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Supported Employment Services and Employment Outcomes for Low-Income Youth with Intellectual and Developmental Disabilities: A Case Control Study

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Abstract

Transition-age youth, ages 14-24 years old, with intellectual and developmental disabilities (IDD) face unique barriers to entering the labor force when exiting high school. These barriers can be even more severe if the youth is from a low-income background. Supported employment (SE) services may help this population overcome these barriers and be employed in competitive integrated employment (CIE) settings. SE provides an employment specialist to guide them through obtaining and retaining a job (McDonough & Whittenburg, 2020; Wehman et al., 2007). However, limited research has been done on the SE experiences and outcomes of transition-age youth with IDD (Wehman et al., 2014), and even less research has been done on the impact of SE for transition-age youth with IDD from low-income backgrounds. This study uses secondary data from RSA-911, program year 2019, to conduct logistic regression and propensity score matching. These analyses are used to explore whether consumers who receive SE services differ by demographic and financial characteristics, and whether receiving SE increases odds of CIE. Intersectionality and social cognitive career theory guide the analyses and interpretation of the findings. Future directions and implications are discussed.

CHAPTER ONE

Introduction

"What do you want to be when you grow up?" This question is often asked of children at a very young age, but for individuals with intellectual and developmental disabilities (IDD), their answers to this question may never become a reality. Individuals with IDD are often unemployed or underemployed, despite their preference and ability to work in the community (Brault, 2012; Roux et al., 2013). In 2019, Americans with disabilities faced unemployment rates of 7.3%, over two times the unemployment rates of their peers without disabilities (3.5%; U.S. Bureau of Labor Statistics, 2020). It is increasingly important for transition-age youth with IDD to have early work experiences, as this is a significant predictor for later employment success (Wehman et al., 2015). Supported employment (SE) services assist individuals with significant IDD by providing an employment specialist to guide them through obtaining and retaining a job (McDonough & Whittenburg, 2020; Wehman et al., 2007). However, limited research has been done on the SE experiences and outcomes of transition-age youth with IDD (Wehman et al., 2014), and even less research has been done on the impact of SE for transition-age youth with IDD from low-income backgrounds. Millions of dollars are invested in SE services each year without much empirical evidence as to its effectiveness (Wehman et al., 2014). Thus, more research is needed to explore the effectiveness of supported employment services for young adults with IDD from low-income backgrounds, and this research will explore those questions.

Overview of the Literature

Individuals with IDD face high rates of unemployment. In a nationally representative survey by Siperstein et al. (2013), less than half of the working-age adults with IDD were in the labor force, meaning either currently employed or searching for work, while more than half were

not working or seeking employment. Conversely, nearly 80% of working-age adults without disabilities were in the labor force (Erickson et al., 2012). Individuals with IDD also have high rates of underemployment, where they are working fewer hours or for smaller wages than their peers without disabilities (Parker Harris et al., 2014).

For adults with disabilities, work is not only necessary to live independently, but can enhance communication, socialization, mental and physical health, and community skills (Wehman et al., 2007). In addition to these opportunities, employment can give us a sense of identity and a connection to others. Think about the last time you met someone new; did you ask each other "what do you do?" as a conversation starter? For decades, individuals with disabilities have been kept from the labor force, leading to isolation and economic dependency on their families or government support (Wehman et al., 2007).

Importance of Employment

Historically, individuals with IDD have transitioned from high school to segregated residential and sheltered work settings instead of competitive integrated employment (CIE). For a job to be considered CIE, it must include the following three characteristics: 1) competitive wages, 2) integrated location, and 3) opportunities for advancement (Maryland Division of Rehabilitation Services, n.d.). This means that an individual with a disability must earn a wage that is comparable to what employees without disabilities in the same positions make, must work alongside coworkers without disabilities, and must have room to grow in the position. CIE offers a more integrated alternative to sheltered employment environments where individuals with disabilities work alongside others with disabilities while making subminimum wages (Cimera et al., 2012).

In addition to the individual-level benefits that CIE provides to people with disabilities, there are macro-level advantages as well. Government savings and revenue are one benefit of increased financial independence of individuals with disabilities (Järbrink et al., 2007; Siperstein et al., 2013). From a financial standpoint, state agencies and the federal government make less money when people with disabilities are unemployed or underemployed. Yin et al. (2014) report that as a working-age population, individuals with disabilities, after controlling for labor supply, demographic, and labor market characteristics, are paid almost 37% (or over $10,000) less than people without disabilities. In 2011 alone, the additional earnings of people with disabilities could have produced an additional $141 billion for the U.S. economy (Yin et al., 2014). This means that there were additional state and national losses in tax revenue. Additionally, un- and underemployment of individuals with disabilities can cost the government more in healthcare costs, disability benefits, and other government-funded supports (Järbrink et al., 2007).

Employment and Socioeconomic Status

Socioeconomic status (SES) has been found to impact employment outcomes and access to services for students with disabilities. Using the National Longitudinal Transition Study-2 (NLTS2) data, Wagner et al. (2014) found when using race and ethnicity as a covariate that SES had statistically significant, though relatively small, effects on high school graduation rates, enrollment in postsecondary education, enrollment in career and technical programs, and competitive employment outcomes after high school. Students with disabilities from lower SES backgrounds (i.e., less than $50,000 USD) were less likely to receive disability-specific services and accommodations while attending 4-year postsecondary institutions (Newman et al., 2009).

Gary et al. (2019) also used NLTS2 and found that when parents had higher educational attainment and income, the likelihood that their children received any disability services was

increased when compared to those with parents with lower education levels and income. The results showed that students attending a school with a higher percentage of youth receiving free or reduced lunch (a common measurement for school population SES) were less likely to receive services. The same was found for those who attended schools with a higher percentage of racial/ethnic minority student enrollment. This implies that socioeconomic status and race and ethnicity are both important indicators of the likelihood of receipt of services. There is limited research on why students from lower-income backgrounds are less likely to receive services and in return have less favorable competitive employment outcomes. Gary et al. (2019) hypothesized that families with higher educational attainment and income may be more likely to have knowledge of disability resources and extra time to put into accessing them compared to families with less education or income. This means that individuals with IDD from low-income backgrounds face even greater difficulty in obtaining and maintaining competitive employment.

Supported Employment

People with IDD are often pushed into segregated services such as day programs or sheltered workshops (Friedman & Rizzolo, 2017). These services are problematic because they rarely act as a stepping stone to integrated employment with competitive wages (Nazarov et al., 2012). Sheltered workshops do not teach translatable work skills to individuals with IDD and may actually reduce the providers' and employers' expectations about employment ability (Nazarov et al., 2012). To move individuals with IDD out of sheltered workshops and day centers and improve employment outcomes, a program termed "supported employment" was introduced as an employment service for individuals with severe IDD, or those needing extensive support (Hall & Rossetti, 2018; Wehman et al., 2014).

Supported employment was specifically developed to empower consumers with significant disabilities and provide individualized community-based support for employment (Wehman et al., 2014). The guiding principles of SE are *competitive work* within *integrated settings* alongside *ongoing support* (Wehman et al., 2014). This means that under supported employment, the jobseeker is expected to work in an environment with employees without disabilities, get paid the same wage for the same work as their coworkers, and are assisted as much or as little as necessary throughout the job seeking and employment process. Employment specialists, often referred to as job coaches, are advocating for and supporting the jobseeker with a disability. Once employees with IDD are comfortable and problem-solving on their own in their job position, the employment specialist will begin supporting less. The philosophy is to place then train the jobseeker with IDD. SE services typically include intake and assessment, job placement, job training and support, and follow-along services (DC DDS, n.d.). Individuals with significant IDD, serious mental health conditions, traumatic brain injury, autism spectrum disorder, and physical disabilities have all benefitted from supported employment (Wehman et al., 2014). This could be an existing service to help transition-age low-income jobseekers with IDD overcome their unique barriers to employment after high school.

SE is funded by the United States federal-state vocational rehabilitation (VR) program. VR is the overall agency that provides employment services for people with disabilities in each state, and SE is just one of many services that are utilized. SE can be provided by VR staff or paid for through VR but provided by community rehabilitation programs (CRPs), also referred to as Employment Service Organizations (ESOs; VA DARS, n.d.). VR agencies serve approximately one million individuals per year across the U.S. and spends more than $2.5 billion annually on assisting individuals with disabilities set and meet their employment goals (Martin et

al., 2010; Wehman et al., 2014). All 50 states and U.S. trust territories currently have VR agencies. Individuals must apply to their state's agency and meet the criteria of having a physical or mental impairment that presents a substantial barrier to employment and requires VR services to assist in facilitating, acquiring, or maintaining employment (Wehman et al., 2014). A VR case is "successfully closed" when services have led to 90 days or more of CIE (Ditchman et al., 2013; Wehman et al., 2014).

Transition-Age Youth with IDD

SE could possibly be most beneficial for transition-age youth with IDD, who are leaving the formal education system losing the supports and routines they have had for years. Transition-age age youth with IDD need new supports help them enter into the workforce. Prior to Wehman et al. (2014), no studies on SE had used randomized controlled trials (RCTs) for people with IDD. Furthermore, SE had not been demonstrated as an evidence-based practice for transition-age youth with IDD. Therefore, Wehman and colleagues used propensity score matching (PSM) to explore the extent to which SE influences successful employment outcomes for young adults with IDD. The team found that SE as a VR service does promote successful employment outcomes for transition-age youth with IDD. By using PSM to match individuals who received SE services and those who did not on several observable characteristics, they created six homogeneous subgroups stratified by the likelihood of receiving supported employment through VR services. Across all subgroups, employment rates for those who received SE services were consistently higher than those who did not. They also found differences between groups on who was more likely to receive SE services. Clients who received Supplemental Security Income or Social Security Disability Insurance benefits and those who did not complete high school were

less likely to receive SE, while individuals with significant IDD and autism were more likely to receive SE services (Wehman et al., 2014).

Transition-Age Youth with IDD from Low-Income Backgrounds

Poverty reduces the likelihood of successful employment and educational outcomes for youth with disabilities (Enayati & Karpur, 2014; Wagner et al., 2014). Studies have found that youth with disabilities from lower-income households are less likely to engage in paid employment than their peers from higher-income households (Eilenberg et al., 2019). A systematic review on the impact of race, ethnicity, and socioeconomic status (SES) for young adults with autism spectrum disorder found that youth with ASD who were eligible for government benefits based on a limited income, such as SSI, were less likely to achieve competitive employment (Eilenberg et al., 2019). Wagner et al.'s (2014) study using the National Longitudinal Transition Study 2 data demonstrated that SES accounted for 25% of the probability of dropping out of high school, 60% of the probability of not engaging in competitive employment, and 50% of the probability of not pursuing postsecondary education.

School-to-work programs can help individuals with disabilities from low-income backgrounds overcome the barriers that they face in terms of competitive employment. Enayati and Karpur (2018) found that engagement in school-to-work programs, defined as receiving vocational education or job training for at least three months, improved the likelihood of employment for youth with disabilities from low-income families. To date there have been no studies that look at the influence of supported employment on employment outcomes for young adults with IDD from low-income backgrounds. The current study would fill a major gap in the research for transition-age youth with IDD, especially for those from low-income backgrounds, affecting thousands of individuals in the VR system. Understanding the impact that SE has on

this population can better prepare us to tailor services and improve employment outcomes for low-income youth who stand to benefit substantially from these programs.

Theoretical Framework

There are two theoretical frameworks that guide this project: intersectionality (Brown & Moloney, 2019) and social cognitive career theory (SCCT; Gibbons et al., 2018). Intersectionality highlights disadvantages associated with hiring practices, income, working conditions, promotion, and work distribution based on various simultaneous statuses including socioeconomic status, age, and disability status (Brown & Moloney, 2019). Someone who is young, disabled, and poor faces unique challenges based on these three identities. SCCT incorporates many constructs that can contribute to career development such as supports, barriers, and learning experiences. It has been heavily researched and utilized to understand career development in different cultural groups (Gibbons et al., 2018). Gibbons and colleagues adapted SCCT and applied it specifically to the population of individuals with intellectual or developmental disabilities (IDD). According to SCCT, disability status falls under "person inputs" and then impacts all learning experiences, ultimately affecting employment beliefs and outcomes (Gibbons et al., 2018). Disability status also impacts the "proximal contextual influences," which can be stated simply as barriers and supports. Having a disability creates unique barriers to employment because of limited access due to societal factors and discrimination (Gibbons et al., 2018).

The focus of this study is on transition-age youth with IDD from *low-income backgrounds*. Person inputs and background contextual affordances have a reciprocal nature, in this case of being both a person with a disability and from a low-income background. Both identities affect the experiences, beliefs, supports, and barriers that each individual faces.

Because of these unique barriers, young adults with IDD need unique supports such as supported employment (SE) to successfully obtain and retain employment. That is why this research will look at how one proximal contextual influence, SE services, may help mitigate the obstacles that this population faces when seeking and keeping employment.

Purpose

While SE is effective for improving employment outcomes, most research has focused on the overall population of individuals with disabilities and has not limited the research to the transition-age youth population. Because of the importance of early work experiences for transition-age youth and the lack of research on the impact of SE for transition-age youth with IDD from low-income families, I evaluated the program's influence through using vocational rehabilitation (VR) case closure information as found in the Rehabilitation Services Administration Case Report (RSA-911) dataset. I examined whether SE is an effective method of change for transition-age youth with IDD from low-income families who were served by state VR agencies. I hypothesized that SE increases positive employment outcomes for transition-age youth with IDD from low-income backgrounds. If this hypothesis is supported, SE should become the principal employment service for transition-age youth with IDD from low-income backgrounds.

This study is unique in its emphasis on transition-age youth with IDD from low-income backgrounds. Findings from this study will have important implications for policy and practice by either supporting or undermining the investment in SE for transition-age youth with IDD. This study will also provide clarity as to what works for a historically overlooked population. This focus will allow policymakers and practitioners to tailor employment interventions for this unique population to help overcome the numerous barriers that they typically face.

Research Questions

The research questions for this study are as follows:

1. How do consumers who received supported employment (SE) services through state-federal vocational rehabilitation agencies (VR) differ in terms of demographic characteristics from those who did not receive SE?
2. Does receiving supported employment (SE) services through state-federal vocational rehabilitation agencies (VR) improve the odds of competitive integrated employment (CIE) for low-income transition-age youth with intellectual and developmental disability (IDD) as compared to a matched sample of youth who did not receive SE?

Design and Methods

Data for this study were extracted from the U.S. Department of Education, Rehabilitation Services Administration Case Service Report (RSA-911). These administrative data were collected and published annually by state vocational rehabilitation (VR) agencies. The RSA-911 data includes detailed demographic, disability, intervention services, and employment information for all state-federal VR clients in the United States whose cases were closed in that program year. Data from the RSA-911 for the 2019 program year was used for the analyses because it was the most current dataset available at the time of the study that had not been impacted by COVID-19 closures and economic events following.

Cases were included if the individual was between the ages of 14 and 24 years old (ages eligible and considered youth for VR services, [U.S. Department of Labor, 2020]) at the time of application to VR, had a primary disability of intellectual or developmental disability (IDD), and was categorized as being low-income. A total of 30,010 consumers met these requirements. From the sample of 30,010 cases, a total of 2,892 (9.6%) individuals received SE and 27,118

(90.4%) did not. The primary outcome measure for this study was competitive integrated employment (CIE), which is employment on a full- or part-time basis for which an individual is paid the same wage by the employer for the same or similar work performed by other employees without disabilities, and work in environments alongside individuals without disabilities (RSA, 2017). VR consumers who were not working in CIE at the time of their case closure were considered as having unsuccessful outcomes for this research. The independent variable for this study was supported employment (SE), defined by RSA as ongoing support services needed to support and maintain an individual with a most significant disability in competitive integrated employment positions. Demographic covariates were used in logistic regression analyses and in to adjust for selection bias in the receipt of SE services, including sex, race, ethnicity, highest educational level completed, enrollment in postsecondary education, significance of disability, various barriers, and other financial characteristics.

After describing the sample and its demographic characteristics, the sample by supported employment services, and the sample by CIE outcomes, data were analyzed using logistic regression (using the "logit" routine in Stata version 14) and propensity score matching (using the "teffects psmatch" routine in Stata version 14). Logistic regression was used to see which covariates could be predictors of the treatment and then the outcomes, while controlling for all covariates. The first logistic regression was used to explore predictors of receiving supported employment services as an outcome, which will be the treatment in the PSM model. This analysis helps answer the question of which characteristics of consumers have greater odds of receiving SE services.

After analyzing the differences in characteristics of consumers who received SE, logistic regression was used to analyze predictors of CIE, earning minimum wage or more, and full-time

employment. After that, I constructed three PSM models, one for each outcome variable, all with SE as the treatment variable. PSM constructs artificial control and treatment groups based on receipt of SE services. In this sample, 2,892 transition-age youth with IDD from low-income backgrounds received SE services, while 27,118 did not. PSM allowed me to match the two groups using covariates. This means that grouping consumers with similar propensity scores replicates a quasi-randomized control trial by matching on observed covariates, if the covariates sufficiently predict the treatment (Stuart, 2010). If the model sufficiently predicts the treatment, the treatment assignment is considered ignorable, the difference in means in the outcome between individuals from either group with a particular propensity score is an unbiased estimate of the treatment effect at that propensity score value (Stuart, 2010). The goal is an ignorable treatment assignment, i.e., matched groups. If a covariate is related to the outcome, then they should be balanced between both groups in the PSM model. If the model is significant, this gives evidence that the treatment alone influenced the outcome.

Summary

Individuals with disabilities are un- and underemployed at higher rates than their peers without disabilities, denying many individuals the opportunities for social connections, financial independence, and mental and physical health benefits. Transition-age youth with intellectual and developmental disabilities (IDD) from low-income backgrounds face unique barriers and challenges to employment after high school due to the dual statuses of disability and poverty. One state-federal vocational rehabilitation (VR) provided service called supported employment (SE) may help this group transition to employment. SE is a program developed for individuals with significant disabilities that provides job placement, on-the-job training, and on-the-job follow-along services. SE emphasizes competitive integrated employment outcomes where the

individual works either full- or part-time in a work environment alongside their peers without disabilities, while making the same wages for the same jobs. This research focuses on low-income transition-age youth with IDD and whether SE leads to better employment outcomes. Descriptive and inferential statistics, such as logistic regression and propensity score matching, will show whether VR consumers who received SE differed in terms of demographic characteristics from those who did not receive SE. They will also show whether receiving SE services through state-federal VR improve the odds of a CIE outcome for low-income transition-age youth with IDD as compared to a matched sample of youth who did not receive SE? This evaluation will add to the limited research on low-income transition-age youth with IDD and their pathway to employment.

Glossary of Key Terms

Competitive integrated employment (CIE) - Employment that is in an integrated location with competitive wages and opportunities for advancement (Maryland Division of Rehabilitation Services, n.d.). An individual with a disability must earn a wage that is comparable to what employees without disabilities in the same positions make, must work alongside coworkers without disabilities, and must have room to grow in the position.

Intellectual and developmental disability (IDD) - These disabilities impact the individual's physical, intellectual, and/or emotional development. IDD can affect multiple systems and are usually present at birth or any time before an individual turns 22. They are characterized by both intellectual functioning and adaptive behavior (AAIDD, n.d.).

Low-income - VR agencies characterizes a low-income individual as matching at least one of the following: 1) Receive or received in the last six months various government assistance such as Supplemental Nutrition Assistance Program, Temporary Assistance for Needy Families, or Supplemental Security Income, 2) are in a family with a total family income below the poverty level, 3) are youth who receives or is eligible for free or reduced lunch, 4) are a foster child, 5) are an individual with a disability whose income is below the poverty level, but whose family income is above the poverty level, 6) are homeless, or 7) are a youth living in a high poverty area (RSA, 2017).

Propensity score matching (PSM) - A data analysis technique that estimates treatment effects from observation data, essentially creating treatment and control groups (StataCorp, 2021).

Rehabilitation Services Administration Case Service Report (RSA-911) - Rehabilitation Services Administration's annual case service report data set.

Supported employment (SE) - Competitive employment in an integrated work setting with ongoing support services for individuals with the most significant disabilities (McDonough & Whittenburg, 2020).

Transition-age youth (TAY) - This term refers to youth or young adults with disabilities between the ages of 14 and 24 years old. This age range is eligible to receive employment services through state-federal vocational rehabilitation agencies to assist with their transition out of school and into the workforce. (Employment and Training Administration, 2021).

Vocational rehabilitation (VR) - State-federal program that provides vocational and rehabilitative services to individuals with disabilities to help them gain employment (Martin et al., 2010).

CHAPTER TWO

Review of the Literature

In 2019, an estimated 38.9% of persons with a disability between the ages of 18 and 64 living in community settings were employed in the United States (Disability Statistics & Demographics RRTC, 2022). This is contrasted against an estimated 78.6% of individuals without a disability aged 18-64 years old living in community settings. The median full-time earnings for Americans with disabilities was $40,858, over $8,000 less than people without disabilities in the U.S. ($49,003; Disability Statistics & Demographics RRTC, 2022). People with disabilities have a 25.9% poverty rate, while people without disabilities have a 11.4% poverty rate. When it comes to private health insurance, usually provided by an employer when working full-time, 46% of people with disabilities had private health coverage compared to 75.8% of people without disabilities.

Employment statistics for the transition-age youth with disabilities population are more difficult to find. This is likely due to lack of consistent questions across youth surveys, including different definitions of youth with disabilities by what constitutes as transition-age youth and/or disability type (Honeycutt et al., 2014). In 2017, transition-age youth, defined after the passage of the Workforce Innovation and Opportunity Act as 14 to 24 years old, were less likely to be employed (24.9%) than their peers without disabilities (41.9%; Cheng & Shaewitz, 2019). These stark statistics are important to keep in mind when looking at the impact and importance of employment for transition-age youth with intellectual and developmental disabilities in the United States.

Importance of Employment

For adults with and without disabilities, work is critical for financial independence, communication, socialization, mental and physical health, and community skills (Nevala et al., 2019; Wehman et al., 2007). There are macro-level advantages to employment for people with disabilities as well. The U.S. government provides financial assistance for individuals with disabilities (Järbrink et al., 2007; Siperstein et al., 2013). Historically, employed individuals with disabilities have been underpaid compared to their peers without disabilities (Yin et al., 2014). If individuals with disabilities are hired into CIE, where they work the same positions for the same wages as those without disabilities, government assistance becomes less critical for healthcare costs, disability benefits, and other government funded support (Järbrink et al., 2007; Yin et al., 2014).

Work is a fundamental part of our lives. It can provide social, mental, and physical health benefits along with financial gains. However, how our work identities and expectations are shaped is important to understand before looking at what predicts successful employment outcomes to CIE. In the next section, I will discuss my theoretical framework and how it guides my project and offers a lens through which I see outcomes for transition-age youth with IDD.

Theoretical Framework

Two theories contribute to the theoretical framework for my study: intersectionality and social cognitive career theory. Intersectionality addresses the interaction between different bases of inequality or oppression (Maroto et al., 2019). It refers to the complex interplay an individual experiences between different social categories such as gender, race, and socioeconomic status. Intersectionality emphasizes that these social categories do not exist independent of one another and can “expand the accumulation of disadvantage” (Maroto et al., 2019, p. 65). In other words,

being a part of more than one disadvantaged group increases the disadvantage that someone faces. This is seen depicted in Figure 2.1 below. The start depicts where multiple identities overlap and challenges compound. These obstacles compound and create barriers to everything from education to employment, from where they live to how healthy they are throughout their life (Maroto et al., 2019). Newer research has begun to explore how disability intersects with other disadvantaged statuses that shape economic inequality (Berghs & Dyson, 2020; Brown & Moloney, 2019; Maroto et al., 2019). The current study, which looks at employment outcomes for young individuals with intellectual and developmental disabilities from low-income families, expands this research. Using variables such as race, gender, education, and socioeconomic status enables the analysis to capture more of the complex layers of interaction of employment for young adults with IDD.

Along with intersectionality, social cognitive career theory (SCCT) is highly relevant in this context. SCCT has been used to explain career development in numerous multicultural groups, but Lent et al. (1994) applied it specifically to young adults with intellectual disabilities. Figure 2.2 depicts Gibbons et al. (2018) adaptation of the SCCT theory. SCCT frames disability as a person input, defined as an individual variable, that influences career development. I have renamed that to group status(es) in my adapted SCCT to reflect the intersectional nature of disability and poverty, depicted in Figure 2.3 below. This is where intersectionality theory influences the framework, as an individual can belong to multiple groups, and disadvantaged group statuses compound the barriers that they may have to overcome to get to successful employment outcomes. These group statuses, such as disability status or low-income status, or both, then frame the individual's learning experiences, which influence employment- and postsecondary education-related beliefs, renamed to "beliefs" (Gibbons et al., 2018).

Figure 2.1

Intersectionality Diagram

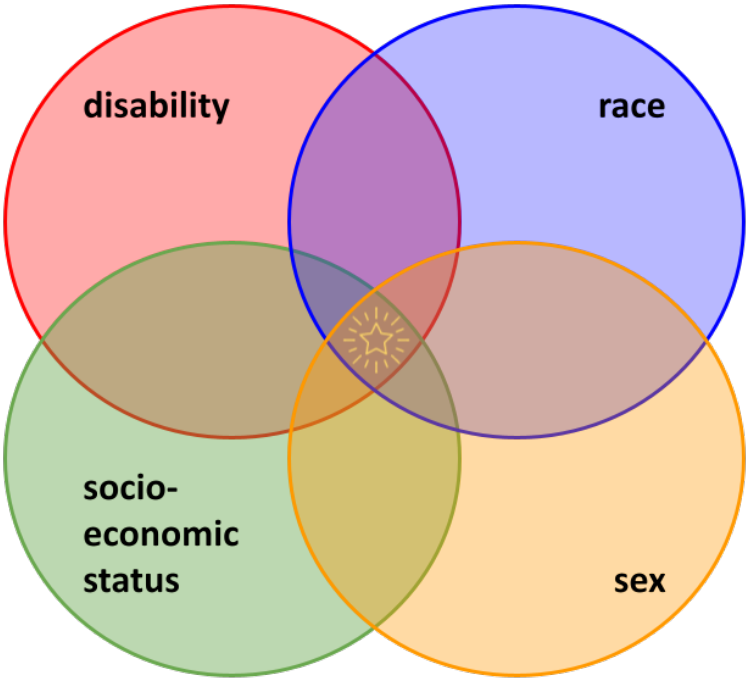
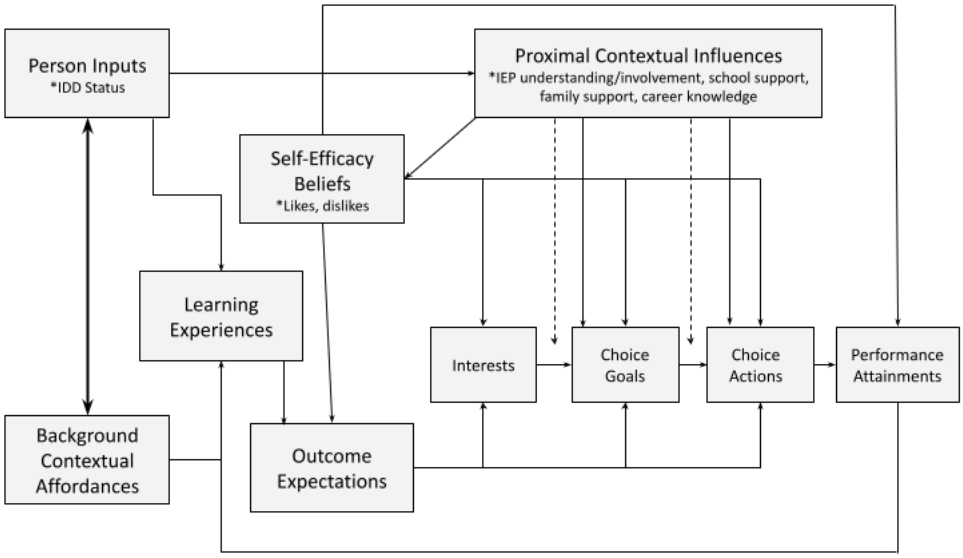


Figure 2.2

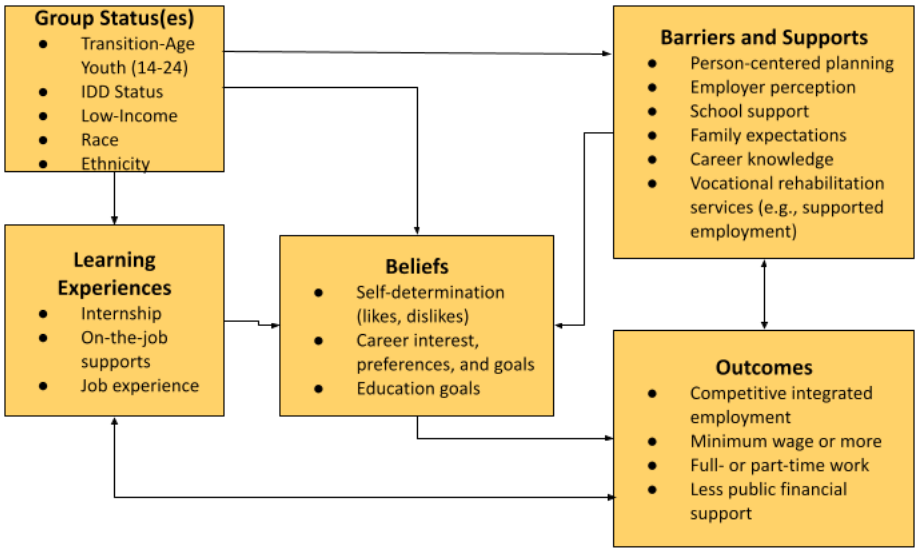
Social Cognitive Career Theory Gibbons Diagram



Note. Gibbons et al. (2018), adapted from Lent et al. (1994).

Figure 2.3

Social Cognitive Career Theory Adapted Diagram



Note. Adapted from Gibbons et al. (2018)

The SCCT model also recognizes that individuals will face barriers as well as supports that influence career-related decisions. These are referred to as proximal contextual influences by Gibbons et al. (2018) in Figure 2.2, and as barriers and supports in my adapted theory depicted in Figure 2.3. Young adults with IDD may face negative public perception or discrimination, low expectations, and even systemic deterrents to CIE, such as disability benefits that are reliant on staying under a certain income level. Perceived supports may be family and school support, or formal work-assistance programs such as VR-funded supported employment services, the treatment variable for this research. My study focused on how one support, SE services, may help mitigate the obstacles that young adults with intellectual and developmental disability who are also low-income may face when seeking successful employment outcomes such as CIE.

Barriers and supports can also influence the individual's beliefs in employment or themselves. This is important, because an individual's beliefs are also tied to their employment

outcomes. If someone does not believe that they can work a full-time job, or a community-based job, a belief that may have come from a barrier, then they will likely prove themselves right. Employment outcomes and learning experiences have a reciprocal relationship, influencing one another, just like barriers and supports with outcomes.

In the following literature review, we will explore sociodemographic, financial, and service predictors of competitive integrated employment for people with intellectual and developmental disabilities.

Disability and Socioeconomic Status

In the United States, disability and poverty are often intertwined. Poverty rates for non-institutionalized Americans aged 18-64 with disabilities are over two times (25.2%) the poverty rate for those without disabilities (11.1%; Disability Statistics & Demographics RRTC, 2022). Poverty causes disability, as children and adults are more likely to face trauma or chronic illnesses that lead to disabilities (Goodman et al., 2019). This is due in part to environmental traumas, more physically demanding jobs, and limited access to quality medical care and early intervention. Disability also causes poverty, as it reduces employment possibilities and earnings, while families are often incurring additional costs for services and supports (Goodman et al., 2019; Lustig & Strauser, 2007).

The Poverty Disability Model (PDM) is a model that explains the factors that put individuals of lower socioeconomic status at higher risks for acquiring disabilities or chronic health conditions (Lustig & Strauser, 2007). PDM explains that an individual who starts in poverty increases the likelihood that they will acquire a disability and may become disabled. This is because of four groups of effects of poverty: 1) social role devaluation, 2) environmental risk factors, 3) negative group influences, and 4) weakened sense of of coherence (Lustig &

Strauser, 2007). These are considered social causes of disabilities. Individuals who experience poverty may not develop a disability or serious health condition, however, they still face many difficulties exercising their rights, accessing resources and services, and navigating the systems that could support them in obtaining and maintaining employment (Lustig & Strauser, 2007). Therefore, it is important to focus on individuals who are transition-age, low-income, and with disabilities and find existing programs that can help alleviate and overcome barriers to employment as soon as possible.

Employment Outcomes for People with Intellectual and Developmental Disabilities

A wealth of research has begun to identify the predictors associated with competitive employment for individuals with disabilities transitioning from high school. Demographic characteristics are important predictors in transition research, such as race/ethnicity (Baer et al., 2011; Gary et al., 2019; Simonsen & Neubert, 2013; Wehman et al., 2015), socioeconomic status (SES; Gary et al., 2019; Wagner et al., 2014; Wehman et al., 2015), gender (Baer et al., 2011; Simonsen & Neubert, 2013), and severity of the disability (Simonsen & Neubert, 2013; Wehman et al., 2015). Race/ethnicity and gender are typically self-reported, while severity of disability is often asked as a series of questions or scales to show independence and levels of communication, decision-making, and understanding (Carter et al., 2012; Simonsen & Neubert, 2013; Wehman et al., 2015). The majority of research detailing the important characteristics of transition practices comes from the National Longitudinal Transition Study-2 (NLTS2).

Findings from the National Longitudinal Transition Study-2

One of the most used instruments in transition research is the National Longitudinal Transition Study-2 (NLTS2). Beginning in 2000, the NLTS2 was implemented to collect data on characteristics, experiences, and outcomes from a nationally representative sample of 13- to 16-

year-olds with disabilities who received special education services (Newman et al., 2009; Wehman et al., 2015). With over ten years and five waves of data collected, the NLTS2 has provided researchers with a wealth of data to analyze about predictors of postsecondary employment and education, as well as questionnaires to model for smaller scale research. The NLTS2 was one of a series of congressionally mandated studies sponsored by the U.S. Department of Education and asked a wide variety of questions of 12,000 special education students from their time in high school and beyond. This longitudinal study focused on multiple areas relevant to students with disabilities, such as coursework, transition planning, extracurriculars, academic achievement, graduation status, postsecondary education, employment, independent living, and community participation (Wehman et al., 2015). The NLTS2 was designed and conducted by SRI International (NLTS2, n.d.).

The NLTS2 consists of multiple instruments: a parent or youth phone interview or mail survey, student assessment, school characteristic survey, school program survey, teacher survey, and student transcript. Research on predictors of postsecondary employment typically focus on the youth assessment and parent or youth phone interview. Surveys were mailed if the parents or youth were unable to be reached via telephone (NLTS2, n.d.). Because of the depth of the data collected, researchers have been using the NLTS2 for years to investigate predictors of employment outcomes.

One of the most significant predictors for postsecondary education and employment for young adults with disabilities is parental expectations of work (Blustein et al., 2016; Carter et al., 2012; Wehman et al., 2015). Results from the NLTS2 found that high school students with severe disabilities whose parents expected them to obtain postsecondary work were more than three times as likely to have paid employment within two years after high school than students

whose parents did not have that expectation (Carter et al., 2012). Whereas parental expectations were a strong predictor of postschool employment, family socioeconomics, such as parental employment status, educational level, income, and transportation, were not found to be significant predictors of transition to employment for young adults with disabilities (Carter et al., 2012).

Although we know that family expectations can lead to postsecondary employment, parents still struggle with having high expectations and goals for their children with disabilities. In a study of over 1,000 parents of children with IDD throughout the state of Tennessee, Blustein and colleagues (2016) saw that there was a large gap between parents' views on the importance of community employment and the likelihood they felt their children would have CIE. Almost 80% of parents felt full-time employment was important, but only 62% believed it would happen for their child (Blustein et al., 2016). Over half of the parents surveyed identified major concerns about future employment that fit into five themes: 1) their child's social and communication skills, 2) their ability to be hired, 3) their ability to apply and find employment, 4) their opportunities for on-the-job training and supports, and 5) the lack of accessibility to programs that support jobs. The authors believed that these themes represented a lack of familiarity with available vocational options, supports, and services (Blustein et al., 2016).

Using the NLTS2, Wagner et al. (2014) found when using race and ethnicity as a covariate, SES had statistically significant effects on high school graduation rates, enrollment in postsecondary education, enrollment in career and technical programs, and competitive employment outcomes after high school. Wagner et al. (2014) demonstrated that SES accounted for 25% of the probability of dropping out of high school, 60% of not engaging in competitive employment, and 50% of not pursuing postsecondary education. The SES measures from the

NLTS2 used by Wagner et al. (2014) were two dichotomous variables: a household income less than $25,000 USD and a household income between $25,000 to $50,000 USD. Analyses indicate the impact of being in one of these categories versus having an income over $50,000 USD. The authors also included a dichotomous variable indicating whether the head of household had a high school diploma or less, which was an additional variable to create a socioeconomic construct to this model. A weakness of Wagner et al.'s (2014) study was that post-high school employment was operationalized as holding a competitive job *at any time* since leaving high school. This does not tell us what poverty does to long term employment outcomes. Instead of an outcome of holding a job at any time, the analysis should include if the participants are currently employed, how many hours they are working, and what wages they make. Another measure of time employed could be helpful to understand employment outcomes more completely. Having had any job any time since high school is an incomplete measure of competitive employment.

Another analysis of the NLTS2 findings indicated that students with disabilities from lower SES backgrounds (i.e., less than $50,000 USD) were less likely to receive disability-specific services and accommodations while attending 4-year postsecondary institutions (Newman et al., 2009). Carter et al.'s (2012) analysis of the NLTS2 found that those with a family income above the poverty level were more likely to be employed after graduation with an odds ratio of 1.13 when compared to those below the poverty line (Carter et al., 2012).

Gary and colleagues (2019) also used the NLTS2 and found that parents with higher educational attainment and income increased the likelihood that their children received *any* disability services when compared to those with parents with lower education levels and income. Students at schools with higher percentages of youth receiving free or reduced lunch, a common measure of school population SES, and those with higher minority enrollment received less

disability services. There is limited research on why students from lower-income backgrounds are less likely to receive services and in return have more grim competitive employment outcomes. Gary et al. (2019) hypothesized that families with higher educational attainment and income may be more likely to have knowledge of disability resources and the time to put into accessing them when compared to families with less education and income. This means that individuals with intellectual and developmental disabilities from low-income backgrounds face greater difficulty in obtaining and maintaining competitive employment.

One of the most significant predictors for postsecondary education and employment for young adults with disabilities is parental expectations of work (Carter et al., 2012; Simonsen & Neubert, 2013; Wehman et al., 2015). Analysis of the NLTS2 findings found that high school students with severe disabilities whose parents expected them to obtain postsecondary work were more than three times more likely to have paid employment within two years after high school than students whose parents did not have that expectation (Carter et al., 2012). Prior work experience is another important predictor of postsecondary employment. Wehman et al. (2015) analyzed data from the NLTS2 to determine what variables were associated with postsecondary competitive employment. Prior work experience, measured as whether the participant was employed in high school, was a statistically significant predictor of competitive employment after high school (Wehman et al., 2015). The authors also found that career awareness training, computer skills, participation in postsecondary vocational school or 4-year college or university program, or any postsecondary school program were all positively associated with competitive employment after high school.

Eilenberg and colleagues (2019) conducted a systematic review of the literature on studies that have examined the transition disparities for young adults with autism spectrum

disorder, one category of developmental disability, based on race, ethnicity, and socioeconomic status. In total, they included 40 articles: 39 quantitative and one qualitative, twenty papers analyzed data from the National Longitudinal Transition Study-2 (NLTS2) and five analyzed data from the Rehabilitation Services Administration Case Service Report (RSA-911). They found 15 papers that examined employment-related outcomes. Seven papers used the NLTS2 for their analyses. Of those seven, five studies found that youth with autism from lower income households were less likely to engage in paid employment than their peers from higher income groups (Eilenberg et al., 2019). Two NLTS2 studies that analyzed smaller subsets of the data found no significant association between household income and paid employment outcomes.

The NLTS2 provided researchers with rich data to learn what characteristics and opportunities lead to more successful employment outcomes for transition-age youth with intellectual and developmental disabilities. Demographic characteristics such as race, gender, educational level, severity of disability, and socioeconomic status have a major impact on future employment. Other experiences, such as previous employment and parental expectations, may also predict employment outcomes. The NLTS-2 collected data last in 2010, making it somewhat dated for current employment outcomes for transition-age youth with disabilities. Researchers will often use annual data from the Rehabilitation Services Administration Case Service Report, another major source of data on employment outcomes for transition-age youth.

Findings from the Rehabilitation Service Administration

Each year the U.S. Department of Education gathers information from state-federal vocational rehabilitation (VR) agencies about demographic variables, services provided, and employment outcomes for individuals who receive services. This is called the Rehabilitation

Services Administration Case Service Report, commonly referred to as the RSA-911. The RSA-911 defines CIE as

> work that is performed on a full- or part-time basis (including self-employment) and for which an individual is compensated at a rate that is… not less than the customary rate paid by the employer for the same or similar work performed by other employees who are not individuals with disabilities and who are similarly situated in similar occupations by the same employer and who have similar training, experience, and skills (RSA, 2017, pp. 101).

VR clients who were not working in CIE after their program are considered as having unsuccessful outcomes (RSA, 2017).

Kaya (2018) used the RSA-911 from fiscal year 2013 to find what demographic variables and VR services lead to CIE outcomes for transition-age youth with intellectual disabilities (ID). The author used a chi-squared automatic interaction detector (CHAID) and multivariate logistic regression analyses to investigate the relationship. Five demographic variables were used as independent variables: age, gender, race, education level, and receipt of cash benefits. Receipt of cash benefits was used to indicate both poverty and severity of the disability, two common eligibility requirements for these benefits. VR services that could be provided to the client were the second set of independent variables and included services such as assessment, diagnostics, VR counseling, on-the-job training, job search assistance, job placement assistance, on-the-job support, and more. The outcome variable was competitive employment.

After receiving services, 46.7% of youth with ID achieved competitive employment (Kaya, 2018). The mean number of services that clients received was 4.48. The most provided services were assessment (63.6%), VR counseling and guidance (54.9%), and job placement

services (47.8%). Youth with ID who received a larger number of services ($M = 5.17$) had significantly better competitive employment rates than those who received less ($M = 3.89$). All of the included demographic variables were significantly associated with employment outcomes for this sample. Education level was the strongest variable that classified competitive employment (Kaya, 2018). The more educated an individual was, the more likely they would be competitively employed. This is similar to previous studies that have found that higher educational levels lead to competitive employment outcomes (Grigal et al., 2011; Nord & Hepperlen, 2016). Female clients were less likely to achieve competitive employment than their male peers. African Americans and Hispanic or Latinos were less likely to achieve competitive employment than their White peers. Transition-age youth who received cash benefits were less likely to achieve competitive employment than those who did not (Kaya, 2018).

Interestingly, the three main supported employment services (job placement services, on-the-job support services, and on-the-job training services) were associated with greater odds of competitive employment (Kaya, 2018). Clients who received job placement services to obtain competitive employment had 3.15 times greater odds of competitive employment than those who did not receive this service. Those who received on-the-job support services were 2.78 times greater than those who did not receive these services. Finally, the author found that clients who received on-the-job training services had 2.16 times greater odds of competitive employment.

The author (Kaya, 2018) did a thorough investigation into the impact of demographic variables as well as VR services on employment outcomes for the unique population of transition-age youth with intellectual disabilities. Their multivariate logistic regression demonstrated how personal characteristics and provided services can impact employment

outcomes. Further investigation should be done using propensity score matching, which can facilitate causal inferences that are not typically possible with this type of analysis.

Nord and Hepperlen (2016) used RSA-911 data from fiscal year 2011 to see how job-related services affect employment outcomes for people with IDD who enter VR without employment. The authors conducted logistic regression analysis to investigate the relationship between demographic variables, VR services, and employment outcomes. Nord and Hepperlen tested age, gender, race, education level, significance of disability, primary impairment, and job-related services. They found that nearly all independent variables had a significant effect on the likelihood of obtaining employment. Similar to Kaya's (2018) findings, the authors found that higher education levels, being White, being younger, being male, and having a less significant disability were associated with higher odds of getting work (Nord & Hepperlen, 2016). All VR services were associated with significantly greater odds of obtaining employment at the time of VR closure, but three services stood out as most helpful, and they were even more helpful when combined. Again, these services are the three major tenets of supported employment: job search, job placement, and on-the-job support. Individuals with IDD who received all three services had 16.39 greater odds of leaving the VR agency with a job compared to those who did not receive any service (Nord & Hepperlen, 2016). Therefore, more research needs to be done on the effect of supported employment services for different disability groups.

In sum, vocational rehabilitation services have been shown to help transition-age youth with disabilities obtain competitive employment outcomes. Next, I will review findings on employment outcomes that are specific to individuals with intellectual and developmental disabilities from low-income backgrounds.

Low-Income with Disabilities and Employment

As more studies on the predictors of successful employment outcomes are written, researchers have found that poverty reduces the likelihood of successful employment and educational outcomes for youth with disabilities (Enayati & Karpur, 2014; Gary et al., 2019; Wagner et al., 2014). Previous work has primarily used the NLTS2 to find the relationship between socioeconomic status and employment for people with disabilities, but a recent study looked at whether a school-to-work program would help alleviate some of the obstacles that this population faces.

Using data from the National Longitudinal Study of Adolescent Health (Add Health), Enayati and Karpur (2018) found that involvement in school-to-work programs improved the likelihood of employment and reduced the likelihood of criminal justice involvement for youth with disabilities from low-income families. The outcome variable for this study was created using three major events: education, criminal record, and employment. Attending college was taken as the highest education measure from the most recent wave of data (Wave IV), limited to those individuals who attended a 2- or 4-year postsecondary school. Criminal record was defined as convicted of or pled guilty to any charges other than a minor traffic violation. Employment was operationalized as any history of paid work, currently employed, and hourly wages (Enayati & Karpur, 2018). The inclusion of "any history of paid work" as an outcome variable instead of a predictor variable is perhaps not a wise choice, as we've seen that high school employment predicts postsecondary employment.

Enayati and Karpur (2018) used a variety of predictor variables to test whether school-to-work programs impacted postsecondary outcomes. School-to-work participation was defined as receiving school-offered vocational education or job training in a program that lasted or would

last for a minimum of 3 months (Enayati & Karpur, 2018). Low-income was determined by whether the youth was from households receiving welfare. Parents were asked whether they received Assistance to Families with Dependent Children (Temporary Assistance to Needy Families), Food Stamps, or Social Security Insurance. Those that responded affirmatively were considered low-income. This perhaps an adequate measure of low-income status, however, not nearly as effective as income-level or a calculated poverty-level. Americans living in poverty may not receive government assistance for a variety of reasons (Jan, 2019). Other predictors included youth disability status, demographic characteristics (age, gender, race/ethnicity, and self-reported health), maternal variables (marital status, education, biological relationship to the youth, and maternal disability status), and school characteristics (overall school size, average class size, and measure of vocational focus; Enayati & Karpur, 2018).

Findings show that beneficiary status negatively impacted employment rates for youth with disabilities (Enayati & Karpur, 2018). Employment was positively impacted by school-to-work programs for youth with disabilities from beneficiary households, suggesting that school-to-work programs can help mitigate the negative impact of being low-income when it comes to employment. The threats to validity in this study are similar to those in the Wehman et al. (2014) study. The biggest threat to internal validity is selection bias, as the secondary data analysis does not allow for random assignment to the intervention group (McMillan, 2016). Enayati and Karpur (2018) did work to adjust for these differences by using demographic characteristics as covariates, but that is not as effective as creating a matched sample using propensity scores. An additional threat to validity is history. The researchers used measures from Waves I to IV across 14 years. Students were asked about participation in the school-to-work program in 2001-2002, while the outcome was measured in 2008. Many uncontrollable events could influence the

dependent variable in that amount of time (McMillan, 2016). In that same vein, maturation is also a threat as changes most likely occurred within the participants over the years that could influence employment (McMillan, 2016). Longitudinal studies provide researchers with a wealth of information, but also can introduce a variety of threats to internal validity.

An additional limitation of this study is the small sample size of youth who participated in school-to-work programs, which was used as the independent variable. Participation in school-to-work programs ranged between 1.4% and 3.2% of the study sample (Enayati & Karpur, 2018). That is only 120 to 274 participants out of the total sample of 8,584. That is a small sample to test the relationship between school-to-work programs and employment outcomes. The number of individuals who participated in the school-to-work intervention is even lower when you narrow it down to participants with both a disability and beneficiary status, a sample of only 148 participants. The percentage of those with a disability and beneficiary status who participated in a school-to-work program were not reported. Although this article was focused on school-to-work programs as the independent variable, this is a very limited measurement of a transition program. This variable was operationalized as a school-offered program only. This is problematic because school funding is closely linked to neighborhood finances (Turner et al., 2016), and because employment supports are often provided by agencies and community organizations that are not affiliated with the schools. A better independent variable would be enrollment in vocational rehabilitation and receipt of services through any agency, school, or community organization.

Enayati & Karpur's (2018) study looked at whether a school-to-work program would help mitigate the effects of living in poverty with a disability on employment outcomes. Their findings were positive, but their study fell short in a few ways that I would like to address in my

own study. In the next section, I will discuss supported employment and how it can help improve employment outcomes for youth with disabilities.

Supported Employment

In 2014, the United States Congress passed the Workforce Innovation and Opportunity Act (WIOA), establishing new guidelines for transition from school-to-work for students with disabilities (Wehman et al., 2020). WIOA provides funding and mandates for vocational rehabilitation agencies and ensures that the primary goal for youth with disabilities in transition is CIE. This law requires state VR agencies to provide employment services for youth who are in school starting at the age of 14 years old until they are 21 years old. Youth who are out of school are eligible for services from 16 to 24 years old (U.S. Department of Labor, 2020). This is designed to provide earlier access to providers, decision-making, and employment opportunities.

CIE is the primary goal for transition-age youth under WIOA. A job is considered CIE if the workplace is typically found in the community where the employee with a disability interacts with other employees or customers without disabilities for the purpose of performing job duties, (WINTAC, n.d.a). The employee with a disability should also receive comparable benefits and wages to those without disabilities for the same job positions. These jobs can be both full- and part-time, as long as the employee with a disability is not making subminimum wages. One pathway to CIE defined in WIOA is supported employment (SE). State VR agencies may provide SE to consumers in-house or use funding to hire employment specialists from employment service organizations (ESOs) to provide the services. SE means providing job placement, job training, and ongoing on-the-job supports, including customizing positions between employers and jobseekers, and other necessary services to support and maintain an

individual with a significant disability in finding and maintaining employment (WINTAC, n.d.b). In order to be categorized as SE, these services must include the following features:

1. Individuals receive support in locating and negotiating preferred jobs that match their interests, skills, and employment preferences
2. Services are delivered in collaboration with the jobseeker with a disability, family members, and other individuals who support them
3. The individual with a disability is
    a. An employee of the business
    b. Earns at least minimum or commensurate wages to the other employees without disabilities
    c. Receives or is eligible to receive benefits that are provided to other employees
    d. Physically and socially integrated into the workplace

For decades, individuals with disabilities spent their days in sheltered work settings or adult day programs. In the 1970s and 80s, individuals with disabilities began working in businesses in small groups under the supervision of a service provider (Wehman, 2012). This was designed to help serve individuals with the most significant disabilities. SE emerged in the 1980s and 90s from this group model and the individualized approach began. Employment specialists, also referred to as job coaches, help jobseeker with employment every step of the way, from identifying their interests and preferences, job searching, and on-the-job training and supports. As the employee with a disability becomes comfortable and skilled at his job position, the employment specialist will fade services, with an eventual goal of full independence in employment.

SE and Transition-Age Youth with IDD

SE has not been demonstrated as an evidence-based practice for transition-age youth with IDD, despite the money spent on VR services each year. This is an innovative approach to examine the extent to which SE influences successful employment outcomes for young adults with IDD. Wehman et al. (2014) conducted a matched case-control study using propensity score matching (PSM) to adjust for selection bias into supported employment (SE) services to evaluate the effectiveness of SE on employment outcomes for young adults with intellectual and developmental disabilities (IDD). This study was the first to use PSM to investigate SE and employment outcomes for this population. This was important because there are inherent limitations that do not allow for randomized controlled trials within the vocational rehabilitation system as eligible clients must be served immediately (Wehman et al., 2014), which often precludes the use of delayed waitlist treatment designs. Instead, the authors used data from the U.S. Department of Education, Rehabilitation Services Administration Case Service Report (RSA-911) and analyzed it using PSM. PSM allows researchers to use large observational datasets to estimate the quasi-experimental effects of an intervention on an outcome (Fan & Nowell, 2011; Guo & Fraser, 2010; Wehman et al., 2014).

In this study, competitive employment was the primary outcome measure and supported employment intervention was the independent variable. Five demographic covariates were used to adjust for selection bias for the supported employment intervention: 1) gender (male, female), 2) race/ethnicity (White, African American, Hispanic/Latino), 3) level of education (special education, less than high school education, completed high school, associate degree, bachelor's degree), 4) type of IDD (intellectual disability, autism, cerebral palsy, traumatic brain injury), and 5) Social Security beneficiary status (yes, no). The study sample included 23,298 individuals

with IDD between the ages of 16 and 25 years old at the time of application to VR and whose cases were closed in the 2009 fiscal year. Over 70% had an intellectual disability (71.9%), followed by 13.4% with autism, 7.4% with cerebral palsy, and 7.2% with traumatic brain injury (Wehman et al., 2014).

Descriptive statistics from Wehman and colleagues (2014) showed that 36.4% of this sample received supported employment services. Individuals with autism or intellectual disabilities were more likely to receive SE services than their peers with cerebral palsy or traumatic brain injury. Clients that had postsecondary education (either an associate degree or bachelor's degree) were less likely to receive SE than those with no postsecondary education. Social Security beneficiaries were more likely to receive SE services than those who did not receive SSI or SSDI, though this likely reflects the eligibility criteria used for financial needs for providing VR services (Wehman et al., 2014).

The authors used the classification and regression tree (CART) method of propensity score matching. Their final analysis included a subtree that had six homogeneous subgroups. Their main findings were that education was the most significant predictor of who would receive SE, followed by Social Security beneficiary status, then type of disability (Wehman et al., 2014). Employment rates for those youth who received SE were higher than those who did not receive the intervention.

Although this study added necessary information to the literature on supported employment for young adults with IDD and used a new statistical technique to provide empirical evidence, limitations certainly exist. Despite the strengths of the study in using PSM to address this population, the study failed to consider socioeconomic status as a variable. We know from literature on family income and employment outcomes for people with disabilities that SES is an

important predictor of successful postsecondary outcomes (Balcazer et al., 2012; Wagner et al., 2014). Additionally, the authors mention that that year's RSA-911 did not provide severity of the client's disability which would be important to add to the model. Newer versions of the RSA-911 do report significance of the disability, which will be included in my model as a demographic covariate.

Wehman et al.'s (2014) study can be categorized as an *ex post facto* design, where the researchers decide whether one or more different preexisting conditions have caused differences after the fact (McMillan, 2016). An *ex post facto* study means developing a study with an intervention and control group after the treatment occurred. The main threat to internal validity in this study is selection bias, as the participants were not randomly assigned to supported employment services (McMillan, 2016). Wehman and colleagues (2014) did take this into consideration when designing the data analysis and used PSM to create similar groups based on the covariates. Instrumentation was also a potential threat to internal validity, as the researchers had no control over the nature of the measurement or the training of the VR agencies to complete the data collection (McMillan, 2016). The Wehman et al. (2014) case control study was strong and appropriate in examining the impact of supported employment on employment outcomes. The current study will help fill in the gaps that Wehman et al. (2014) left.

Summary

Based on the research literature summarized in this chapter, we know that transition-age youth with IDD face major barriers to transition to employment. For many populations, supported employment has been identified as an evidence-based pathway to employment. Some efforts have been made to find out whether supported employment alleviates the difficulties of transitioning to adulthood for transition-age youth with IDD (Wehman et al., 2014). However,

more research is needed to examine whether supported employment is provided for low-income transition-age youth with IDD and whether it leads to CIE.

CHAPTER THREE

Methodology

Research Design

This study utilized an *ex post facto* quasi-experimental case control design and analyzed quantitative secondary data from the U.S. Department of Education, Rehabilitation Services Administration, Case Service Report (RSA-911). The RSA-911 is a national administrative dataset for consumers with disabilities who participated in state-federal vocational rehabilitation (VR) services. This researched used data from Program Year 2019. This study extracted data for consumers who were classified as having a cognitive impairment (referred to as intellectual or developmental disability [IDD] throughout this study) as either a primary or secondary disability and had their VR case closed in the Program Year 2019, either successfully with an employment outcome or unsuccessfully without. Logistic regression and propensity score matching (PSM) were used to create *ex post facto* control and treatment groups and determine whether young adults with IDD from low-income backgrounds receive supported employment services at the same rate as their peers from higher income households, and whether receiving those services leads to a successful employment outcome, such as competitive integrated employment.

Ethical Approval

Human subject research should be submitted to a university's Institutional Review Board for ethical approval. However, because the RSA-911 data had already been de-identified by the Department of Education and included no identifiable information to the researcher or readers, this research was not considered as involving human subjects (HHS, 2020; VCU, 2021). This study was not submitted to IRB for review.

Data Source

Data for this study was from the U.S. Department of Education, Rehabilitation Services Administration (RSA), Case Service Report (RSA-911). The RSA collects this information quarterly and releases it as an annual RSA-911 report to describe the performance of state vocational rehabilitation and supported employment programs. Data from the RSA-911 for the 2019 program year was used for these analyses because it was the most up-to-date dataset available at the beginning of this study, and the most recent year that had not been impacted by COVID-19 closures and economic unknowns. Collection policies for the program year 2019 data began July 1, 2017, in accordance with policy directive RSA-PD-16-04 (RSA, 2017). RSA-911 data are mandated by the Rehabilitation Act of 1973 and amended by the Workforce Innovation and Opportunity Act (WIOA) of 2014.

Data reported included detailed demographic, disability, intervention services, and employment outcome information for all state-federal VR clients in the United States whose cases were closed during that program year. The cases could be closed successfully, with CIE for 90 days, or unsuccessfully. Data access requests for the RSA-911 are handled by the Department of Education. I filed paperwork via e-mail with the Department of Education on the study details and received the 2019 program year case closure data for those clients who had an intellectual or developmental disability as a primary or secondary disability.

Instrumentation

Data Collection Procedures

The Case Service Report (RSA-911) is administrative data, collected by state VR agencies and submitted to the Rehabilitation Services Administration (RSA) quarterly throughout the specified program year. The program year runs from July 1st to June 30th. VR

agencies submit to the RSA through a data portal on the website. Each VR director receives login information and is responsible for ensuring submission and certification of the data on a quarterly basis. The VR director may delegate these tasks to another individual, but that must be done formally and to an individual who is authorized to certify the data. RSA provides a comprehensive edit check table on their website and requires these checks for reliability. Submissions that fail an edit check are returned to the agency for correction and resubmission.

At application, demographic information, including date of birth, individual characteristics, locale, education status, beneficiary status, and medical coverage, is collected. After the VR consumers are determined as eligible to receive services, an Individualized Plan for Employment (IPE) is created, and all services are recorded and reported. Each year, RSA releases data of those individuals who exited VR, either successfully, defined as having a job for 90 days, or unsuccessfully, to researchers upon request. These data are known as the RSA-911.

Inclusion/Exclusion Criteria

A total number of 150,928 consumers with a primary or secondary disability of IDD exited VR in the 2019 program year. A primary disability was defined as an individual's primary physical or mental impairment that causes or results in a substantial barrier to employment. Cognitive impairment is the official listing for intellectual or developmental disability, which RSA defines as impairments involving learning, thinking, processing information, and concentrating. Because the focus of this study was on those with IDD and whether supported employment impacts employment outcomes, those with a secondary disability of IDD will not be included. Of the 150,928 consumers in the dataset, 122,927 had IDD as their primary disability. Since this study is focused on transition-age youth, only consumers aged between 14 and 24 at the time of application will be included and will comprise the study sample. Age of application is

reported in the RSA-911 data as whole years. This age range was selected based on eligibility for youth to receive VR services. WIOA requires VR agencies to provide employment services for youth who are in school starting at the age of 14 years old until they are 21 years old. Youth who are out of school are eligible for services from 16 to 24 years old (U.S. Department of Labor, 2020).

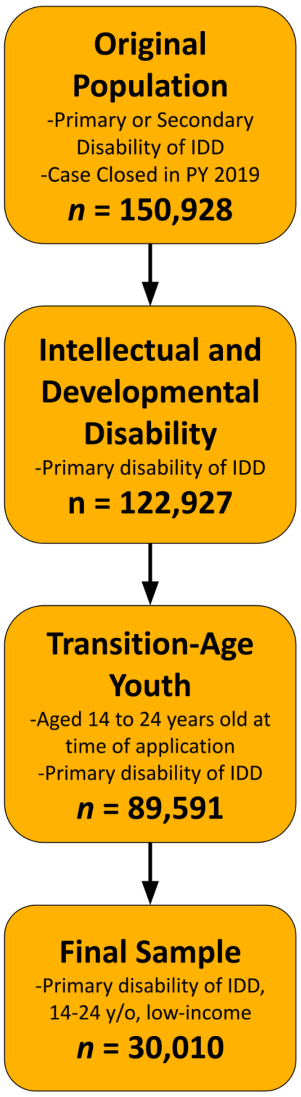
A total of 89,591 cases met the age and disability inclusion criteria. A consumer was considered low-income by RSA if they:

1. Receive or received in the last six months various government assistance such as Supplemental Nutrition Assistance Program, Temporary Assistance for Needy Families, or Supplemental Security Income,
2. Are in a family with a total family income below the poverty level,
3. Are youth who receives or is eligible for free or reduced lunch,
4. Are a foster child,
5. Are an individual with a disability whose income is below the poverty level, but whose family income is above the poverty level,
6. Are homeless, or
7. Are a youth living in a high poverty area (RSA, 2017).

Of the cases with a primary or secondary disability as IDD and aged 14 to 24 years old at application, 30,010 were labeled low-income status. This is the sample population for this study. A flow-chart of the exclusion criteria is shown below.

Figure 3.1

Flowchart of Participant Selection in Study



Independent (Treatment) Variable

The independent variable for this study is receipt of supported employment (SE) services provided through state-federal VR. Table 3.1 provides the variables of interest in the dataset that will be used to construct the treatment variable (SE). The three variables measuring receipt of SE services are binomial, either they received the service, or they did not. These variables were

combined into one binomial categorical variable: received SE services (regardless of method), or they did not. Most consumers received SE services from outside VR. Legislation, such as WIOA, requires that SE must result in a CIE outcome and must be individualized and customized, consistent with the individual's unique strengths, abilities, interests, and informed choice, including with ongoing support services for individuals with the most significant disabilities (WINTAC, n.d.b). Fidelity of SE services provided by different organizations cannot be known from the administrative data, which could certainly be a limitation of this study.

Table 3.1

Treatment Variable Construct and Variables of Interests

Construct	RSA Variable Name	Variable Label	Variable Type	Final Variable for Analyses
Supported employment services	sesvragencystaff	Service provided by VR agency staff (in-house)	Categorical, dichotomous (yes, no)	yesse (1, received SE; 0, did not receive SE)
	sesvragencypurchase	Service provided through VR agency purchase	Categorical, dichotomous (yes, no)	
	sescompserviceprovider	Service provided by Comparable Services and Benefits Providers	Categorical, dicotomous (yes, no)	

Dependent Variable

The outcome, or dependent, variable for this study was an employment outcome at exit of "competitive integrated employment" (CIE). CIE is work that is performed for a customary rate paid by the employer for the same or similar work performed by other employees without disabilities, in a location typically found in the community where the employee with a disability interacts with others without disabilities as customers, vendors, and/or other employees (RSA, 2017). If the CIE position was held for 90 days, RSA marks the participant as having a successful case closure. For this study, CIE was recoded into a binomial categorical variable. Employment outcome at exit was recoded as the CIE outcome with the options as yes or no, the participant exited with CIE, or they did not. The yes CIE outcome included CIE coded by RSA in addition to supported employment in competitive integrated employment and supported

employment on short-term basis. These levels were included as CIE because the individual was employed in that setting. Further analyses were completed using hourly wages as a continuous variable. Table 3.2 displays the RSA variables for this construct.

Table 3.2

Dependent Variable Construct and Variables of Interests

Construct	RSA Variable Name	Variable Label	Variable Type
Competitive integrated employment	exitempoutcome	Employment Outcome at Exit	Categorical, recoded to categorical, dichotomous ● 1, yes (CIE, SE in CIE, SE on short-term) ● 0, no
	exithourlywage	Hourly Wage at Exit	Continuous

Matching Variables

Previous literature has reported that several demographic characteristics are correlated with receipt of supported employment services and employment outcomes for transition-age youth with IDD. Table 3.3 shows these variables and the key constructs they represent.

Table 3.3

Covariate constructs and variables of interests

Construct	RSA Variable Name	Variable Label	Variable Type
Age	age_app	Age at VR application	Continuous
	age_exit	Age at VR exit	Continuous
Sex	sex	Sex	Categorical, dichotomous
Race	amerindian	American Indian or Alaska Native	Categorical, dichotomous
	asian	Asian	Categorical, dichotomous
	black	Black or African American	Categorical, dichotomous
	hawaiian	Native Hawaiian or Other Pacific Islander	Categorical, dichotomous
	white	White	Categorical, dichotomous
Ethnicity	hispanic	Hispanic or Latino	Categorical, dichotomous
Disability Significance	disabilitysigcode	Significance of Disability	Ordinal, three levels
Education	edlevelcompleted	Highest Educational Level Completed	Ordinal, four levels
	enrolledinpostseced	Enrolled in Postsecondary Education	Categorical, dichotomous
Barriers Categorized by RSA	basicskillsdeficient	Basic Skills Deficient/Low Levels of Literacy	Categorical, dichotomous
	culturalbarriers	Cultural Barriers to Employment	Categorical, dichtomous

	englishlearner	English Language Learner	Categorical, dichotomous
	singleparent	Consumer Is Single Parent	Categorical, dichotomous
	exoffenderstatus	Consumer Is Ex-Offender	Categorical, dichotomous
	longtermunemp	Longterm Unemployment	Categorical, dichotomous
	exhausttanf	Risk of Exhausting TANF Benefits Within 2 Years	Categorical, dichotomous
	fostercareyouth	Youth in Foster Care	Categorical, Dichotomous
	homelessorrunaway	Experiencing Homelessness	Categorical, dichotomous
Financial Indicators	appssdi	Received SSDI at Application	Categorical, dichotomous
	appprimsupportcode	Primary Financial Support at Application	Categorical, four levels
	exitprimsupportcode	Primary Financial Support at Exit	Categorical, four levels
	livingarangementcd	Living Arrangement	Categorical, dichotomous
	ipeempstatus	Employment Status at Initial IPE	Categorical, dichotomous
	appmedicaid	Received Medicaid at Application	Categorical, dichotomous
	exitmedicaid	Received Medical at Exit	Categorical, dichotomous
Supported Employment Goal	ipesupportedempgoal	SE was a Goal on Current IPE	Categorical, dichotomous

Sex. Sex was reported at application for all consumers. The applicant could indicate that he or she is male, female, or did not self-identify their sex. This variable was recoded to be dichotomous, male (0) and female (1).

Race. Reporting on race for students or youth with disabilities is required by RSA. If the student refuses to self-identify his or her race, an observer-identification method was used. Each race category is dichotomous, either the individual is that race (yes, 1), or they are not (no, 1). All race variables were included in the analyses due to the large overall numbers of the sample and interest in seeing if any of the non-White groups were significantly more or less likely to receive services or have successful employment outcomes.

Ethnicity. Ethnicity is reported separately from race in the RSA-911. Reporting on ethnicity was required for students or youth with disabilities in secondary education. Again, if students refused to self-identify, an observer-identification method was used in accordance with the Department of Education's and OMB's standards for collecting ethnicity data. Participants could identify themselves as Hispanic or Latino, or not. Hispanic is defined as an individual of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. This was a dichotomous variable, 1 for yes Hispanic of Latino, and 0 for not Hispanic or Latino.

Significance of Disability. The RSA-911 provides three different values for significance of disability: a significant disability (1), most significantly disabled (2), and no significant disability (0). These definitions are described in the Rehabilitation Act of 1973. An individual with a significant disability is defined as an individual

a. Who has a physical or mental impairment that critically limits one or more functional capacities (e.g., mobility, communication, self-care); AND

b. Whose VR can be expected to require multiple services over an extended period of time; AND
c. Who has one or more physical or mental disabilities determined on the basis of an assessment for determining eligibility and VR needs to cause comparable substantial functional limitation (RSA, 2017).

Highest Education Level. Individuals reported the highest educational level completed at program entry. These levels were

1. Individual attained a secondary school diploma.
2. Individual attained a secondary school equivalency.
3. Individual has a disability and attained a certificate of attendance/completion as a result of successfully completing an Individualized Education Program (IEP).
4. Individual completed one or more years of postsecondary education.
5. Individual attained a postsecondary certification, license, or educational certificate (non-degree).
6. Individual attained an Associate's Degree.
7. Individual attained a Bachelor's Degree.
8. Individual attained a degree beyond a Bachelor's Degree.
9. No educational level was completed.

For the analysis, I recoded the variable to a four-level categorical variable: no high school completed (1), completed high school (2), some postsecondary education (3), and postsecondary degree (4). This removes some nuances that could be found in the data; however most individuals were either still in school and had no high school completed or had completed high school.

Enrolled at Postsecondary Education. At the time of their initial Individualized Plan for Employment (IPE) meeting, consumers were marked as either being enrolled in postsecondary education (1), or not (0).

Barriers Categorized by RSA. RSA created a larger category in the RSA-911 of barriers faced by the consumers. For this study, I chose to use one, low-income, as an exclusion criterion. Nine were chosen as covariates for this study, and all were dichotomous yes/no variables: deficient in basic skills or low levels of literacy, cultural barriers to employment, English language learner, single parent status, ex-offender status, long-term unemployment (defined as 26 weeks or more), risk of exhausting TANF benefits within 2 years, whether the individual was in foster care, and whether the individual was experiencing homelessness.

Financial Indicators. Other financial variables were included as covariates in the analysis. These indicators were whether consumer received SSDI at application, their primary financial support at application (personal earnings, family and friends, public support, and other), their primary financial support at exit (same levels as at application), whether they lived in a private residence or not, if they were employed at their initial IPE meeting, and whether they received Medicaid at application or exit.

Supported Employment Goal. Since SE is the treatment, SE as goal on current IPE was added to the analysis as well. This should have a lot of predictive power for whether the consumer received SE at all.

Validity and Reliability

For my findings to be of any significance, I need to use measures that provide valid scores (McMillan, 2021). With secondary data analysis, especially with an ex post facto design, researcher influence over the design of measures is nonexistent. However, validity and reliability

can and should still be considered. For reliability, RSA requires training for all authorized data reporters and has strict reporting procedures (see RSA-PD-16-04 for procedures related to PY2019 data). RSA also provides edit checks and requires changes and resubmissions if something is found to be incorrect or missing. This assures reliability and consistency between agencies.

As for validity of the data, RSA-911 measures are written to reflect definitions in the Rehabilitation Act of 1973 and WIOA (2014). RSA-911 has been used as a data source for countless articles by researchers from Ph.D. students to policy research centers (e.g., Honeycutt & Sevak, 2019). Data are used to describe the performance of the VR and SE programs Congress and the President annually, evaluate the fulfillment of standards and indicators required by the Rehabilitation Act of 1973, and support the agency's other responsibilities and activities. To understand the services provided by and outcomes achieved under state-federal VR agencies, the RSA-911 Case Service Report is used, and its measures and data have been deemed reliable and valid.

Data Analysis

After importing my data in Stata 14, I organized, recoded, and labeled the variables that I would be using in the analyses (StataCorp, 2015). The variables section below explains the recoding that was done. I ran frequencies (`tabulate`) for all categorical variables and means (`summarize`) for all continuous variables, such as age, in the sample. Frequencies and percentages will be reported to describe the sample in terms of categorical measures, with special attention to the covariates and receipt of SE services.

Research Question One

After descriptive statistics reported by receipt of SE services (`tabulate covariate yesse, column row; summarize`), I ran a simultaneous logistic regression with odds ratios (`logit yesse i.covariate1 i.covariate2…etc, or`) to help answer my first research question: How do consumers who received supported employment services differ in terms of demographic characteristics from those who did not receive SE? I used this analysis to compare the SE group, which will be the treatment group in PSM, with the group that did not receive SE services, the control group. This analysis looked at receipt of SE services as the outcome or dependent variable and each covariate as independent variables, controlling for the other covariates. This analysis helped answer the question of who is more likely to receive SE services. Findings from this logistic regression were presented using odds ratios (O.R.), standard errors, confidence intervals (95% CI), *z* scores, and *p*-values. Fit statistics were produced using `estat gof` and `estat classification`.

Research Question Two

After comparing groups by receipt of SE services, I ran descriptive statistics (`tabulate covariate cie, column row; summarize`), for consumers who had CIE outcomes and those who did not, those who were paid federal minimum wage or higher, and who worked full-time. After descriptives, I ran simultaneous logistic regression (`logit CIE i.covariate1 i.covariate2…etc, or`) to see what variables could predict these dichotomous (yes or no) outcomes. Findings from this logistic regression were presented using odds ratios (O.R.), standard errors, confidence intervals (95% CI), *z* scores, and *p*-values. Fit statistics were run using `estat gof` and `estat classification`.

After running the logistic regressions, I used propensity score matching (PSM) to match consumers with IDD who received SE services with those who did not. This helped answer research question two: Does receiving supported employment services improve the odds of a CIE outcome for low-income transition-age youth with intellectual and developmental disability? PSM constructs artificial control and treatment groups based on receipt of SE services. Out of a population of 30,010 consumers, 2,892 transition-age youth with IDD from low-income backgrounds received SE services, while 27,118 did not.

I used `teffects psmatch, nn(#)` in Stata 14. This estimated the average treatment effect (ATE) that SE had on observational data for CIE outcomes (StataCorp, 2021). This meant that grouping consumers with similar propensity scores replicated a mini-randomized control trial when it comes to the observed covariates (Stuart, 2010). There are a multitude of different options when running PSM in Stata and I ran multiple models (1:1, 2:1, 3:1, etc.) to assess the robustness of the findings to the choice of matching procedure. The `nneighbor(#)` code allows me to set the number of individuals from the control group to match with the treatment participants. PSM in Stata (`teffects nnmatch`) uses a bias-correction term when matching on more than one continuous covariate. Ultimately, nearest neighbor 1:1 was the most preferred analysis method, as it gave the highest ATE and lowest standard error when compared to nearest neighbor 2:1 and 3:1. Appendix A provides Stata code for this study. Table 4.5 provides findings from the PSM model with nearest neighbor methods 1:1, 2:1, and 3:1. Because the treatment and control groups share the same demographic characteristics in the PSM model, I can infer that differences in competitive employment outcomes are likely due to the SE intervention.

CHAPTER FOUR

Findings

The purpose of this study was to examine whether supported employment (SE) services, funded and provided through state-federal vocational rehabilitation (VR) agencies, can improve competitive integrated employment (CIE) outcomes for low-income transition-age youth with intellectual and developmental disabilities (IDD). I evaluated the program's influence using VR case closure information as found in the Rehabilitation Services Administration Case Report (RSA-911) dataset. I hypothesized that SE increases competitive integrated employment outcomes for transition-age youth with IDD from low-income backgrounds. If this hypothesis was supported by my findings, SE could become a dominant employment service for low-income transition-age youth with IDD.

Descriptive Statistics of Sample

A total of 30,010 participants were included in the final data analyses. These participants met the criteria of being recorded as transition-age youth, primary disability of IDD, and low-income status. Participants ranged in age from 14 to 24 years old at the time of application to vocational rehabilitation, with a mean age of 18.5 years old (SD = 2.2) and median age of 18 years old. At the time of case closure, participants ranged from 17 to 45 years old, with the mean age of 21.1 years old (SD = 2.6) and median age of 21 years old. Figures 4.1 and 4.2 show the ages of participants at application and exit. Table 4.1 displays the covariates and demographic characteristics for the entire sample.

Figure 4.1

Total Sample by Age at VR Application

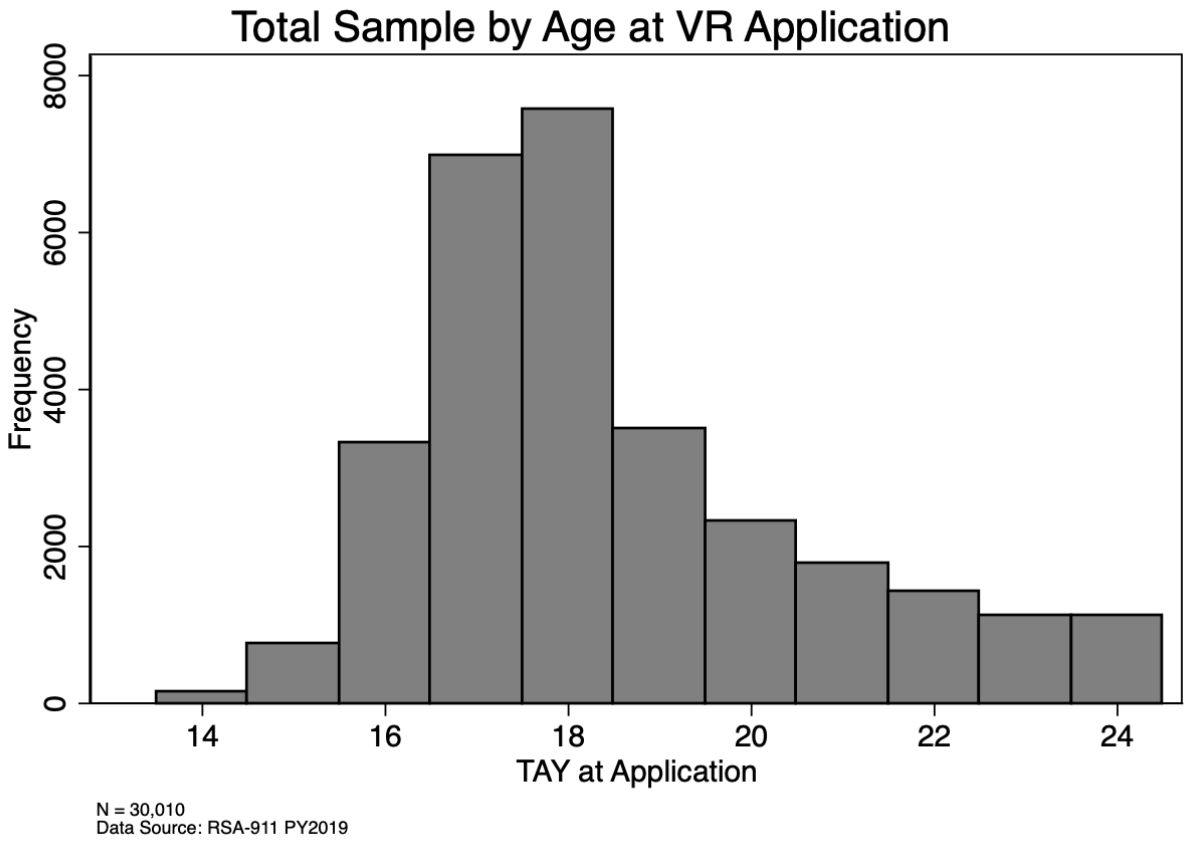


Figure 4.2

Total Sample by Age at VR Case Closure

Table 4.1

Demographics of Total Sample

Demographic	Total Sample (N = 30,010)
Sex	
Male	18,216 (60.8%)
Female	11,740 (39.2%)
Race	
White	20,620 (69.3%)
Black	8,251 (27.7%)
American Indian	781 (2.6%)
Asian	643 (2.2%)
Hawaiian	219 (0.7%)
Hispanic	6,764 (22.7%)
Education Completed[a]	
Not Completed High School	17,682 (59.1%)
Completed High School	10,703 (35.7%)
Some Postsecondary Education	1,315 (4.4%)
Postsecondary Degree	233 (0.8%)
Enrolled in PSE	3,530 (11.8%)
Significance of Disability	
Most Significant	19,276 (64.2%)
Significant	9,772 (32.6%)
No Significant Disability	962 (3.2%)
Deficient in Basic Skills/Low Literacy	15,488 (51.6%)

Cultural Barriers	2,270 (7.6%)
English Language Learner	3,816 (12.7%)
Single Parent	923 (3.4%)
Ex-Offender	692 (2.5%)
Longterm Unemployment	12,077 (40.2%)
Exhaust TANF Within 2 Years	254 (0.9%)
Foster Care	1,613 (5.4%)
Experiencing Homelessness	548 (1.8%)
Received SSDI	1,281 (4.3%)
Primary Financial Support at App.	
Personal Earnings	1,229 (4.1%)
Parents or Family	21,114 (70.4%)
Public Support	6,635 (22.1%)
Other	1,032 (3.4%)
Primary Financial Support at Exit	
Personal Earnings	9,402 (31.7%)
Parents or Family	12,656 (42.7%)
Public Support	5,753 (19.4%)
Other	1,843 (6.2%)
Lived in Private Residence	28,717 (95.7%)
Employed at IPE	2,190 (7.3%)
Received Medicaid at App.	16,569 (55.2%)
Received Medicaid at Exit	14,174 (50.3%)
SE as Goal on IPE	6,692 (22.3%)

Note. [a]Variable was measured at time of participant application.

Research Question One

Research question one looks to explore how participants who received supported employment services differ in terms of demographic characteristics from those who did not receive supported employment (SE). The mean age at application for those who received SE was 19.77 years old (*SD* = 2.35), and the median age was 20 years old. For those who did not receive SE, the mean age was 18.36 (*SD* = 2.11), and the median age was 18 years old. The mean age at exit for those who received SE was 22.22 years old (*SD* = 2.43) and the median age was 22 years old. For those who did not receive SE, the mean age at exit was 20.99 (*SD* = 2.60), and the median age was 20 years old. Figure 4.3 continues the flow chart of exclusion criteria. Figures 4.4 and 4.5 shows the frequency and distribution of age for those who received SE compared to those who did not.

Figure 4.3

Flow Chart of Participant Sample by Receipt of Supported Employment

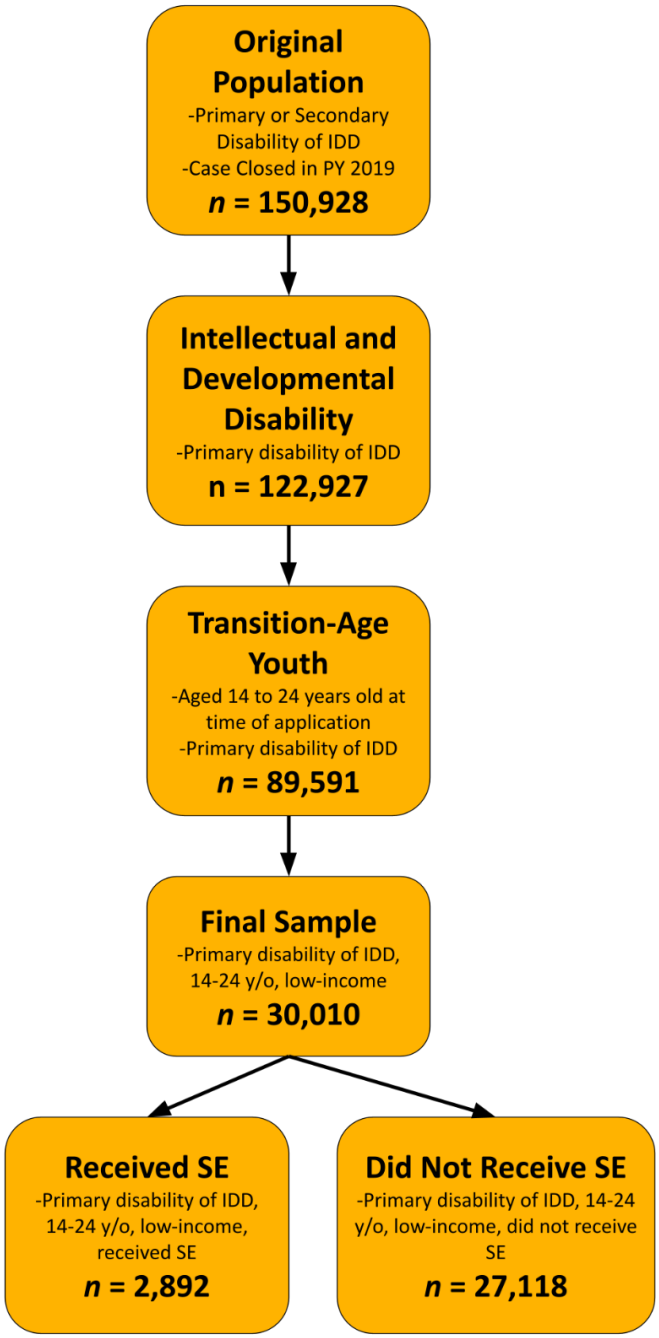


Figure 4.4

Age at Application of Sample by Receipt of Supported Employment

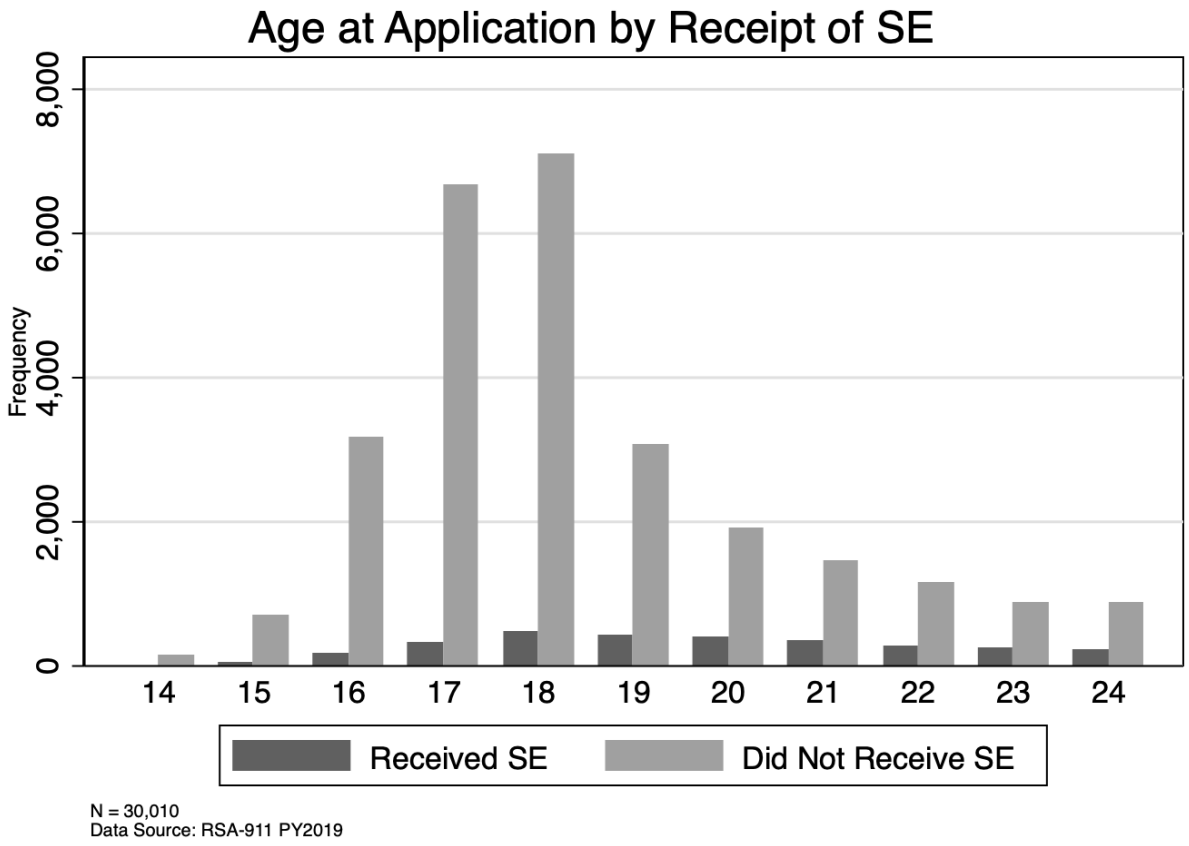


Figure 4.5

Age at Exit of Sample by Receipt of Supported Employment

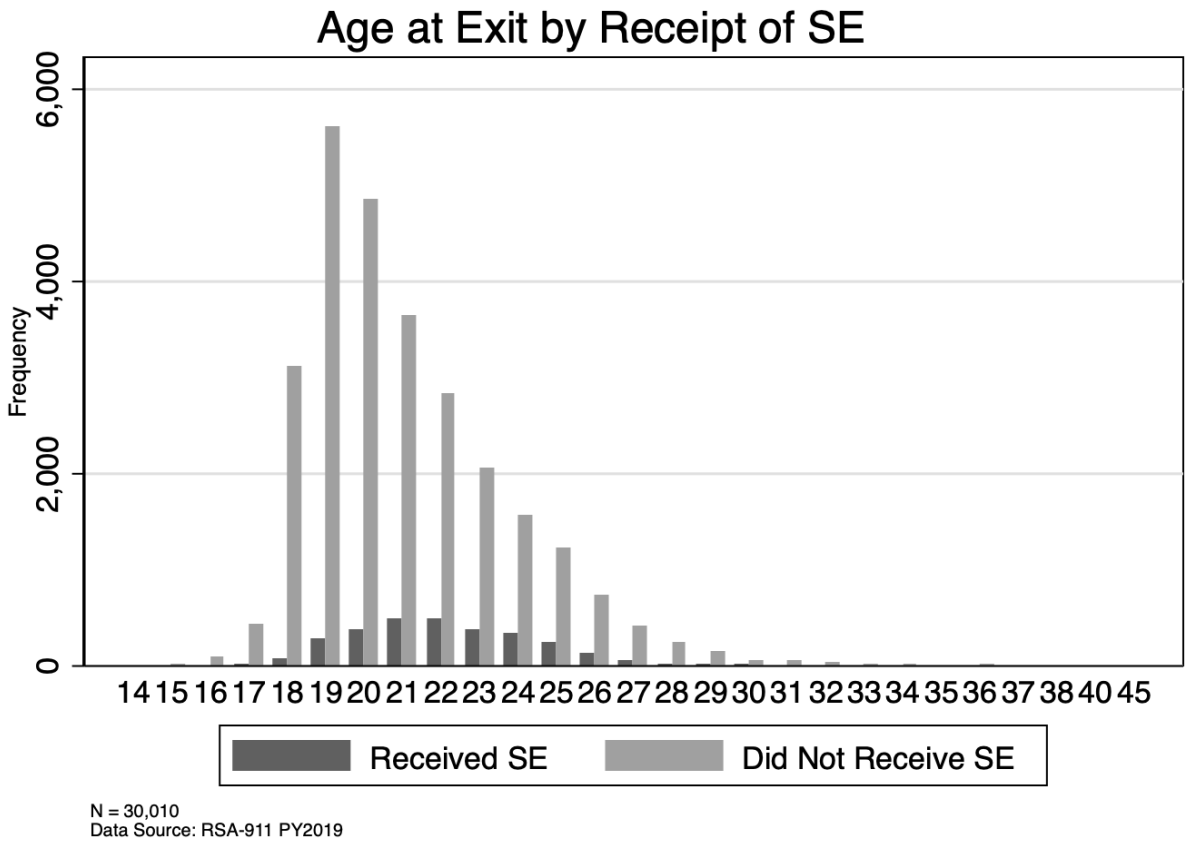


Table 4.2 provides the demographic characteristics of the sample by frequencies and percentages when stratified by whether they received supported employment services, the treatment for this study.

Table 4.2

Demographics by Receipt of Supported Employment Services

Variable	Supported Employment (SE) (n = 2,892)	Did Not Receive SE (n = 27,118)	Total Sample (N = 30,010)
Sex			
Male	1,910 (66.3%)	16,306 (60.2%)	18,216 (60.8%)
Female	973 (33.8%)	10,767 (39.8%)	11,740 (39.2%)
Race			
White	1,946 (67.3%)	18,674 (68.9%)	20,620 (69.3%)
Black	854 (29.2%)	7,397 (27.3%)	8,251 (27.7%)
American Indian	66 (2.3%)	715 (2.6%)	781 (2.6%)
Asian	88 (3.0%)	555 (2.0%)	643 (2.2%)
Hawaiian	18 (0.6%)	201 (0.7%)	219 (0.7%)
Hispanic	347 (12.0%)	6,417 (23.7%)	6,764 (22.7%)
Education Completed[a]			
Not Completed High School	1,494 (51.7%)	16,189 (59.7%)	17,683 (59.1%)
Completed High School	1,253 (43.3%)	9,450 (34.8%)	10,703 (35.7%)
Some Postsecondary Education	129 (4.5%)	1,186 (4.4%)	1,315 (4.4%)
Postsecondary Degree	11 (0.4%)	222 (0.8%)	233 (0.8%)
Enrolled in PSE	88 (3.0%)	3,442 (12.7%)	3,530 (11.8%)

Significance of Disability			
Most Significant	2,728 (94.3%)	16,548 (61.0%)	19,276 (64.2%)
Significant	156 (5.4%)	9,616 (35.5%)	9,772 (32.6%)
No Significant Disability	8 (0.3%)	954 (3.5%)	962 (3.2%)
SE as Goal on Recent IPE	2,532 (87.6%)	4,160 (15.3%)	6,692 (22.3%)
Deficient in Basic Skills/Low Literacy	1,859 (64.3%)	13,629 (50.3%)	15,488 (51.6%)
Has Cultural Barriers	176 (6.1%)	2,094 (7.7%)	2,270 (7.6%)
English Language Learner	313 (10.8%)	3,503 (12.9%)	3,816 (12.7%)
Single Parent	57 (2.0%)	869 (3.2%)	926 (3.4%)
Ex-Offender	89 (3.1%)	603 (2.2%)	692 (2.5%)
Longterm Unemployment	1,315 (45.5%)	10,762 (39.7%)	12,077 (40.2%)
Exhaust TANF Within 2 Years	21 (0.7%)	233 (0.9%)	254 (0.8%)
Foster Care	292 (10.1%)	1,321 (4.9%)	1,613 (5.4%)
Experiencing Homelessness	52 (1.8%)	496 (1.8%)	548 (1.8%)
Received SSDI at App.	260 (9.0%)	1,021 (3.8%)	1,281 (4.3%)
Primary Financial Support at App.			
Personal Earnings	111 (3.8%)	1,118 (4.1%)	1,229 (4.1%)
Parents or	1,416 (49.0%)	19,698 (72.6%)	21,114 (70.4%)

Family			
Public Support	1,287 (44.5%)	5,348 (19.7%)	6,635 (22.1%)
Other	78 (1.0%)	954 (3.5%)	1,032 (3.4%)
Primary Financial Support at Exit			
Personal Earnings	1,185 (41.0%)	8,217 (30.3%)	9,402 (31.7%)
Parents or Family	541(18.7%)	12,115 (44.7%)	12,656 (42.7%)
Public Support	1,097 (37.9%)	4,656 (17.2%)	5,753 (19.4%)
Other	55 (1.0%)	1,788 (6.6%)	1,843 (6.2%)
Lived in Private Residence	2,667 (92.2%)	26,050 (96.1%)	28,717 (95.7%)
Employed at IPE	229 (7.9%)	1,961 (7.2%)	2,190 (7.3%)
Received Medicaid at App.	1,916 (66.3%)	14,653 (54.0%)	16,569 (55.2%)
Received Medicaid at Exit	1,991 (68.8%)	12,183 (44.9%)	14,174 (50.3%)

Note. [a]Variable was measured at time of participant application.

Simultaneous logistic regression was used to determine the extent to which receiving supported employment (SE) services through state-federal vocational rehabilitation (VR) agencies differed by demographic, educational, and financial covariates. All consumers in this sample were transition-age (14 - 24 years old) at the time of VR application, had a primary disability of intellectual or developmental disability, and were considered to be low-income. Results from this model are displayed in Table 4.3. The model is displayed visually in Figure

4.6, and with only statistically significant results in Figure 4.7. Figure 4.8 shows the odds ratios as percent.

Table 4.3

Logistic Regression Results with Supported Employment Services as Outcome

	Odds Ratio	Standard Error	95% CI		*z*	*p*
Variable			LL	UL		
Age at App.	1.053**	0.018	1.018	1.090	2.99	0.003
Age at Exit	1.027	0.016	0.997	1.059	1.76	0.079
Female	0.897*	0.067	0.702	0.965	-1.99	0.046
White	1.203	0.166	0.918	1.576	1.34	0.181
Black	1.266	0.177	0.963	1.664	1.69	0.090
American Indian	0.866	0.158	0.605	1.240	-0.79	0.432
Asian	1.320	0.247	0.915	1.904	1.47	0.138
Hawaiian	0.868	0.275	0.467	1.615	-0.45	0.655
Hispanic	0.823*	0.067	0.702	0.965	-2.40	0.017
Education Completed[b]						
Not Completed High School	1.142*	0.066	1.019	1.280	2.29	0.022
Some Postsecondary Education	1.258	0.165	0.973	1.628	1.75	0.080
Postsecondary Degree	0.755	0.293	0.353	1.614	-0.72	0.469

Enrolled in PSE	0.621***	0.091	0.466	0.829	-3.24	0.001
Significance of Disability[c]						
Most Significant	1.775***	0.189	1.441	2.186	5.39	<0.001
No Significant	0.802	0.319	0.368	1.749	-0.55	0.579
SE as Goal on IPE	26.568***	2.048	23.832	31.890	44.64	<0.001
Basic Skills Deficient/Low Literacy	1.177**	0.657	1.055	1.313	2.92	0.004
Has Cultural Barriers	0.764*	0.081	0.620	0.940	-2.54	0.011
English Language Learner	1.048	0.096	0.876	1.253	0.51	0.610
Is a Single Parent	0.671*	0.120	0.473	0.952	-2.23	0.025
Ex-Offender Status	1.187	0.181	0.881	1.600	1.13	0.259
Longterm Unemployment	1.112	0.061	0.999	1.237	1.94	0.052
Exhaust TANF Within 2 Years	0.588	0.197	0.221	1.078	-1.77	0.076
Foster Care	1.697	0.163	1.406	2.049	5.51	0.000
Experiencing Homelessness	1.255	0.251	0.848	1.856	1.13	0.256
Received SSDI at App.	1.289**	0.127	1.063	1.564	2.58	0.010
Primary Financial Support at App.[d]						
Parents or Family	1.302	0.197	0.968	1.751	1.74	0.081
Public Support	1.347	0.206	0.998	1.819	1.95	0.052
Other	1.371	0.295	0.899	2.089	1.47	0.142

Primary Financial Support at Exit[e]						
Parents or Family	0.289***	0.021	0.252	0.332	-17.49	<0.001
Public Support	0.458***	0.031	0.401	0.524	-11.42	<0.001
Other	0.199***	0.034	0.142	0.279	-9.37	<0.001
Lived in Private Residence	1.256*	0.130	1.026	1.538	2.21	0.027
Employed at IPE	1.198	0.126	0.976	1.472	1.72	0.085
Received Medicaid at App.	0.912	0.059	0.804	1.035	-1.43	0.153
Received Medicaid at Exit	1.288***	0.086	1.130	1.467	3.80	<0.001

Note. [a]The sex variable uses male as the comparison group.

[b]Variable collected at time of application. Completed high school is the comparison group.

[c]The significance of disability variable uses significant disability as the comparison group.

[d]The comparison group for this variable is personal earnings.

[e]The comparison group for this variable is personal earnings.

$^{***}p \leq 0.001, ^{**}p \leq 0.01\ ^{*}p \leq 0.05$

Figure 4.6

Logistic Regression All Results with Supported Employment Services as Outcome Plot

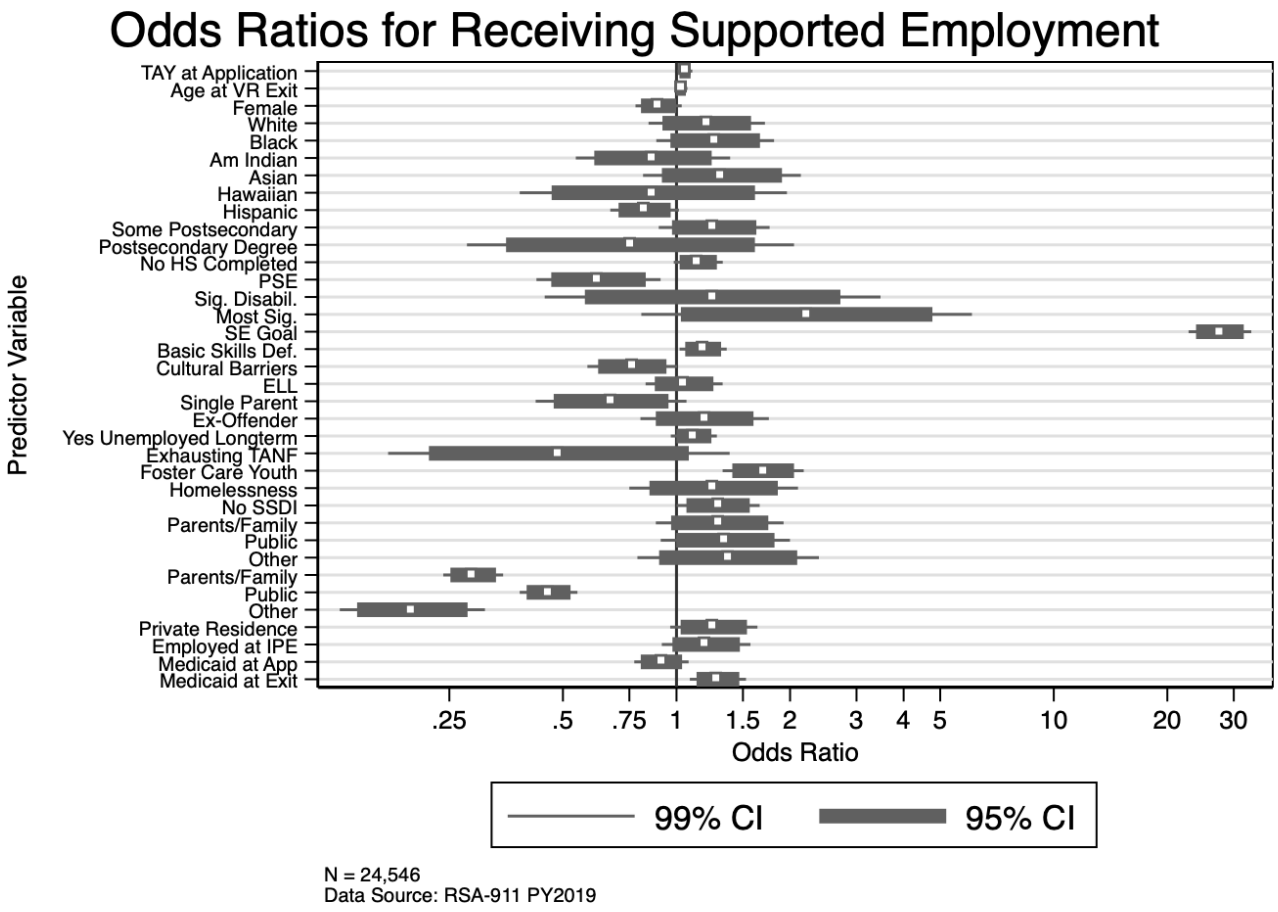


Figure 4.7

Logistic Regression Statistically Significant Results with Supported Employment Services as Outcome Plot

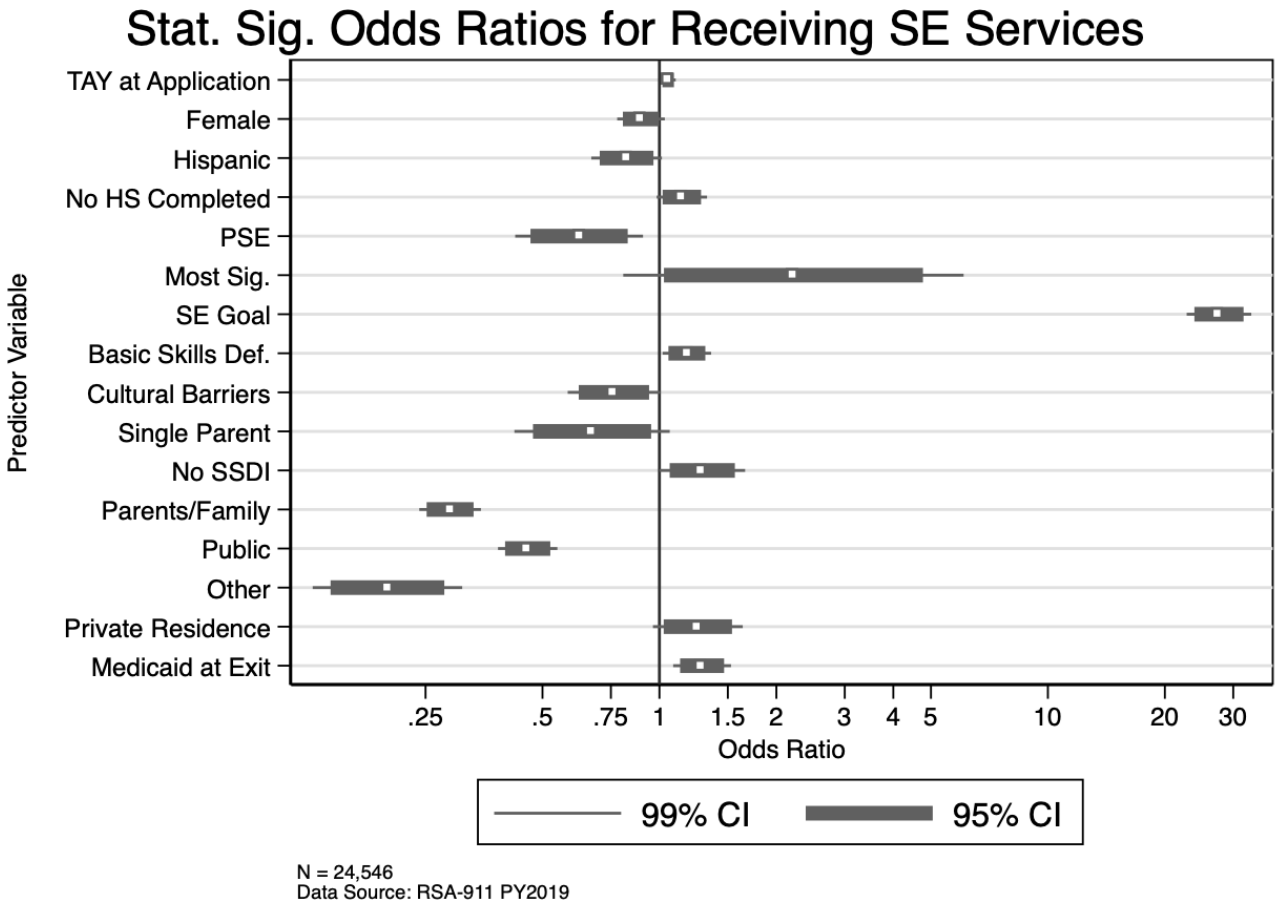
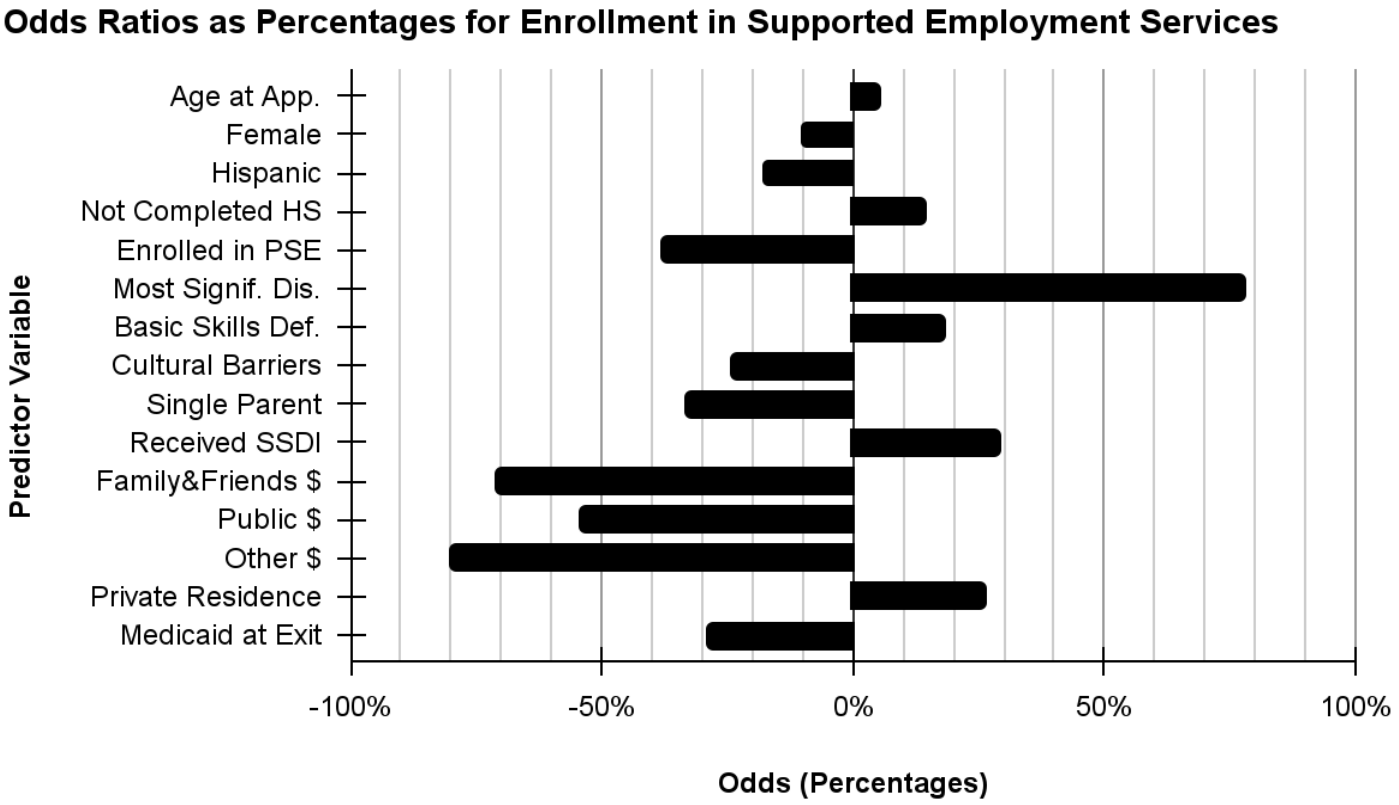


Figure 4.8

Logistic Regression Statistically Significant Results as Odds as Percentages with Supported Employment Services as Outcome



Some, but not all, covariates were found to be statistically significant. Age at application was a statistically significant predictor of receiving SE. A one-year increase in age corresponded to a consumer having consumers had about 5% higher odds of SE (O.R. = 1.053, $z = 2.99$, $p = 0.003$). Female VR consumers had about 10% lower odds than their male peers to receive SE (O.R. = 0.897, $z = -1.99$, $p = 0.046$). Hispanic consumers were 18% less likely to be provided SE services than their non-Hispanic peers (O. R. = 0.823, $z = -2.40$, $p < 0.017$).

When compared with high school graduates, consumers who did not have a high school at the time of application had 14% greater odds of receiving SE (O.R. = 1.142, $z = 2.29$, $p = 0.022$). If a consumer was enrolled in postsecondary education at the time of their initial Individualized Plan for Employment (IPE), they had 38% lower odds than those not enrolled in postsecondary education to have received SE services (O.R. = 0.621, $z = -3.24$, $p = 0.001$). Consumers who were categorized as having a disability that was "most significant" had over 78% better odds of receiving SE than those categorized as "significant" (O.R. = 1.775, $z = 5.39$, $p < 0.001$). Consumers who were considered to be basic skills deficient and have low levels of literacy had 18% higher odds of being enrolled in SE (O.R. = 1.177, $z = 2.92$, $p = 0.004$), while those who perceived themselves as having cultural barriers to employer had 24% lower odds (O.R. = 0.764, $z = -2.54$, $p = 0.011$). Consumers who were single parents had 33% lower odds of receiving SE (O.R. = 0.671, $z = -2.23$, $p = 0.025$). Consumers who were in foster care had 70% greater odds of receiving SE (O.R. = 1.697, $z = 5.51$, $p < 0.001$).

If a consumer received Social Security Disability Insurance (SSDI) at the time of VR application, they had 29% higher odds of receiving SE (O.R. = 1.289, $z = 2.58$, $p = 0.010$). When compared to their peers who had personal earnings as their primary source of economic support at the time of case closure, consumers who had public support as their primary source of

financial support had 54% lower odds (O.R. = 0.458, z = -11.42, $p < 0.001$), and those who had parents or family as the primary had 71% lower odds of receiving SE (O.R. = 0.289, z = -17.49, $p < 0.001$). Those who had "other" as their primary economic source had 80% lower odds of supported employment (O.R. = 0.199, z = -9.37, $p < 0.001$). Consumers who lived in private residences had 26% greater odds of receiving SE (O.R. = 1.256, z = 2.21, p - 0.027). Receiving Medicaid insurance at the time of application was not statistically significant, and therefore not a predictor for receiving SE, but consumers who received Medicaid at the time of their exit from VR had 29% higher odds of having received supported employment (O.R. = 1.288, z = 3.80, $p <$ 0.001).

Despite an indication of slightly poor fit as evidenced by statistically significant results on the Hosmer and Lemeshow test (χ^2[g = 10] = 20.08, df = 8, p = 0.010), the model had a small a small to medium effect size (McFadden's Pseudo R^2 = 0.38). The Hosmer and Lemeshow test and all tests that rely on Chi-square are notoriously over-powered in large samples. This sample is very large, therefore the p-value over a highly significant result (e.g., as .0000001) suggests that model fit really is decent. Overall, the logistic regression model accurately predicted 90.7% of the consumers in our sample. The model demonstrated much higher specificity (97.5%) than sensitivity (29.3%).

Research Question Two

Research question two asks, does receiving supported employment services improve the odds of competitive integrated employment for low-income transition-age youth with intellectual and developmental disability as compared to a matched sample of youth who did not receive supported employment services? Figure 4.9 shows the exclusion criteria and sample breakdown by CIE outcome. To get an initial look at the outcome of competitive integrated employment

(CIE), descriptive statistics were analyzed. The mean age at application of consumers who had an outcome of CIE was 18.78 years old (*SD* = 2.26) and a median age of 18 years old. The mean age at application for those who did not have an outcome of CIE was 18.33 years old (*SD* = 2.10) and a median age of 18 years old. The mean age at exit was 21.47 years old (*SD* = 2.55) and a median age of 21 years old for those had an outcome of CIE, while 20.88 years old (*SD* = 2.63) was the mean age at exit for those who did not have an outcome of CIE, and a median age of 20. Figures 4.10 and 4.11 display age by outcome of CIE. Table 4.4 shows the demographic characteristics of the sample including frequencies and percentages by employment outcome of competitive integrated employment, or the outcome for this study. It is important to note that consumers who received SE were about 10% of the total population, however, 75% of those consumers became employed, reflecting almost 20% of all those with successful case closures to CIE.

Figure 4.9

Flow Chart of Participant Sample by Receipt of Supported Employment and CIE Outcome

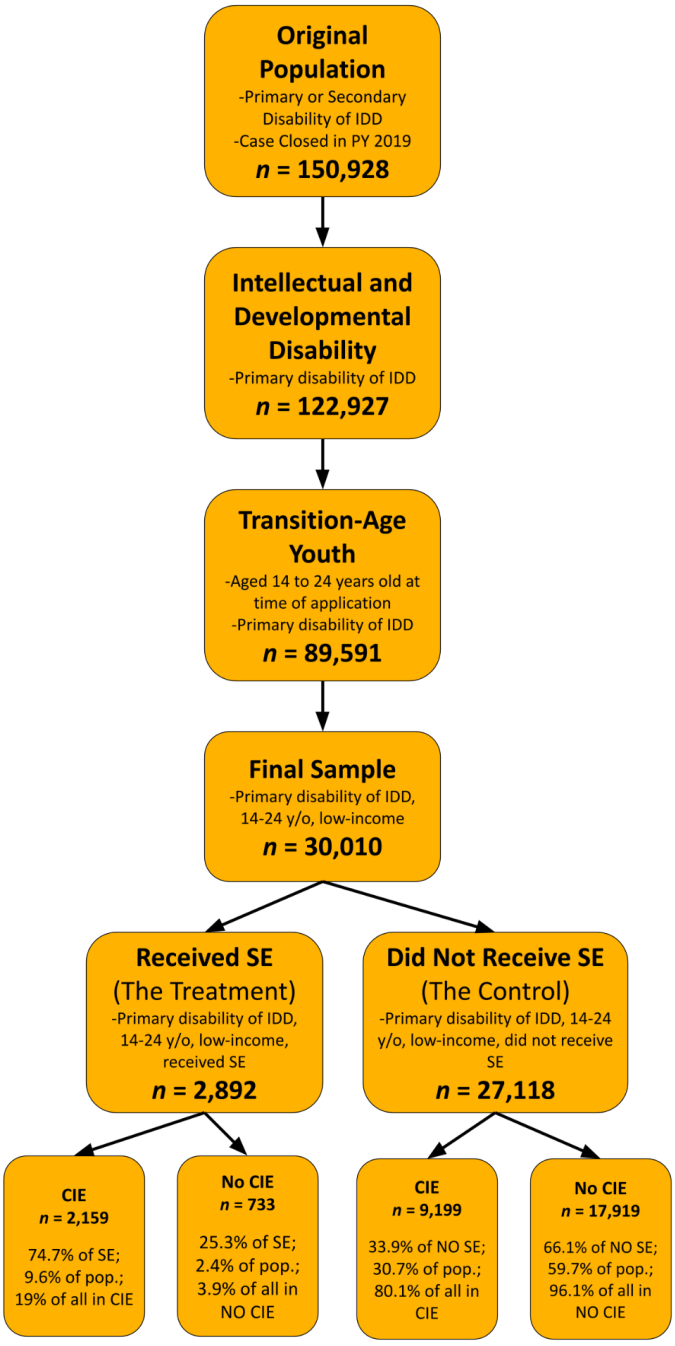


Figure 4.10

Age at Application of Sample by CIE Outcome

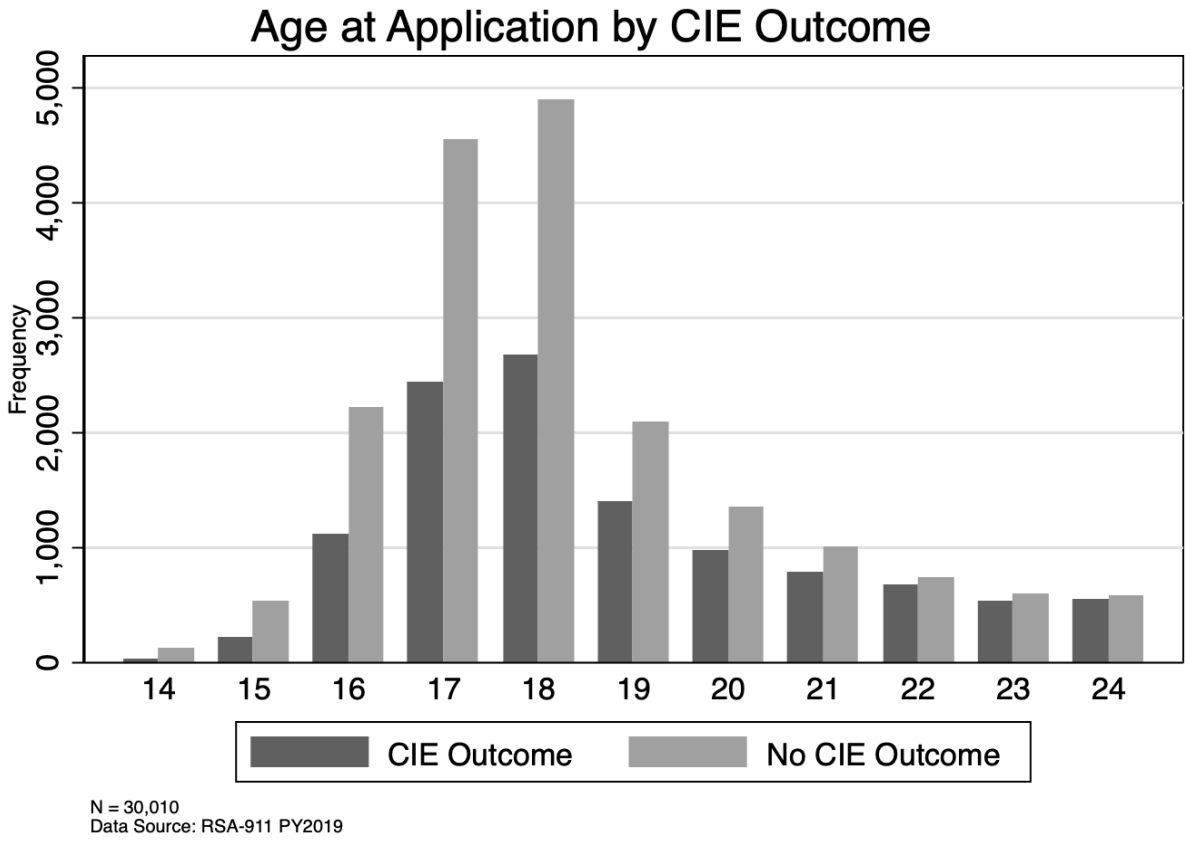


Figure 4.11

Age at VR Case Closure of Sample by CIE Outcome

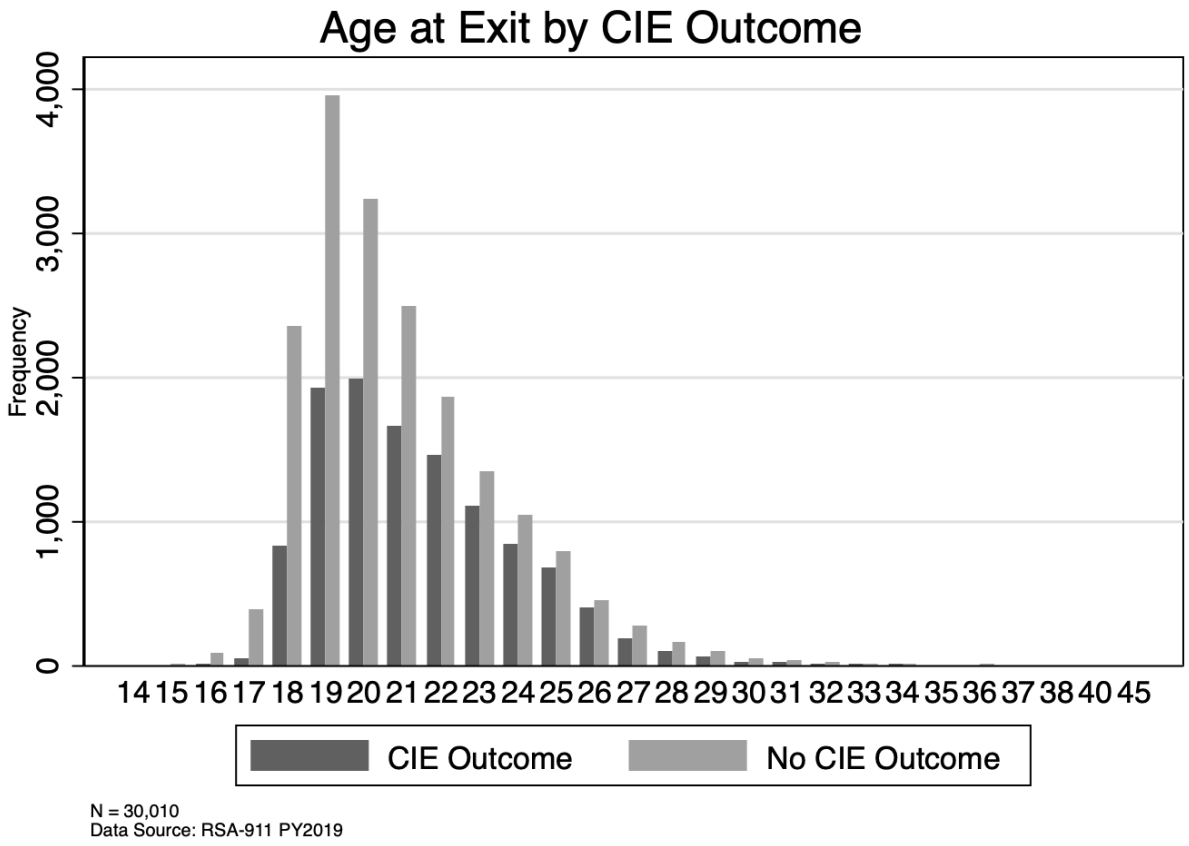


Table 4.4

Demographics by Competitive Integrated Employment at Exit Outcome

Variable	Competitive Integrated Employment (CIE)[a] (*n* = 11,358)	Outcome Not CIE[b] (*n* = 18,652)	Total Sample (*N* = 30,010)
Received SE	2,159 (74.7%)	733 (25.3%)	2,892 (9.6%)
Never Received SE	9,199 (33.9%)	17,919 (66.1%)	27,118 (90.4%)
Sex			
Male	7,173 (39.4%)	11,043 (60.6%)	18,216 (60.8%)
Female	4,161 (35.4%)	7,579 (64.6%)	11,740 (39.19)
Race			
White	8,081 (39.2%)	12,539 (60.8%)	20,620 (69.3%)
Black	2,890 (35.0%)	5,361 (65.0%)	8,251 (27.7%)
American Indian	258 (33.0%)	523 (67.0%)	781 (2.6%)
Asian	247 (38.4%)	396 (61.6%)	643 (2.2%)
Hawaiian	76 (34.7%)	143 (65.3%)	219 (0.7%)
Hispanic	2,544 (37.6%)	4,220 (62.4%)	6,764 (22.7%)
Education Completed[c]			
Not Completed High School	6,206 (35.1%)	11,477 (64.9%)	17,682 (59.1%)
Completed High School	4,351 (40.6%)	6,352 (59.4%)	10,703 (35.7%)
Some Postsecondary Education	635 (48.3%)	680 (51.7%)	1,315 (4.4%)

Postsecondary Degree	148 (63.5%)	85 (36.5%)	233 (0.8%)
Enrolled in PSE	1,516 (43.0%)	2,014 (57.0%)	3,530 (11.8%)
Significance of Disability			
Most Significant	7,309 (37.9%)	11,967 (62.1%)	19,276 (64.2%)
Significant	3,639 (37.2%)	6,133 (62.8%)	9,772 (32.6%)
No Significant Disability	410 (42.6%)	552 (57.4%)	962 (3.2%)
Deficient in Basic Skills/Low Literacy	5,748 (37.1%)	9,740 (62.9%)	15,488 (51.6%)
Has Cultural Barriers	868 (38.2%)	1,402 (61.8%)	2,270 (7.6%)
English Language Learner	1,594 (41.8%)	2,222 (58.2%)	3,816 (12.7%)
Is a Single Parent	325 (35.1%)	601 (64.9%)	923 (3.4%)
Ex-Offender Status	223 (32.2%)	469 (67.8%)	692 (2.5%)
Longterm Unemployment	4,370 (36.2%)	7,707 (63.8%)	12,077 (40.2%)
Exhaust TANF Within 2 Years	70 (27.6%)	184 (72.4%)	254 (0.9%)
Foster Care	599 (37.1%)	1,014 (62.9%)	1,613 (5.4%)
Experiencing Homelessness	153 (27.9%)	395 (72.1%)	548 (1.8%)
Received SSDI[d]	536 (41.8%)	745 (58.2%)	1,281 (4.3%)
Primary Financial Support at App.			
Personal Earnings	584 (47.5%)	645 (52.5%)	1,229 (4.1%)
Parents or Family	7,837 (37.1%)	13,277 (62.9%)	21,114 (70.4%)

Public Support	2,509 (37.8%)	4,126 (62.2%)	6,635 (22.1%)
Other	428 (41.5%)	604 (58.5%)	1,032 (3.4%)
Primary Financial Support at Exit			
Personal Earnings	8,189 (87.1%)	1,213 (12.9%)	9,402 (31.7%)
Parents or Family	1,528 (12.1%)	11,128 (87.9%)	12,656 (42.7%)
Public Support	1,410 (24.5%)	4,343 (75.5%)	5,753 (19.4%)
Other	225 (12.2%)	1,618 (87.8%)	1,843 (6.2%)
Lived in Private Residence	10,917 (38.0%)	17,800 (62.0%)	28,717 (95.7%)
Employed at IPE	1,175 (53.7%)	1,015 (46.4%)	2,190 (7.3%)
Received Medicaid at App.	5,885 (35.5%)	10,684 (64.5%)	16,569 (55.2%)
Received Medicaid at Exit	5,193 (36.6%)	8,981 (63.4%)	14,174 (50.3%)

Note. [a]Variable for competitive integrated employment (CIE) includes participants currently enrolled in supported employment in a competitive integrated employment setting.

[b]Variable includes employed in job not considered CIE or not employed.

[c]Variable was measured at time of participant application.

[d]Variable was measured at time of participant application.

Table 4.5 shows results for logistic regression with competitive integrated employment as the outcome, while figures 4.12 and 4.13 provide the results visually.

Table 4.5

Logistic Regression Results for Competitive Integrated Employment as Outcome

	Odds Ratio	Standard Error	95% CI		*z*	*p*
Variable			LL	UL		
SE Services	8.139***	0.562	7.108	9.319	30.35	<0.001
Age at Application	1.088***	0.014	1.061	1.117	6.45	<0.001
Age at Exit	0.982	0.011	0.961	1.003	-1.70	0.089
Female	0.894**	0.035	0.828	0.966	-2.84	0.004
White	1.113	0.112	0.914	1.355	1.07	0.286
Black	0.954	0.098	0.781	1.166	-0.46	0.649
American Indian	0.902	0.117	0.699	1.163	-0.80	0.426
Asian	1.003	0.150	0.748	1.346	0.02	0.981
Hawaiian	1.462	0.338	0.929	2.299	1.64	0.101
Hispanic	1.208***	0.062	1.092	1.335	3.68	<0.001
Education Completed[b]						
Not Completed High School	0.884**	0.039	0.810	0.964	-2.77	0.006
Some Postsecondary Education	1.010	0.097	0.836	1.219	0.10	0.921

Postsecondary Degree	1.119	0.265	0.704	1.779	0.47	0.635
Enrolled in PSE	1.230**	0.080	1.082	1.397	3.17	0.002
Significance of Disability[c]						
Most Significant	0.987	0.046	0.902	1.081	-0.28	0.781
No Significant	1.121	0.128	0.896	1.401	1.00	0.318
Basic Skills Deficient/Low Literacy	1.063	0.043	0.982	1.149	1.52	0.130
Has Cultural Barriers	1.255***	0.089	1.093	1.441	3.22	0.001
English Language Learner	0.926	0.059	0.817	1.049	-1.21	0.226
Is a Single Parent	0.827	0.093	0.663	1.031	-1.69	0.092
Ex-Offender Status	0.713**	0.088	0.560	0.909	-2.73	0.006
Longterm Unemployment	0.944	0.038	0.872	1.022	-1.43	0.154
Exhaust TANF Within 2 Years	0.512**	0.114	0.330	0.793	-2.99	0.003
Foster Care	0.998	0.084	0.847	1.176	-0.03	0.978
Experiencing Homelessness	0.515***	0.079	0.382	0.695	-4.34	<0.001
Received SSDI at Application	1.219*	0.110	1.021	1.455	2.20	0.028
Primary Financial Support at Application[d]						
Parents or Family	3.258***	0.320	2.687	3.950	12.01	<0.001
Public Support	2.989***	0.318	2.425	3.683	10.27	<0.001
Other	3.428***	0.493	2.587	4.544	8.57	<0.001

Primary Financial Support at Exit[e]						
Parents or Family	0.019***	0.001	0.017	0.021	-81.61	<0.001
Public Support	0.030***	0.002	0.026	0.034	-55.02	<0.001
Other	0.019***	0.002	0.016	0.023	-43.48	<0.001
Lived in Private Residence	1.265*	0.120	1.050	1.524	2.47	0.014
Employed at IPE	1.240**	0.095	1.067	1.440	2.80	0.005
Received Medicaid at Application	0.862***	0.039	0.788	0.943	-3.24	0.001
Received Medicaid at Exit	1.060	0.050	0.966	1.163	1.22	0.222

Note. [a]The sex variable uses male as the comparison group.

[b]Variable collected at time of application. Completed high school is the comparison group.

[c]The significance of disability variable uses significant disability as the comparison group.

[d]The comparison group for this variable is personal earnings.

[e]The comparison group for this variable is personal earnings.

$^{***}p \leq 0.001$, $^{**}p \leq 0.01$ $^{*}p \leq 0.05$

Figure 4.12

Logistic Regression All Results with CIE as Outcome Plot

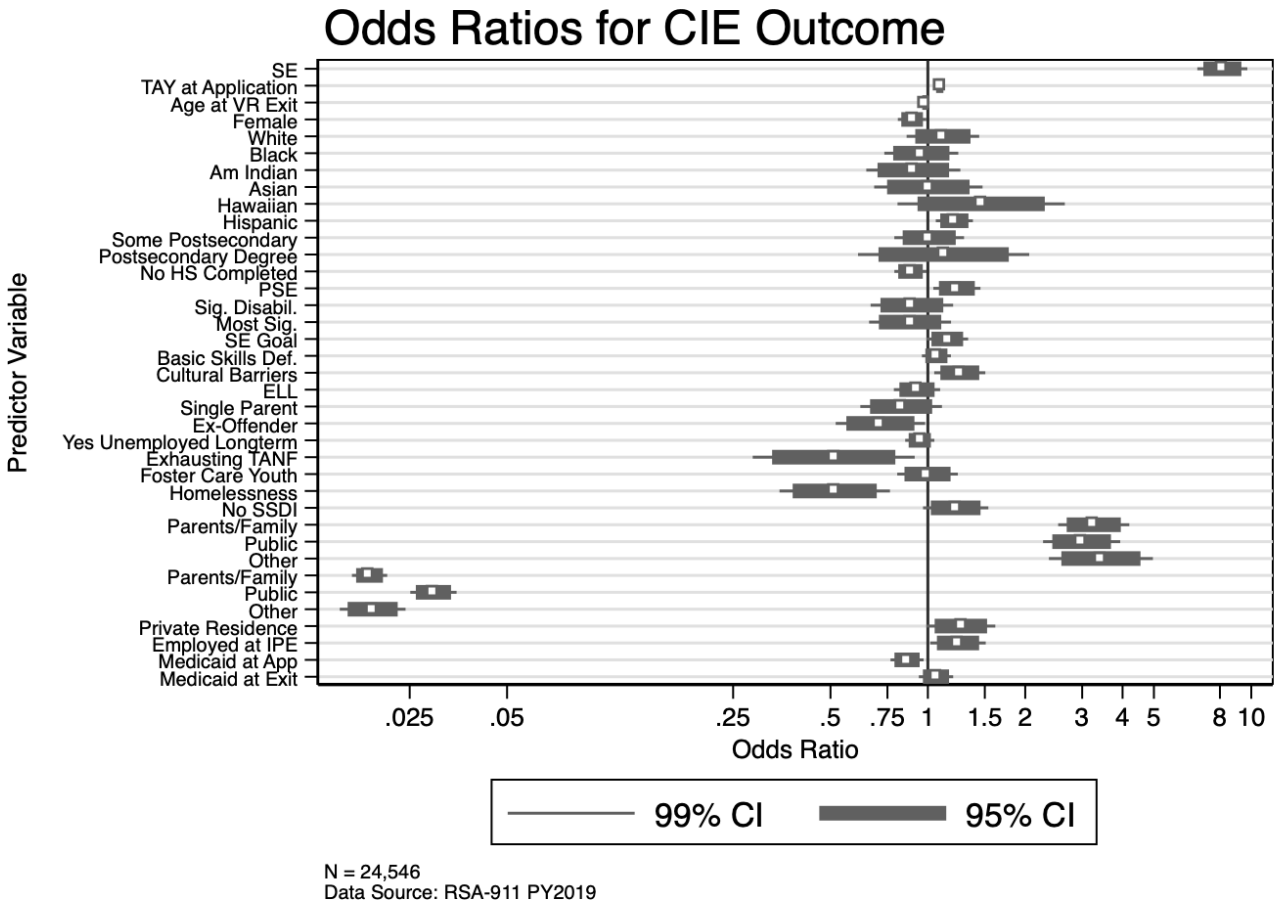
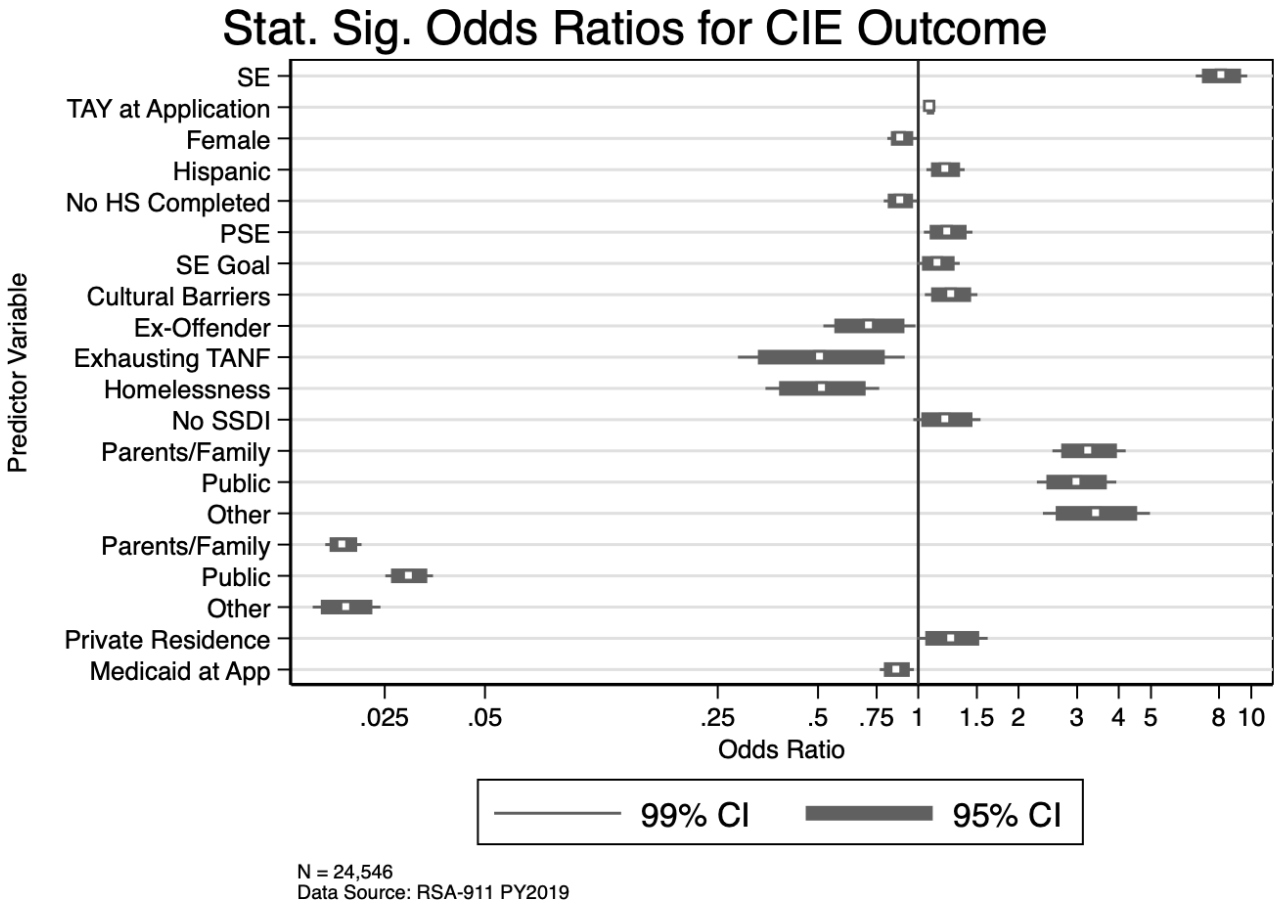


Figure 4.13

Logistic Regression Statistically Significant Results with CIE as Outcome Plot



Age at application was significant, with an increase in age by one year having 9% greater odds of being employed in CIE at VR case closure (O.R. = 1.088, $z = 6.45$, $p < 0.001$). Receiving supported employment increased the odds of CIE for consumers by 714% compared to those who did not receive SE (O.R. = 8.139, $z = 30.35$, $p < 0.001$), while females had 11% lower odds than their male peers to have an outcome of CIE (O.R. = 0.894, $z = -2.84$, $p = 0.004$). Hispanic consumers had 21% greater odds of CIE than their non-Hispanic peers (O.R. = 1.208, $z = 3.68$, $p < 0.001$). Compared to those who had completed high school, consumers who had not completed high school at the time of application had 12% lower odds to have CIE as an outcome (O.R. = 0.884, $z = -2.77$, $p = 0.006$). Being enrolled in postsecondary education led to 23% greater odds of CIE over those who were not enrolled (O.R. = 1.230, $z = 3.17$, $p = 0.002$). Consumers who perceived themselves as having cultural barriers to employment had 26% greater odds of CIE than those who did not perceive themselves as having cultural barriers (O.R. = 1.255, $z = 3.22$, $p = 0.001$). Consumers who also had an ex-offender status had about 30% lower odds of CIE than their peers who were not (O.R. = 1.255, $z = -2.73$, $p = 0.006$). Those who were at risk of exhausting their TANF benefits and those who were experiencing homelessness had 49% lower odds of a CIE outcome (O.R. = 0.512, $z = -2.99$, $p = 0.003$; O.R. = 0.515, $z = -4.34$, $p < 0.001$).

Those who were SSDI recipients at application had 22% greater odds of CIE than those who did not receive SSDI at time of application (O.R. = 1.219, $z = 2.20$, $p = 0.028$). Consumers who said they relied on parents or family as their primary economic source at the time of application had 226% greater odds of having a CIE outcome when compared to their peers who relied on personal earnings (O.R. = 3.258, $z = 12.01$, $p < 0.001$), and those who relied on public support and other support had 199% and 243% greater odds respectively than their peers who relied on personal earning to have a CIE outcome (O.R. = 2.989, $z = 10.27$, $p < 0.001$; O.R. =

3.428, z = 8.57, $p < 0.001$). However, those who relied on family or friends, public support, or other support at the time of exit had significant lower odds of a CIE outcome when compared with their peers who relied on personal earnings at the time of exit (O.R. = 0.019, z = -81.6, $p <$ 0.001; O.R. = 0.030, z = -55.02, $p < 0.001$; O.R. = 0.019, z = -43.48, $p < 0.001$). Consumers who were living in a private residence at the time of application had 27% greater odds of CIE than those who were not (O.R. = 1.265, z = 2.47, p = 0.014). Those who were employed at the time of their initial IPE had 24% greater odds of CIE than those who were not (O.R. = 1.240, z = 2.80, p = 0.005). Consumers who received Medicaid insurance at the time of application had 14% lower odds of CIE than those who did not receive Medicaid (O.R. = 0.862, z = -3.24, p = 0.001).

This model has decent fit, as evidenced by a statistically significant result on the Hosmer and Lemeshow test (χ^2[g = 10] = 15.82, df = 8, p = 0.0472), and a medium effect size (McFadden's Pseudo R^2 = 0.431). These results suggest that our covariates may reliably distinguish between consumers who did and did not have competitive integrated employment as their outcome. Again, the p-value of the Hosmer and Lemeshow tests being greatly above 0.000001, suggests that model fit is good. Overall, the logistic regression model accurately predicted 86.1% of the consumers in our sample. The model demonstrated high specificity (90.2%) and sensitivity (79.7%).

The mean hourly wage for the entire sample was $5.86, with a median hourly wage of $7.25. Transition-age consumers with IDD from low-income backgrounds who received SE had a mean hourly wage of $8.61 ($SD$ = 4.47) and a median wage of $9.25. Consumers who did not receive SE had a mean hourly wage of $5.50 ($SD$ = 7.46) and a median wage of $0.00.

Propensity Score Matching

When compared to a matched cohort of consumers who did not receive supported employment, transition-age low-income youth with intellectual and developmental disabilities (IDD) who received supported employment services were more likely to work in competitive integrated employment (ATE = 0.378, SE = 0.032, $p < 0.001$). Table 4.6 shows the average treatment effects at nearest neighbor 1:1, 2:1, and 3:1. The odds ratio for SE is 1.46, meaning consumers who received SE had 46% greater odds of CIE. That is a very large impact. Overall, relative bias in ATE estimates due to the choice of matching procedure was very low, as ATEs differed at most by 2.6%.

Table 4.6

Average Treatment Effects for Matched Sample for Competitive Integrated Employment as Outcome

	N	ATE	Robust Standard Error	95% CI		*z*	*p*
Matching Procedure				LL	UL		
Competitive Integrated Employment							
1:1	24,546	0.379	0.032	0.315	0.442	11.70	<0.001
2:1	24,546	0.378	0.030	0.318	0.437	12.42	<0.001
3:1	24,546	0.369	0.028	0.315	0.423	13.40	<0.001

CHAPTER FIVE

Discussion

This study used logistic regression and propensity score matching (PSM) to estimate whether VR-funded supported employment (SE) services can help low-income transition-age youth with intellectual and developmental disabilities (IDD) have an employment outcome of competitive integrated employment (CIE). Receiving SE services does have a positive effect on employment outcomes. After matching consumer groups in PSM based on demographic characteristics, barriers, and financial indicators, SE had a statistically significant effect on CIE (ATE = 0.378, Robust SE = 0.032, $p < 0.001$). Consumers who received SE had 46% greater odds of CIE at exit. This adds to previous literature that has shown the positive effect that SE has on CIE outcomes for many disability groups (Kaya, 2018; Wehman et al., 2014). SE can help this unique population overcome some employment challenges.

Findings from the logistic regression showed that receiving SE does differ by some characteristics not previously explored in prior research has not really delved into. Younger, female, and Hispanic consumers were less likely to receive SE. When it came to education, individuals who had not completed high school at the time of VR application were more likely to receive SE than their peers who had already graduated high school. Consumers who were enrolled in postsecondary education at their initial IPE meeting were less likely to be enrolled in SE. This could reflect the philosophy behind supported employment, that even the individuals with the most significant disabilities can work with support (Wehman et al., 2014). In fact, low-income transition-age consumers with IDD who were considered to have a “most significant” disability had 78% greater odds to be enrolled in SE than their peers with a “significant” disability. Additionally, consumers who met the criteria as being deficient in basic skills were

also more likely to receive SE. This could also reflect those with less significant disabilities being placed in less support-focused programs like postsecondary education. As previous literature (Wehman et al., 2014) has found, those who received SSDI were more likely to receive SE. There is likely a cyclical effect going on between receiving cash benefits like SSDI and applying for VR services. If an applicant receives Social Security Disability Insurance (SSDI) or Supplemental Security Income (SSI) for their disability, they are presumed eligible for VR services (FL DOE, 2021).

Consumers who were also single parents had lower odds of receiving SE services, something that has not been thoroughly explored in prior research. Those who had perceived cultural barriers to employment were also less likely to receive SE services. It is unclear if they were offered services but declined to enroll. One major financial indicator that significantly predicted whether a consumer would receive SE was where their primary financial support at exit came from. Those who relied primarily on personal earnings were more likely to receive SE than their peers who relied on parents or family, public support, or other. Consumers living in a private residence were more likely to be enrolled in an SE program than those living in group homes or other institutions, suggesting that living arrangements are predictors of employment and having a private home or apartment is conducive to either accessing the services or helps support the process. If a consumer received Medicaid at the time of VR exit, they were more likely to receive SE. Medicaid can be used to pay for vocational assistance, so the link may be similar to that of SSDI.

Findings from the unmatched sample in the logistic regression for CIE outcome reflect findings from previous studies. Receiving SE was a highly significant, positive predictor of CIE (Kaya et al., 2018; Wehman et al., 2014). Once again, female consumers had lower odds of CIE

than their male peers (Kaya et al., 2018; Nord & Hepperlen, 2016). Surprisingly, Hispanic or Latino consumers were less likely to receive SE, but more likely to have a CIE outcome. Education was once again an important predictor, with those consumers who had not completed high school as less likely to be in CIE, and those who were enrolled in postsecondary education as more likely to be in CIE (Eilenburg et al. 2019; Grigal et al., 2011; Kaya et al., 2018; Nord & Hepperlen, 2016; Wehman et al., 2014).

Another surprising finding was that individuals who perceived themselves as having cultural barriers to employment were more likely to be in CIE at exit than those who did not perceive barriers. That could reflect the importance of learning experiences through their time with VR and employment services, though it is unclear from this data. Other barrier and financial indicators were predictors of whether a consumer had a CIE outcome. Consumers who had a status of ex-offender, those who were close to exhausting TANF benefits, and those who were experiencing homelessness were all less likely to be employed. Those are indicators for financial challenges, and it does not appear that SE mitigates their effects, at least in the unmatched sample. Similarly, to receiving SE, SSDI recipients had greater odds likely of having a successful employment outcome, though the nature of the relationship is complicated with eligibility requirements.

One of the strongest predictors of CIE in the logistic regression model was where the consumers' primary financial support comes from at both application and at exit. If the consumer was relying on personal earnings at the time of application as their primary form of financial support, they were more likely to be in CIE at exit. However, if the consumer was not relying on personal earnings at the time of exit, they were much less likely to have an outcome of CIE. This could be an indicator of familial expectations changing throughout the VR process, but more

research should be done to investigate this relationship. Consumers who lived in a private residence were more likely to have a CIE outcome, while those who received Medicaid at application were less likely to be in CIE at exit. This shows the complicated nature of benefits, finances, and employment for jobseekers with disabilities. Finally, another important predictor of CIE was whether the consumer was employed at the time of the initial IPE. This is the one measure I could use to act as previous work experience. Those who were employed at IPE were more likely to be exit VR in CIE. This suggests that early work experience, such as having a job in high school, predicts future success.

It is important to emphasize that SE worked to overcome barriers to employment that low-income transition-age youth with IDD face. Seventy-five percent of consumers who received SE were employed in CIE at VR case closure, compared to only 34% of those who had not received SE. When the sample was matched, individuals who received SE had 46% greater odds of CIE than consumers who did not have SE. It is crucial that SE receive more prominence and funding.

Limitations

All research has limitations, and this study is no different. Secondary data analysis involves no control over the measures, how they are asked, or the participants who are asked to be involved. In this case, the RSA-911 is administrative data. Although RSA provides strict reporting guidelines and definition of each measure, the fidelity of the services provided is unknown. How one agency provides supported employment services may differ from another, although they should follow the same guidelines provided by the Rehabilitation Act of 1973 or WIOA, and there is no measure to check fidelity between services. Another weakness is that the RSA-911 does not report a long-term view of employment. A case is marked successful and

closed after the employment outcome is maintained for 90 days. More research should be done on the longevity of CIE outcomes after receiving SE services.

Another limitation to this research is the lack of location or neighborhood variables. Individual who are low-income often live in neighborhoods that are also low-income, causing risks of high crime, poor schools, and limited social networks (Lustig & Strauser, 2007). School systems in high-poverty areas spend less per pupil than more affluent school districts, and access to or financial costs of health care makes medical care complicated for this population (Lustig & Strauser, 2007). Future research should use analyses such as multilevel modeling and more PSM to explore the location aspect of age, poverty, disability, VR and transition services, and employment outcomes. Additionally, more information should be added on characteristics of the parent or legal guardian of the transition-age youth with IDD. Young adults with IDD are still very ingrained in their family and may not have income of their own. Previous studies suggest that parental expectations play a major role in CIE outcomes, and measures about the family educational attainment, financial makeup, and expectations could be beneficial to providing a better picture of how low-income youth with IDD transition to employment after high school.

Implications

Implications for Research

This study used an *ex post facto* quasi-experimental design, not a true experimental design. However, because of the ethical considerations with providing state-federal funded services to individuals with disabilities, a randomized controlled trial in the VR-setting is not feasible. Creating matched treatment and control groups after the fact provides an ethical way to test whether services provided have better outcomes. Using PSM to test VR-provided services is an effective way to see if an intervention may suit a particular group, and future research should

more PSM in VR data to test the effectiveness of other services and other subsets of the population of people with disabilities.

This research expanded the literature on SE and CIE for transition-age youth. This project began as an update to Wehman et al. (2014) PSM study on VR-funded SE services for transition-age youth with IDD and focused on a much-needed subset of that group – those who were considered low-income. Knowing the link between poverty and disability makes it even more important to find what helps individuals with disabilities find and maintain employment. Providing more evidence-based practices, especially ones that are currently provided, for policymakers and practitioners should be at the forefront of disability employment research.

Implications for Policy and Practice

This study is unique in its emphasis on a specific population of transition-age youth with IDD from low-income backgrounds. SE was found to be a positive intervention for low-income transition-age youth with IDD. Those who received SE were more likely to engage in CIE. Early work experiences are vital for transition-age youth with IDD from low-income backgrounds, as this provides learning experiences, social connections, and increased self-efficacy in employment. This study provides additional evidence that SE can help low-income transition-age youth with IDD obtain and maintain CIE better than without it. VR agencies and counselors should prioritize SE if available, and policymakers should fund more SE initiatives. More attention should be focused on individuals with other group statuses such as female or Hispanic/Latino to ensure that they have the same access to SE services as their peers. SE can help those of all backgrounds work in CIE.

Conclusions

CIE comes with major financial, social, and health benefits, and early work experiences lead to better employment outcomes later in life. Transition-age youth with IDD from low-income backgrounds deserve a chance to thrive after they leave the supports of their school system and be employed in real jobs. Early collaborations between families, schools, and vocational rehabilitation are critical to better prepare youth with disabilities for employment. Providing SE is a crucial way to assist youth with disabilities into CIE. These services help consumers alleviate some of the barriers and challenges that being young, low-income, and with a disability can bring. CIE should be the first choice for all youth, including those with disabilities, as they prepare for a life postschool, and SE can make it happen.

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Appendix A

Stata Code

```
*Pull Data
*Set Scheme for Graphs
set scheme s1mono, permanently
*Narrow Down Sample
**Primary Disability
tab primdisability
clonevar idd = primdisability
destring idd, replace
label variable idd "Primary Disability"
label define idd1 17 "cognitive impairment"
label value idd idd1
drop if idd > 17
drop if idd < 17
tab idd

**Transition-age youth
summarize age_app
clonevar tay = age_app
drop if tay > 24
drop if tay < 14
label variable tay "TAY at Application"
tab tay
hist tay, frequency discrete title("Total Sample by Age at VR Application",
span size(large)) ///
note("N = 30,010" "Data Source: RSA-911 PY2019", size(vsmall))


**Low-Income Status
tab lowincomestatus
clonevar lowses = lowincomestatus
destring lowses, replace
label variable lowses "Low Income"
label define lowses1 1 "Low income" 0 "Not Low Income"
label value lowses lowses1
keep if lowses == 1
tab lowses
tab lowses idd

*Treatment
**Receive SE services
***By Staff
tab sesvragencystaff
clonevar sevr = sesvragencystaff
destring sevr, replace
replace sevr = 0 if sevr == .
label variable sevr "VR Provided SE"
label define sevr1 1 "VR Provided SE" 0 "No SE"
label value sevr sevr1
tab sevr
***Outsourced
tab sesvragencypurchase
```

```
clonevar sepurchase = sesvragencypurchase
destring sepurchase, replace
replace sepurchase = 0 if sepurchase == .
label variable sepurchase "Purchased SE"
label define sepurchase1 1 "Purchased SE" 0 "No SE"
label value sepurchase sepurchase1
tab sepurchase
***Comp Service Providers
tab sescompserviceprovider
clonevar secomppurchase = sescompserviceprovider
destring secomppurchase, replace
replace secomppurchase = 0 if secomppurchase == .
label variable secomppurchase "Purchased SE from Comp Serv Provider"
label define secomppurchase1 1 "Purchased SE" 0 "No SE"
label value secomppurchase secomppurchase1
tab secomppurchase
**Combine services into one variable
generate yesse = sevr + sepurchase + secomppurchase
tab yesse
label variable yesse "Received SE"
recode yesse (0 = 0) (1 2 3 = 1)
label define yesse1 1 "SE" 0 "No SE"
label value yesse yesse1
tab yesse
tab yesse, summarize(tay)

*Outcome Variable, employment
tab exitempoutcome
clonevar cie = exitempoutcome
destring cie, replace
replace cie = 0 if cie == .
label variable cie "CIE at Exit"
recode cie (1 5 6= 1) (2 3 4 = 0)
label define ciel 1 "CIE" 0 "No CIE"
label value cie ciel
tab cie
tab cie yesse, chi2

*DEMOGRAPHIC COVARIATES
**Sex
sort sex
tab sex
recode sex (0=.) (1=1) (2=2) (9=.)
label variable sex "Sex"
label define sexl 1 "Male" 2 "Female"
label value sex sexl
tab sex

graph hbar (count), over(sex) ascategory ytitle("Frequency", size(small)) ///
legend(off) title("Total Sample by Sex", span size(large)) blabel(value,
format(%9.3gsize) size(vsmall)) ///
note("N = 30,010" "Data Source: RSA-911 PY2019", size(vsmall))

**Race and Ethnicity
clonevar amindian = amerindian
recode amindian (9=.)
```

```
label variable amindian "American Indian"
label define amindianl 0 "Not Am Indian" 1 "Am Indian"
label value amindian amindianl
tab amindian

tab asian
recode asian (9=.)
label variable asian "Asian"
label define asianl 0 "Not Asian" 1 "Asian"
label value asian asianl
tab asian

tab black
recode black (9=.)
label variable black "Black or African American"
label define blackl 0 "Not Black" 1 "Black"
label value black blackl
tab black

tab hawaiian
recode hawaiian (9=.)
label variable hawaiian "Hawaiian or Other Pacific Islander"
label define hawaiianl 0 "Not Hawaiian" 1 "Hawaiian"
label value hawaiian hawaiianl
tab hawaiian

tab white
recode white (9=.)
label variable white "White"
label define whitel 0 "Not White" 1 "White"
label value white whitel
tab white

**Ethnicity
tab hispanic
recode hispanic (9=.)
label variable hispanic "Hispanic or Latino"
label define hispanicl 0 "Not Hispanic" 1 "Hispanic"
label value hispanic hispanicl
tab hispanic

*Race and Ethnicity Pie Graph
graph hbar white black amindian asian hawaiian hispanic, ascategory
ytitle("Percent", size(small)) ///
legend(off) title("Total Sample by Race", span size(large)) blabel(value,
format(%9.3gsize) size(vsmall)) ///
note("N = 27,760" "Data Source: RSA-911 PY2019", size(vsmall))



**Educational Level
tab edlevelcompleted
destring edlevelcompleted, replace
recode edlevelcompleted (1 2 3 = 1) (4 5 = 2) (6 7 8=3) (9=4), generate
(edlevel)
label variable edlevel "Highest Education Level Completed"
```

```
label define edlevell 1 "Completed HS" 2 "Some Postsecondary" 3
"Postsecondary Degree" 4 "No HS Completed"
label value edlevel edlevell
tab edlevel

*Enrolled in PSE
tab enrolledinpostseced
destring enrolledinpostseced, generate (pse)
recode pse (0 .= 0) (1=1)
label variable pse "Enrolled in PSE"
label define psel 1 "PSE" 0 "Not in PSE"
label value pse psel
tab pse

**Disability significance
tab disabilitysigcode
destring disabilitysigcode, generate (dissig)
label variable dissig "dissigicance of Disability"
label define dissigl 1 "Sig. Disabil." 2 "Most Sig." 0 "No Sig. Disabil."
label value dissig dissigl
tab dissig
tab dissig yesse, column row

*SE as Goal on Most Recent IPE
tab ipesupportedempgoal
destring ipesupportedempgoal, generate (ipesegoal)
recode ipesegoal (.=0)
label variable ipesegoal "SE as Goal on IPE"
label define ipesegoall 1 "SE Goal" 0 "No SE Goal"
labe value ipesegoal ipesegoall
tab ipesegoal

*Barriers by RSA
**Basic Skills Deficient
tab basicskillsdeficient
destring basicskillsdeficient, generate (skilldef)
label variable skilldef "Basic Skills Deficient, Low Levels Literacy"
label define skilldefl 1 "Basic Skills Def." 0 "Not Basic Skills Def."
label value skilldef skilldefl
tab skilldef
tab skilldef yesse, column row
**Cultural Barriers
tab culturalbarriers
destring culturalbarriers, generate (culture)
recode culture (0 9 = 0) (1 = 1)
label variable culture "Cultural Barriers"
label define culturel 1 "Cultural Barriers" 0 "Cultural Barriers"
label value culture culturel
tab culture
tab culture yesse, column row
**English Language Learner
tab englishlearner
destring englishlearner, generate (ell)
label variable ell "English Language Learner"
label define elll 1 "ELL" 0 "Not ELL"
label value ell elll
```

```
tab ell
tab ell yesse, column row
***Single Parent Status
tab singleparent
destring singleparent, generate (singpar)
recode singpar (9 = .)
label variable singpar "Individual is Single Parent"
label define singparl 1 "Single Parent" 0 "Not Single Parent"
label value singpar singparl
tab singpar
*Exoffender Status
tab exoffenderstatus
destring exoffenderstatus, generate (exoff)
recode exoff (9=.)
label variable exoff "Ex-Offender Status"
label define exoffl 1  "Ex-Offender" 0 "Not Ex-Offender"
label value exoff exoffl
tab exoff
*Longterm Unemployment Status
clonevar ltunemp = longtermunemp
destring ltunemp, replace
label variable ltunemp "Longterm Unemployment"
label define ltunempl 1  "Yes Unemployed Longterm" 0 "Not Unemployed
Longterm"
label value ltunemp ltunempl
tab ltunemp
*Exhausting TANF Within 2 Years
clonevar tanf = exhausttanf
destring tanf, replace
recode tanf (9=0)
label variable tanf "Exhausting TANF Within Two Years"
label define tanfl 1 "Exhausting TANF" 0 "Not Exhausting TANF"
label value tanf tanfl
tab tanf
*Fostercare Youth
clonevar foster = fostercareyouth
destring foster, replace
recode foster (.=0)
label variable foster "Foster Care Youth"
label define fosterl 1 "Foster Care Youth" 0 "Not Foster Care Youth"
label value foster fosterl
tab foster
*Experiencing Homelessness
clonevar homeless =  homelessorrunaway
destring homeless, replace
label variable homeless "Experiencing Homelessness"
label define homelessl 1 "Homelessness" 0 "Homelessness"
label value homeless homelessl
tab homeless

*Financial Supports
***Receive SSDI at App
tab appssdi
clonevar ssdiapp = appssdi
label variable ssdiapp "SSDI at App"
label define ssdiappl 0 "SSDI" 1 "No SSDI"
```

```
label value ssdiapp ssdiappl
tab ssdiapp

**Primary Source of Monetary Support at Application
tab appprimsupportcode
clonevar supportapp = appprimsupportcode
label variable supportapp "Primary Money Support at App"
label define supportappl 1 "Personal at App" 2 "Parents/Family" 3 "Public" 4
"Other"
label value supportapp supportappl
tab supportapp

*Primary Support at Exit
tab exitprimsupportcode
destring exitprimsupportcode, generate (supportexit)
label variable supportexit "Primary Money Support at Exit"
label define supportexitl 1 "Personal" 2 "Parents/Family" 3 "Public" 4
"Other"
label value supportexit supportexitl
tab supportexit

*Living Arrangements
tab livingarangementcd
recode livingarangementcd (1 = 1) (2/10 = 0), generate (living)
tab living
label variable living "Living Arrangement"
label define livingl 1 "Private Residence" 0 "Not Private Residence"
label value living livingl
tab living

*Employment Status at IPE
tab ipeempstatus
destring ipeempstatus, generate (jobatipe)
recode jobatipe (1/6 = 1) (7/10 = 0)
tab jobatipe
label variable jobatipe "Employment Status at IPE"
label define jobatipe1 1 "Employed at IPE" 0 "Unemployed at IPE"
label value jobatipe jobatipe1
tab jobatipe

*Medicaid at Application
tab appmedicaid
label variable appmedicaid "Received Medicaid at App"
label define appmedicaidl 1 "Medicaid at App" 0 "Not Receive Medicaid at App"
label value appmedicaid appmedicaidl
tab appmedicaid

*Medicaid at Application
tab exitmedicaid
destring exitmedicaid, replace
label variable exitmedicaid "Received Medicaid at App"
label define exitmedicaid1 1 "Medicaid at Exit" 0 "Not Receive Medicaid at
Exit"
label value exitmedicaid exitmedicaid1
tab exitmedicaid
```

```
**Age at exit
destring age_exit, replace
gen exitage = age_exit
label variable exitage "Age at VR Exit"
summarize exitage
hist exitage, frequency discrete title("Total Sample by Age at VR Case
Closure", span size(large)) ///
note("N = 30,010" "Data Source: RSA-911 PY2019", size(vsmall))


*Descriptives for RQ1
*Age summary
summarize tay
summarize exitage
**Age at app if receive yesse for mean
gen tayse = tay if yesse==1
summarize tayse, detail
tab tayse
**Age at app if no receive yesse for mean
gen taynose = tay if yesse==0
summarize taynose, detail
tab taynose
**Age at exit if receive yesse for mean
gen exitagese = exitage if yesse==1
summarize exitagese, detail
**Age at exit if no receive yesse for mean
gen exitagenose = exitage if yesse==0
summarize exitagenose, detail

tab tayse
*Descriptive Graphs for Yesse Model
graph bar (count) tayse taynose, over(tay) ytitle("Frequency", size(small))
///
title("Age at Application by Receipt of SE", span size(large)) blabel(value,
format(%9.3gsize) size(vsmall)) ///
note("N = 30,010" "Data Source: RSA-911 PY2019", size(vsmall)) legend(label(1
"Received SE") label(2 "Did Not Receive SE"))

graph bar (count) exitagese exitagenose, over(exitage) ytitle("Frequency",
size(small)) ///
title("Age at Exit by Receipt of SE", span size(large)) blabel(value,
format(%9.3gsize) size(vsmall)) ///
note("N = 30,010" "Data Source: RSA-911 PY2019", size(vsmall)) legend(label(1
"Received SE") label(2 "Did Not Receive SE"))

*Frequencies
tab sex yesse, column row
tab amindian yesse, column row
tab white yesse, column row
tab black yesse, column row
tab hispanic yesse, column row
tab hawaiian yesse, column row
tab asian yesse, column row
tab edlevel yesse, column row
tab dissig yesse, column row
tab skilldef yesse, column row
```

```
tab culture yesse, column row
tab ell yesse, column row
tab ssdiapp yesse, column row
tab supportapp yesse, column row
tab supportexit yesse, column row
tab singpar yesse, column row
tab exoff yesse, column row
tab pse yesse, column row
tab living yesse, column row
tab jobatipe yesse, column row
tab appmedicaid yesse, column row
tab exitmedicaid yesse, column row
tab ltunemp yesse, column row
tab tanf yesse, column row
tab foster yesse, column row
tab homeless yesse, column row
tab ipesegoal yesse, column row


**Descriptives for RQ2
tab sex cie, column row
tab amindian cie, column row
tab white cie, column row
tab black cie, column row
tab hispanic cie, column row
tab hawaiian cie, column row
tab asian cie, column row
tab edlevel cie, column row
tab dissig cie, column row
tab skilldef cie, column row
tab culture cie, column row
tab ell cie, column row
tab ssdiapp cie, column row
tab supportapp cie, column row
tab supportexit cie, column row
tab singpar cie, column row
tab exoff cie, column row
tab pse cie, column row
tab living cie, column row
tab jobatipe cie, column row
tab appmedicaid cie, column row
tab exitmedicaid cie, column row
tab ltunemp cie, column row
tab tanf cie, column row
tab foster cie, column row
tab homeless cie, column row
tab ipesegoal cie, column row

*Graphs for RQ1 Descriptives



*Logits for RQ1, yesse as outcome
logit yesse tay exitage i.sex i.white i.black i.amindian i.asian i.hawaiian
i.hispanic ///
```

```
i.edlevel i.pse i.dissig i.ipesegoal i.skilldef i.culture i.ell i.singpar
i.exoff i.ltunemp i.tanf ///
i.foster i.homeless i.ssdiapp i.supportapp i.supportexit i.living i.jobatipe
i.appmedicaid i.exitmedicaid, or
est store logitse
estat gof
estat gof, g(10) table
estat classification

*Graph Coding for All Results SE Logit Model
coefplot, eform drop(_cons) xline(1, lwidth(medium)) xtitle("Odds
Ratio",size(small)) ///
xlabel(0.25 0.50 0.75 1.0 1.5 2.0 3.0 4.0 5.0 10 20 30) xscale(log)
xlabel(,labsize(small)) ///
title("Odds Ratios for Receiving Supported Employment", span size(large))
ytitle("Predictor Variable",size(small)) ///
ylabel(,labsize(vsmall)) levels(99 95) msym(s) mfcolor(white) legend(order(1
"99% CI" 2 "95% CI")) ///
ciopts(lwidth(*1 *5)) note("N = 24,546" "Data Source: RSA-911 PY2019",
size(vsmall))
*Graph Coding for Statistically dissigicant Results SE Logit Model
coefplot, eform drop(_cons) keep(tay *.sex *.hispanic 4.edlevel *.pse
*.ipesegoal ///
2.dissig *.skilldef *.culture *.singpar *.ssdiapp *.supportexit *.living
*.exitmedicaid) xline(1, lwidth(medium)) ///
xtitle("Odds Ratio",size(small)) xlabel(0.25 0.50 0.75 1.0 1.5 2.0 3.0 4.0
5.0 10 20 30) xscale(log) ///
xlabel(,labsize(small)) title("Stat. Sig. Odds Ratios for Receiving SE
Services", span size(large)) ///
ytitle("Predictor Variable",size(small)) ylabel(,labsize(small)) levels(99
95) msym(s) mfcolor(white) ///
legend(order(1 "99% CI" 2 "95% CI")) ciopts(lwidth(*1 *5)) note("N = 24,546"
"Data Source: RSA-911 PY2019", size(vsmall))

*Descriptives for CIE Outcome
**Age at app if CIE outcome for mean
gen taycie = tay if cie==1
summarize taycie, detail
tab taycie
**Age at app if no CIE outcome for mean
gen taynocie = tay if cie==0
summarize taynocie, detail
tab taynocie
**Age at exit if receive Yes CIE for mean
gen exitagecie = exitage if cie==1
summarize exitagecie, detail
**Age at exit if no  CIE for mean
gen exitagenocie = exitage if cie==0
summarize exitagenocie, detail

graph bar (count) taycie taynocie, over(tay) ytitle("Frequency", size(small))
///
title("Age at Application by CIE Outcome", span size(large)) blabel(value,
format(%9.3gsize) size(vsmall)) ///
note("N = 30,010" "Data Source: RSA-911 PY2019", size(vsmall)) legend(label(1
"CIE Outcome") label(2 "No CIE Outcome"))
```

```
graph bar (count) exitagecie exitagenocie, over(exitage) ytitle("Frequency",
size(small)) ///
title("Age at Exit by CIE Outcome", span size(large)) blabel(value,
format(%9.3gsize) size(vsmall)) ///
note("N = 30,010" "Data Source: RSA-911 PY2019", size(vsmall)) legend(label(1
"CIE Outcome") label(2 "No CIE Outcome"))

**Regressions with CIE as outcome
logit cie i.yesse tay exitage i.sex i.white i.black i.amindian i.asian
i.hawaiian i.hispanic ///
i.edlevel i.pse i.dissig i.ipesegoal i.skilldef i.culture i.ell i.singpar
i.exoff i.ltunemp i.tanf ///
i.foster i.homeless i.ssdiapp i.supportapp i.supportexit i.living i.jobatipe
i.appmedicaid i.exitmedicaid, or
est store logitcie
estat gof
estat gof, g(10) table
estat classification

*Graph Coding for All Results CIE Logit Model
coefplot, eform drop(_cons) xline(1, lwidth(medium)) xtitle("Odds
Ratio",size(small)) ///
xlabel(0.025 0.05 0.25 0.50 0.75 1 1.5 2.0 3.0 4 5 8 10) xscale(log)
xlabel(,labsize(small)) ///
title("Odds Ratios for CIE Outcome", span size(large)) ytitle("Predictor
Variable",size(small)) ///
ylabel(,labsize(vsmall)) levels(99 95) msym(s) mfcolor(white) legend(order(1
"99% CI" 2 "95% CI")) ///
ciopts(lwidth(*1 *5)) note("N = 24,546" "Data Source: RSA-911 PY2019",
size(vsmall))
*Graph Coding for Statistically dissigicant Results CIE Logit Model
coefplot, eform drop(_cons) keep(*.yesse tay *.sex *.hispanic ///
4.edlevel *.pse *.ipesegoal *.culture *.exoff *.tanf *.homeless *.ssdiapp
*.supportapp *.supportexit *.living *.appmedicaid) ///
xline(1, lwidth(medium)) xtitle("Odds Ratio",size(small)) xlabel(0.025 0.05
0.25 0.50 0.75 1 1.5 2.0 3.0 4 5 8 10) ///
xscale(log) xlabel(,labsize(small)) title("Stat. Sig. Odds Ratios for CIE
Outcome", span size(large)) ///
ytitle("Predictor Variable",size(small)) ylabel(,labsize(small)) levels(99
95) msym(s) mfcolor(white) ///
legend(order(1 "99% CI" 2 "95% CI")) ciopts(lwidth(*1 *5))note("N = 24,546"
"Data Source: RSA-911 PY2019", size(vsmall))

*Outcome Variables
destring exithourlywage, replace
summarize exithourlywage, detail
sort yesse
sort cie
bysort yesse: egen wagese = mean(exithourlywage)
sum wagese

gen cieandse1 = cie + yesse
recode cieandse1 (2 = 1) (0 1 . = 0)
tab cieandse1
```

```
graph bar (mean) wagese, over(yesse) ascategory ytitle("Mean in Dollars",
size(small)) ///
title("Mean Wage by Receipt of SE", span size(large)) ///
note("N = 30,010" "Data Source: RSA-911 PY2019", size(vsmall))

graph bar (mean) wagese, over(cie) over(yesse) ascategory ytitle("Mean in
Dollars", size(small)) ///
title("Mean Wage by CIE", span size(large)) ///
note("N = 30,010" "Data Source: RSA-911 PY2019", size(vsmall))



by cie: summarize exithourlywage, detail

*Descriptives Graphs for SE and CIE
graph hbar (count), over(yesse) asyvars over(cie, descending) ///
title("CIE Outcomes by Whether the Consumer Received SE", span size(large))
ytitle("Frequency",size(small)) ///
note("N = 24,546" "Data Source: RSA-911 PY2019", size(vsmall)) blabel(bar,
format(%15.0fc))

graph hbar (percent), over(yesse) asyvars over(cie, descending) yscale(r(0
100)) ylabel(10(10)100) ///
title("CIE Outcomes by Whether the Consumer Received SE", span size(large))
ytitle("Percent",size(small)) ///
note("N = 24,546" "Data Source: RSA-911 PY2019", size(vsmall)) blabel(bar,
format(%-9.3g))


**Propensity Score Matching
*cie as outcome
teffects psmatch (cie) (yesse tay exitage amindian black hispanic sex ssdiapp
asian hawaiian ///
white supportapp supportexit edlevel pse dissig singpar skilldef culture ell
living jobatipe appmedicaid ///
exitmedicaid exoff ltunemp tanf foster homeless ipesegoal), nn(1)
est store psm1
teffects psmatch (cie) (yesse tay exitage amindian black hispanic sex ssdiapp
asian hawaiian ///
white supportapp supportexit edlevel pse dissig singpar skilldef culture ell
living jobatipe appmedicaid ///
exitmedicaid exoff ltunemp tanf foster homeless ipesegoal), nn(2)
est store psm2
teffects psmatch (cie) (yesse tay exitage amindian black hispanic sex ssdiapp
asian hawaiian ///
white supportapp supportexit edlevel pse dissig singpar skilldef culture ell
living jobatipe appmedicaid ///
exitmedicaid exoff ltunemp tanf foster homeless ipesegoal), nn(3)
est store psm3
```