using effective, evidence-based practices to ensure that students

had the greatest possible opportunity to achieve academic curricular standards. The reauthorization continued many of the hallmarks of previous iterations of IDEA such as FAPE and LRE in addition to more recent additions such as the 1997 amendment that Individualized Education Program (IEP) teams should document students' participation and progress in the general education environment (Agran et al., 2002). In practice, the LRE provision of IDEA compels IEP teams to place students in inclusive settings and provide required supplementary aids and services, but much is left up to the discretion of the team and the service options made available by LEA. Many inclusive education advocates have pointed to the LRE mandate to make the argument that full inclusion in typical classrooms should be near-universal for all students (Artiles & Kozleski, 2016). However, court precedent has refined the operational definition of LRE to fall between fully inclusive placements and those that deny any opportunity for access to education with peers without disabilities (Yell, 2015).

Every Student Succeeds Act of 2015

The most recent reauthorization of the Elementary and Secondary Education Act, ESSA (2015) maintains many of the protections for students with disabilities introduced by NCLB while also relaxing state and local requirements in response to widespread public criticism of high-stakes testing (e.g., Darling-Hammond, 2007). Continued provisions include accountability standards and a federal commitment to closing achievement gaps. However, additional flexibility has been granted to states to address these specific program requirements. These state-developed plans under ESSA should be designed to address achievement gaps and equity while increasing instructional quality and successful postsecondary outcomes for students. In keeping with this increased emphasis on local control in ESSA (2015), states and LEAs are encouraged to develop

strategic organizational approaches to delivering services and supports to students (Artiles & Kozleski, 2016).

Summary of current inclusive education policy

Under IDEA, students are required to receive their education in the Least Restrictive Environment (LRE) to the maximum extent possible alongside non-disabled peers in general education classrooms. Although the LRE mandates inclusive education with supplemental aids and services when possible, demonstrating a clear preference for general education as the primary educational setting for students with disabilities, recent court rulings have added nuance to this interpretation. Endrew F. v. Douglas County (2015) reinterprets the requirements of a free and appropriate public education under IDEA by rejecting a previous interpretation that a student receive "merely more than *de minimis*" benefits. As these decisions begin to impact educational practice, some researchers suggest that the Endrew decision refocuses special education on the delivery of specially designed instruction rather than simply access to the general education curriculum (Sayeski et al., 2019).

While IDEA and ESSA are regarded as the primary legislative policies governing all aspects of special education and public education respectively, the ADA has increasingly been cited by the Department of Justice in cases to ensure the inclusion of individuals with disabilities as a right to equal access (Wehman et al., 2018). Other legislation governing non-educational aspects of adult life further this federal commitment to the inclusion of individuals with disabilities in all aspects of society. The Supreme Court's decision in Olmstead v. L.C. (1999) ruled that states are required to provide individuals with disabilities the opportunity to live in integrated settings within their communities.

While there have been significant changes in policy governing the inclusive education of students with IDD over the last several decades, it is inconclusive the extent to which these policies have resulted in higher numbers of students receiving their education in more inclusive environments. For example, Brock (2018) conducted a longitudinal analysis of LRE data for students with ID since the passage of PL 94-142 and found that the overall placement of students in regular classes, separate classes, and separate schools was largely flat over almost four decades. More granular data available over the last three decades showed recent progress in the number of students with ID included in general education classrooms. Brock (2018) reported that the share of students with ID in general education classrooms and resource rooms fell from 37.7% in 1976 to 26.9% in 1989. Since then, those figures have steadily increased both in terms of students included in general education schools, as well as for students included in general education for at least 80% of the school day, rising from 7.4% in 1990 to a peak of 17.9% in 2010 (Brock, 2018). Since 2010, the number of students with ID included at least 80% of their day has slowly decreased to 16.9% in the most recent measure in 2014.

Postsecondary Transition Policy

Since transition takes place before students' graduation or exit from the K-12 education system, many of the same legislation affecting inclusive education policy also shape transition policy. IDEA is the primary legislative act that outlines requirements for transition services for school-age students with disabilities. However, in attempts to improve persistently poor post-school outcomes for individuals with disabilities and IDD, in particular, legislation governing adult service agencies also includes key provisions that impact transition-age individuals with IDD. Most recently, the Workforce Innovation and Opportunity Act of 2014 (WIOA) introduced major changes in the way state and local vocational rehabilitation agencies provide services for

this group with an emphasis on achieving competitive, integrated employment. Likewise, the Higher Education Opportunity Act of 2008 (HEOA) created new access to college and federal aid for students with IDD. Key provisions of WIOA and HEOA will be discussed in more detail below.

In addition to legislation directly governing employment and education systems, social security plays a crucial role in transition services for transition-age students with IDD. Amendments to the Social Security Act in 1983 made available Home and Community Based Service (HCBS)—also known as Medicaid Waivers—to address the institutional bias in Medicaid rules and provide for community-integrated services for individuals with IDD. These HCBS waivers vary considerably from state to state but often provide individualized services in employment and community integration. Nationwide, considerable effort in the last decade has been focused on evaluating the impact of these benefits programs through Youth Transition Demonstration (YTD) and PROMISE grant projects, which both use randomized control designs (RCT) to evaluate the impact of various transition services and supports provided through Supplemental Security Income (SSI) and Social Security Disability Insurance (SSDI). These policies form a patchwork of funding and services that many individuals and families must navigate to receive the supports needed for a successful transition.

Individuals with Disabilities Education Improvement Acts of 1997 and 2004

While many of the key components of IDEA reauthorizations were addressed in terms of overall provisions and those that addressed inclusive education specifically, IDEA (2004) is also the primary legislation guiding transition planning and services for secondary students with disabilities. Requirements for transition services for students with disabilities were first introduced in the 1997 reauthorization of IDEA, which stipulated that transition-related content

should be provided to students beginning no later than age 14 and transition-related services no later than age 16. It should be noted that many states have adopted earlier requirements for transition services beginning at age 14. As with conventional educational services, transition goals and services provided under IDEA (2004) should be individualized based on student strengths and needs but should address goals for desired student outcomes in the areas of employment, (postsecondary) education, and independent living.

IDEA (2004) also mandates that representatives from any service agency likely to provide or pay for services needed to achieve these postsecondary goals should also be included in development of transition IEPs (Povenmire-Kirk et al., 2015). While the benefits of interagency collaboration for promoting improved postsecondary employment and educational outcomes has been well documented (e.g., Noonan et al., 2008; Test et al., 2009), large caseloads made it nearly impossible for adult agency representatives to follow through in satisfying this requirement (Povenmire-Kirk et al., 2015).

Higher Education Opportunity Act of 2008

In 2008, The Higher Education Act of 1964 was reauthorized and amended as the Higher Education Opportunity Act of 2008 (HEOA; 2008). HEOA (2008) included major provisions for individuals with disabilities including a new grant to provide for transition and postsecondary programs for students with intellectual disabilities (TPSID), a national demonstration and dissemination project to promote college access for individuals with IDD. These TPSID programs are integrated into two and four-year colleges and universities across the country and provide inclusive and specialized programming in developing academic, independent living, and work-based skills. Major changes were also made to provide access to federal financial aid for youth with IDD, including those who may receive disability benefits. Madaus and colleagues

(2012) reported that federal legislation including HEOA, as well as ADA, and other policy led to a rise in higher education enrollment of students with disabilities from 3% in 1978 to 11% of students in 2011. HEOA (2008) also created a national coordinating center responsible for collecting data on inclusive postsecondary education programs across the country and provide technical assistance and training to support those efforts (Grigal et al., 2011). Initial findings from evaluation of these TPSID programs indicate their potential as a pathway to competitive employment, especially in inclusive PSE programs and those that provide work experiences (Grigal et al., 2019).

Workforce Innovation and Opportunity Act of 2014

In 2014, reauthorization of the Rehabilitation Act was passed into law as WIOA (2014), which brought many key provisions for youth and adults with IDD, oriented around a commitment to competitive integrated employment (CIE). This focus on CIE serves as the preferred outcome of all people with disabilities and is the goal of all vocational rehabilitation (VR) services and funded activities. This alone is a considerable shift in policy given that less than 20% of individuals with IDD are currently served in CIE (Winsor et al., 2016). In order to address this goal of accomplishing CIE for all individuals with disabilities, WIOA earmarked 15% of VR state budgets for the provision of Pre-Employment Transition Services (Pre-ETS) and coordination for transition-age youth still enrolled in K-12 secondary school. Required Pre-ETS services include job exploration counseling, work-based learning, counseling on transition or PSE programs, workplace readiness training, and instruction in self-advocacy. In addition to these five required Pre-ETS activities, states may also use those allotted funds on additional authorized Pre-ETS as well as coordination activities to include collaboration with stakeholders to develop internship, apprenticeship, and summer work experiences, participate in IEP meeting,

and work with schools to coordinate joint activities (Workforce Innovation Technical Assistance Center, 2019). While many other aspects of WIOA (2014) focus on adults rather solely on transition-related services, it should be noted that WIOA (2014) puts in place many other provisions such as curtailing the use of special certificates issued under Section 14(c) of the Fair Labor Standards Act that permit paying workers with disabilities subminimum wage. Other aspects stipulate use of supported and customized employment and engage VR in workforce development and business engagement.

Summary of Current Transition Policy

In the last several decades, transition education and services have received considerably more attention in both research and policy in response to persistently poor postsecondary outcomes for students with IDD. Most recently, WIOA (2014) has made significant policy changes both in terms of transition programming for students with IDD and post-school service delivery. Given the current employment outcomes of youth with IDD (Winsor et al., 2016) the commitment of WIOA (2014) to achieving CIE for all individuals with disabilities could have a considerable impact on opportunities in transition and adult employment. Like inclusive education policy, transition legislation demonstrates a firm commitment to the full integration of people with IDD in schools, workplaces, colleges, and communities. In higher education, HEOA (2008) has already resulted in an increase in enrollment of youth with IDD in colleges and PSE institutions (Madaus et al., 2012). Pre-ETS activities under WIOA (2014) requiring provision of PSE counseling to students with disabilities prior to graduation may have an additional effect on PSE outcomes.

Evidence from NLTS-2 Supporting Inclusive Education for Students with IDD

Overall, studies drawing from NLTS-2 data show promising but mixed support for inclusive education as a pathway to employment and PSE (Taylor et al., 2020). However, it should be noted that methodologies largely used to examine the relationship between these factors in the literature were exploratory, non-experimental, and cannot be used to describe causal relationships. In fact, the sole causal-comparative study that used propensity scoring to investigate potential causality did not find any statistically significant association between inclusive education and PSE (Foster & Pearson, 2012). Other studies lacked robust statistical analysis methods and experimental designs. Furthermore, none of the studies examined other potentially confounding variables such as quality of instruction, school resources and expertise devoted to inclusive educational efforts, or potentially moderating effects of individual-level traits. Thus, it is difficult to conclude the overall effectiveness of inclusive education as a pathway to positive postsecondary employment and educational outcomes from the literature, given limitations in the design and scope of studies.

Operationalization of Inclusive Education in NLTS-2 Literature

Definitions of inclusive education varied greatly between studies. Most studies examined levels of inclusion, measured by time in general education classrooms and extra-curricular activities (Baer et al., 2011; Chan et al., 2018; Foster & Pearson, 2012; Luftig & Muthert, 2005; Ryndak et al., 2010a; 2010b), as well as peer interactions (Ryndak et al., 2010a; 2010b; White & Weiner, 2004). Others measured whether or not the student attended a typical high school or special school (Chiang, et al., 2012; Luftig & Muthert, 2005; Simonsen & Neubert, 2013). Each of the studies which examined the amount of time a student spent in the general education classroom or least restrictive environment (LRE) used ordinal categories to calculate levels of

inclusion rather than using a continuous percentage. Many of these studies collapsed multiple dimensions of inclusive education such as inclusion in academic and non-academic activities (Chan et al., 2018; Ryndak et al. 2010 a; 2010b) or LRE and time spent with typical peers (White & Weiner, 2004). To date, no peer-reviewed studies have specifically operationalized inclusive education in terms of academic credits earned despite significant discussion of the vital role played by academic inclusion in impacting the post-school trajectory of students' lives (e.g., Courtade et al., 2012).

Inclusion in Terms of Academic Coursework

Given the emphasis of recent educational legislation on access to the general education curriculum for all students, there is a clear need for measures that evaluate the extent to which these policies have succeeded in incorporating students with IDD in inclusive academic instruction. Much of the previous research examining inclusive education has been in terms of the physical placement of students in schools and classrooms with non-disabled peers (e.g., Chiang et al., 2012; Simonsen & Neubert, 2012). However, there has been a dearth of research operationalizing inclusive education in terms of the rigor of academic coursework for students with IDD, and none of that literature examines how the engagement of students with IDD in rigorous academic coursework may predict post-school outcomes.

Postsecondary Outcome(s)

Seven of the nine studies measured employment as an outcome, while three examined postsecondary education—with Baer and colleagues (2011) including both as variables of interest. Studies focused on employment varied slightly in how successful outcomes were operationalized, using minimum wage (Baer et al., 2011; Chan et al., 2018; Luftig & Muthert, 2005; Simonsen & Neubert, 2013) and minimum hours per week thresholds (Baer et al., 2011;

Chan et al., 2018), as well as defining work as community-based (Chan et al., 2018; White & Weiner, 2004) and not in sheltered work settings (Ryndak et al., 2010a; Simonsen & Neubert, 2013). Luftig and Murthert (2005) and Ryndak and colleagues (2010a) each examined job history and employee benefits of participants. For all PSE studies, a successful outcome was defined by enrollment, attendance, or participation in postsecondary education including two- and four-year colleges, universities, vocational training, and other adult education options (Baer et al., 2011; Chiang et al., 2012; Foster & Pearson, 2012).

Results of this review for studies measuring the impact of inclusive education on employment all reported positive effects. Chan and colleagues (2018) found that having inclusive education was a strong predictor of employment after graduation with an odds ratio of 4.13. Several more studies found statistically significant relationships between participants with ID who experienced higher levels of inclusive education as students and community-integrated employment outcomes (Luftig & Muthert, 2005; Simonsen & Neubert, 2013; White & Weiner, 2004).

Studies investigating PSE were less conclusive. Two of the three studies found positive effects with Baer and colleagues (2011) reporting that inclusive experience nearly doubled the chances of PSE for a sample of individuals with ID and multiple disabilities, while Chiang and colleagues (2012) found that attending a regular high school increased odds of enrollment by 432% for graduates with ASD. However, Foster and Pearson (2012) did not find positive results in their study of the effect of time spent in general education and enrollment in PSE for youth with ASD using NLTS-2 data through a propensity score methodology, which used covariates to control for individual and student-level characteristics.

Relationship Between Inclusion and Postsecondary Outcomes

Studies using NLTS-2 data report mixed support regarding the impact of inclusive education for students with IDD. Although the majority of studies present positive findings, design methodologies employed were quite limited and examined only narrow constructs of inclusive education at the individual level (e.g., Baer et al., 2011; Simonsen & Neubert, 2012). Given that the only study (Foster & Pearson, 2012) that employed a more complex covariate design found no effect for inclusive education on postsecondary outcomes suggests that the relationship between these two factors may be more complex and merit further research with greater consideration of potential mediating and moderating effects of system- and individual-level factors such as individual participant characteristics, staff competence, alignment of instruction with transition goals, district and state policy, and collaboration between special and general educators and adult service agencies and providers. The lack of more intensive research efforts for this population of students is especially troubling given the continued placement of students with IDD in highly restrictive settings (Kurth et al., 2014).

What We Know About Inclusive Education for Students with IDD

Inclusive education for students with IDD, while clear in concept, remains somewhat complex in practice, nuanced in research, and elusive to define in policy. Inclusive education is identified as a research-based predictor of post-secondary success for students with disabilities (Haber et al., 2016; Mazzotti et al., 2021), yet research is limited for students with IDD specifically (Wehman et al., 2018). In practice, students with IDD are often removed from general education classroom settings, often for the most restrictive settings despite research recommendations (Kurth et al., 2014) and policy efforts (ADA, 1990; ESSA, 2015; IDEA, 2004; WIOA; 2016) toward inclusion. Youth with IDD are commonly removed from inclusive settings

to receive more intensive, specially designed instruction (Fuchs et al., 2015). Furthermore, as students begin the transition planning for adulthood, the focus of the IEP centers around goals and skills needed for success in employment, postsecondary education, and independent living (Test et al., 2014).

Early research in inclusive education focused mainly on providing a rationale and making the case for inclusion (e.g., Giangreco et al., 1993; Sailor, 1991; Skrtic, 1991). Artiles and Kozleski (2016) note that the focus of inclusive education research gradually shifted from the individual student to a systems change approach. Early inclusive education research was largely situated in response to the fact that for most students with IDD, functional skills and IEP-driven curriculum were the sole purpose of educational content in the absence of any consideration of academic instruction and education in general education spaces. More recently, a growing body of evidence supports the benefit and success of students with IDD to achieve academic success when provided with structured academic instruction that maintains high expectations while providing differentiation (e.g., Browder et al., 2008; Jimenez & Kemmery, 2013). Much of the focus of research in academic instruction involves demonstrating the efficacy of applied behavior analytic techniques to systematically teach academic skills in math and literacy to students with significant IDD (Spooner et al., 2012). Despite growing research showing the effectiveness of academic instruction for students, other researchers and stakeholders have advocated for a renewed focus on functional skill instruction aligned with skills that students will need in life after graduation (e.g., Ayers et al., 2011). This perspective has been met with resistance from other researchers who emphasize the importance of maintaining high expectations in light of the unknown potential of people with more significant disabilities and reject the assumption that

challenging academic expectations are mutually exclusive with functional skill instruction (Courtade et al., 2012).

While the debate among researchers about the prioritization of academic and functional skill instruction for students with IDD is far from resolved, there is a general consensus on the importance of providing students with both academic and functional skill instruction, along with high expectations for their achievement (Spooner & Browder, 2015). With this in mind, effective instruction for students with IDD should be individualized, maintain high expectations for achievement academically and post-school, addressing students' future goals and vision, and integrate that instruction within inclusive school, community, and workplace contexts (Dymond et al., 2015; Kurth et al., 2018). To achieve instruction for students that is both rigorous academically and individualized to current and future student needs, strong collaboration and co-planning between school staff are needed (Collins et al., 2017). Aside from the issue of curriculum itself, there is also evidence of a relationship between the inclusion of students with significant disabilities in general education spaces and improved post-school outcomes (Bouck, 2012; Test et al., 2009). Many of the studies identified in this literature review show strong correlation between inclusive education and CIE and enrollment in PSE. However, as mentioned previously, these results should be interpreted with some caution since none of the studies which showed a positive relationship between inclusion and postsecondary outcomes controlled for other potentially confounding variables such as intellectual, adaptive, or other skills that might influence both inclusive opportunities and success post-school.

What We Know About Postsecondary Transition for Students with IDD

Research regarding the postsecondary outcomes of students with IDD is clear—outcomes are poor in all assessments of the experience of people with IDD in any sphere of adult life

(Newman et al., 2011; Roux et al., 2018; Winsor et al., 2016). Acquiring and maintaining CIE remains elusive for the vast majority of those with IDD (Wehman et al., 2018; Winsor et al., 2016); despite efforts to integrate youth and adults with IDD into communities, most remain highly isolated (e.g., Newman et al., 2011; Roux et al., 2018). These poor postsecondary outcomes for individuals with IDD have persisted for several decades, despite the significant efforts of various stakeholders from parents and self-advocates to policymakers and researchers to improve the state of these outcomes.

As a result, beginning in the 1990s, research and policy began focusing on students' transition phase, or the final years of enrollment and eligibility in the K-12 education system. These transition years serve as a critical period to maximize the impact of services while students are still engaged in the entitlement service system (i.e., K-12 education) to prepare them for success in the eligibility-based service system of adulthood (e.g., VR, Medicaid waiver, SSI, SSDI). In simple terms, transition services attempt to make the most use of a student's blank check of IDEA-provided services before they exit the system to have to navigate a vastly more complicated adult services system. In order to address issues with moving from an entitlement system to an eligibility-based one, transition policy and research emphasize early interagency linkage and collaboration to ensure that community agency-provided services needed for a students' postsecondary success are planned for in advance (Povenmire-Kirk et al., 2015). In addition to interagency collaboration—a key element of transition planning and services—policy has also emphasized individualized person-centered planning and use of evidence-based practices (IDEA, 2004; WIOA, 2014).

Research in transition has largely been focused on identifying pathways to successful outcomes (e.g., Siperstein et al., 2014), and on identifying factors that predict achievement of

those outcomes (Carter et al., 2012). Recently, there have been a series of articles introducing strong research evidence related to transition to employment for individuals with IDD largely limited to a small handful of studies showing high impact for Project SEARCH + ASD Supports, an intensive, business-integrated internship for youth with autism (e.g., Wehman et al., 2014; 2017; 2019). Additionally, career and technical education (CTE) offers the potential to expand career pathways, though recent research has shown that students with IDD participating in CTE are often focused on low-wage preparation programs (Lombardi et al., 2018).

This research aimed at excavating predictors has largely relied on the National Longitudinal Transition Study-2 (NLTS-2) to better understand the practices and experiences that are correlated with employment and enrollment. NLTS-2 was a U.S. Department of Education funded study that sampled data from students aged 13 to 16 from across the country over ten years as they moved from secondary grades into adulthood. Data from the NLTS-2 produced a large volume of research investigating the experiences and trajectories of students with a variety of disability, the culmination of which has been a series of literature reviews and meta-analyses of these studies revealing several key predictors of post-school success (Carter et al., 2012; Haber et al., 2016; Mazzotti et al., 2021; Mazzotti et al., 2016; Test et al., 2009). Most recently, Mazzotti et al. (2021) conducted a systematic review of studies using NLTS-2 data and examined factors that were predictive of improved post-school outcomes for transition-age youth. This study expanded a previously established framework for organizing evidence-based predictors for school-age youth impacting postsecondary outcomes (Test et al., 2009).

These reviews employ a strength of evidence scale to evaluate their level of recommended use to practitioners (i.e., none, potential, emerging evidence, and moderate) in the areas of employment, PSE, and independent living. Haber and colleagues (2016) followed up

these efforts with a meta-analytic review, providing more granular evidence behind specific practices and experiences. These seminal reviews of the literature have informed key dissemination projects such as the National Technical Assistance Center on Transition (NTACT), which provide practitioner-friendly guides and materials based on these NLTS-2 predictors. Predictors of post-school success include such varied characteristics and experiences as work experience prior to graduation, inclusive educational experiences, student-focused planning practices, self-determination instruction, and response prompting, among others (Test et al., 2013). While NTACT has recently published guides specific to youth with ASD, these recommended practices largely draw from research, which includes students with ASD as part of broader samples of students with disabilities. Carter and colleagues (2012) and Chiang et al. (2012) represent the sole studies focused on individuals with IDD in this area. Thus, it is unclear the extent to which these widely disseminated predictors of postsecondary success apply to students with IDD.

Among evidence collected from NLTS-2 on the transition trajectories of youth with IDD, a few recommended predictors emerge. First, paid work experience prior to graduation is perhaps the most powerful and critical predictor of post-secondary success among those mentioned (Carter et al., 2012; Wagner et al., 2014). Inclusion in general education was also indicated as a predictor of positive employment outcomes (e.g., Chiang et al., 2012; Wagner et al., 2014). However, it merits noting that measures of inclusive education varied considerably between overall attendance at a separate school to the percentage of time spent in general education classrooms.

In addition to research related to NLTS-2, there have been other efforts to generate knowledge through a broad research agenda. Combining elements of both research and policy,

several large-scale demonstration projects have used field-based RCT designs to evaluate the efficacy of certain interventions for transition-age youth. The Youth Transition Demonstration (YTD) and PROMISE grants sought to infuse evaluative research methods into large-scale demonstration projects. YTD used a randomized controlled trial design nationally to increase the financial independence of youth transitioning into adulthood; the design evaluated differential models of service delivery (Fraker et al., 2014). Each of the YTD implementation sites addressed common CIE barriers by using individualized work experiences, youth and family supports, interagency collaboration, and benefits counseling (Fraker et al., 2014).

The U.S. Social Security Administration also funded the PROMISE grant program aimed at achieving improved results in employment for SSI recipients with IDD. PROMISE projects were instituted to provide a rigorous evaluation (using random control trial design) of services, case management, benefits counseling, financial literacy, paid work experiences, and family education that impact employment outcomes. As a result of these efforts, many states have reported an improvement in eligibility service delivery as a result of broadening interagency collaboration and involving individuals and families more closely in critical case management decisions (Honeycutt & Livermore, 2018).

Summary

Based on the research literature and policy summarized above, we know that the outcomes of youth with IDD remain poor despite efforts in K-12 education and transition to improve those outcomes. Within education, inclusion in general education (often operationalized in terms of space or curriculum) has been identified as a research-based predictor of post-school success. Further efforts to implement best practices on a broader scale have been attempted through YTD and PROMISE grant projects. Additionally, inclusive education has been targeted

by technical assistance projects such as the SWIFT schools initiative. Within each of those systems (i.e., inclusive education and transition) many policies, practices, and predictors have been identified as effective interventions in various areas. However, more research is needed to examine the extent to which inclusive academic education affects postsecondary outcomes, especially within the context of other predictors of post-school success that emphasize specialized instruction, as well as factors that impact these outcomes for students from historically marginalized racial and ethnic groups.

Research Questions

As a result of this review of the literature, several questions remain. These are:

1. To what extent does inclusive academic education predict postsecondary outcomes?
2. To what extent do vocationally-oriented transition experiences predict postsecondary outcomes?
3. To what extent does inclusive academic education predict postsecondary outcomes controlling for vocationally-oriented transition experiences? (and vice versa)
4. Is there an interaction between inclusive academic education and vocationally-oriented transition experiences in how they predict postsecondary outcomes?
    a. Are these relationships consistent for students from historically marginalized racial and ethnic groups?

CHAPTER 3: METHODOLOGY

Problem State and Purpose

The purpose of this study was to determine the association between both inclusive academic education and vocational transition experiences with postsecondary outcomes in employment for youth with intellectual and developmental disabilities (IDD). Previous studies have shown that inclusive education is a research-based predictor of post-school success for students with disabilities in the outcome areas of employment, education, and independent living (e.g., Mazzotti et al., 2021; Test et al., 2009). However, few studies have examined whether this relationship holds for students with IDD, whether true for specifically academic aspects of inclusive education, or whether inclusive education occurred concurrently with other transition predictors of success. Multivariate logistic and linear regression was used to examine these relationships between K-12 transition educational experiences and postsecondary outcomes in employment. This study assessed: (1) How inclusive educational experiences relate to postsecondary outcomes; (2) How vocational transition experiences relate to postsecondary outcomes; (3) How the combination of inclusive education and specialized transition programming relates to postsecondary outcomes; (4) Whether any interaction effect occurred for those who received both inclusive academic education and vocational transition experiences. The study hypotheses were as follows:

- Hypothesis 1: Inclusive academic education variables (i.e., academic credits earned in regular general education classes) will predict positive postsecondary

outcomes in employment (i.e., job, earnings, wages, hours) and education (i.e., enrollment in PSE),

- Hypothesis 2: Vocationally-oriented transition activities (i.e., work experience, vocational education, parental expectations) will predict positive postsecondary outcomes in employment (i.e., job, earnings, wages, hours) and education (i.e., enrollment in PSE).
- Hypothesis 3: Inclusive academic education variables will predict positive postsecondary outcomes, after accounting for vocationally-oriented transition activities—and vice versa.
- Hypothesis 4: The interaction between inclusive academic education and vocationally-oriented transition will have an additive effect in predicting positive post-secondary outcomes with a consistent association for students from historically marginalized racial and cultural groups.

Rationale for Analysis of High School Longitudinal Study (HSLS) Data

Secondary data analyses have provided critical insights into the trajectories of transition-age youth with disabilities and the interactions between their K-12 educational experiences and their adult outcomes. Much of the research evidence currently defining best practice in the field emerged from analyses based on data from the National Longitudinal Transition Study-2 (NLTS-2). NLTS-2 documented the experiences of several thousand high school youth with and without disabilities beginning in the year 2000, following them through several data points as they progressed through their final years in the K-12 system and entered adulthood. More specifically, the research evidence supporting inclusive education as a research-based predictor of post-school success is based on studies using NLTS-2 data. However, given significant changes in policy

relating to inclusive education and access to the general education curriculum, as well as changes in practices related to recommendations for transition programming, the educational experiences of students included in the NLTS-2 sample likely diverge significantly from that of present students with IDD, specifically in regards to the experiences of interest to this study.

While it has been used less extensively to examine the experiences of youth with IDD than NLTS-2, the High School Longitudinal Study of 2009 (HSLS) offers a rich breadth of variables that relate closely with the constructs of interest concerning inclusive education, transition predictors, and postsecondary success. Additionally, HSLS allows examination of groups of students with specific disability labels, permitting exploration of these phenomena specific to the population of students with IDD. Like NLTS-2, HSLS is a longitudinal data set composed of data collected through administrative and individual, parent, and school staff survey instruments over time points over several years. Data collected in the HSLS is high-quality and sampling weights are available to generalize findings to a national population. Most importantly, HSLS offers national longitudinal data collected from students with more recent matriculation through the K-12 system whose educational experiences were shaped by policy and practice similar to those of current and future transition-age youth.

Data Source

Data used for this study were sampled from the High School Longitudinal Study of 2009 (HSLS), a nationally representative longitudinal survey of more than 23,000 students from 944 schools who were in ninth grade in the fall of 2009. The study followed students through their secondary K-12 years and following their exit from school, with the most recent follow-up time point in 2013. HSLS data was compiled from both administrative (e.g., school transcripts, school characteristics) and survey data (e.g., students, parents, teachers, administrators, school

counselors). The sample used two-stage randomization to collect the sample. First, 944 schools were selected as the primary units from a total of 1,889; next, students were selected randomly from within those schools. HSLS data were collected over four waves beginning in 2009 until the final wave included in this study in 2014. Wave 1 data from 2009 were composed of surveys completed by students, parents, math and science teachers, school counselors, and school administrators, as well as a student math assessment. Surveys were completed online at school or home, or by phone. The first follow-up (Wave 2) was administered in spring 2012 when students were in their junior year of high school. Wave 2 also consisted of surveys from students, parents, counselors, and administrators. One year later, Wave 3 data was limited to only student and parent surveys. Transcripts were collected during the 2013-14 school year during students' senior year.

Sampling Design

Students sampled were randomly selected from high schools included in the HSLS sample set, and participants and their parents and school staff were then invited to complete surveys. A nationally representative sample of 944 public and private schools were selected to draw a sample of students from. From each school, an average of 25 participants were invited to participate, totaling over 24,000 students. Of these invitees, approximately 21,000 students responded to the survey and were included in the sample.

No students who met the criteria identified for the target population were removed from eligibility for the study because of an inability to complete the survey questionnaire or assessment. This included students with severe disabilities and language barriers who were unable to complete the student components of the survey directly, who were retained in the study

and additional contextual data were included for them. During Wave 1, 548 of the 25,206 were unable to complete the questionnaire and were reassessed in subsequent follow-up waves.

Data Collection Methods and Instruments

The design of the HSLS was informed by a conceptual model using the student as the primary unit of analysis and subsequently seeking to isolate individual factors like motivation, interest, and self-belief that may lead to student decisions and goals related to academic success. These factors include students' perceptions about expectations, values, barriers, and opportunities that inform their decision-making process. HSLS also takes into account the social context surroundings students' academic decision-making by examining families, peers, teachers, and the school community. Finally, the HSLS considers school-level policies, values, and other system factors that may influence student academic decision-making and outcomes.

A variety of instruments were used to collect data to inform this rich, multilevel model of students' high school career and their experiences after exiting. The questionnaire instruments were provided electronically to students, parents, teachers, administrators, and counselors, which was chosen for its reduction of potential error and limitation of lost and corrupted data in transcription. Computer-assisted telephone interviews were also made available to those who were unable to complete the electronic questionnaire. Specific questionnaires each provide specific information that helps inform students' educational ecology.

School Administrator Questionnaire

The school questionnaire probed participating administrators for information about characteristics of the school, available courses, the student population, teachers at the school, and the principals themselves. This section was made up of two parts, a four-part factual information section that provided contextual background information about the school and staff and a final

section that examined the principal's own experiences, values, and beliefs. The final section must be completed by the school principal, whereas the first four-part section could be delegated to a designee.

Parent Survey Instrument

The parent questionnaire contains a range of items inquiring about not only home life and family characteristics and involvement, but also information about the student's educational history and experiences. Data collected in the parent instrument include demographic information, members of the household and their roles, socioeconomic status of family members (including education, income, and occupation), immigration status, and language use at home. School-specific items included details about their child's history in school including grade retention, school changes, parental involvement at school, and plans for higher education after graduation.

Student Survey Instrument and Composites

Student questionnaire items include both perceptual questions about present attitudes and future aspirations, as well as more objective, substantive questions. Substantive items included demographic information (such as sex, race, and ethnicity), language, and specific experiences at school in current and previous school years. More abstract items probed students about self-efficacy in various subjects, self-identity, plans for careers and postsecondary education, and a range of other topics.

Study Sample

For this study, participants were drawn from the total sample of approximately 24,000 participants who provided survey data to HSLS. The primary sample for this study includes participants with IDD, which includes those reporting diagnoses of autism spectrum disorder

(ASD), intellectual disability (ID), and other developmental disabilities (DD). Initial analysis of the study sample with demographic information including gender, race, family income and education, and English language status is provided in the population section below.

Variables

In order to evaluate the study's research hypotheses, several variables were obtained from the student survey instrument. These data were collected in waves 1 and 3. Dependent variables were obtained from wave 3 to capture student outcome measures at high school exit, whereas independent measures were drawn from wave 1. Variables associated with inclusive academic education were obtained from the student survey transcript specific to how many academic credits were earned in regular general education classes. Those variables associated with vocational predictors of post-school success were also taken from the student survey instrument from wave 1 data. Finally, variables associated with the study population will be taken from baseline parent survey items. A description of selected variables, how data were obtained, and the type of data (e.g., dichotomous, categorical, continuous) will be provided in detail in the following section.

Population

Before examining specific variables of interest, given the focus of this study on the experiences of people with IDD, it was necessary to create a sub-sample from all HSLS participants containing only students with IDD. For this study, the IDD variable was constrained to include students identified as having been previously diagnosed with autism spectrum disorder (ASD), developmental disability (DD), and intellectual disability (ID). In the HSLS data set, those variables are derived from responses to the parent instrument taken from Wave 1. Table 3.1 shows population variables and their alignment with disability population categories.

Table 3.1

Population constructs and variables of interest

Construct	Sub-construct	Domain	Var. Name	Variable Label
Population	ASD	BY Parent Instrument Variables	P1AUTISM	P1 D03C Doctor/school has told parent 9th grader has some form of autism
	DD	BY Parent Instrument Variables	P1DD	P1 D03B Doctor/school has told parent 9th grader has developmental delay
	ID	BY Parent Instrument Variables	P1INTELLECT	P1 D03F Doctor/school has told parent 9th grader has intellectual disability

Demographics

Variables related to demographic information of participants were also included in the descriptive and multivariate analysis in order to examine how measured effects were differentially associated with various groups. This included information about participants' race/ethnicity, gender, and household income. Table 3.2 presents demographic information about participants.

Table 3.2

Demographic information about participants

Variable	Sample
Participants with IDD	*n* = 703
Gender	
Male	64.6%
Female	35.4%
Race and ethnicity	
White	53%
Black	12%
Latinx	3.5%
Asian	2.9%
Pacific-islander	0.4%
Multiple	15.3%
Socio-economic status	
First quintile	28.4%
Second quintile	18.7%
Third quintile	18.1%
Fourth quintile	14.8%
Fifth quintile	20.0%

Dependent Measures

Outcome measure data for the study are a combination of dichotomous (e.g., employment status, college enrollment) and continuous (e.g., earnings, wages, hours worked). Dependent variables of interest for employment consisted of whether the youth respondent had a job, what the respondent's income was, what the respondent's hourly wage was, and how many hours a week the respondent worked. The variable measuring whether the respondent had a job represented a dichotomous variable in the imputed form that answered the question: *Did you work for pay at any time between [date received [high school diploma/date received certificate of attendance/date last attended high school] and 2013, including continuing in any jobs started before you [received your high school diploma/received your certificate of attendance or completion/last attended high school]? Include all types of paid employment including part-time*

work, temporary and odd jobs lasting one month or more, and self-employment. Variables of interest for enrollment in post-secondary education are a dichotomous variable asking whether the student applied to or registered at a college or other postsecondary educational institution. Table 3.3 below lists outcome variables of interest and the instrument and item that provides data to inform each construct.

Table 3.3

Outcome constructs and variables of interest

Construct	Sub-construct	Domain	Var. Name	Variable Label
PSO: Employment	Job	F-2 Student-level composites	S3WORK	Whether the student worked for pay
	Earnings	F-2 Student-level composites	S3CURJOBEARN	Respondent's income
	Wages	F-2 Student-level composites	X3EARNPERHR1	Current job earnings per hour
	Hours	F-2 Student-level composites	S3CURJOBHRS	Average hours worked
PSO: Education	College	F-2 Student-level composites	X3CLASSES	Whether applied to or registered at a college

Predictor Variables

In order to examine the strength of the relationship between the outcome variables listed above and the educational experiences of sampled participants, several sets of predictor variables will be used that each capture a different construct of the educational experiences of these students. Namely, these are inclusive education experiences and vocational transition predictors of post-school success.

Inclusive Education. Previous studies examining the post-school impact of inclusive education experiences have incorporated a wide range of variables including measures of time in general education classrooms and extra-curricular activities in proportion to overall school time (Baer et al., 2011; Chan et al., 2018; Foster & Pearson, 2012; Luftig & Muthert, 2005; Ryndak et al., 2010a; 2010b), peer interactions (Ryndak et al., 2010a; 2010b; White & Weiner, 2004), and whether or not the student attended a typical high school or special school (Chiang, et al., 2012; Luftig & Muthert, 2005; Simonsen & Neubert, 2013). For this study, inclusive academic education was measured by the number of academic credits earned in inclusive general education classes. Table 3.4 lists inclusive education variables of interest.

Table 3.4

Inclusive education constructs and variables of interest

Construct	Sub-construct	Domain	Var. Name	Variable Label
Inclusive academic education	School type	HS transcript student-level comp	X3TCREDACAD	X3 Credits earned in academic courses

Vocational Transition Predictors of Post-School Success. Previous studies have consistently pointed to several strong predictors of positive postsecondary outcomes from paid work experience, vocational education, and occupational training for students with disabilities (Mazzotti et al., 2021; Test et al., 2009). In particular, having paid, community-based work experience before graduation is a strong predictor of future employment for youth and adults with more significant disabilities (Carter et al., 2012). In this study, these predictors were measured using a variety of variables. For experience, data will be used from student survey response variables measuring whether students participated in internships or apprenticeships, as well as whether they had paid or volunteer work related to their career goals. Vocational

education was based on a variable taken transcript from transcript data showing whether or not a student took a career and technical education course during their K-12 education. These variables and their alignment with key constructs related to other predictors of post-school success are shown in table 3.5.

Table 3.5

Other predictors of post-school success constructs and variables of interest

Construct	Sub-construct	Domain	Var. Name	Variable Label
Other predictors of post-school success	Work experience	F1 Student Instrument Variables	S2INTERN	S2 C01D Participated in internship or apprenticeship related to career goals
		F1 Student Instrument Variables	S2CAREERJOB	S2 C01E Performed paid/volunteer work in job related to career goals
	Vocational education	HS transcript student-level comp	X3TCREDCTE	X3 Credits earned in: CTE

Data Analytic Plan

Given the focus of this study on examining predictive relationships between variables, and the fact that the primary outcome measures were a mix of dichotomous (e.g., whether youth has a job) and continuous (e.g., youth's current earnings), a combination of logistic and linear regression were used as the primary methods of analysis. Logistic and linear regression have been used extensively in previous studies examining the relationship between inclusive education and postsecondary outcomes in both employment and education (e.g., Baer et al., 2011; Chan et al., 2018; Chiang et al., 2012; Simonsen & Neubert, 2012). Since logistic regression is based on the logit transformation of the dependent variable, a continuous logarithmic curve is generated from non-continuous data to allow for analysis of a regression model. As such, the logistic regression method deals with many of the problems with

dichotomous dependent variables and assumptions of normal distribution, heteroscedasticity, and linearity needed to justify the use of multiple linear regression analysis. Instead of calculating based on a sum of squares to a model linear function, logistic regression calculates outcome probabilities for each value of the predictor variable used in the model. The result of logistic regression analysis is an odds ratio that represents the increased or decreased probability of the outcome occurring based on the events specified by the predictor variables. An odds ratio above one implies an increased probability of occurrence and below one a decreased probability of occurrence.

Multivariate Logistic and Linear Regression

In this study, linear and logistic regression were used in four phases corresponding with the research questions outlined in Chapter 2. In the first phase of analysis, logistic regression was conducted to calculate the odds of positive postsecondary outcomes in employment and education for students with greater inclusive academic education opportunities, and linear regression was conducted to calculate the extent to which predictive variables explained variance in continuous dependent variables (i.e., earnings, wages, hours). This analysis was then replicated specifically to students from historically marginalized racial and ethnic groups to determine whether the predictive association is consistent for that group. Figure 3.1 shows a path analysis diagram of the relationship between variables.

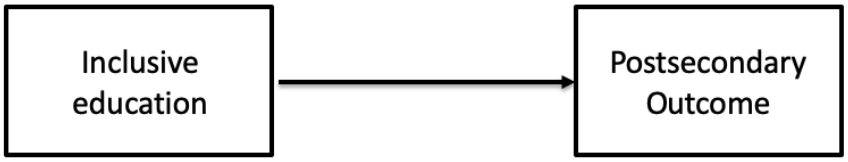

Figure 3.1 *Path Analysis: Research Question 1*

In the second phase of analysis, logistic and linear regression were used to calculate the odds of positive postsecondary outcomes in employment and education for students with greater engagement in vocationally-oriented transition experiences (i.e., work experiences, vocational education, and occupational coursework) as well as the extent to which these experiences explained variance in continuous outcome variables (i.e., earnings, wages, hours); this model was also replicated with a subsample of students from historically marginalized racial and ethnic groups to determine whether the association is consistent. Figure 3.2 shows the path diagram between these variables.

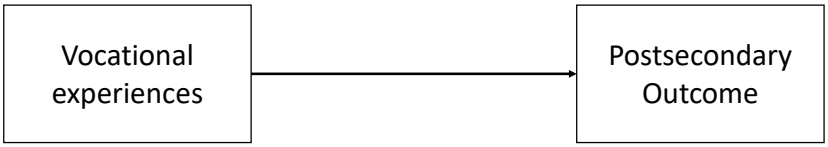

Figure 3.2 *Path Analysis: Research Question 2*

Third, logistic and linear regression was conducted to determine to what extent inclusive academic education and vocationally-oriented transition experiences (i.e., work experiences, vocational education, and occupational coursework) predicted positive postsecondary outcomes in employment and education controlling for one another. Figure 3.3 shows the path diagram including statistical controls between variables.

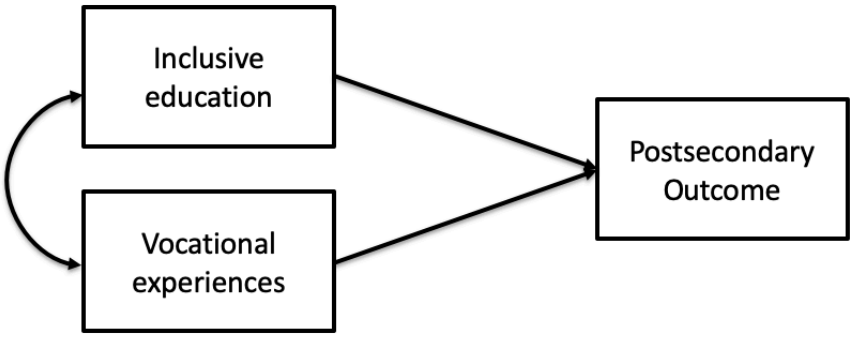

Figure 3.3 *Path Analysis: Research Question 3*

Finally, a full model was used which included not only inclusive academic education and vocational transition experiences as separate variables but also as a combined interaction effect between variables. In other words, this fourth approach analyzed the extent to which the combination of inclusive academics and vocational experiences predicted positive postsecondary outcomes. The full model for all sets of analyses included covariates related to the race, ethnicity, gender, and SES status of participants. Figure 3.4 shows a path analysis diagram of the full model including interaction effects between predictive variables.

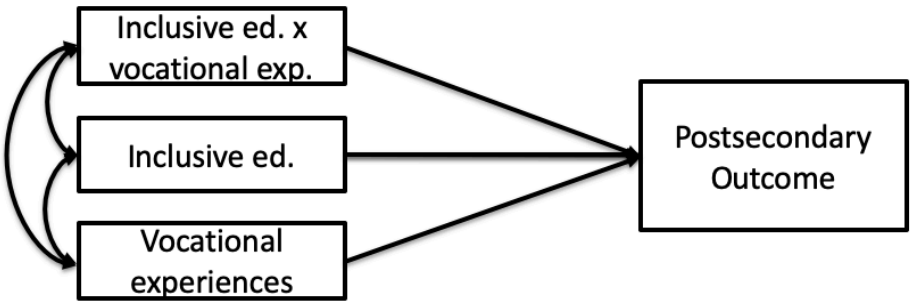

Figure 3.4 *Path Analysis: Research Question 4*

Following data analysis using the four main models and their derivates, tests of sensitivity and specificity will be conducted to evaluate the utility of the model itself.

Sampling Weights

Data weighting is a technique for adjusting the results of analyses to account for sampling bias and make more accurate estimates of population parameters. HSLS was designed to produce generalizable results for the population of high school students with and without disabilities who were in 9th grade in 2009. However, since HSLS used stratified sampling techniques to estimate population parameters, not every student had an equal opportunity to participate. Weighting is used to estimate the true population parameter based on values provided in the HSLS sample. HSLS has provided weights for each of the instruments from which variables were obtained. When analyses were limited to variables from a single wave of data, the full weight was used in analysis using weights from the instrument with the smallest sample size—in this case, the third wave of data from which outcome variables were used.

Missing Data

A common problem with using survey-based data is the issue of missing data. Missing data cannot be disregarded because it may mask certain confounding variables that may explain the missingness of the data and render biased results that no longer represent the true relationship between variables for all participants—including those with missing data. Longitudinal studies can be especially prone to missing data since it is collected over multiple waves over several years. Data may be completely missing for some participants, whereas others may have missing data on one or more items for a variety of reasons.

There are several approaches to compensating for missing data to ensure that bias is not introduced into the sample data that would invalidate any analysis. However, before consideration of any method for dealing with missing data, it is critical to first understand the underlying mechanisms that explain the missing data and their relationship to other variables in the sample. Missing data can either be 1) *missing completely at random (MCAR)* in which no

variables are able to predict whether a value will be missing, 2) *missing at random (MAR)* in which other variables in the data set predict missingness but not a variable in the model, and 3) *missing not at random (MNAR)* in which the unobserved variable predicts the missingness (Rubin, 1976). Since dealing with missing data depends greatly on the degree to which data are missing at random, Little's (1988) MCAR test will be used to determine whether there is evidence that data are missing at random. If data are MCAR, missing observations can be deleted and estimates should be unbiased. In data that are not MCAR, logistic regression will be used to examine whether other variables in the dataset predict missingness by creating variables of missing values from each variable. If none of those are significant, we can assume data are MAR, in which case multiple imputation will be used to calculate probably values for missing data using other variables in the data set that predict missingness.

Implications of the Study

Due to the lack of updated research on how inclusive education relates to postsecondary outcomes for youth with IDD, this study provides great benefit for researchers, policymakers, and practitioners. The study's findings offer insight into how recent changes to provide greater access to inclusive education and academic instruction impact students with IDD and whether those experiences occur in conjunction with other transition predictors of post-school success. The identification of these predictors for youth with disabilities over the last decade has provided critical guidance to practitioners about which experiences should be emphasized in transition planning and programming. This study extends that work specific to the impact of inclusive academic education specific to students with IDD—a population that experiences these educational opportunities least often. Findings of this study add to limited previous research with this population to ascertain whether recent policy changes regarding access to the general

education curriculum have led to any changes. Furthermore, the findings from this study provide additional understanding of whether students with IDD do truly receive "the best of both worlds" in terms of both inclusive education and rigorous academics along with more specialized transition experiences. Findings from our analysis provide insight into how to best prepare students with IDD for better adult outcomes and inform policy regarding the transition planning and programming of students with IDD.

CHAPTER 4: FINDINGS

The purpose of this study was to determine the extent to which inclusive academic education and vocational transition experiences predicted improved postsecondary employment and educational outcomes. Chapter 4 summarizes the results from the analysis conducted based on the methods outlined in Chapter 3. Previous studies have shown support for both inclusive academic education and vocational transition experiences such as work experience, internships, and career and technical education in promoting improved postsecondary outcomes for youth with IDD (e.g., Carter et al., 2012; Mazzotti et al., 2021). Considering these findings from previous literature, four research questions were developed:

1. To what extent does inclusive academic education predict postsecondary outcomes?
2. To what extent do vocationally-oriented transition experiences predict postsecondary outcomes?
3. To what extent do inclusive academic education predict postsecondary outcomes controlling for vocationally-oriented transition experiences? (and vice versa)
4. Is there an interaction effect between inclusive academic education and vocationally-oriented transition experiences in how they predict postsecondary outcomes?
    a. Are these relationships consistent for students from historically marginalized racial and cultural groups?

To explore these relationships, multiple regression was employed to determine the extent of the association between predictive experiences and outcomes. Since outcomes related to both dichotomous (i.e., job status, enrollment in PSE) and continuous (i.e., earnings, hours worked), a combination of linear and logistic regression was used for each of the four research questions.

Descriptive Statistics

Prior to conducting these analyses a descriptive analysis of key variables was conducted to provide an overview of the experiences of participants. Table 4.1 presents the descriptive statistics of key variables of interest included in the analysis.

Table 4.1

Descriptive Statistics of Participants

	Percent	Mean	Std. dev.	Min	Max
Had a job	65.5%	-	-	-	-
Participated in an internship	14.1%	-	-	-	-
Previous work experience	28.38%	-	-	-	-
Engaged in PSE	41.9%	-	-	-	-
Inclusive academic credits	-	15.6	6.0	0.5	36
CTE credits	-	3.8	3.0	0.1	18.5
Wages (per hour)	-	$9.13	$6.14	$2.13	$80.00
Hours (per week)	-	26.3	12.5	1	90
Earnings (per week)	-	$112.70	$359.53	$2.13	$3600.00

Note. – Std. dev. = standard deviation; CTE = career and technical education

Research question 1

Logistic regression was used to examine the effects of inclusive academic education on employment status and enrollment in PSE. Table 4.2 shows the extent to which inclusive academic education predicted these dichotomous postsecondary outcome variables. Results showed that inclusive academic education reduced the odds of being employed, albeit non-significantly in all three models. However, it should be noted that the uncontrolled model approached statistical significance (OR = .97; $p = 0.065$). Interestingly, the direction of the

relationship also became greater than one after applying sampling weighting, implying a change in the overall direction of the effect. Conversely, the odds of enrollment in PSE significantly increased for students with higher inclusive academic education (OR = 1.19; $p < 0.001$).

Table 4.2

Association of Inclusive Academic Education with Postsecondary Outcomes

	OR (U)	OR (W)	Std. err.	z	*p*	[95% Conf. Int.]	
Empl. Status							
Model 1	.969	1.017	.0166	-1.84	0.065	.937	1.002
Model 2	.971	1.017	.0180	-1.60	0.109	.936	1.007
Model 3	.989	1.019	.0197	-0.55	0.585	.951	1.029
PSE							
Model 1	1.191	1.187	.021	9.90	0.000***	1.150	1.233
Model 2	1.185	1.180	.022	9.16	0.000***	1.143	1.229
Model 3	1.147	1.166	.022	7.17	0.000***	1.105	1.191

Note. – OR = odds ratio; U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; employ. = employment; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status.
* $p < .05$; ** $p < .01$; *** $p < .001$

Linear regression was used to determine the effect of inclusive academic education on earnings, wages, and hours. Table 4.3 shows the results of those analyses. Across all outcome variables, inclusive academic education resulted in reduced levels of earnings (B = -4.842; $p = 0.326$), wages (B = -0.058; $p = 0.491$), and hours (B = -0.29; $p = 0.066$), though none of these associations were statistically significant in the uncontrolled model. After accounting for gender, race, and ethnicity, there was a statistically significant negative association between inclusive academic education and hours worked per week.

Table 4.3

Association of Inclusive Academic Education with Employment-specific Outcomes

	B (U)	B (W)	Std. err.	*t*	*p*	[95% Conf. Int.]	
Earnings							
Model 1	-4.842	-1.262	4.918	-0.98	0.326	-14.537	4.853
Model 2	-4.588	-1.087	5.375	-0.85	0.394	-15.189	6.014
Model 3	-5.924	-1.436	6.051	-0.98	0.329	-17.861	6.012
Wages							
Model 1	-.058	-.0346	0.084	-0.69	0.491	-0.225	0.108
Model 2	-.079	-.0702	0.092	-0.86	0.394	-0.260	0.103
Model 3	-.119	-0.127	0.103	-1.16	0.249	-0.321	0.084
Hours							
Model 1	-.287	-.277	.156	-1.84	0.066	-.594	.0195
Model 2	-.346	-.325	.166	-2.08	0.039*	-.673	-.018
Model 3	-.364	-.489	.189	-1.92	0.056	-.737	.009

Note. – U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status.
* $p < .05$; ** $p < .01$; *** $p < .001$

Research question 2

Analyses related to the second research question investigated the association between vocational transition experiences and postsecondary outcomes. Logistic regression was used to examine the extent to which vocational transition experiences (i.e., internship participation, work experience, CTE participation) predicted increased odds of having a job and enrolling in postsecondary education. Results of these logistic analyses are shown in Table 4.4. Vocational transition experiences led to somewhat increased odds of employment for internship participants (OR = 1.14; $p = 0.649$), those with work experience (OR = 1.18; $p = 0.448$), and CTE participation (OR = 1.02; $p = 0.606$) though none of those relationships were statistically significant. The association between vocational transition experiences and PSE enrollment was more complex. Positive significant relationships were found between work experience and PSE in all three models, whereas CTE was negatively associated with PSE enrollment—with

significance in the unadjusted model—and when accounting for differences related to gender and race/ethnicity (OR = 0.93; $p = 0.011$).

Table 4.4

Association of Vocational Transition Experiences with Postsecondary Outcomes

	OR (U)	OR (W)	Std. err.	z	*p*	[95% Conf. Int.]	
Empl. Status							
Model 1							
Intern.	1.138	2.204	.324	0.45	0.649	.652	1.987
Work exp.	1.182	1.138	.261	0.76	0.448	.767	1.823
CTE	1.018	1.036	.035	0.52	0.606	.952	1.088
Model 2							
Intern.	1.044	1.968	.317	0.14	0.887	.575	1.894
Work exp.	1.155	1.106	.266	0.63	0.532	.735	1.814
CTE	1.041	1.067	.041	1.04	0.298	.965	1.124
Model 3							
Intern.	.9792	2.122	.305	-0.07	0.946	.531	1.805
Work exp.	1.236	1.223	.294	0.89	0.373	.776	1.968
CTE	1.012	1.049	.040	0.31	0.757	.936	1.095
PSE							
Model 1							
Intern.	.946	.866	.219	-0.24	0.810	.601	1.488
Work exp.	1.584	1.539	.287	2.54	0.011*	1.111	2.258
CTE	.932	.990	.026	-2.53	0.011*	.882	.984
Model 2							
Intern.	.991	1.027	.246	-0.04	0.970	.610	1.610
Work exp.	1.631	1.439	.310	2.57	0.010**	1.123	2.368
CTE	.938	.982	.030	-2.04	0.042*	.882	.998
Model 3							
Intern.	1.051	1.107	.279	0.19	0.851	.625	1.767
Work exp.	1.635	1.546	.336	2.39	0.017*	1.092	2.446
CTE	.984	1.035	.033	-0.47	0.636	.921	1.051

Note. – OR = odds ratio; U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; employ. = employment; inter. = internship experience; work exp. = work experience; CTE = career and technical education experience; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status.
* $p < .05$; ** $p < .01$; *** $p < .001$

Linear regression was used to examine the extent to which vocational transition experiences led to increased earnings, wages, and hours. Results of these analyses are shown in

Table 4.5. Overall, these results were highly mixed. For example, internship participation was negatively associated with earnings in the unadjusted model but became positive after adjusting for gender and race/ethnicity—though neither of these parameters was statistically significant. CTE negatively predicted (though non-significantly) both hours and earnings. The only significant relationship noted in this set of analyses was that increased participation in CTE coursework predicted higher wages per hour for participants (B = 0.55; $p = 0.003$).

Table 4.5

Association of Vocational Transition Experiences with Employment-specific Outcomes

	B (U)	B (W)	Std. err.	*t*	*p*	[95% Conf. Int.]	
Earnings							
Model 1							
Intern.	-6.428	-19.744	79.258	-0.08	0.935	-162.765	149.910
Work exp.	91.287	92.176	58.149	1.57	0.118	-23.413	205.987
CTE	-13.973	-8.992	9.136	-1.53	0.128	-31.994	4.048
Model 2							
Intern.	5.965	-3.955	85.713	0.07	0.945	-163.193	175.123
Work exp.	93.260	95.053	62.329	1.50	0.136	-29.749	216.268
CTE	-17.022	-11.941	10.346	-1.65	0.102	-37.441	3.397
Model 3							
Intern.	13.384	17.516	88.938	0.15	0.881	-162.168	188.935
Work exp.	102.786	109.199	63.068	1.63	0.105	-21.700	227.272
CTE	-19.115	-14.622	10.697	-1.79	0.076	-40.229	1.999
Wages							
Model 1							
Intern.	-1.071	-1.457	1.348	-0.79	0.428	-3.731	1.588
Work exp.	-0.381	-0.616	0.985	-0.39	0.699	-2.324	1.562
CTE	0.450	0.709	0.160	2.81	0.005*	0.134	0.765
Model 2							
Intern.	-1.127	-1.532	1.452	-0.78	0.439	-3.992	1.739
Work exp.	-0.526	-0.712	1.054	-0.50	0.618	-2.607	1.555
CTE	0.525	0.787	0.182	2.89	0.004*	0.166	0.885
Model 3							
Intern.	-1.588	-1.954	1.498	-1.06	0.291	-4.545	1.369
Work exp.	-.5149	-0.648	1.061	-0.49	0.628	-2.609	1.579
CTE	0.555	0.896	0.187	2.97	0.003**	0.185	0.924
Hours							
Model 1							
Intern.	1.482	0.197	2.576	0.58	0.566	-3.597	6.561
Work exp.	2.294	3.207	1.883	1.22	0.225	-1.418	6.006
CTE	-0.236	-0.668	0.312	-0.76	0.450	-0.851	0.379
Model 2							
Intern.	1.517	0.493	2.703	0.56	0.575	-3.815	6.848
Work exp.	3.146	3.426	1.960	1.61	0.110	-0.719	7.012
CTE	-0.307	-0.835	0.320	-0.96	0.337	-0.938	0.323
Model 3							
Intern.	1.446	-0.342	2.789	0.52	0.605	-4.055	6.947
Work exp.	3.332	4.607	1.978	1.68	0.094	-0.569	7.234
CTE	-0.357	-0.808	0.327	-1.09	0.275	-1.002	0.287

Note. – U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; work exp. = work experience; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status.
* $p < .05$; ** $p < .01$; *** $p < .001$

Research Question 3

The third set of analyses related to the extent to which inclusive academic education and vocational transition experiences predicted improved postsecondary outcomes after accounting for one another. Table 4.6 shows the results of these analyses specific to the respective likelihoods of having a job and enrolling in PSE. In terms of employment status, results were mixed. As with analyses conducted in the first research question, inclusive academic education led to reduced odds of having a job, which narrowly approached statistical significance (OR = 0.97; $p = 0.056$). However, after applying sampling weights, this relationship reversed to an increased odds (OR = 1.02), further underscoring the uncertainty of these results within the sample.

Inclusive academic education was strongly predictive of PSE enrollment in all models, even after accounting for gender, race/ethnicity, and SES (OR = 1.16; $p < 0.001$). The association between internship participation and PSE enrollment changed from less than one in the unadjusted model to greater than one in both adjusted models, though none of these were statistically significant. Work experience predicted increased enrollment in PSE and was statistically significant in the adjusted and full model (OR = 1.54; $p = 0.043$).

Table 4.6

Association of Educational and Vocational Transition Experiences with Postsecondary Outcomes

	OR (U)	OR (W)	Std. err.	z	*p*	[95% Conf. Int.]	
Empl. Status							
Model 1							
Incl. acad.	0.968	1.017	0.0167	-1.91	0.056	0.935	1.001
Intern.	1.015	1.840	0.280	0.05	0.958	0.590	1.744
Work exp.	1.278	1.111	0.271	1.16	0.248	0.843	1.938
Model 2							
Incl. acad.	0.978	1.038	0.021	-1.03	0.302	0.938	1.020
Intern.	1.019	2.105	0.311	0.06	0.952	0.560	1.852
Work exp.	1.171	1.021	0.270	0.68	0.494	0.745	1.842
Model 3							
Incl. acad.	0.999	1.038	0.023	-0.03	0.977	0.956	1.045
Intern.	0.979	2.230	0.306	-0.07	0.945	0.531	1.805
Work exp.	1.236	1.114	0.294	0.89	0.373	0.775	1.971
PSE							
Model 1							
Incl. acad.	1.190	1.185	0.021	9.80	0.000***	1.149	1.232
Intern.	0.881	0.999	0.210	-0.53	0.595	0.552	1.406
Work exp.	1.330	1.114	0.247	1.54	0.124	0.925	1.914
Model 2							
Incl. acad.	1.201	1.191	0.026	8.59	0.000***	1.152	1.252
Intern.	1.025	1.245	0.272	0.09	0.925	0.610	1.724
Work exp.	1.535	1.103	0.313	2.10	0.036*	1.029	2.289
Model 3							
Incl. acad.	1.160	1.174	0.026	6.70	0.000***	1.111	1.212
Intern.	1.073	1.278	0.293	0.26	0.798	0.628	1.833
Work exp.	1.535	1.153	0.325	2.02	0.043*	1.014	2.325

Note. – OR = odds ratio; U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; employ. = employment; acad. = inclusive academic education; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status.

* $p < .05$; ** $p < .01$; *** $p < .001$

Linear regression was used to analyze the effects of inclusive academic education and vocational transition experiences on earnings, wages, and hours. Table 4.7 provides the results of

those analyses. Inclusive academic education predicted lower earnings and significantly lower wages in the unadjusted model (B = -0.37; $p < 0.001$). Internship participation was negatively associated with earnings in the unadjusted model but reversed this association in the adjusted and full models. Internships also significantly predicted increased wages per hour in the unadjusted model (B = 0.394; $p = 0.007$). Work experience positively predicted earnings but fell just short of statistical significance in each of the models.

Table 4.7

Association of Educational and Vocational Transition Experiences with Employment-specific Outcomes

	B (U)	B (W)	Std. err.	*t*	*p*	[95% Conf. Int.]	
Earnings							
Model 1							
Incl. acad.	-5.170	-1.813	4.958	-1.04	0.298	-14.944	4.604
Intern.	-27.032	-34.847	74.162	-0.36	0.716	-173.241	119.177
Work exp.	79.0572	85.590	53.601	1.47	0.142	-26.616	184.731
Model 2							
Incl. acad.	-7.768	-2.112	6.245	-1.24	0.215	-20.093	4.556
Intern.	1.486	-9.324	85.656	0.02	0.986	-167.566	170.538
Work exp.	94.180	95.927	62.237	1.51	0.132	-28.651	217.011
Model 3							
Incl. acad.	-9.319	-2.301	6.910	-1.35	0.179	-22.958	4.320
Intern.	11.527	12.807	88.738	0.13	0.897	-163.636	186.691
Work exp.	105.088	110.382	62.941	1.67	0.097	-19.153	229.330
Wages							
Model 1							
Incl. acad.	-0.037	-0.041	0.010	-3.59	0.000***	-0.058	-0.017
Intern.	0.394	0.371	0.147	2.68	0.007**	0.105	0.683
Work exp.	0.205	0.284	0.111	1.86	0.064	-0.012	0.422
Model 2							
Incl. acad.	-0.002	-0.010	0.106	-0.17	0.862	-0.228	0.191
Intern.	-1.137	-1.556	1.457	-0.78	0.436	-4.012	1.739
Work exp.	-0.524	-0.708	1.058	-0.50	0.621	-2.611	1.564
Model 3							
Incl. acad.	-0.078	-0.108	0.117	-0.67	0.506	-0.308	0.152
Intern.	-1.602	-2.175	1.501	-1.07	0.287	-4.564	1.360
Work exp.	-0.495	-0.592	1.063	-0.47	0.642	-2.593	1.603

Note. – U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; work exp. = work experience; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status.
* $p < .05$; ** $p < .01$; *** $p < .001$

Table 4.7 Continued

	B (U)	B (W)	Std. err.	*t*	*p*	[95% Conf. Int.]	
Hours							
Model 1							
Incl. acad.	-0.284	0.020	0.157	-1.81	0.072	-0.594	0.025
Intern.	0.251	-1.395	2.475	0.10	0.919	-4.625	5.128
Work exp.	2.388	-0.631	1.776	1.34	0.180	-1.112	5.888
Model 2							
Incl. acad.	-0.433	-0.407	0.181	-2.38	0.018*	-0.791	-0.075
Intern.	1.072	-1.770	2.678	0.40	0.689	-4.209	6.354
Work exp.	3.175	4.183	1.937	1.64	0.103	-0.645	6.995
Model 3							
Incl. acad.	-0.501	-0.566	0.203	-2.46	0.015*	-0.902	-0.100
Intern.	1.233	-1.622	2.754	0.45	0.655	-4.199	6.664
Work exp.	3.426	4.781	1.952	1.75	0.081	-0.425	7.278

Note. – U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; work exp. = work experience; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status.
* $p < .05$; ** $p < .01$; *** $p < .001$

Research Question 4

The fourth set of analyses related to interaction effects between inclusive academic education and vocational transition experiences in predicting postsecondary outcomes. Results of these analyses for employment status and PSE enrollment are presented in Table 4.8. For employment status, similar trends to previous analyses were noted. Specifically, inclusive academic education reduced the odds of having a job, albeit non-significantly. For the most part, this relationship held even in the interactions with internship participation and previous work experience, though the association between work status and the interaction effect between inclusive academic education and internship participation was slightly positive in the unweighted analysis using the adjusted and full models (OR = 1.01; $p = 0.903$).

In terms of predicting PSE enrollment, inclusive academic education remained the strongest positive predictor (OR = 1.23; $p < 0.001$), showing statistical significance in all three models even when accounting for vocational transition experiences and the interaction effects between them. Of the interaction effects analyzed in terms of these outcome variables, none of the interaction effects were statistically significant, though the interaction between inclusive academic education and internship participation approached a negative significant odds ratio in predicting PSE enrollment for both adjusted and full models (OR = 0.88; $p = 0.056$).

Table 4.8

Interaction Effect of Educational and Vocational Transition Experiences on Postsecondary Outcomes

	OR (U)	OR (W)	Std. err.	z	*p*	[95% Conf. Int.]	
Empl. Status							
Model 1							
Incl. acad.	0.958	1.028	0.028	-1.45	0.146	0.905	1.015
Intern.	1.274	10.657	1.250	0.25	0.805	0.186	8.717
Work exp.	1.785	2.301	1.553	0.67	0.506	0.324	9.825
Incl. acad. x intern.	0.990	0.905	0.059	-0.17	0.868	0.882	1.112
Incl. aca. x work exp.	0.976	0.953	0.049	-0.49	0.627	0.885	1.076
Model 2							
Incl. acad.	0.952	1.011	0.031	-1.54	0.124	0.894	1.014
Intern.	0.883	8.759	0.991	-0.11	0.912	0.098	7.970
Work exp.	1.709	1.625	1.626	0.56	0.574	0.265	11.034
Incl. acad. x intern.	1.011	0.914	0.067	0.16	0.870	0.887	1.152
Incl. aca. x work exp.	0.978	0.973	0.053	-0.41	0.680	0.880	1.087
Model 3							
Incl. acad.	0.978	1.006	0.033	-0.67	0.504	0.915	1.045
Intern.	0.882	9.027	0.995	-0.11	0.912	0.097	8.041
Work exp.	1.586	1.407	1.535	0.48	0.634	0.238	10.570
Incl. acad. x intern.	1.008	0.914	0.068	0.12	0.903	0.884	1.150
Incl. aca. x work exp.	0.985	0.986	0.054	-0.27	0.788	0.885	1.098
PSE							
Model 1							
Incl. acad.	1.227	1.204	0.039	6.47	0.000***	1.153	1.305
Intern.	3.016	0.219	2.980	1.12	0.264	0.435	20.917
Work exp.	0.605	3.644	0.531	-0.57	0.567	0.109	3.375
Incl. acad. x intern.	0.936	1.106	0.055	-1.12	0.263	0.834	1.051
Incl.acad.x work exp.	1.055	0.934	0.054	1.04	0.300	0.954	1.166

Note. – OR = odds ratio; U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; employ. = employment; work exp. = work experience; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status.
* $p < .05$; ** $p < .01$; *** $p < .001$

Table 4.8 Continued

	OR (U)	OR (W)	Std. err.	z	*p*	[95% Conf. Int.]	
Model 2							
Incl. acad.	1.233	1.207	0.041	6.24	0.000***	1.155	1.317
Intern.	7.033	0.546	7.412	1.85	0.064	0.891	55.487
Work exp.	0.429	2.073	0.409	-0.89	0.374	0.066	2.779
Incl. acad. x intern.	0.889	1.052	0.055	-1.89	0.059	0.787	1.005
Inc.acad. x work exp.	1.078	0.963	0.060	1.35	0.176	0.967	1.202
Model 3							
Incl. acad.	1.167	1.178	0.041	4.44	0.000***	1.090	1.249
Intern.	8.085	0.679	8.734	1.93	0.053	0.973	67.174
Work exp.	0.300	1.935	0.298	-1.21	0.225	0.043	2.098
Incl. acad. x intern.	0.884	1.040	0.057	-1.91	0.056	0.780	1.003
Incl. aca. x work exp.	1.102	0.970	0.064	1.67	0.095	0.983	1.234

Note. – OR = odds ratio; U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; employ. = employment; work exp. = work experience; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status.
* $p < .05$; ** $p < .01$; *** $p < .001$

Table 4.9 provides comprehensive results of full model analysis specific not only to the predictors of employment status in and of themselves, but also in terms of how these experiences and interaction effects predicted having a job for individuals based on race and ethnicity, SES, and gender. Figure 4.1 shows a visual representation of the interaction effect between inclusive academic education and internship participation on job status. Overall, the effects of these participants' identities had a non-significant effect on the model, except those in the highest SES category having reduced odds of being employed at the time of graduation. No statistically significant differences related to predicting employment among students from various racial or ethnic groups were noted.

Table 4.9

Full Predictive Model for Employment Status

	OR (U)	OR (W)	Std. err.	z	*p*	[95% Conf. Int.]	
Empl. Status							
Incl. acad.	0.978	1.006	0.033	-0.67	0.504	0.915	1.045
Intern.	0.882	9.027	0.995	-0.11	0.912	0.097	8.041
Work exp.	1.586	1.407	1.535	0.48	0.634	0.238	10.570
Incl. acad. x intern.	1.008	0.914	0.068	0.12	0.903	0.884	1.150
Incl. acad. x work exp.	0.985	0.986	0.054	-0.27	0.788	0.885	1.098
Race/ethnicity							
White	0.475	-	0.549	-0.64	0.520	0.049	4.575
Black	0.632	-	0.753	-0.39	0.700	0.061	6.514
Latinx	0.263	-	0.336	-1.05	0.296	0.021	3.218
Asian	0.311	-	0.426	-0.85	0.393	0.021	4.540
Pac. Isl.	1	-	-	-	-	-	-
Multiple	0.561	-	0.660	-0.49	0.623	0.056	5.624
Gender							
Female	0.990	1.021	0.226	-0.05	0.963	0.632	1.548
SES							
2nd quint.	1.042	1.598	0.374	0.11	0.909	0.515	2.107
3rd quint.	0.749	1.157	0.242	-0.90	0.370	0.398	1.410
4th quint.	1.305	3.175	0.474	0.73	0.463	0.640	2.660
5th quint.	0.361	0.401	0.122	-3.01	0.003**	0.186	0.701

Note. – OR = odds ratio; U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; employ. = employment; work exp. = work experience; Pac. Isl. = Pacific Islander; SES = socioeconomic status; quint. = quintile; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status; for SES, 1st quintile group used as comparison. Gender- male used as the reference category.
* $p < .05$; ** $p < .01$; *** $p < .001$

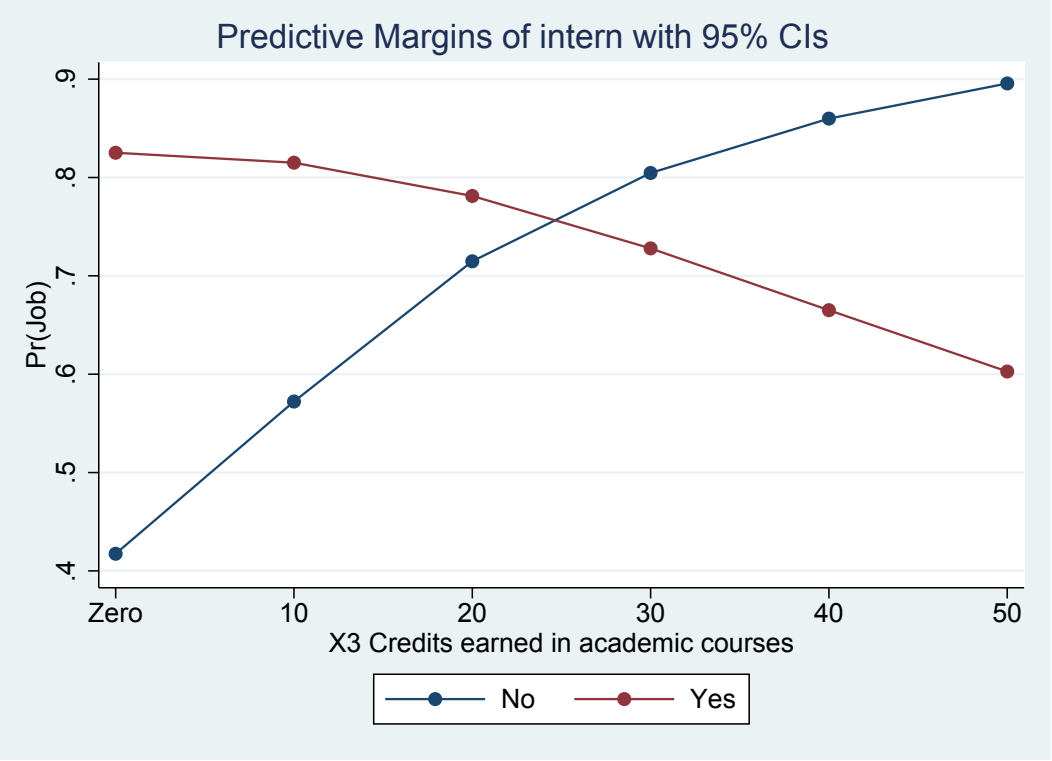

Figure 4.1 *Interaction Between Inclusive Academic Education and Internship Participation on Job Status*

In predicting PSE enrollment, the model presented more complex findings. As with previous models, inclusive academic education was a strong predictor of PSE enrollment. Internship participation and the interaction effects between inclusive academic education and both internship and work experience approached significance at the $p \leq 0.05$ level. While no significance was noted relative to the race/ethnicity or gender of participants in these analyses, a strong relationship was found with regard to SES. In particular, those participants at higher levels of SES had much more likelihood of enrolling in PSE, with statistical significance for those in the third (OR = 2.46; $p = 0.002$), fourth (OR = 2.31; $p = 0.005$), and fifth (OR = 6.00; $p < 0.001$) SES quintiles. Table 4.10 shows the results of the full predictive model. Figures 4.2 and 4.3 show the interaction effect of inclusive academic education on internship participation and work

experience, respectively, on PSE enrollment. No statistically significant differences among students in predicting post-secondary education from various racial or ethnic groups were noted.

Table 4.10

Full Predictive Model for Enrollment in Postsecondary Education

	OR (U)	OR (W)	Std. err.	z	P > | z |	[95% Conf. Int.]	
PSE							
Incl. acad.	1.167	1.178	0.041	4.44	0.000***	1.090	1.249
Intern.	8.085	0.679	8.734	1.93	0.053	0.973	67.174
Work exp.	.300	1.935	0.298	-1.21	0.225	0.043	2.098
Incl. acad. x intern.	.884	1.040	0.057	-1.91	0.056	0.780	1.003
Incl. aca. x work exp.	1.102	0.970	0.064	1.67	0.095	0.983	1.234
Race/ethnicity							
White	1.948	0.648	1.617	0.80	0.422	0.383	9.915
Black	2.575	0.964	2.219	1.10	0.272	0.476	13.937
Latinx	1.137	0.576	1.092	0.13	0.893	0.173	7.472
Asian	3.129	2.137	3.185	1.12	0.262	0.425	23.008
Pac. Isl.	6.713	0.398	10.836	1.18	0.238	0.284	158.863
Multiple	2.078	1.010	1.769	0.86	0.391	0.391	11.030
Gender							
Female	1.212	0.931	0.247	0.95	0.344	0.813	1.808
SES							
2nd quint.	1.181	1.794	0.349	0.56	0.575	0.661	2.108
3rd quint.	2.456	3.278	0.703	3.14	0.002**	1.401	4.305
4th quint.	2.308	2.070	0.690	2.80	0.005**	1.284	4.147
5th quint.	6.004	8.268	1.876	5.74	0.000***	3.254	11.078

Note. – OR = odds ratio; U = unweighted; W = weighted; std. err. = standard error; conf. int. = confidence interval; employ. = employment; work exp. = work experience; Pac. Isl. = Pacific Islander; SES = socioeconomic status; quint. = quintile; Model 1 = predictors only; Model 2 = predictors, race, sex; Model 3 = predictors, race, sex, socioeconomic status; for SES, 1st quintile group used as comparison. Gender- male used as reference category.
* $p < .05$; ** $p < .01$; *** $p < .001$

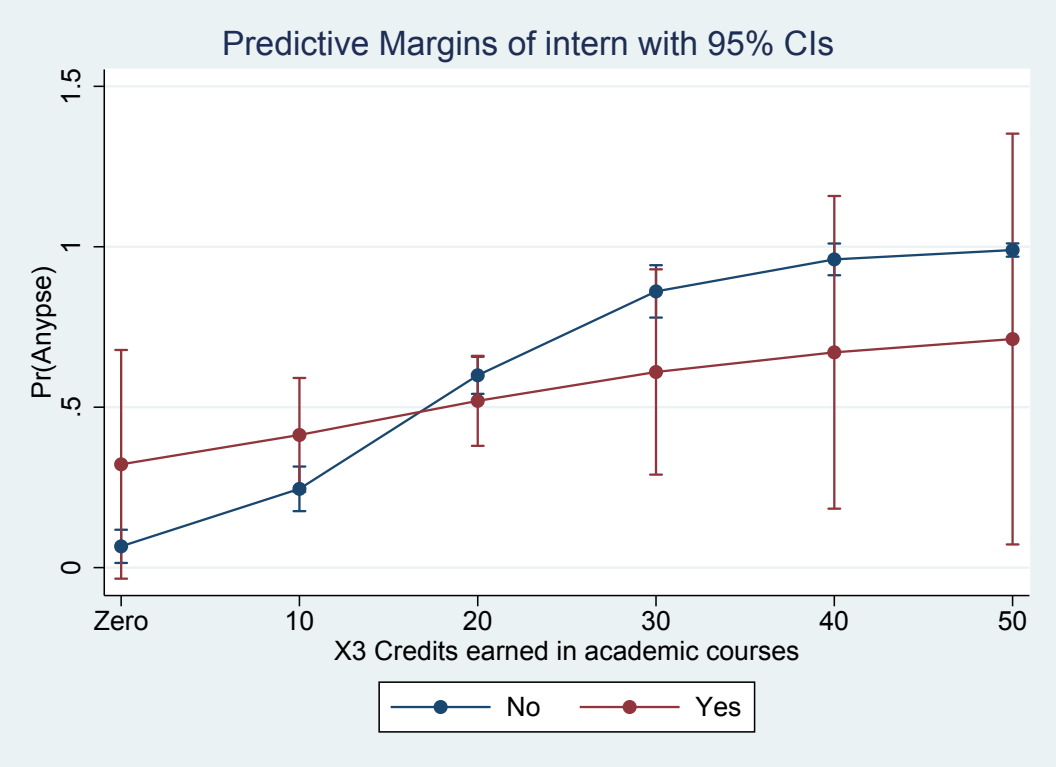

Figure 4.2 *Interaction Between Inclusive Academic Education and Internship Participation on PSE Enrollment*

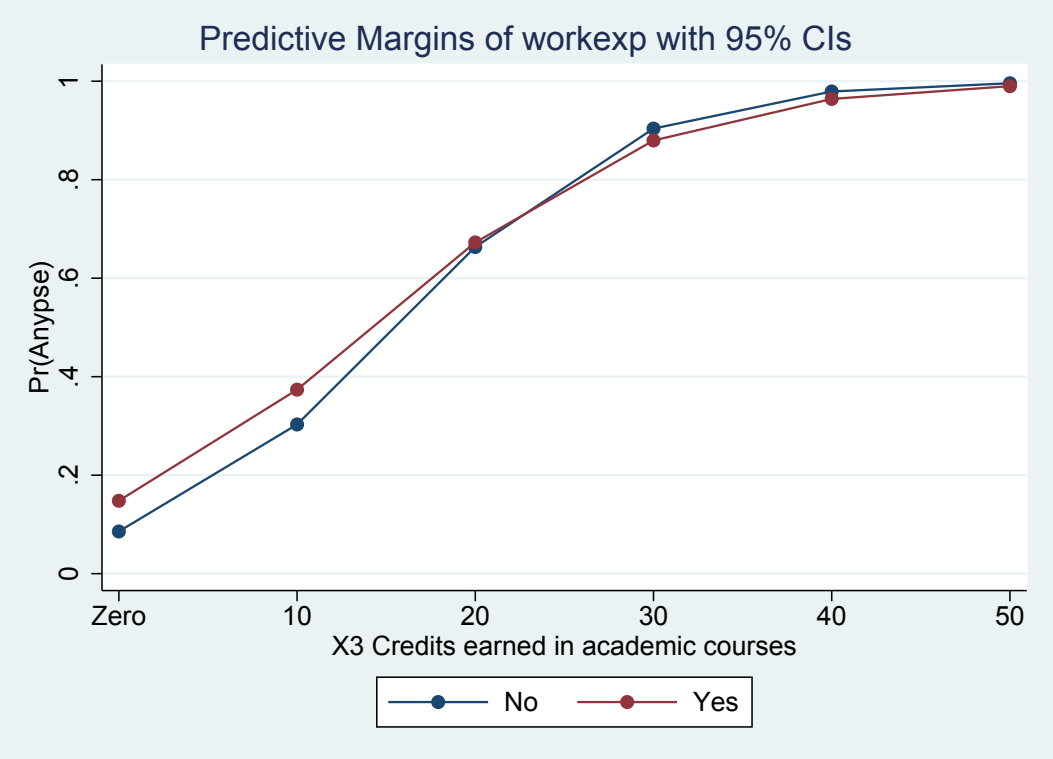

Figure 4.3 *Interaction Between Inclusive Academic Education and Work Experience on PSE Enrollment*

Chapter 4 described the results of the study's main analysis using multiple linear and logistic regression to investigate the effect of inclusive education and vocational transition experiences on postsecondary outcomes in the areas of employment and PSE for youth with IDD. Findings of these analyses showed several statistically significant relationships between key variables as well as other noteworthy nonsignificant associations. The findings of these analyses offer important insights into the career trajectories of youth with IDD as they progress through educational and transitional experiences and engage in PSE or enter the workforce. Chapter 5 discusses how these findings contribute to the research literature. Additionally, limitations of the study are discussed along with implications with research, policy, and practice.

CHAPTER 5: DISCUSSION

The purpose of this study was to explore how the inclusive academic education and vocational transition high school experiences of youth with IDD impact postsecondary outcomes in employment and education. Chapter 4 summarized the results of analyses aligned with four specific research questions designed to explore the overall purpose of the study. The first research question considered the extent to which inclusive academic education predicted postsecondary outcomes. This research question was based on previous research showing inclusive education to be an evidence-based predictor of post-school success in both employment and education (e.g., Chiang et al., 2012; Haber et al., 2016; Mazzotti et al., 2021). The second research question considered the extent to which vocational transition experiences (i.e., internship participation and work experience) predicted postsecondary outcomes in isolation. This research question was also strongly aligned with previous research showing that these vocational transition experiences strongly predicted better post-school outcomes, particularly about employment (e.g., Carter et al., 2012; Wagner et al., 2014). The third research question considered the extent to which inclusive academic education and vocational transition experiences predicted outcomes when controlling for one another. The fourth research question considered the extent to which these factors predicted post-school outcomes not only separately, but in their interaction effect with one another. To investigate the complex sets of associations between predictors and outcome variables, a series of analyses was conducted. Logistic and

linear regression were used to examine the effect of inclusive academic education, vocational transition experiences, and their relative interactions, on postsecondary outcomes in employment and PSE engagement. Results of these analyses were described in Chapter 4.

Major Contributions

The current study offers several key contributions to the research literature in terms of providing insight into how the K-12 transition experiences of youth with IDD impact their longer-term prospects to engage in PSE and employment. This study built on previous research that examined single factors predictive of postsecondary outcomes (e.g., Mazzotti et al., 2021) by designing and executing an analytic approach that investigated the interactions between transition experiences, using a longitudinal, nationally-representative data sample of transition-age youth students from their ninth-grade years through their exit from high school.

Among the study's main findings, the strongest in terms of significance is the added support for the importance of inclusive academic educational opportunities in predicting enrollment in PSE. While this is perhaps not surprising given the academic requirements of PSE programs, its practical significance in promoting greater postsecondary opportunity for individuals with IDD should not be. However, it should also be noted that results indicated that, in some cases, inclusive academic educational opportunities may come at the expense of employment experience, at least in the short-term. However, it should also be strongly noted that data used in these analyses were drawn from students' chronological senior year when many are only just exiting school. Given the substantial proportion of the sample enrolled in PSE, as well as the fact that students with disabilities retain K-12 eligibility until their 22nd birthday, many of the student outcomes reported in this study do not yet fully describe complete outcomes for those youth still emerging in their post-high school careers. Although participants with higher levels of

inclusive education were not directly associated with improved employment outcomes in this analysis, given previous research showing the potential of PSE to improve the employment outcomes of youth with autism and ID (Cimera et al., 2018; Whittenburg et al., 2018), these findings offer promise of the potential impact of these inclusive educational experiences on youth's long-term employment potential. While these findings related to the interaction between inclusive education and vocational transition experiences provide some initial insight, much more research is needed to better understand their impact on the short- and long-term postsecondary trajectories of youth with IDD as they exit school and pursue lives and careers as adults and members of their communities.

Association of Inclusive Academic Education with Postsecondary Outcomes

This study identified several patterns of association between inclusive academic education and postsecondary outcomes. Most prominently, the study showed a strong and consistent predictive relationship between inclusive academic education and enrollment in PSE across analyses and models. This strongly significant positive relationship held not only when measuring the predictive association in isolation, but also after controlling for effects related to vocational transition experiences and other participant characteristics represented in each of the models (i.e., race/ethnicity, gender, SES). Although it is hardly surprising to note this relationship given the academic eligibility requirements for enrollment in many PSE institutions—particularly colleges and universities—it is nonetheless noteworthy as an important factor in transition planning for youth with IDD. Although this study was non-experimental, these findings do present strong correlational evidence to support the importance of inclusive academic education in leading to PSE enrollment. Although the longer-term effects of PSE on employment fall outside the scope of this study, previous research has indicated that PSE is itself

a strong predictor of career and employment success for individuals with IDD as measured by increased earnings, self-sufficiency, and reduced dependence on public subsidies (e.g., Cimera et al., 2018; Whittenburg et al., 2018). Along with other primary results of this study, implications for research, policy, and practice related to this finding will be discussed further later in this section.

Although its impact on enrollment in PSE was quite direct and positive, the associations between inclusive academic education and employment outcomes were more complex and often negatively correlated. Findings of the study show that higher levels of inclusive education decreased the odds of having a job and reduced earnings and hours at the time of graduation in the majority of models. Although the majority of these findings were within the margin of error, a few did show statistical significance. Of these, the most significant was the effect of inclusive education on wages when controlling for vocational transition experiences. This analysis showed a strongly significant negative effect on wages as for those students with IDD who were more included in general education academic coursework, implying that when controlling for vocational transition experiences, having increased inclusive academic education results in decreased earnings. This is a major finding which shows that while the recommendation of current research is to provide both rigorous inclusive academics and robust transition experiences (Courtade et al., 2012), the reality for many youth is likely otherwise. However, it should also be noted that outcome measures used in this study were captured at the conclusion of students' 12th grade year as many youth were either just exiting school or even continuing with their K-12 education until their 22nd birthday as mandated by IDEA (2004). Likewise, many youth with disabilities who enroll in PSE may have lower wages at the time of graduation, but are likely to have higher wages after earning a degree (e.g., Cimera et al., 2018; Whittenburg et al., 2018)

Thus, since this outcome measure is limited to a point in time where students may be only just exiting from school, or even still engaged in IDEA eligible K-12 services, these results almost certainly do not account for long-term benefits of inclusive academic education on the employability and earning potential of individuals with IDD.

Association of Vocational Transition Experiences with Postsecondary Outcomes

The effects of vocational transition experiences were complex and marginally significant compared to that of inclusive academic education but provided interesting insights into the transition experiences of youth with IDD. In the direct analysis (i.e., research question 2), vocational transition experiences were positively but non-significantly associated with improved employment outcomes in terms of job status, earning, hours, and wages. Among these analyses, the only statistically significant finding was that youth with higher participation in CTE also experienced higher job wages. This finding presents an interesting contrast to previous literature indicating that students with disabilities are often engaged in low-wage focused CTE programs (Lombardi et al., 2018). Since this benefit of CTE did not show statistical significance in other areas of employment outcomes such as job status or hours worked, it is possible that training and coursework involved in CTE engagement provided participants with skills that made them more valuable to their employers, even in these initial work experiences. However, like other major findings, this should be taken with some caution as these results may indicate wage gains from CTE in the short term that diminish over time based on youth engagement in career trajectories with lower opportunities for wage advancement (e.g., Lombardi et al., 2018).

While these hypotheses are relatively speculative based on the findings, they also underscore the fact that the data used in this analysis examines a time relatively early in the

career of these youth. While these work experiences will no doubt shape their later employment trajectories, they are still inconclusive and do not describe the full labor market potential of these individuals.

Although these short-term employment benefits were not noted for youth who engaged in CTE coursework, after controlling for marginal effects of inclusive academic education, those who participated in internships did earn higher wages than their peers. This finding shows that although many of the likely benefits of vocational experiences documented by previous research may need more a longer-range view to detect, some may also provide shorter-term employment benefits that could be pivotal in supporting youth as they embark on their careers.

Additionally, several findings in this area were statistically nonsignificant, but also remain noteworthy. First, findings around internship participants showed mixed results. On the one hand, taking part in an internship led to a higher likelihood of securing a job after graduation. However, in terms of earnings, wages, and hours, the effect of having an internship varied greatly depending on sampling weighting and controlling for other effects. Conversely, while the effect did not rise to the level of statistical significance, participation in work experiences led to consistently positive effects in terms of job status, earnings, wages, and hours. In terms of enrollment in PSE, work experience had a slightly positive, nonsignificant effect in predicting enrollment, whereas CTE participation was shown to have a slightly negative nonsignificant effect.

Interaction of Inclusive Education and Vocational Experiences on Postsecondary Outcomes

This study built upon previous research that individually examined inclusive academic education and vocational transition experiences separately by investigating the extent to which their interaction might predict employment and educational outcomes. In the full model, when

controlling for race and ethnicity, gender, and SES, several individual and interaction effect factors reached or approached the level of statistical significance. As in previous models, inclusive academic education strongly predicted PSE, even after accounting for other discrete and interaction effects. As mentioned previously, this finding further underscores the importance of inclusive academic education in increasing opportunities for PSE.

Although inclusive academic education was the only PSE predictor which reached the level of significance ($p < 0.05$), several others resulted in near significant predictive relationships. Only participant characteristics related to SES showed any significance, but these indicated a clear trend. Namely, as participants' SES increased, their likelihood to enroll in PSE also increased. This increase occurred dramatically between the fourth and fifth SES quintile; those in the fourth (second highest) quintile were 130.7% more likely to enroll in PSE ($p = 0.005$), whereas those in the highest quintile were 500.4% more likely ($p < 0.001$). These findings indicate clearly that despite efforts in legislation such as HEOA (2008) to increase financial aid to create more equitable PSE opportunities for youth with IDD, significant disparities remain.

In this full model, internship participation in isolation increased the odds of PSE by 809% in the unweighted model ($p = 0.053$), though the odds ratio reversed direction after sampling weights, indicating a high level of internal variability in a somewhat small sample. Likewise, students with more inclusive education and work experience were 10% more likely to enroll in PSE ($p = 0.095$), but these odds sank to 97.0% as likely after weighting. Conversely, participants with inclusive education and internship participation were less likely to enroll in PSE in the unweighted sample (0.88 = OR; $p = 0.056$), but after applying weights, emerged as slightly more likely to enroll. Overall, these findings point to a clear need for further research with larger

samples of students with IDD to better understand the complex interactions between these variables.

In terms of employment outcomes, none of the predictor or interaction variables approached significance in the full model. In keeping with previous research (e.g., Carter et al., 2012), prior work experience led to fairly high odds of having a job (OR = 1.59), the model showed little confidence in the estimate ($p = 0.634$). Among participant characteristics, those in the 5th (highest) SES quintile were only 36.1% ($p = 0.003$) as likely to be employed immediately following graduation as those in the first quintile. Given the previous findings related to the dramatically increased odds of attending PSE for this group, it is likely that short-term employment was less of a goal for this group at this stage of the transition process.

Although no statistical significance was found in the primary analysis related to the interaction effect between inclusive academic education and vocational transition experiences, findings indicated that increased inclusive academic education predicted lower levels of participation in employment activities—at least in the short term. It is important to take into context the fact that outcome data used in this study came soon after graduation—or even while students were still enrolled in K-12 education systems. Thus, it is premature to conclude from these findings that inclusive academic education limits individuals' earning potential. Rather, these findings show that participants with higher levels of K-12 educational opportunities overwhelmingly opt for higher education as the next step in their career trajectories. Furthermore, given research showing the importance of PSE participation in predicting higher wages for individuals with IDD (Cimera et al., 2018; Whittenburg et al., 2018), these findings should be interpreted with some caution.

Findings Related to Youth from Historically Marginalized Racial and Ethnic Groups

To date, very little research has been conducted that specifically examines the transition experiences and outcomes of individuals with IDD from historically marginalized racial and ethnic groups. This study included analyses specific to whether the association of inclusive academic education and vocational transition experiences on post-secondary outcomes varied for youth from historically marginalized racial and ethnic groups. No significant difference was found in any of the four main analyses for any of the groups included. However, further research in this area is clearly needed. While this study did not clear evidence of inequity based on the analysis conducted, it is also important to note the substantial research documenting the historical inadequacy of quantitative research to fully describe complex phenomena such as racial bias within systems. Thus, these findings should be interpreted with significant limitations (as outlined below) and further investigated through future research which more critically analyzes the experiences of these youth in more nuanced contexts using methodology and designs that better situate .

Findings Related to Ecological Systems Theory

As discussed in Chapter 2, Bronfenbrenner's (1976) Ecological Systems Theory provided a framework for better understanding how an individual's experiences in their K-12 education intersected with policies, practices, and societal attitudes to impact individuals' lives as they moved chronologically through these relative spheres of influence. In this study, most of the analyses conducted here focus on the microsystemic (i.e., educational and vocational) and mesosystemic (i.e., the interaction of the two microsystems) experiences of students at various chronosystemic time points as they progress through their K-12 education and into adulthood. However, although the focus and analyses themselves were primarily nested within these two

systems, there are clear and direct implications from these findings that relate to each of the other ecological systems. In the following sections of this chapter related to implications for future research, policy, and practice, these connections with each of these systems will be interwoven into the discussion to explain how the results of this study inform the mesosystemic collaboration between microsystemic spheres (i.e., educational and vocational), the exosystem of national, state, and local policy, as well as the macrosystem of broader socio-cultural ideologies that impact youth with IDD as a whole and those from certain groups. Finally, these findings show the need for more extensive research and policy that elaborates on how these findings intersect with other levels that impact these factors for youth with IDD and may moderate and mediate the relationship with outcome variables that operate within other ecological systems that will be discussed in the interpretation of the findings of this study.

Limitations

In interpreting these findings, several major limitations should first be noted. For the most part, these limitations relate to the nature of the data collected within the HSLS (2009) dataset and the availability of data for use in the study. First, outcome data analyzed in this study in each of the four main analyses were limited to a time point approximately four years after students' ninth-grade year and initiation in the study cohort. For many youth with IDD in the sample who graduated in four years, this time point represented the moment of their exit from high school and entry into adult employment or enrollment in college or other PSE. For these youth, measurement of their employment status and quality at this time likely vastly underestimates their peak earning potential and employability. Furthermore, given the eligibility of students with disabilities to remain engaged in K-12 education until at least their 22nd birthday according to IDEA (2004), it is almost certain that a substantial portion of the sample remained

enrolled in K-12 education at the 'outcome' data point used in this analysis. As a result, any estimate of employment activity or PSE enrollment intention of youth at this stage of their transition to adulthood is almost certainly highly unreliable and falls short of accurately describing the long-term career trajectory of these individuals.

Additionally, although the quality of the nationally representative data used in this study provided many advantages in allowing for generalization to a broad population of individuals with IDD in the U.S., there is also a key limitation related to the data collection method specific to participants' disability identity that should be noted in the interpretation of findings. Unlike other aspects of the data collection of HSLS which triangulated multiple sources and methods, disability information about participants was indicated only by a single parent survey response. The survey response was structured "Has a doctor, health care provider, teacher, or school official ever told you that [your 9th-grader] has any of the following conditions?" (HSLS, 2009). The reliance on this single measure to determine the population of this study presents several potential issues with the reliability of its sample. First, the reliance on parent-reported data introduces substantial potential for error in reporting for reasons as diverse as reluctance to disclose a child's disability to uncertainty about the definition of medical and educational disability labels. Given the difference between the employment rate found in this study and the rates of competitive, integrated employment of individuals with IDD widely reported in the research literature (e.g., Hiersteiner et al., 2016), it is likely that the disability population data used to construct the study's sample contained both false positives, as well as false negatives. As such, this significantly limits the reliability of generalizing findings to all youth with IDD.

Similarly, the lack of operationalization of the job status outcome variable presents another limitation of the data used in this study. As noted previously, youth with IDD sampled in

this study were employed at more than three times the rate (i.e., 65% vs. 18-20%) of CIE engagement of individuals with IDD widely reported in the research literature (e.g., Hiersteiner et al., 2016). This may likely have been due to reporting of segregated, facility-based, and even sub-minimum wage vocational activities as 'having a job.' The inability to disaggregate these different types of employment outcomes is a major limitation of the study that lies at the heart of the purpose of this research and should be addressed in subsequent studies. Due to these limitations in the current study, further investigation and replication with other samples of data are needed to verify these findings.

Finally, there were several limitations of this study related to the capacity of analyses to assess the extent to which outcome experiences differed for individuals belonging to various demographic groups, including those from historically marginalized racial and ethnic groups. Some of these limitations were related to the structure of the data as initially collected. For example, gender-related data only included dichotomous (i.e., male and female) measures, thus preventing analysis in the experiences of individuals who do not identify with these binary categories. Furthermore, and specifically related to the research question regarding the extent to which experiences and outcomes differed for individuals from historically marginalized racial and ethnic groups, it is the opinion of the author that the analysis itself fell short of comprehensively answering these questions. Although significant variance did not emerge in any of the analyses for any individual subgroup, these results more likely obscured potential trends in the data by aggregating nationally. Based on these limitations, there is a need for further research in this and other areas related to the study that are explored in the following section.

Implications for Research

Due to the limitations of the data used in this study, it is still unclear how patterns and combinations of inclusive academic education and vocational transition experiences impact longer-term employment trajectories of youth. Future studies should use longer-term longitudinal data to examine how the transition experiences vocationally and educationally play out over the course of individuals' careers beyond their exit from school. Furthermore, given the pattern that emerged among individuals of higher SES groups in experiencing extremely high rates of PSE enrollment and low rates of initial employment, more is needed to understand how these initial decisions following K-12 exit are impacted by previous transition and educational experiences and may, in turn, mediate employment outcomes. This also includes investigating how an educational or vocational emphasis during transition programming may be linked to other factors (e.g., parent or teacher expectations, interagency collaboration, and counseling on PSE, benefits, self-advocacy, and any number of potential mediating factors). There is also a need for replication of this study with data that more reliably measure information related to participants' disability. Likewise, future replication studies should include measures that more specifically detail the employment outcomes experienced by individuals with IDD not only in terms of hours and wages but also regarding the vocational rehabilitation service model. The striking disparity in descriptive rates of employment between this study's sample and those widely reported in the research literature underscores the need for replication of findings with more reliable data in these two areas.

This study expanded on previous research in the transition predictors of post-school success (e.g., Mazzotti et al., 2021) to more specifically investigate how these predictive experiences operated in conjunction with one another. However, there is a need for substantially

more research in this area both in terms of examining the extent to which transition-age youth receive differential *patterns* of services and experiences, as well as more directly building on the findings of this study to determine how inclusive academic education and vocational transition experiences affect longer-term career prospects for individuals with IDD. Future research in this area should continue to build on the concepts and methods explored in this study to form a better understanding of how K-12 transition education can be a more effective means of accomplishing successful outcomes for youth with IDD.

Concerning the more general need for better understanding the differential patterns of services and experiences that youth take part in during the transition process, studies are needed that apply methods that allow for a better understanding of which predictors students with IDD are more likely to receive not only in isolation but in clusters and how these patterns impact outcomes. This research should certainly include inclusive education and vocational experiences as key nodes of the transition programming of students, but also be more comprehensive of the range of services and experiences provided in this phase of transition such as engagement in CTE. Similar pattern analysis studies in vocational rehabilitation (e.g., Kaya et al., 2018; Sima et al., 2015) have used classification and decision tree analytics to describe groups of youth and individuals in terms of characteristics and services to better pinpoint potential pathways to employment. Similar approaches would be highly useful in the area of K-12 education and transition. Given that we now have an emerging understanding of experiences predictive of better outcomes in general, future research should search for answers as to how to assemble these services and experiences in comprehensive transition programs for students. There is a great need to better understand the service patterns experienced by individuals with IDD and explain

how those patterns serve to advance the interests of these individuals (or conversely, do not serve those interests).

Finally, given the limitations of this study to comprehensively describe the experiences and outcomes of individuals from historically marginalized racial and ethnic groups, further research is needed in this area. Given the importance of context to providing rich and thorough descriptions of the experiences of students within racialized and ableist contexts (Annamma et al., 2013; Ladson-Billings, 2005), there is a clear need for qualitative studies that may better describe the experiences of students and their families in navigating both inclusive academic education and vocational transition experiences as a means of seeking desired post-secondary outcomes. However, although the current study fell short of fully capturing the experiences of individuals from historically marginalized racial and ethnic groups in the transition process, there is promise in methods emerging in the area of QuantCrit (Garcia et al., 2018)—which applies the critical race theory framework to quantitative methods—may provide further insight into ways in which racism can be disrupted through education and transition research.

Implications for Policy

The findings of this study offer support for many of the existing policy recommendations from previous research—namely to expand opportunities for transition-age youth to participate in activities and experiences that lead to successful employment outcomes such as paid work experience, internships, CTE participation, and inclusive education (Carter et al., 2012; Mazzotti et al., 2021; Thoma et al., 2009; Wehman et al., 2018). Although they provide additional support for these overall recommendations, this study's findings do not dramatically shift policy directives needed to improve employment outcomes for individuals with IDD. As discussed in Chapter 2, IDEA (2004) requires that students with disabilities be provided with access to

academic instruction and transition programming. ESSA (2015) provides further guidance to hold schools accountable for the participation of youth with IDD in instruction and assessment as they progress through their K-12 education. However, although research has recommended that transition-age youth receive both academics and vocational experiences (e.g., Courtade et al., 2012; Mazzotti et al., 2021), the findings of this study offer indication that some students are not receiving robust programming in both of these areas. Despite the need for ongoing research to better understand factors related to this issue, there are also several key points that policymakers can currently adopt to improve this area.

First, in evaluating accountability measures around the academic expectations of students with disabilities demanded by ESSA (2015) and IDEA (2004), as well as the expanded community-based vocational experiences introduced by Pre-ETS components of WIOA (2014), there is a need to examine how these policies intersect and overlap. This is not only an issue for researchers, but also for policymakers in designing incentives for stakeholders to emphasize and work toward the joint goals of these policies and their intersection in impacting the lives of individuals with IDD. The emphasis of WIOA (2014) on interagency engagement through formal agreements on a more focused set of policy objectives offers a potential model for how to build on the emphasis on multiple stakeholder collaboration set out in IDEA (2004). As WIOA (2014) placed concrete requirements on state agencies to set forth plans to implement these policy objectives across localities, future reauthorizations of IDEA (2004) and HEOA (2008) could use similar approaches to create structured frameworks for state education agencies to guide districts in improving transition programming for students with disabilities and raising expectations for youth around both academic and vocational competencies.

Second, given the comprehensive nature of this problem, a stronger commitment of funding for future research into investigating this issue is needed, as well as model demonstration projects to identify models for secondary education and transition services that include the role of VR counselors as required by WIOA (2014). Not only is there an urgency around understanding what transition experiences themselves promote better outcomes for students, but there is also demand for learning support for pre- and in-service teachers to deliver evidence-based academic and vocational transition services and instruction to students with IDD. Additionally, the potential of CTE participation to promote career development for youth with IDD should be a continued area of focus. However, without an investment in the teacher workforce to provide high-quality services to youth based on what we know works from research, further progress in this area will continue to stall.

Finally, just as WIOA (2014) has established a unified purpose of vocational services funded under that policy around competitive, integrated employment as a means of phasing out segregated alternatives for youth with IDD, all educational transition-related policy moving forward should meet this commitment to the future of all youth with IDD in competitive integrated employment. Nearly two decades ago, Rusch and Braddock (2004) outlined a framework for ensuring that all graduating students with disabilities be required to have linkages with integrated vocational services or attend PSE. Even at that point over a decade ago, in his invited commentary to the Rusch and Braddock paper, Test (2004) remarked, "how the heck can we still have so many people and so much money going into segregated, dead-end places?" (p. 248). That question remains, as do the soundness of recommendations to accomplish meaningful employment for all through interagency partnership and student-centered planning and programming using evidence-based practices and long-term supports (Test, 2004). However,

combining elements of previous policy mechanisms such as the singular commitment to the integration of WIOA (2014), the accountability of ESSA (2015), and the emphasis on educational inclusion of IDEA (2004), it is now possible to shape future policy in this area to better accomplish the goal of preparing all students for a successful career following graduation.

Implications for Practice

This study and its findings resulted in several clear recommendations for practice as well. Primarily, practitioners have a crucial role to play in ensuring that transition-age youth with IDD receive experiences that will set them up for future success after graduation. In terms of the findings of this study, this means providing supports to ensure that students are successfully included in academic coursework that provides opportunities for them to engage in higher education as a means of expanding their career prospects. Likewise, this study shows the importance of vocational transition experiences such as having paid work experiences and participation in internships (Carter et al., 2012) in promoting improved employment outcomes.

These findings point to the vital role of practitioners in delivering instruction in both academics and vocational transition services. Providing opportunities for special education teachers during pre-service experiences to combine academic and vocational expectations for students is critical to preparing them to effectively support the transition needs of students (Scott & Puglia, 2018; Scott et al., 2017). Universal Design for Transition offers a model for how to accomplish these twin goals and initial studies have provided some emerging evidence at the effectiveness of the framework in providing a roadmap for teachers to plan instruction linking both academic and transition goals (Thoma et al., 2009). To successfully lead students to successful futures, transition practitioners must be prepared to deliver the range of services and instruction needed by individual students, and thus must themselves be equipped with the

strategies and preparation activities to adopt this new role as an educator. Thus, pre- and in-service professional development is needed to further train special educators using Universal Design for Transition principles and others that promote person-centered approaches to academic and transition-oriented instruction and experiences. This includes providing greater instructional differentiation for students receiving CTE instruction who may not be provided with robust curricular options (Lombardi et al., 2018).

However, given the scope of vocational transition predictors such as paid work experience, internship participation, and vocational education (e.g., Carter et al., 2012; Mazzotti et al., 2021), special educators cannot directly provide support in all of these potential areas of engagement that a student may require. Interagency partnership and collaboration have vital importance to practitioners in delivering transition programming embedded with academic and vocational rigor. To increase the effectiveness of that partnership, practitioners need opportunities to cross-train and plan. For K-12 practitioners, there is a need for expanded opportunities to collaborate with vocational rehabilitation agencies by planning and engaging students on their caseloads in available Pre-ETS activities and other transition-related services offered by vocational rehabilitation. For adult practitioners, there is a need to expand collaborative efforts with K-12 colleagues both in terms of increasing partnerships directly with schools, as well as increasing community-integrated opportunities for youth, including work-based learning experiences.

Simply put, transition-age youth, their families, and practitioners should continue to pursue both rigorous and inclusive academic education as well as robust vocational experiences that include community integrated work experiences. While the findings of this study offer an initial perspective on further developing our understanding of how these sets of skills build the

career potential of individuals with IDD, it seems clear that both are important components of successful educational and transition programming that should be strongly considered by all planning teams.

Impact of Study

This study provides two key contributions to the field. First, this study offers comprehensive insight into how inclusive academic education and vocational transition experiences operate in interaction with one another to affect the postsecondary outcomes of youth. Although each of these predictors has been widely researched on their own, no study to date has examined these sets of variables in terms of their interaction with one another and how that combined effect may play a role in improving employment and access to PSE for youth with IDD. The analytical model used in this study provides a model that could be replicated in future research in examining the relative impact of various services for students in predicting outcomes. Thus, this study lays the groundwork for expanding on what we know works in isolation in the field of transition and helps offer a process for building new knowledge that can be of great benefit to individuals with IDD themselves as well as practitioners and policymakers.

As the findings have demonstrated, the transition experiences of students in their K-12 years have an impact on their odds of achieving more successful adult outcomes. Providing inclusive academic education to students with IDD opens a clear and undeniable pathway to PSE. Although the full extent of that impact on employment outcomes throughout an individual's life is yet unclear, it is apparent that these early experiences have a lasting impact. These ideas and concepts outlined in this study may provide a framework for beginning to better provide a roadmap of these pathways. Although not every individual will take the same pathway,

a better understanding of which ones are more likely to lead to different destinations will provide youth and their teams will critical information to impact their success.

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APPENDIX

Table 6.1

Key Terms

Term	Definition
Access to general education curriculum	As defined by both IDEA (2004) and ESSA (2015), access to the general education curriculum is defined in this study as the extent to which students with disabilities have access to a) curriculum standards-based goals and instruction and b) accountability measures based on growth and performance of those standards.
Competitive integrated employment	Employment that is defined by both a) earning a competitive wage (i.e., at least minimum wage) and b) involving work in typical workplace settings with coworkers and/or clients without disabilities. Competitive integrated employment is a primary focus of WIOA (2014).
Functional curriculum	For the purpose of this study, functional curriculum is defined broadly to include not only traditional life skills instruction offered to students with significant disabilities, but also other non-academic instruction and support including evidence-based predictors of post-school success including paid work experience, internships, self-determination instruction, community navigation skills, etc.
Inclusion	Inclusion is defined broadly to include efforts to promote the engagement of individuals with disabilities in many aspects of

	life, including not only education but also the broader community. Inclusion serves as an umbrella term that subsumes many aspects of research, practice, and advocacy related to the provision of more normative experiences in one or more areas. For the purpose of this study, inclusion and inclusive education will be contrasted with mainstreaming in that the two former terms will describe adaptations of educational approach and the latter to describe adaptations on the part of the student to fit the environment.
Inclusive education	Inclusive education describes provision of educational services and interventions that include: a) the education of students with disabilities in spaces with peers without disabilities, b) specific interaction with peers without disabilities, and c) access to the general education curriculum and/or academic instruction.
Integration	Integration refers broadly to merging one or more individuals with disabilities into a previously existing ecological system (school-based or otherwise). For example, *competitive integrated employment* (defined above) emphasizes the vocational participation of people with disabilities within community-based work settings.
Mainstreaming	Mainstreaming is defined in this study primarily in terms of the physical space in which students with disabilities receive their education. In the 1980s, this was a primary focus of interpretation of IDEA's LRE principle and continues to be a focus on inclusive education in many countries internationally.

Vita

Joshua Paul Taylor was born on July 16, 1981 in Nashville, Tennessee and is a U.S. citizen. He graduated from Lassiter High School, Marietta, Georgia in 2000. He received his Bachelor of Arts in English Studies from Kennesaw State University, Kennesaw, Georgia in 2005. He then taught English for International House Katowice in Katowice, Poland, where he also played and served as defensive coordinator for the Silesia Miners in the inaugural season of the Polska Liga Futbolu Amerykańskiego (American football league of Poland). He received a Master of Arts in Special Education from the University of Virginia in 2013, and subsequently taught and served as an autism specialist for Arlington Public Schools, Arlington, Virginia for seven years. He has worked for the last six years as a Research, Training, and Technical Assistance Associate at Virginia Commonwealth University for the Rehabilitation Research and Training Center and the Autism Center for Excellence.