

VOCATIONAL REHABILITATION: PREDICTING EMPLOYMENT OUTCOMES
FOR YOUNG ADULTS WITH DISABILITIES

by

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DISSERTATION ABSTRACT

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Title: Vocational Rehabilitation: Predicting Employment Outcomes for Young Adults with Disabilities

Working within the National Longitudinal Transition Study (NLTS) theoretical framework, the purpose of this study was to explore the effects of individual characteristics, in-school experiences, post-school experiences, and contextual factors on Vocational Rehabilitation (VR) closure status among 4,443 young adults with disabilities who had received and completed services from Oregon VR between 2003 and 2013. This study analyzed extant data from the Oregon Rehabilitation Case Automation System (ORCA), an integrated case management database that collects and tracks demographic characteristics, service records and employment data on each individual who receives services from VR. Four logistic regression models were developed using Hosmer, Lemeshow & Studivant's model building approach to test the effects of individual characteristics, in-school experiences, post-school experiences, and contextual factors on VR closure status. Seven risk factors were identified that decrease the probability of young adults with disabilities achieving a positive VR closure status: (1) being female; (2) having a primary disability of mental illness; (3) having a primary disability of traumatic brain injury; (4) having an interpersonal impediment to employment; (5) receiving Social Security Income at application; (6) closing VR services during federal

fiscal year (FFY) 2008; and (7) closing VR services during FFY 2009. Five protective factors were identified that increase the probability of young adults with disabilities achieving a positive VR closure status: (1) participation in the Oregon Youth Transition Program; (2) earning at least a high school completion certificate by closure; (3) receiving a higher number of VR services; (4) closing VR services on or below the median number of days to closure; and (5) closing VR services during FFY 2004. These findings support the hypothesis that individual characteristics, in-school experiences, post-school experiences, and contextual factors are predictors of positive VR closure status among young adults with disabilities. Further, these results provide evidence that transition services and supports provided to young adults with disabilities receiving services from VR can help them to achieve positive VR closure status.

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CHAPTER I

INTRODUCTION AND STATEMENT OF PROBLEM

Employment is a critical component of identity and perceived success in society. According to Borjas (2010), most people interact with the world of work at some point in their lives as employment creates opportunities for both economic and social mobility. Access to employment is a particularly important issue for individuals with disabilities who have historically experienced significant barriers to employment and high rates of underemployment (Sharf, 2010). This first chapter will provide: (a) a brief rationale for investigating employment outcomes for young adults with disabilities, (b) an overview of the conceptual model and theoretical framework for this study (c) my methods for a systemic review of the literature, and (d) a summary of findings from this literature review.

Individuals with disabilities are among the least represented demographic in the labor force (U.S. Department of Labor, 2013). The Bureau of Labor Statistics reported that the 2012 labor force participation rate for people with a disability was 17.8% compared to 63.6% for people without a disability. Furthermore, young adults with disabilities aged 16 to 19 are an exceptionally disadvantaged group when it comes to employment outcomes and experience an unemployment rate of 42%, which is nearly double that of 26% experienced by their same age peers without a disability (U.S. Department of Labor, 2013). According to the U.S. Department of Labor (2013), the largest unemployment discrepancy between individuals with and without disabilities exists for young adults aged 16 to 19. Therefore, persistent disparities in employment outcomes for young adults with disabilities have reinforced the need for special educators

to better understand and address barriers that prevent successful transitions for adolescents with disabilities (Madaus, Dukes, & Carter, 2013).

Research has shown that early career-related experiences are key factors in students' with disabilities achieving positive post-secondary outcomes such as employment and postsecondary education (Rabren, Dunn & Chambers, 2002). By actively engaging youth with disabilities in career development activities, we can increase access to employment opportunities, decrease barriers, and lay the foundation for a future of employment for young adults with disabilities.

Vocational Rehabilitation (VR) is one example of a federal program that is dedicated to increasing employment outcomes for individuals with disabilities. VR—historically an agency that has been challenged by working with individuals while they are still receiving public education—has made an effort to partner with state education departments to focus on providing services and supports to adolescents with disabilities while they are still in school (Stapleton, Honeycutt, & Schechter, 2010). Since 1990, the number of VR clients who are transition age increased by more than 10%; from 17.0% in 1990 to 27.8% of all VR consumers in 2005 (National Council on Disability, 2008). State VR agencies play an important role in facilitating employment outcomes for individuals with disabilities and are the largest providers of vocational services to individuals with disabilities in the United States (Stapleton et al., 2010).

Although VR has the capacity and interest in providing services to increase access to employment for young adults with disabilities, very little research has been done to investigate the impact of these services and supports on the employment outcomes of

young adults with disabilities while accounting for individual, family and other environmental characteristics.

The purpose of this dissertation was to explore predictors of employment for young adults with disabilities receiving services from VR. I was able to access an existing data set in order to analyze outcomes for all eligible youth with disabilities who received services from Oregon VR between 2003 and 2013. I used logistic regression to explore a prediction model explaining how individual characteristics, secondary and post-secondary experiences, and contextual factors contribute to a successful VR closure.

Rationale and Literature Review

The theoretical framework that I used to conceptualize this study was developed in the mid 1980's for the National Longitudinal Transition Study of Special Education Students (NLTS; (Fairweather, Stearns, Wagner, Backman & Madow, 1984, 1984, Wagner et al., 1991). The NLTS theoretical framework was chosen based upon a thorough review of multiple theoretical frameworks that help to explain employment outcomes among young adults with disabilities. The NLTS theoretical framework was chosen because it provides a broad picture of factors that influence employment outcomes for young adults with disabilities. This framework has served as my guide for selecting variables that might be related to employment outcomes for young adults with disabilities, to formulate research questions, and to test hypothesized relationships between dependent and independent variables.

NLTS Conceptual Framework

The National Longitudinal Transition Studies of Special Education Students (NLTS, 1985-1994, & NLTS-2, 2001-2011) were congressionally mandated studies

funded by the Office of Special Education Programs of the U.S. Department of Education to provide national information about youth with disabilities as they move through high school and beyond. The framework that was used to specify variables for these studies was developed during the design phase of NLTS (see figure 1.1). The NLTS theoretical framework was developed in an effort to present the broadest possible picture of factors that influence the transition process for young adults with disabilities in the United States. (Fairweather et al., 1984; Wagner,1991).

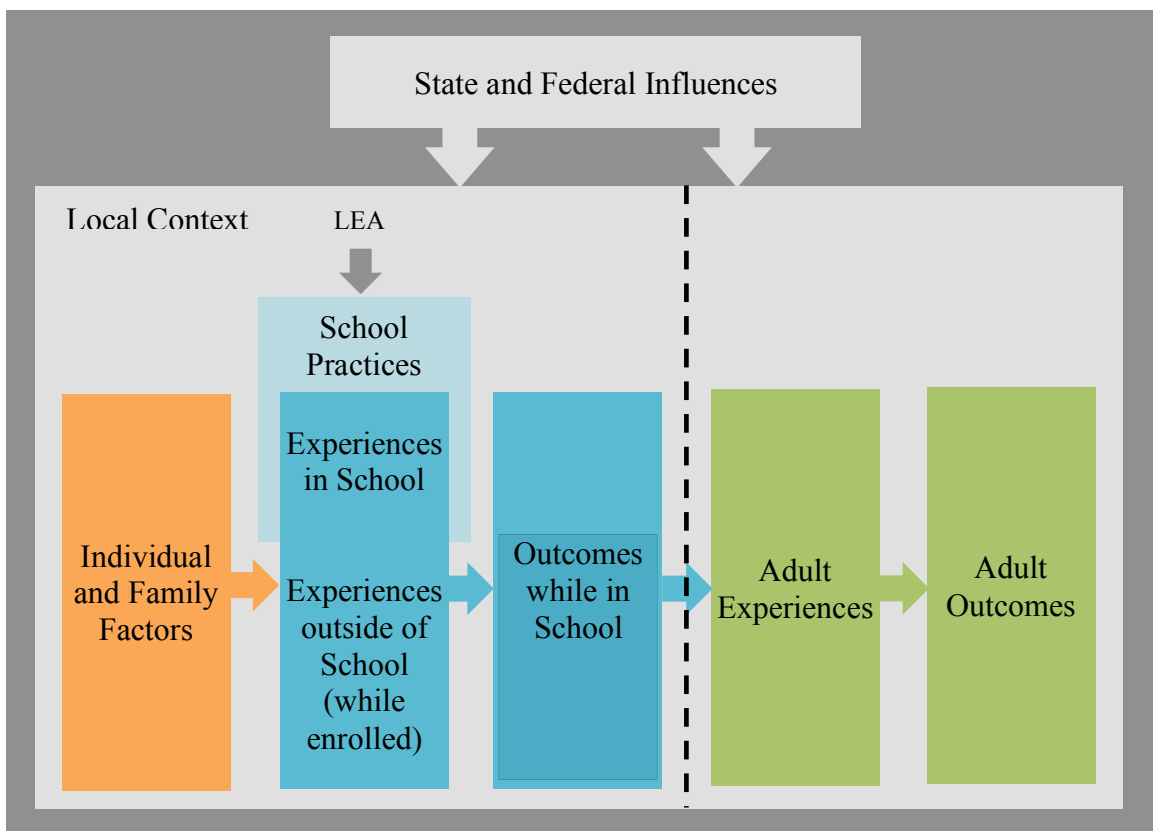


Figure 1.1. NLTS Conceptual Framework (Fairweather, et al., 1984).

Major components of the NLTS conceptual framework. The NLTS theoretical framework includes four major components: (1) individual and family characteristics, (2) experiences while enrolled in high school and related outcomes, (3) post-school experiences and related outcomes, and (4) contextual factors (i.e., school practices, Local Education Area [LEA], local context, and state and federal influences). The NLTS conceptual framework includes a focus on services and experiences that are provided to young adults with disabilities as a part of their special education programs during high school as well as other experiences during that time frame. However, the NLTS theoretical framework also acknowledges that career development takes place across the lifespan and takes into consideration post-school experiences that may play a role in determining subsequent outcomes. The dotted line in Figure 1.1 represents the time that a student leaves high school. (Fairweather et al., 1984). The three major components and contextual factors are described below.

Individual and family characteristics. The first major component of the NLTS theoretical framework includes the following individual and family characteristics: socio-economic status, family composition, parent/family/young adult future expectations, individual demographics (i.e., gender, disability), and psychological factors. These factors are critical for understanding how variations in individual and family characteristics influence post school outcomes.

Experiences while enrolled in school and related outcomes. The second major component of the NLTS theoretical framework includes experiences while enrolled in school and related outcomes. Experiences while enrolled in school include: school-based experiences (i.e., career development activities, transition classes, etc.), extracurricular

experiences, and school policies or practices. In-school related outcomes include: educational (academic knowledge, grades, high school completion, etc.), employment and independence (transportation, financial). These variables are included in the NLTS theoretical framework because in-school experiences are important predictors of both in-school and post-school transition outcomes. (Fairweather et al., 1984; Wagner et al., 1991).

Experiences after leaving high school and related outcomes. The third major component of the NLTS theoretical framework includes post-school experiences and related outcomes. Post-school experiences include: academic, vocational, socialization, leisure activities, and related services. Post-school outcomes include: education, employment and independence (residential, financial, transportation). These experiences and related outcomes are included in the NLTS framework since experiences after leaving high school are important predictors of post-school outcomes. (Fairweather et al., 1984).

Contextual Factors. The fourth major component of the NLTS theoretical framework includes the local contexts and state and federal influences that impact the in-school and post-school experiences and related outcomes of youth. The contextual factors accounted for in the NLTS framework include: recreational facilities, types/availability of housing, geographic characteristics or community types, local education agency (LEA) policies and program, service agencies/programs, types/availability of employment, and welfare/other financial support systems (Fairweather et al., 1984).

Summary of the NLTS theoretical framework. In summary, the four major components of the NLTS theoretical framework include individual and family

characteristics, in-school experiences and related outcomes, post-school experiences and related outcomes, and contextual factors. This theoretical framework has guided all parts of this study, including the findings from a systematic review of the literature described in Chapter II.

CHAPTER II

LITERATURE REVIEW

The NLTS theoretical framework was used to guide a systematic review of the literature. The systematic literature review followed six steps that are outlined in Jackson's (1980) seminal article on integrative literature reviews. The results of my systematic review of the literature, in turn, informed the variables that I included in my analysis and the apriori hypotheses of the effects of each of these variables.

The purpose of this systematic literature review was twofold, (a) to identify literature that had previously explored post-secondary employment outcomes for young adults with disabilities receiving services from VR, and (b) to identify variables that had been demonstrated to predict positive employment outcomes. The systematic review was broken into two domains. The first domain included *peer-reviewed* sources from five online journal databases. The second domain included federal data based reports that summarized results from federal data that was collected for the purpose of identifying predictors of employment for young adults with disabilities. Note, that there are a number of sources, such as the NLTS and NLTS2, within the second domain that identified predictors of employment for all young adults with disabilities, as opposed to only those who had received services from VR. The sources identified in each of these searches have been coded and summarized using the NLTS theoretical framework. The methods and findings of this systematic review of the literature are described below.

Peer Reviewed Journal Articles

A search of peer-reviewed articles that identified predictors of employment for young adults with disabilities receiving services from VR was conducted using five

online journal databases (Academic Search Premiere, Educational Abstracts, ERIC, Social Services Abstracts, and PsychNet). I limited articles included in this search to those published in a peer-reviewed academic journal. I did not set any date parameters to restrict my findings. I identified articles that reported predictors of employment for young adults with disabilities who had received services from VR by using a clearly defined set of search terms that included terms from five word domains: (1) predictor; (2) employment; (3) young adult; (4) disability; and, (5) vocational rehabilitation. From these five word domains I developed a list of key words and synonyms to be searched within each of the five journal databases. I searched all possible combinations of these key words and included articles in this search that returned a match on all five domains. Any articles that were identified in more than one of the online journal databases were only included once in this review. The reference lists of articles identified were also reviewed for potential sources.

After completing this search, I identified only six articles that met the criteria. Each of the six primary sources identified were published between 2006 and 2012. While all of these studies included young adults who had received services from VR, the specific populations of focus in these sources varied; two studies focused specifically on individuals with visual impairments, one was specific to individuals with autism, one was specific to participants in a community college short-term training program, one was specific to individuals with ADHD, and one was specific to individuals with learning disabilities. Two of the six articles were from the *Journal of Visual Impairment & Blindness*, two were from *Rehabilitation Counseling Bulletin*, and two were from the *Journal of Applied Rehabilitation Counseling*. The primary methodology in each of the

six articles was quantitative, and all utilized logistic regression to identify predictors of employment. One of the six articles also used independent t-tests with adjusted significance values to demonstrate significant relationships between variables. At times, important values such as standard errors and effect sizes were not included in the articles. Within these six articles 35 predictors of employment were identified. Each of the 35 predictors were statistically significant positive or negative predictors of an employment outcome for young adults with disabilities receiving services from VR. Employment outcomes were primarily measured as vocational rehabilitation status - closed rehabilitated; however, in one study the employment outcome was combined with other positive program outcomes (i.e., participation) to create a composite positive outcome variable.

Using the NLTS theoretical framework, I coded each of the 35 predictors identified into one of the four major NLTS components: (1) individual and family characteristics; (2) in-school experiences and outcomes; (3) post-school experiences and outcomes; and (4) contextual factors. All of the 35 predictors were coded into one of the four major NLTS components.

Data Based Reports

In addition to the peer-reviewed articles, I also explored federal reports that have documented employment outcomes for young adults with disabilities. Many of these federal reports included young adults with disabilities who were not receiving services from VR. I utilized this approach in order to sample an extensive base of literature that has investigated predictors of post-secondary outcomes for young adults with disabilities. The four sources I used to identify reports included the National Longitudinal Transition

Study one and two (NLTS, and NLTS-2), the Rehabilitation Service Administration 911 (RSA-911), and the U.S. Department of Labor Current Population Survey. While not peer-reviewed, reports that are written from these sources are widely cited and are often used to describe variables that are related to employment outcomes for young adults with disabilities. A thorough investigation of reports coming from these federal data was conducted to identify additional sources that report predictors of employment for young adults with disabilities. A brief description of each of these sources is provided below.

NLTS and NLTS-2. The National Longitudinal Transition Studies of Special Education Students (NLTS, 1985-1994, & NLTS-2, 2001-2011) were congressionally mandated studies to provide national information about youth with disabilities as they move through high school and beyond. In each of these studies, student level data was collected on multiple cohorts of students across about a ten-year timespan. Students who were included received special education services and were purposefully selected as to represent a large enough sample of individuals from each of the disability categories. Data were collected in multiple waves from student interviews, or parent interviews if the student was not available or could not respond to the questions. Data collection was guided by the NLTS theoretical framework and included individual and family characteristics, in-school experiences and outcomes, post-school experiences and outcomes, and contextual factors. For the purpose of this literature review, the dependent variable that I focused on to identify potential predictors from these sources was post-secondary employment. This variable was measured in response to two questions that were asked of either the young adult or their parents: (1) is this individual currently engaged in paid-work outside of the home and (2) has this individual been engaged in

paid-work outside of the home in the previous year. Reports were written at various time points during each study and utilized mostly descriptive statistics. All items that have been selected as predictors from these sources were reported as statistically significant predictors of employment in either an independent t-tests or multivariate analysis.

NLTS. The NLTS was the first of two longitudinal transition surveys and followed 8,000 students who were enrolled in secondary special education between the ages of 13 to 21 in the 1985-86 school year for up to six years after they left high school (Wagner et al., 1991; Wagner, D'Amico, Marder, Newman & Blackorby, 1992; Wagner, Blackorby, Cameto & Newman, 1993). To identify reports from NLTS that included predictors of employment for young adults with disabilities, I contacted Mary Wagner (a lead investigator in both NLTS and NLTS-2) and asked for a list of reports from NLTS (and NLTS-2) that identified predictors of employment for young adults with disabilities. Mary Wagner identified and provided four reports from NLTS that included predictors of employment. Three of the four reports from NLTS were not available electronically and had to be either scanned and emailed, or sent by mail. The four reports were published between 1991 and 1993. Within the four reports from NLTS, 10 variables were identified as statistically significant positive or negative predictors of employment outcomes for young adults with disabilities.

NLTS-2. The NLTS-2 was the second of the longitudinal transition surveys and followed a cohort of representatively sampled youth who were enrolled in special education between the ages of 13 and 16 in the year 2000 for up to 8 years after school completion (Newman, Wagner, Cameto & Knokey, 2009; Newman, et al., 2011; Sanford et al., 2011; Wagner, Newman, Cameto, Garza & Levine, 2005; Wagner, Newman,

Cameto, Levine & Garza, 2006). To identify sources from NLTS-2, I reviewed all of the available reports on the NLTS-2 website to determine which of these reports included information on predictors of employment for young adults with disabilities. From the 19 reports that were available on the NLTS-2 website, four of them included information on predictors of post-school employment for young adults with disabilities and were thus included in this systematic review. Within the four reports from NLTS, 14 variables were identified as statistically significant positive or negative predictors of employment outcomes for young adults with disabilities.

RSA-911. The Rehabilitation Services Administration (RSA)-911 data set is yet another important federal data set that provides information about employment outcomes for young adults with disabilities. RSA collects annual data on rehabilitation outcomes and services for individuals who have applied for or received VR services (e.g., the target population of my study). These data are reported at the time the case is closed by a Vocational Rehabilitation Counselor and are compiled annually at the federal level. Variables included in RSA-911 include individual demographic characteristics, services provided, contextual factors, and rehabilitation outcomes. The dependent variable of focus for my systematic review of the literature was VR closure status, which serves as a proxy for a competitive employment outcome. A VR closure status of rehabilitated signifies that an individual has been in competitive employment for at least 90 days.

To identify reports from RSA-911 that include information on predictors of employment for young adults with disabilities receiving services from VR, all reports posted on the RSA Publications and Products website were reviewed. Because VR provides services to adults as well as young adults, only reports that included information

about young adults (ages 16-25) were included in this review. In total, two reports were identified. One of the two reports identified was a study conducted by Mathematica Policy Research that was hosted on the RSA Publications and Products website. Within these two reports, 11 predictors of employment for young adults with disabilities were identified. The Mathematica Policy Research publication was focused on state level variables that predicted state proportions of young adult clients closed rehabilitated.

Current Population Survey. The Current Population Survey (CPS)-a survey sponsored by the U.S Census Bureau and the U.S. Bureau of Labor Statistics- is yet another source that was used to identify data-based predictors of employment outcomes for young adults with disabilities. The CPS provides a number of high-profile economic statistics that are widely used as national indicators of employment (i.e., unemployment rate, labor force participation rate). The CPS also provides data on a wide range of issues relating to employment and earnings. (U.S. Census Bureau, 2013). In 2008, the CPS began collecting information on disability as a part of their demographic data. The CPS uses six questions to identify people with disabilities and classified individuals who answered "Yes" to any one of the six questions as having a disability. These six questions include: (1) is anyone deaf or have seriously difficulty hearing?; (2) is anyone blind or have serious difficulty seeing even when wearing eyeglasses?; (3) because of a physical, mental, or emotional condition, does anyone have serious difficulty concentrating, remembering, or making decisions, have hearing and vision impairments, physical, mental or emotional condition?; (4) does anyone have serious difficulty walking or climbing stairs?; (5) does anyone have difficulty dressing or bathing?; (6) because of a

physical, mental, or emotional condition, does anyone have serious difficulty doing errands along such as visiting a doctor's office or shopping?

To identify sources from the U.S. Department of Labor Current Population Survey, I reviewed 17 Bureau of Labor Statistics reports on the labor force characteristics for persons with a disability. One of these reports included predictors of employment and was included in this systematic review of the literature. Within this report 4 predictors of employment were identified.

Summary of data based reports. In summary, 11 data based reports were identified from these four sources that provided information about employment outcomes for young adults with disabilities. Across each of these 11 reports, 37 statistically significant predictors of employment for young adults with disabilities were identified. Using the NLTS theoretical framework, each of the 37 predictor were coded into the four major components: (1) individual and family characteristics; (2) in-school experiences and outcomes; (3) post-school experiences and outcomes; and (4) contextual factors. All of the variables identified in these reports were able to be coded into one of the four major NLTS components.

Summary of Sources Used in the Systematic Review of the Literature

In total, 17 sources were identified across a search of peer-review articles and data based reports. Journal articles were located through a comprehensive search of peer-reviewed journal databases. Data based reports were located through a comprehensive search of NLTS & NLTS-2 reports, RSA-911 reports, and CPS reports. Table 2.1 lists each of the 17 sources that were identified in this review.

Table 2.1. Sources Identified in Systematic Literature Review

No.	Source
Peer-Reviewed Journal Articles	
1	Schaller, J., Yang, N., & Trainor, A. (2006). Transition-age adults with ADHD: Gender and predictors of Vocational Rehabilitation outcomes. <i>Journal of Applied Rehabilitation Counseling, 37</i> , 3-12.
2	McDonnall, M., & Crudden, A. (2009). Factors affecting the successful employment of transition-age youth with visual impairments. <i>Journal of Visual Impairment and Blindness, 103</i> , 329-341.
3	Gonzalez, R., Rosenthal, D., Kim J. (2011). Predicting vocational rehabilitation outcomes of young adults with specific learning disabilities: Transitioning from school to work. <i>Journal of Vocational Rehabilitation, 34</i> , 163-172.
4	Flannery, B., Benz, M., Yovanoff, P., McGrath Kato, M., & Lindstrom, L. (2011). Predicting employment outcomes for consumers in community college short-term training programs. <i>Rehabilitation Counseling Bulletin, 54</i> , 106-117.
5	Migliore, A., Timmons, J., Butterworth, J., & Lugas, J. (2012). Predictors of employment and postsecondary education of youth with autism. <i>Rehabilitation Counseling Bulletin, 55</i> , 176-184.
6	Giesen, M., & Cavanaugh, B. (2012). Transition-age youths with visual impairments in Vocational Rehabilitation: A new look at competitive outcomes and services. <i>Journal of Visual Impairment & Blindness, 106</i> , 475-487.
Data Based Reports	
7	D'Amico, R. (1991). The working world awaits: Employment experiences during and shortly after secondary school. <i>Findings from the NLTS</i> .
8	Wagner, M. (1991). The benefits of secondary vocational education for young people with disabilities. <i>Findings from the NLTS</i> .
9	D'Amico, R., & Blackorby, J. (1992). Trends in employment among out-of-school youth with disabilities. <i>Findings from the NLTS</i> .
10	Wagner, M., Blackorby, J., Cameto, R., & Newman, L. (1993). What makes a difference? Influences on postschool outcomes of youth with disabilities. <i>Findings from the NLTS</i> .
11	Cameto, R. (2005). Employment of youth with disabilities after high school. <i>A report from the NLTS-2</i> .
12	Newman, L., Wagner, M. Cameto, R., & Knokey, A. (2009). The post-high school outcomes of youth with disabilities up to 4 years after high school. <i>A report from the NLTS-2</i> .
13	Sanford, C., Newman, L., Wagner, M., Cameto, R., Knokey, A., and Shaver, D. (2011). The post-high school outcomes of young adults with disabilities up to 6 years after high school. <i>A report from the NLTS-2</i> .
14	Newman, L., Wagner, M., Knokey, A.-M., Marder, C., Nagle, K., Shaver, D., Wei, X., Cameto, R., Contreras, E., Ferguson, K., Greene, S., & Schwarting, M. (2011). The post-high school outcomes of young adults with disabilities up to 8 years after high school. <i>A report from the NLTS-2</i> .

Table 2.1. (continued).

No.	Source
15	Hayward, B., & Schmidt-Davis, H. (2000). A longitudinal study of the vocational rehabilitation service program, fourth interim report: Characteristics and outcomes of transitional youth in VR. <i>Research Triangle Institute</i> .
16	Honeycutt, T., Thompkins, A., Bardos, M., & Stern, S. (2013). State differences in the vocational rehabilitation experiences of transition-age youth with disabilities. <i>Mathematica Policy Research</i> .
17	U.S. Department of Labor (2013). Persons with disabilities: Labor force characteristics summary. <i>A CPS report</i> .

Note. See references for a more completely formatted reference.

Findings from the Systematic Review of the Literature

In this section, I present the findings from the systematic review of the literature organized by the four components of the NLTS theoretical framework: (1) individual and family characteristics; (2) in-school experiences and outcomes; (3) post-school experiences and outcomes, and (4) contextual factors. This review includes findings from the six peer reviewed articles and 11 data based reports for a total of 17 sources.

Individual and family characteristics. Twelve of the 17 sources included at least one individual and family factor that predicted employment outcomes for young adults with disabilities. Within individual and family characteristics seven sub-categories emerged: age, sex, race/ethnicity, disability, impairment/impediment, self-advocacy/self-determination, and family/household variables. These sub-categories are described in more detail below. For a complete list of individual and family characteristics that were identified, refer to Table 2.2.

Age. Across the four sources that identified age as a predictor of employment, two were peer-reviewed journal articles, and two were from the NLTS and NLTS-2. Three of the four sources reported that employment outcomes increase significantly with age,

however, one source reported a contrary finding. A description of the evidence supporting age as a key factor is provided chronologically below.

The earliest evidence from my sources that supports the claim that age is a significant factor in predicting employment is from D'Amico's (1991) analysis of NLTS data. The author compared the extent to which young adults were competitively employed shortly after high school, and reported that participants who were 18 years old or younger were eight percentage points more likely to be competitively employed than those who were 20 years or older. The results of this comparison were statistically significant, $r(1,271) = .17, p < .05$. This finding is contrary to the other sources in this review that found employment outcomes increase with age. D'Amico (1991) suggests that this finding may be attributed to the fact that the youth in the sample who were 20 years or older at the time of this analysis were 18 years or older and still in school at the time of recruitment for the study. D'Amico purports that those who finish school when they are 18 or older may have other impairments that make it more difficult for them to find competitive employment than young adults who finish high school by the time they are 18.

In 2005, Cameto et al., reported from a multivariate analysis of NLTS-2 data that 19-year-old young adults with disabilities were 23 percentage points more likely to be employed at the time of the interview than 17 year olds. While no correlation coefficients were reported, the results of this comparison were statistically significant, where $p < .001$. While this finding contradicts that from D'Amico (1991), it is consistent with the findings from the research in subsequent years.

Similarly, in their peer-reviewed study of 1,687 young adults from RSA-911 between the ages of 18 and 25 receiving services from VR with a disability of ADHD, Schaller, Yang and Trainor (2006) found that for males, competitive employment outcomes increased with age. These researchers broke their sample into two groups in order to cross validate an initial step-wise logistic regression. Results of the analysis from both samples suggest that for males, age in increasing years was a statistically significant predictor of VR case closure status. For sample one, $\beta = .143$, $SE = .046$, $Wald = 9.48$, $p = .002$, $Exp(\beta) = 1.15$, and sample two, $\beta = .128$, $SE = .044$, $Wald = 8.63$, $p = .003$, $Exp(\beta) = 1.13$. Schaller et al. (2006) report that males aged 18 experienced a successful VR closure status 53% of the time, males aged 23 experienced a successful VR closure status 66% of the time, males aged 24 experienced a successful VR closure status 74% of the time, and males aged 25 experienced a successful closure VR status 73% of the time. Notably, age was not a statistically significant predictor of VR case closure status among females and the results from these analyses were not reported. Authors suggest that knowledge and self-awareness that comes with age may be contributing factors for males increasing successful closure rates, but do not make any mention as to why this may not be an important factor for young women (Schaller et al., 2006).

Additionally, in their study of 465 participants of the Career Workforce Skills Training (CWST) program, Flannery, Benz, Yovanoff, McGrath Kato and Lindstrom (2011) found that employment outcomes increased with age. CWST was a collaborative effort between Vocational Rehabilitation and local community colleges. The CWST served 112 (25%) participants who were 25 years old or younger, 83 (19%) who were between the ages of 26 and 35, and 246 (55%) who were 36 years or older. Of the 112

Table 2.2. Individual and Family Characteristics that Impact Employment for Young Adults with Disabilities Receiving Services from VR

Factor	(+/-)	Systematic Literature Review Source																	Total
		Peer Reviewed Article						NLTS & NLTS-2								RSA-911		CPS	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Age</i>																			
Age	+	X			X			X							X				4
<i>Sex</i>																			
Male	+					X		X		X									3
Female	-/+						X										X		2
<i>Race/Ethnicity</i>																			
White	+							X		X			X						3
African American	-						X	X				X							3
Hispanic	-						X			X									2
<i>Disability</i>																			
Orthopedic Impairment	-							X				X	X	X					4
Hearing Impairment	+							X				X	X						3
Visual Impairment	-							X				X							2
Speech Language	+												X	X					2
Other Health Impairment	+												X	X					2
Learning Disability	+												X	X					2
Emotional Disturbance	+												X	X					2
Cognitive Secondary Disability	-						X												1
Non-Cognitive Secondary Dis.	-						X												1
Psychiatric Disability	-																		1
Mild/Moderate Intellectual Dis.	-				X			X											1
<i>Impairment/Impediment</i>																			
Cognitive Functioning	+							X									X		2
Low Personal Care Function	-							X									X		2
Reading Assessment Score	+		X																1
Math Assessment Score	+		X																1
Number of Functional Limitations	-											X							1
High Gross Motor Function	+																X		1
Disability Significance	-																X		1
Skills Barrier	-				X														1

Table 2.2 (continued)

Factor	(+/-)	Systematic Literature Review Source																	Total
		Peer Reviewed Article						NLTS & NLTS-2								RSA-911		CPS	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Self-Advocacy/Self-Determination</i>																			
Self-Determination	+		X																1
Locus of Control	+		X																1
High Social Skills	+										X								1
Belief in Control by Others	+																X		1
<i>Public Financial Assistance</i>																			
Recipient of Public Financial Asst.	-			X		X	X										X		4
<i>Family/Household</i>																			
High Household Income	+							X				X	X	X					4
Single Parent Home	-							X											1
Total		1	4	1	4	2	6	12	-	3	-	6	8	7	1	7	-	-	60

Note. See Table 2.1 for a list of references. Sources 8, 10, 16 & 17 did not report any individual or family characteristics that impacted employment outcomes. Positive and negative symbols represent the direction of the relationship of the factor on predicting an employment outcome.

participants 25 years old or younger, 56 (50%) dropped out, 34 (30%) achieved some of the intended program outcomes, and 22 (20%) completed the program and obtained all intended program outcomes. Intended program outcomes included receipt of an occupational certificate documenting completion of all approved requirements, employment at exit in a career-related job, and maintenance of employment at 90 days follow up. When comparing the outcomes of the younger participants to the older participants, the odds that older participants would stay in the program and obtain all positive outcomes were 1.74 times greater than the odds that younger participants would accomplish the same outcomes. (Flannery et al., 2011).

Across these four studies, age was a significant factor in predicting employment outcomes for young adults with disabilities included in the NLTS, young adults with ADHD receiving services from VR, and young adults who participated in a collaborative transition program within a community college (D'Amico, 1991; Cameto et al. 2005; Schaller et al., 2006; Flannery et al., 2011). In three of the four studies, employment outcomes increased with age (Cameto et al. 2005; Schaller et al., 2006; Flannery et al. 2011). Further, in one of the four studies, age was a significant predictor of competitive employment for males but was not for females (Schaller et al., 2006). The results from this review suggest that as young adults age their chances of being employed increase. However, the results from this literature review also support the need for additional investigation into the impact of age on employment outcomes for young adults with disabilities receiving services from VR.

Sex. The second sub-category of individual and family characteristics that predicted employment for young adults with disabilities and young adults with

disabilities receiving services from VR was sex. Five of the 17 sources suggest that sex is a significant factor in predicting employment outcomes for these young adults. Each of the five sources reported that females were less likely to be employed than males (D'Amico, 1991; D'Amico & Blackorby, 1992; Hayward & Schmidt-Davis, 2000; Migliore, Timmons, Butterwoth & Lugas, 2012; Geisen & Cavanaugh, 2012). One of the five sources reported that the outcomes for young women who did not receive special education were more favorable than males (Hayward & Schmidt-Davis, 2000).

D'Amico's (1991) analysis of NLTS data suggest that males are 13 percentage points more likely to obtain competitive employment than females, even when the effects of other variables such as age, disability, household and community characteristics, and school variables were controlled. The results of this comparison were statistically significant, $r(1,271) = .55, p < .05$.

Similarly, in D'Amico's (1992) analyses of NLTS data comparing the extent to which youth had competitive jobs when they had been out of secondary school less than two and three to five years, it was reported that males generally experienced higher rates of competitive employment than females. For young adults out of school less than 2 years, 52% of males were competitively employed compared to 32% of females. For young adults out of school three to five years, 64% of males were competitively employed compared to 40% of females. The 14 percentage point increase in competitive employment experienced by males out of school less than two years and those out of school three to five years was a statistically significant increase ($p < .01$), whereas the eight percentage point increase for females was not. D'Amico (1992) also reports that the pattern of males being employed to a greater extent than females also emerged among

participants within disability classifications. Among those classified with a learning disability, 77% of males reported being employed compared to 52% of females ($p < .05$). Among those classified with an emotional/behavioral disorder, 57% of males reported being employed compared to 19% of females ($p < .05$). Also, among those who were classified as being hard of hearing, 62% of males reported being employed compared to 27% of females ($p < .05$).

Furthermore, in Hayward & Schmidt-Davis's (2000) multiple regression analysis of 135,000 VR consumers, females 25 years old or younger were negatively associated with competitive employment outcomes for individuals who received special education, and were positively associated with competitive employment among those young adults who did not receive special education. Hayward & Schmidt-Davis's (2000) rationale for separating their results by receipt of special education services in high school was unclear. Students who received special education services while in school were more often male, and less often had prior work experience. In their multiple regression prediction models, Hayward & Schmidt-Davis (2000) report that being female was one of six variables that influenced achievement of a competitive employment outcome among young adults who participated in special education. The results for the overall model explained about 20% of the variance ($R^2 = .197, p < .0001$) where the unstandardized coefficient of female was negative ($B = -.18$). Conversely, the effect of being female was not statistically significant among young adults who did not participate in special education. Note, that the only statistics reported from the multiple regression analysis included the variance explained by the overall model and the unstandardized beta weight of each statistically significant factor included in the model. Additionally, there was no

discussion related to being female as negative predictor of employment for students who received special education and a positive predictor of employment among those who did not.

Another study that supports the influence of sex in predicting employment outcomes among young adults with disabilities receiving services from VR can be found in Migliore et al.'s (2012) analysis of 2,913 young adults with autism between the ages of 16 and 26 who received services from VR. Migliore, et al. (2012) identified sex as one of eight predictors of competitive employment identified in their logistic regression model, where males were about 1.5 times more likely to be in an integrated employed setting than females ($Wald = 13.92$, $OR = 1.53$, 95% CI [1.22, 1.91]). The fit of the model was good, *Hosmer and Lemeshow test*, $\chi^2(8, N = 2,913) = 7.5$, $p = .48$, and the Nagelkerke coefficient was medium ($R^2_{Nag} = .20$). Migliore, et al., (2012) report that their findings on the effects of being male on being in an integrated employed setting are consistent with the literature, but do not provide an explanation for their finding.

Lastly, Geisen and Cavanaugh (2012) found in their sequential block logistic regression analysis of 2,282 young adults from RSA-911 who were aged 22 or younger with visual impairments, that females were less likely to be competitively employed than males, $\beta = -.202$, $SE = .098$, $Wald = 4.309$, $p = .038$, $Exp(\beta) = .817$. Geisen and Cavanaugh (2012) report that while these findings are consistent with the previous literature on the effect of sex on employment outcomes, their findings confirmed that the effect is also present for a population of young adults with visual impairments.

In sum, sex was a significant factor in predicting employment outcomes for young adults with disabilities included in the NLTS, those receiving services from VR, those

with autism receiving services from VR, and those with visual impairments receiving services from VR (D'Amico, 1991; D'Amico & Blackorby, 1992; Hayward & Schmidt-Davis, 2000; Migliore, et al., 2012; Geisen & Cavanaugh, 2012). In each of the five sources, females were less likely to achieve an employment outcome than males. The results from this review suggest that sex is an important factor in predicting employment outcomes for young adults with disabilities receiving services from VR, and that further investigation is necessary.

Race/ethnicity. Five of the 17 sources in this review suggest that race/ethnicity influence employment outcomes for young adults with disabilities and young adults with disabilities receiving services from VR.

D'Amico's (1991) analysis of NLTS data comparing the extent to which youth had competitive employment shortly after high school suggests that youth who are not White are about four percentage points less likely to obtain competitive employment than youth who are White, even when accounting for other demographic variables such as age, disability, household and community characteristics, and school variables. The results of this comparison were statistically significant, $r(1,271) = -.16, p < .05$.

Furthermore, in D'Amico's (1992) analyses of NLTS data comparing the extent to which youth had competitive jobs when they had been out of secondary school less than two years with those who had been out of school three to five years, youth who were White generally experienced higher rates of competitive employment than young adults who were African American or of Hispanic descent. For young adults out of school less than two years, 53% of young adults who were White were competitively employed compared to 26% of young adults who were African American and 49% of young adults

who were of Hispanic descent. In comparison, for young adults out of school three to five years, 61% of young adults who were White were competitively employed compared to 47% of young adults who were African American and 51% of young adults who were of Hispanic descent. The 8% and 22% percent increases in competitive employment experienced by young adults who were White and African American, respectively, were statistically significant ($p < .10$), however the increase in employment over time was not significantly significant for young adults of Hispanic descent.

Race/ethnicity also influenced employment outcomes for young adults who participated in the NLTS-2. In their multivariate analysis of NLTS-2 participants who had been out of school less than two years, Cameto, et al. (2005) report that youth who were African American were 16 percentage points less likely to have regular paid employment at the time of the interview than were young adults who were White ($p < .01$). In a subsequent NLTS-2 report of youth who had been out of high school for up to four years, Newman et al. (2009) report that that significant differences in employment outcomes by race/ethnicity were noted for both employment at the time of the interview, and employment since leaving high school. Specifically, at the time of the interview, young adults who were African American were employed 35% of the time, compared to 63% of young adults who were White ($p < .01$). And, 47% of young adults who were African American had been employed at some point since graduating high school, compared to 80% of young adults who were White ($p < .001$).

In their sequential block logistic regression analysis of 2,282 young adults from RSA-911 who were aged 22 or younger with visual impairments, Geisen and Cavanaugh (2012) found that both race and ethnicity significantly predicted competitive employment

among participants. Being of Hispanic descent (any race) was positively associated with competitive employment, and was one of the top six largest effects for predicting a competitive employment outcome ($\beta = .501$, $SE = .145$, $Wald = 11.949$, $p = .001$, $\text{Exp}[\beta] = 1.650$). Being African American, on the other hand, was negatively associated with competitive employment, and while statistically significant was not among the top six largest effects ($\beta = -.352$, $SE = .146$, $Wald = 5.827$, $p = .016$, $\text{Exp}[\beta] = .703$).

This review suggests that race/ethnicity can be important predictors of competitive employment among young adults with disabilities and those receiving services from VR. Four of the five sources that identified race/ethnicity as a predictor of employment were from either the NLTS or NLTS-2 (D'Amico's, 1991; D'Amico & Blackorby, 1992; Cameto, et al. 2005; Newman et al., 2009). The results from these studies were consistent and suggest that youth who are White were competitively employed to a greater extent than those who are not White. Similarly, reports from NLTS and NLTS-2 suggest that youth who are African American are significantly less likely to be competitively employed or make the same gains in competitive employment, than those who are not. The results from Geisen and Cavanaugh (2012) confirm that findings from NLTS and NLTS-2 are similar for young adults with visual impairments who are receiving services from VR; those who are African American are less likely to be competitively employed than those who are not. However, Geisen and Cavanaugh (2012) also found ethnicity to be one of the largest positive predictors of employment within their sample. The results from these studies suggest that race/ethnicity are important factors when investigating predictors of employment among young adults with disabilities receiving services from VR.

Disability type. Six of the 17 sources report that a specific disability characteristic played a significant role in predicting competitive employment outcomes for these young adults.

The earliest evidence of this can be found in D'Amico's (1991) analysis of NLTS data comparing the extent to which youth had been competitive employment shortly after high school. D'Amico (1991) reported that young adults with orthopedic impairments were competitively employed 47 percentage points less than those with learning disabilities ($r [1,271] = -2.57, p < .001$), 28 percentage points less than those who were deaf ($r [1,271] = -1.17, p < .001$), 28 percentage points less than those with visual impairments ($r [1,271] = -1.17, p < .001$), 17 percentage points less likely than those with an other health impairment ($r [1,271] = -.68, p < .05$), and 15 percentage points less than those who had mild or moderate intellectual disabilities ($r [1,271] = -.60, p < .05$). No other significant differences by disability type in competitive employment outcomes were identified in this report.

Similarly, NLTS-2 (Cameto, 2005) data suggest that young adults with orthopedic impairments who had been out of school less than two years had regular paid employment at the time of the interview 22 percentage points less often than young adults with learning disabilities ($p < .01$). Cameto et al. (2005) also found that young adults with a visual impairment had regular paid employment at the time of the interview 21 percentage points less often than young adults with learning disabilities ($p < .01$).

NLTS-2 (Newman et al., 2009) also report that for young adults with disabilities up to four years after high school, significant differences in employment outcomes by disability were noted for both employment at the time of the interview, and employment

since leaving high school. At the time of the interview, young adults with other health impairments and learning disabilities were more likely to be employed (68% and 64%, respectively) than young adults with an orthopedic impairment, intellectual disability, or emotional disturbance (27%, 31%, and 42%, respectively; $p < .01$). Similarly, young adults with a speech/language impairment were more likely to be employed at the time of the interview (58%) than young adults with an orthopedic impairment, or intellectual disability (27%, and 31%, respectively; $p < .01$). Further, at the time of the interview, young adults with a hearing impairment were more likely to be employed (55%) than young adults with an orthopedic impairment (27%, $p < .01$).

When looking at the percentage of young adults who had been employed since leaving high school by disability, Wagner et al., (2009), report that young adults with an other health impairment, speech/language impairment, or learning disability were more likely to have been employed since leaving high school (77%, 73%, 80%, respectively) than young adults with an orthopedic impairment or intellectual disability (40% and 52%, respectively; $p < .01$). Additionally, young adults with an other health impairment were more likely than those with multiple disabilities to have been employed since high school (80% compared to 50%; $p < .01$), and the same was true for young adults with emotional disturbances who were also more likely to be employed than those with an orthopedic impairment (63% compared to 40%; $p < .01$).

Similar to Wagner's findings (2009), Sanford et al.'s (2011) multivariate analysis of young adults with disabilities up to 6 years after high school, also suggested significant differences in employment outcomes by disability for both employment at the time of the interview, and employment since leaving high school. Young adults with

learning disabilities, other health impairments, speech/language impairments, emotional disturbances, and hearing impairments all had at least one statistically significant comparison for being employed at the time of the interview to a greater extent than young adults from at least one other disability category. Specifically, young adults with learning disabilities were more likely to be employed at the time of the interview than young adults with deaf/blindness, orthopedic impairments, visual impairments, traumatic brain injuries, autism, intellectual disability, or multiple disabilities (79% compared to 30%, 38%, 40%, 44%, 45%, 46%, and 46%, respectively; $p < .01$). Young adults with other health impairments or speech/language impairments were more likely to be employed at the time of the interview than young adults with deaf/blindness, orthopedic impairments, traumatic brain injuries, autism, intellectual disabilities, or multiple disabilities (68% each compared to 30%, 38%, 40%, 44%, 45%, 46%, and 46%, respectively; $p < .01$). Young adults with emotional disturbances were more likely to be employed at the time of the interview (65%) than young adults with deaf/blindness, orthopedic impairments, visual impairments, autism, or intellectual disabilities (30%, 38%, 40%, 45%, and 46%, respectively; $p < .01$). Finally, young adults with hearing impairments were more likely to be employed at the time of the interview (64%) than young adults with deaf/blindness, orthopedic impairments, visual impairments, or intellectual disabilities (30%, 38%, 40%, and 46%, respectively; $p < .01$)

Flannery, et al. (2011), also found that disability type influenced employment outcomes for young adults with disabilities receiving services from VR. Specifically, those with a psychiatric disability were significantly less likely to achieve all positive program outcomes than youth without a psychiatric disability ($B = -.91$, $SE = .335$, $OR =$

0.40, 95% CI [0.21, 0.78]). Of the 465 participants of the Career Workforce Skills Training (CWST) program, 159 (41%) reported having a psychiatric disability. Psychiatric disability included disabilities such as schizophrenia, anxiety disorder, or mental illness. Of the 159 participants with a psychiatric disability, 81 (51%) dropped out, 40 (25%) achieved some of the intended program outcomes, and 38 (29%) completed the program and obtained all intended program outcomes.

Lastly, in their sequential block logistic regression analysis of 2,282 young adults from RSA-911 who were aged 22 or younger with visual impairments, Geisen and Cavanaugh (2012) found that disability categories were significantly predictors of young adults achieving competitive employment outcomes. The differences were specifically observed between those who were blind and low vision, and those with non-cognitive and cognitive secondary disabilities. Those individuals who were blind were statistically significantly less likely to be competitively employed than those who had a low vision ($b = -.551$, $SE = .103$, $Wald = 28.531$, $p = .000$, and $Exp B. = .577$). Both individuals with non-cognitive secondary disabilities and cognitive disabilities were less likely to be competitively employed than young adults without secondary disabilities. Individuals with a non-cognitive secondary disability were significantly less likely to be competitively employed than those without a secondary disability ($B = -.439$, $SE = .126$, $Wald = 12.043$, $p = .002$, $Exp[\beta] = .645$). Similarly, individuals with a cognitive secondary disability were significantly less likely to be competitively employed than for those without a secondary disability ($B = -.418$, $SE = .171$, $Wald = 6.002$, $p = .014$, $Exp[\beta] = .658$).

Across each of these six sources, disability type impacted employment outcomes positively and negatively for young adults with disabilities and young adults with disabilities receiving services from VR. Young adults with visual impairments, cognitive or non-cognitive secondary disabilities, psychiatric disabilities, or mild/moderate intellectual disabilities were likely to experience lower competitive employment outcomes than young adults with other disabilities. On the other hand, having a hearing impairment, speech or language impairment, an other health impairment, or a learning disability was associated with more favorable outcomes when compared to young adults experiencing other disabilities. The findings from this review support the need for further investigation into the impact of disability type on competitive employment outcomes for young adults with disabilities receiving services from VR.

Impairment/impediment. The literature review also demonstrated that disability-related impairments and impediments influence employment outcomes for young adults with disabilities and young adults receiving services from VR. Disability-related impairments and impediments included variables such as cognitive functioning, disability significance, and a young adult's ability to care for themselves.

D'Amico's (1991) analysis of NLTS data comparing the extent to which youth had competitive employment shortly after high school reported that young adults with high functional mental scores were competitively employed 11 percentage points more often than young adults with low or medium functional mental scores. Functional mental scores were measured by parent interviews, where parents were asked to rate on a four-point scale how well they believed their children could complete four tasks on their own without help: looking up telephone numbers in the phone book and using the phone,

telling time on a clock with hands, reading and understanding common signs like STOP, MEN, WOMEN, or DANGER, and counting change. Scores were summed to create a single scale ranging from four to 16, where young adults who had a score of 16 were considered to have high functional mental scores. The results of this comparison were statistically significant, $r(1,271) = .11, p < .01$.

Similarly, D'Amico (1991) reported that young adults with high personal care scores were competitively employed 24 percentage points more often than young adults with low or medium personal care scores. Personal care scores were measured by parent interviews, where parents were asked to rate on a 4-point scale how well they believed their children could complete three very basic self-care tasks on their own without help: feeding oneself, dressing oneself, and getting to places outside of the home such as a neighbor's house or nearby park. Scores were summed to create a scale ranging from three to 12, where young adults with a score of 12 were considered to have high personal care scores. The results of this comparison were statistically significant, $r(1,271) = .45, p < .001$. Of note, students who had learning disabilities, were emotionally disturbed, had a speech impairment, or were hard of hearing and did not have another secondary disability were not asked this question and instead were assigned high personal care scores for analysis.

Next, in their multiple regression analysis of 135,000 VR consumers 25 years old or younger, Hayward and Schmidt-Davis (2000) reported that for young adults who did not receive Special Education, disability significance and cognitive functioning were associated with a positive employment outcome. Disability significance was determined by the individual's VR case report, which labels all individuals as either having a

disability that is non-significant or significant/most significant. Eighty-percent of participants had a disability that was significant/most significant, and the remaining 20% had a disability that was considered to be non-significant. Additionally, Hayward and Schmidt-Davis (2000) reported that for young adults who did receive special education, gross motor function, cognitive function, and personal care function were associated with an employment outcome. Cognitive function was determined by participants' response to six questions about their ability to do the following things by themselves: read, write, manage their money, shop for personal items, drive, and use public transportation. It's unclear as to how these items were scored. Gross motor function was determined by participants' response to five questions about their ability to do the following things by themselves: walk for a quarter of a mile, walk up a flight of stairs without resting, do heavy housework, lift and carry something as heavy as 10 pounds, and get around outside of the house. Personal care function was determined by participants' response to five questions about their ability to do the following things by themselves: use the toilet, dressing, bathing or showering, getting into and out of bed, and eating.

Additionally, in their sample of NLTS-2 participants who were out of secondary school up to two years, Cameto, 2005, report that the number of functional limitations exhibited by a young adult was negatively associated with a positive employment outcome. Cameto et al., 2005 report that young adults with three functional limitations are 12 percentage points less likely to be competitively employed than young adults with 1 functional limitation ($p < .05$). Functional limitations were determined by parents report on whether young adults experienced any limitations in six areas: general health, vision,

use of arms hands legs and feet, speech production, understanding of speech, and participation in bidirectional communication.

In their study of variables affecting the successful employment of 41 young adults with visual impairments served by VR agencies, McDonnall and Crudden (2009) found through the use of t-tests that reading and math grade level equivalent scores were significantly associated with employment (reading $t(12,4) = 3.62, p = .003$; math $t(12,4) = 2.16, p = .003$). Those who were employed were significantly more likely to have higher reading and math grade level equivalent scores (7.71 and 7.56, respectively) than those who were unemployed (3.09 and 4.09, respectively; *Cohen's d* = 1.58 for reading difference and 1.03 for math difference). McDonnall and Crudden (2009) report reading and math grade level equivalent data were obtained from the youth's case files, however, the data measurement procedures were not specified.

Lastly, in their study of the Career Workforce Skills Training (CWST) program, Flannery, et al. (2011) found that employment outcomes were higher for individuals who did not have a skills barrier. Of the 465 participants in their study, 177 (38%) had an identified skills barrier. Having a skill barrier meant that a student experienced one or more of the following barriers to employment, including: no prior work experience, poor social skills, low academic placement test scores, or an unclear career goal. When comparing the outcomes for those with and without a skill barrier, even while accounting for other demographic and programmatic characteristics, young adults who had a skill barrier were .37 times less likely to find employment than those without a skill barrier ($B = -.99, SE = .333, OR = 0.37, p < .01, 95\% CI [0.19, 0.71]$). Only 22% of those with a

skill barrier completed all positive outcomes, compared to 32% of those without a skill barrier. (Flannery, et al., 2011).

Overall, there are a number of disability related impairments and impediments that have been demonstrated to predict employment outcomes among young adults with disabilities and young adults with disabilities receiving services from VR. These impairments include cognitive function and personal care function (D'Amico, 1991), disability significance, gross motor function, cognitive function, and personal care function (Hayward and Schmidt-Davis, 2000), functional limitations (Cameto, 2005), reading and math scores (McDonnall & Crudden, 2009), and skills barriers (Flannery et al., 2011).

Self-advocacy/self-determination. Self-advocacy and Self-determination skills were also variables that emerged from this literature review as predictors of employment for young adults with disabilities. Four of the 17 sources identified a predictor that was coded into the category.

Hayward and Schmidt-Davis (2000) reported that for young adults who did not receive special education, having a belief that others exert control over one's experiences and accomplishments was a significant positive factor influencing competitive employment. According to self-determination theory, believing that others control your experiences and accomplishments suggests a high level of extrinsic motivation, which has been linked to a number of negative outcomes such as less interest, value or effort and more blaming of others (Ryan & Deci, 2000). The results for the overall model, which included a number of other unspecified predictors, was $R^2 = .254$, $p < .0001$, where the unstandardized coefficient believing that others exert control over one's experiences

and accomplishments is negative ($B = .13$). This was not a predictor of competitive employment for young adults who did receive special education.

In their sample of NLTS-2 participants who were out of secondary school up to 2 years, Cameto, et al. (2005) found that social skills were significantly associated with competitive employment. Social skills ratings were determined using parent reports on nine items from the Social Skills Rating System (SSRS; Greshman & Elliot, 1990). Parents were asked to report on a scale of 1 to 3 (1 = never; 3 = very often) how often their children exhibit behaviors that resemble self-control, assertiveness, and cooperation. Scores ranged from nine to 27. Young adults whose parents responded very often to each of the nine were considered to have high social skills (16%). Twenty-percent were considered to have low social skills, however it is unclear what range of social skills scores were assigned to this group of participants. Multivariate analysis suggest that young adults with high social skills ratings had regular paid employment at the time of the interview 14 percentage points more often than young adults with low social skills ratings ($p < .05$).

Next, in their study of variables affecting the successful employment of 41 young adults with visual impairments served by VR agencies, McDonnall and Crudden (2009) found that self-determination and locus of control were significant predictors of employment. Data were collected from personal interviews and VR case records. Self-determination was represented by a single variable of three levels (great extent, some extent, and not at all) that measured the extent of decision making by the youth during the VR process. Fisher's exact test suggests that there is a nonrandom association between higher levels of self-determination and employment among young adults with visual

impairments ($p = .04$). Those who engaged a great extent in the decision making process were employed 65% of the time, compared to 31% of those who engaged to some extent in the decision making process. Using a multivariate analysis of variance (MANOVA), McDonnall and Crudden (2009) also found that locus of control was significantly associated with employment. Locus of control was measured for young adults prior to receipt of VR services using Levenson's Locus of Control Scales (Levenson, 1981), which contains three aspects of Locus of Control, namely internal, powerful others, and chance, that were scored on a three point scale. MANOVA results suggest that for young adults with visual impairments receiving services from VR agencies, youth that were employed had higher scores on all three locus of control subscales ($F(3, 13) = 3.60, \lambda = 0.55, p = .04$). The results from McDonnall and Crudden (2009) suggest that young adults who believe they have more control over what happens to them are more likely to be employed than young adults who do not share those same beliefs.

Across each of these sources, the self-advocacy and self-determination variables that influenced employment for young adults with disabilities included a belief that others exert control over one's actions, social skills, and self-determination and locus of control. The results from literature review suggest that there are intrinsic individual characteristics have a significant impact on employment outcomes for young adults with disabilities.

Receipt of public financial assistance. Research has also demonstrated that receipt of public financial assistance is negatively associated with positive post-secondary outcomes. Specifically, three of the seventeen sources in this systematic review contributed to this conclusion (Hayward & Schmidt-Davis, 2000; Geisen & Cavanaugh, 2012; Migliore et al., 2012).

Hayward and Schmidt-Davis (2000) reported that for young adults who did and did not receive special education, receiving public financial assistance was a significant negative factor influencing competitive employment. The results for the overall model for those young adults who had received special education during high school was $R^2 = .197$, $p < .0001$, where the unstandardized coefficient of receipt of public financial assistance was negative ($B = -.25$). The results for the overall model for those young adults who did not receive special education during high school was $R^2 = .254$, $p < .0001$, where the unstandardized coefficient of receipt of public financial assistance was negative ($B = -.29$). No other statistical results were reported.

Additionally, in their sequential block logistic regression analysis of 2,282 young adults from RSA-911 who were aged 22 or younger with visual impairments, Geisen and Cavanaugh (2012) found that young adults who received public financial assistance (as measured by receipt of SSI) were less likely to be competitively employed than young adults who did not receive public financial support. Notably, receiving SSI at VR application was the strongest negative predictor of competitive employment for young adults with visual impairments receiving services from Vocational Rehabilitation ($B = -.881$, $SE = .114$, $Wald = 59.251$, $p = .001$, $\text{Exp}[\beta] = .415$). Receiving SSI at VR application was also the second strongest overall (positive or negative) predictor of competitive employment (second to the positive impact of a young adult having earnings at the time of application). Twenty-one percent of young adults who were competitively employed were recipients of SSI, compared to 41% of young adults who were not-competitively employed (sheltered workshop, earning less than minimum wage, etc.), and 40% of those who were not employed at all.

Furthermore, Migliore et al., (2012) found that youth who were not Medicaid or Medicare recipients were 1.29 times more likely to be competitively employed than those who received Medicaid or Medicare ($Wald = 8.67$, $OR = 1.29$, 95% CI [1.09, 1.52]). The fit of the model was good, *Hosmer and Lemeshow test*, $\chi^2(8, N = 2,913) = 7.5$, $p = .48$, and the Nagelkerke coefficient was medium ($R^2_{Nag} = .20$). Migliore et al, (2012) report that being a recipient of SSI or SSDI at VR application was not a significant predictor of competitive employment, but it was however a significant negative predictor of higher earnings and number of hours worked per week. Lastly, Gonzalez, Rosenthal & Kim (2011) report that young adults with disabilities who received public financial support were more likely to be competitively employed at the time of VR closure than young adults who did not receive public financial support.

Four sources identified receipt of public financial assistance, including SSI, Medicaid, and Medicare, as negative predictors of post-secondary employment (Hayward & Schmidt-Davis, 2000; Geisen & Cavanaugh, 2012; Migliore et al., 2012, and Gonzalez et al., 2011).

Family/household variables. Another sub-category of individual and family predictors of employment for young adults with disabilities was family and household variables. Family and household variables were identified in five of the 17 sources. These variables are included in Table 2.1.

First, D'Amico's (1991) analysis of NLTS data comparing the extent to which young adults had competitive employment shortly after high school revealed that young adults from households with an annual income of less than \$12,000 experienced significantly lower rates of employment (32%) than young adults from higher income

households (more than \$25,000; 58%; $p < .001$). Similarly, the author reported that young adults from single-parent households had significantly lower rates of employment than young adults from two parent households (55%; $p < .001$).

Furthermore, results from NLTS-2 reports suggest that annual household earnings play a significant role in predicting employment for young adults with disabilities (Newman et al., 2009; Sanford et al., 2011; Newman et al., 2011). NLTS-2 (Wagner et al., 2009) multivariate analysis of young adults with disabilities up to four years after high school suggest that young adults from households earning more than \$50,000 annually were significantly more likely to have been employed since leaving high school than youth from households earning \$25,000 or less (81% compared to 61%, $p < .01$). No significant differences were found for being employed at the time of the interview. Similarly, NLTS-2 (Sanford et al., 2011) multivariate analysis of young adults with disabilities up to six years after high school suggest that young adults from households earning more than \$50,000 annually were significantly more likely to have a paid job at the time of the interview than youth from households earning \$25,000 or less (79% compared to 58%, $p < .01$). Additionally, NLTS-2 (Newman, et al., 2011) multivariate analysis of young adults with disabilities up to eight years after high school suggest that young adults from households earning more than \$50,000 and \$25,001 to \$50,000 annually were significantly more likely to have a paid job at the time of the interview than youth from households earning \$25,000 or less (71% and 65%, compared to 44%, $p < .01$).

One family and household factor, level of household income, was identified to significantly influence the employment outcomes of young adults with disabilities in

multiple sources (D'Amico, 1991; Newman et al., 2009; Sanford et al., 2011; Newman et al., 2011).

In-school experiences and outcomes. The second component of the NLTS theoretical framework is in-school experiences and outcomes. Four of the 17 sources in this literature review included in school experiences as a predictor of competitive employment. There were three sub-categories including: (1) career development opportunities; (2) school setting; and (3) high school completion. For a complete list of in-school experiences and outcomes identified in the review of the literature, refer to Table 2.3. A summary of the findings for each sub-category is provided below.

Career development opportunities. Career development opportunities was the first sub-category of in-school experiences and outcomes shown to be a predictor of employment for young adults with disabilities and young adults with disabilities receiving services from VR. Career development opportunities were documented in three sources between 1991 and 2012. Career development opportunities that predicted competitive employment for these individuals included having had prior work experience and vocational education experiences with their high school.

First, in D'Amico's (1991) analysis of NLTS data comparing the extent to which youth had competitive employment shortly after high school suggests that youth who were enrolled in at least one vocational education course during the last year of their secondary school were more likely to be competitively employed than those who were not. Similarly, those who had work experiences a part of their secondary school

Table 2.3. In-School Experiences and Outcomes that Impact Employment for Young Adults with Disabilities Receiving Services from VR

Factor	(+/-)	Systematic Literature Review Source																	Total
		Peer Reviewed Article						NLTS & NLTS-2								RSA-911		CPS	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Career Development Opportunities</i>																			
Prior Work Experience	+		X				X	X											3
Vocational Education	+							X											1
<i>School Setting</i>																			
Inclusion in General Education	+							X											1
Regular School Setting	+							X											1
<i>High School Completion</i>																			
High School Completion	+							X	X					X					3
Total		-	1	-	-	-	1	5	-	1	-	-	-	1	-	-	-	-	9

Note. See Table 2.1 source key for a list of references. Sources 2, 3, 4,5, 8, 10, 11, 12, 14, 15, 16 & 17 did not report in-school experiences that impacted employment outcomes. Positive and negative symbols represent the direction of the relationship of the factor on predicting an employment outcome.

vocational programming were more likely to be competitively employed than those who did not (62% compared to 45%). The results of this comparison were statistically significant, $p < .05$. Furthermore, multivariate analysis of predictor variables of employment, revealed that even after controlling for other demographic variables such as age, race/ethnicity, disability, and household, school and community characteristics, young adults who had been enrolled in at least one vocational education course during their last year of secondary school were more likely to be competitively employed than those who did not. The results of this analysis were statistically significant, $r(1,271) = .40, p < .05$. Additionally, the same multivariate analysis suggest that young adults who had work experience as a part of their secondary school vocational programming were more likely to be competitively employed at the time of the interview than those who did not. The results of this analysis were also statistically significant, $r(1,271) = .57, p < .001$.

Next, in their study of variables affecting the successful employment of 41 young adults with visual impairments served by VR agencies, McDonnall & Crudden (2009) found in data collected from personal interviews and VR case records, that having prior work experiences was a significant predictor of employment. Descriptive data suggest that all 22 of those young adults who had cases closed as competitively employed had worked at some point since the onset of their disability, compared to 10 of the 13 cases that were closed other than competitively employed. The results of this comparison were statistically significant, $p = .04$. Additionally, McDonnall & Crudden (2009) found that the number of jobs a young adult held prior to the receipt of VR services was a significant predictor of employment, whereas for each additional job that a young adult

held prior to receiving VR services, the odds of them finding competitive employment increased by more than five times ($\chi^2 = 8.69, p = .003, OR = 5.64, 95\% CI = 1.21, 26.28$).

Lastly, Geisen and Cavanaugh (2012) found in their sequential block logistic regression analysis of 2,282 young adults from RSA-911 who were aged 22 or younger with visual impairments, that prior work experience was a significant predictor of competitive employment ($\beta = 1.170, SE = .168, Wald = 148.426, p = .001, Exp[\beta] = 3.222$). Prior work experience was determined by a client having any earnings at the time of their application to vocational rehabilitation.

The results from this review of the literature suggest that a young adults career development opportunities prior to receiving services from VR are important variables in predicting their subsequent employment outcomes. Career development opportunities that were demonstrated to be predictors of employment among young adults with disabilities and young adults with disabilities receiving services from VR included enrolling in a vocational class during high school, and having prior work experience (D'Amico, 1991; McDonnall & Crudden, 2009; Geisen & Cavanaugh, 2012).

School setting. The second sub-category of predictors of employment for young adults with disabilities within this category was school setting. One of the 17 sources identified two in-school setting variables that significantly predicted employment. D'Amico (1991) reported that students who received their education in a regular school setting and students who were included in the general education classroom were significantly more likely to be competitively employed than those who did not have either of these two in-school experiences. Specifically, students who spent between two-thirds and their entire day in a regular education classroom were competitively employed

67% of the time, compared to 45% of those who spent one-thirds and two-thirds of their class time in a regular education. The results from this comparison were statistically significant, $p < .05$. Similarly, students who attended secondary school at a regular school setting were competitively employed at the time of the interview 51% of the time, compared to only 19% of the time for those who attended a special school. The results of this comparison were statistically significant, $p < .01$. (D'Amico, 1991).

High school completion. The third sub-category of variables from in-school experiences and outcomes was high school completion. Three of the 17 sources identified high school completion as a significant predictor of employment among young adults with disabilities (D'Amico, 1991; D'Amico & Blackorby, 1992; Sanford et al., 2011). Two other sources found that this variable was not significant in their analysis (Cameto, 2005; Newman, et al., 2011).

First, D'Amico (1991) reported that the manner in which a young adult left high school was a significant predictor of their subsequent competitive employment. Young adults who graduated were competitively employed 55% of the time, compared to 39% of those who either dropped out or were expelled, and 29% of those who aged out. When conducting a multivariate analysis of competitive employment taking into account individual and family, school and community variables, youth who graduated from high school were 17% points more likely to be competitively employed than those who had dropped out. The results of this analysis were statistically significant, $r(1,271) = .74, p < .001$.

Next, D'Amico (1992) reported significant differences in competitive employment outcomes depending on high school completion status. These findings were

identified in two groups of students: (a) those who had been out of school less than two years, and (b) young adults who had been out of school between three and five years. For young adults who had been out of school less than two years, 53% of those who completed high school were employed, compared to 42% of those who dropped out and 25% of those who aged out. For young adults who had been out of school between 3-5 years, 65% of those who completed high school were employed, compared to 47% of those who dropped out and 37% of those who aged out ($p < .10$).

Sanford et al., (2011) found differences in employment status by high school leaving characteristics. Specifically, they found that young adults who had completed high school were more likely to report being employed at the time of the interview than young adults who had not completed high school. Young adults who had completed high school were employed 73% of the time, compared to 52% of the time for those who did not complete high school ($p < .01$).

In summary, three of the 17 studies identified high school leaving characteristics as a significant predictor of post-secondary employment (D'Amico, 1991, 1992; Sanford et al., 2011). Two of the 17 studies included this factor in their analysis and it was not determined significant (Cameto, 2005; Newman et al., 2011).

Post-school experiences and outcomes. The third component of the NLTS theoretical framework is post-school experiences and outcomes. Eight of the 17 sources in the literature review included at least one predictor of competitive employment that was coded as a post-school experience or outcome. The two sub-categories from these variables included (1) VR services, and (2) post-secondary education. For a complete list of post-school experiences and outcomes that were identified in this review of the

literature, refer to Table 2.4. A summary of the finding for each sub-category is discussed below.

VR services. The first sub-category of post-school experiences and outcomes was the specific services an individual received after applying for VR. Six sources identified specific services that significantly predicted competitive employment outcomes among young adults receiving services from VR.

First, in their multiple regression analysis of 135,000 VR consumers 25 years old or younger Hayward and Schmidt-Davis (2000) reported that for young adults who participated in special education, receiving education and training services from VR was a significant positive factor in predicting a competitive employment outcome. The results for the overall model for those young adults who received special education during high school was $R^2 = .197, p < .0001$, where the unstandardized coefficient of receipt of education and training services was positive ($B = .21$). Additionally, for young adults who did not participate in special education, receiving diagnostic/evaluation services from VR was a significant positive factor in predicting competitive employment. The results for the overall model for those young adults who did not receive special education during high school was $R^2 = .254 (p < .0001)$, where the unstandardized coefficient of receipt of education and training services was positive ($B = .20$).

Next, In their study of 1,687 young adults from RSA-911 between the ages of 18 and 25 receiving services from VR, Schaller et al. (2006) found that for males with a disability of ADHD, competitive employment outcomes increased with receipt of VR counseling, job search assistance services, and job placement assistance services. In an effort to cross validate their step-wise logistic regression findings, the sample was broken

Table 2.4. Post-School Experiences and Outcomes that Impact Employment for Young Adults with Disabilities Receiving Services from VR

Factor	(+/-)	Systematic Literature Review Source																	Total	
		Peer Reviewed Article						NLTS & NLTS-2								RSA-911		CPS		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
<i>VR Services</i>																				
Job Placement	+	X				X	X													3
General or vocational supports	+						X													1
College services	+						X													1
Evaluation and Diagnostic Services	+																X			1
Education/Training Services	+																X			1
Job search provided	+					X														1
Job search assistance	+	X																		1
VR counseling	+	X																		1
Miscellaneous training provided	+					X														1
Financial Support	+				X															1
Assistive technology	+		X																	1
Below median # of days to closure	+					X														1
Remedial services	-						X													1
College services	-					X														1
<i>Post-Secondary Education</i>																				
Level of Education	+						X											X		2
Postsecondary Education Imprv.	+					X														1
Postsecondary Completion	+														X					1
Total		3	1	-	1	6	5	-	-	-	-	-	-	-	1	2	1	-		20

Note. See Table 2.1 source key for a list of references. Sources 3, 7, 8, 9, 10, 11, 12, 13, & 17 did not report any post-school experiences that impacted employment outcomes. Positive and negative symbols represent the direction of the relationship of the factor on predicting an employment outcome.

into two groups. The results from both samples were consistent. For receipt of VR counseling services the results for sample one were, $\beta = .478$, $SE = .180$, $Wald = 7.027$, $p = .008$, $Exp(\beta) = 1.612$, and for sample two were, $\beta = .447$, $SE = .177$, $Wald = 6.353$, $p = .012$, $Exp(\beta) = 1.564$. For receipt of job search assistance services the results for sample one were, $\beta = .870$, $SE = .255$, $Wald = 11.683$, $p = .001$, $Exp(\beta) = 2.387$, and for sample two were, $\beta = .636$, $SE = .277$, $Wald = 5.287$, $p = .021$, $Exp(\beta) = 1.564$. For receipt of job placement services the results for sample one were, $\beta = .757$, $SE = .270$, $Wald = 7.839$, $p = .005$, $Exp(\beta) = 2.132$, and for sample two were, $\beta = .734$, $SE = .281$, $Wald = 6.812$, $p = .021$, $Exp(\beta) = 2.083$. Additionally, results from analysis from both samples suggest that for females with ADHD receipt of job search assistance positively predicted a competitive employment outcome, where for sample one the results were, $\beta = 1.802$, $SE = .433$, $Wald = 17.305$, $p < .001$, $Exp(\beta) = 6.062$, and for sample two were, $\beta = 1.675$, $SE = .462$, $Wald = 13.117$, $p < .001$, $Exp(\beta) = 5.338$.

Additionally, in their study of variables affecting the successful employment of 41 young adults with visual impairments served by VR agencies, McDonnall & Crudden (2009) found that youth who used assistive technology services were more likely to be competitively employed than those who did not. Fisher's exact test suggests that there is a nonrandom association between using assistive technology and employment among young adults with visual impairments ($p < .01$). In this study, 91% of those who used assistive technology services were employed compared to 9% of those who did not use assistive technology services.

Subsequently, in their study of 465 participants of the CWST program, Flannery et al. (2011) report that individuals who received financial support services were about

3.5 times more likely to have completed the program and be competitively employed at exit and follow up than participants who did not receive financial support services. The results from this analysis were statistically significant, ($B = 1.32$, $SE = .342$, $OR = 3.74$, $p < .01$, 95% CI [1.98, 7.06])

Another source that revealed VR services as a predictor of employment among young adults receiving services from VR was Migliore et al. (2012). In their sample of 2,913 young adults with autism between 16 and 26 who had received services from VR, these researchers found that job placement services, miscellaneous training provided, college services provided, and job search services provided were all significant predictors of competitive employment outcomes. Receiving college services was a significant negative predictor of competitive employment. Forty-eight percent of young adults in their sample received job placement services, and were four times more likely to obtain competitive employment than those who did not receive job placement services, $Wald = 232.39$, $OR = 4.08$, 95% CI (3.41, 4.89), $p < .01$. Sixteen percent of young adults in their sample received miscellaneous training, and were 1.5 times more likely to obtain competitive employment than those who did not receive miscellaneous training, $Wald = 12.45$, $OR = 1.54$, 95% CI (1.21, 1.96), $p < .01$. Ten percent of young adults in their sample received college services, and those who did not receive college services were 1.5 times more likely to obtain competitive employment than those who did receive college services, $Wald = 7.45$, $OR = 1.53$, 95% CI (1.13, 2.08), $p < .05$. Thirty-four percent of young adults in their sample received job search services, and were almost 1.5 times more likely to obtain competitive employment than those who did not, $Wald = 25.18$, $OR = 1.47$, 95% CI (1.21, 1.78), $p < .01$. Additionally, Migliore et al. (2012), reported that

young adults with autism who were below the median number of days to closure (820 days; Min = 7, Max = 2,702, SD = 552) were 1.5 times more likely to obtain competitive employment than those who closed above the median number of days to closure. The results from these analysis were significant, $Wald = 25.18$, $OR = 1.54$, 95% CI (1.30, 1.82), $p < .01$.

Lastly, Geisen and Cavanaugh (2012) found in their sequential block logistic regression analysis of 2,282 young adults from RSA-911 who were aged 22 or younger with visual impairments that job placement services, general or vocational supports, college services and remedial services were significant predictors of competitive employment. Young adults who received job placement services ($\beta = .674$, $SE = .056$, $Wald = 147.117$, $p < .001$, $Exp(\beta) = 1.961$), general vocational supports ($\beta = .163$, $SE = .042$, $Wald = 15.175$, $p < .001$, $Exp(\beta) = 1.777$), or college services ($\beta = .364$, $SE = .048$, $Wald = 56.704$, $p < .001$, $Exp(\beta) = 1.440$) were more likely to obtain competitive employment than those who did not (Geisen & Cavanaugh, 2012). On the other hand, young adults who received remedial services were significantly less likely to obtain competitive employment than those who did not ($\beta = -.867$, $SE = .116$, $Wald = 56.005$, $p < .001$, $Exp(\beta) = 0.420$).

In summary, a variety of services that individuals received while participating in VR were significant predictors of employment outcomes for young adults with disabilities. The findings from this review suggest VR services that are positive predictors of competitive employment include: education and training, VR counseling, job search assistance job placement assistance, assistive technology, financial support, miscellaneous training, and college services. However, young adults with visual

impairments who received remedial services were significantly less likely to enter competitive employment than those who did not. The results from this review suggest that specific types of VR services can have an impact on employment outcomes for young adults with disabilities. Further investigation is needed to better understand the impact of these services on the outcomes of young adults with disabilities receiving services from VR.

Post-secondary education. The second sub-category of post-school experiences and outcomes was post-secondary education. Three sources identified post-secondary education related variables that predicted competitive employment outcomes among young adults receiving services from VR.

First, in their sample of 2,913 young adults with autism between 16 and 26 who had received services from VR, Migliore et al. (2012) found that post-secondary education improvement between application and closure was a significant predictor of competitive employment, where students who demonstrated education improvement were 1.73 times more likely to be competitively employed than those who had not. The results from this comparison were significant, $Wald = 13.97$, $OR = 1.73$, 95% CI (1.30, 2.30), $p < .01$. Post-secondary education improvement was assigned to students who entered the VR program with a high school diploma/certificate or lower education attainment and exited the VR program after participating in postsecondary education, with or without a degree.

Next, in their sequential block logistic regression analysis of 2,282 young adults from RSA-911 who were aged 22 or younger with visual impairments, Geisen & Cavanaugh (2012) found that level of education at VR application predicted competitive

employment. The results of these analysis were significant, ($\beta = .140$, $SE = .040$, Wald = 11.940, $p = .001$, $\text{Exp}(\beta) = 1.150$). Level of education was coded into categories ranging from 1 (no formal school or elementary grades) to 7 (bachelor's degree or higher). The labels of the intervals between 1 and 7 were not provided. The average education level of students who were competitively employed was 2.994 ($SE = .044$) compared to 2.650 ($SE = .033$) of those students who were not employed.

Lastly, Newman et al.'s (2011) multivariate analysis of participants of NLTS-2 up to 8 years after high school suggest that young adults who completed post-secondary training and education programs were significantly more likely to have been employed since high school than young adults who had not finished high school or those who did finish high school (99% compared to 78% and 89%, $p < .001$).

Across these three studies that identified post-secondary education variables as a predictor of competitive employment for young adults with disabilities, the variables included improvement in post-secondary education between application to VR and VR closure, level of education at VR application, and post-secondary training and education completion (Migliore et al., 2012, Geisen & Cavanaugh, 2012; Newman et al., 2011). The results from this review suggest that post-secondary education is an important factor that may contribute positively to the employment outcomes of young adults with disabilities receiving services from VR.

Contextual factors. The last component of the NLTS theoretical framework is contextual factors. Two of the seventeen sources in the literature review included predictors of competitive employment that were coded as a contextual factor. The three subcategories included: (1) geographic characteristics; (2) VR state program

characteristics; and (3) availability of employment. For a complete list of contextual factors that were identified in this review of the literature, refer to Table 2.4. A summary of the finding for each sub-category is discussed below.

Geographic Characteristics. The first sub-category is geographic characteristics, specifically being from a suburban area. This variable was not included in any other sources. D'Amico (1991) reported that the geographic location where a young adult lived was a significant predictor of post-secondary employment status. Specifically, young adults who lived in a suburban area were employed a greater percentage of the time than young adults who lived in either a rural area or urban area (62% compared to 48% and 38%, respectively). When conducting a multivariate analysis of competitive employment taking into account individual and family, school and community variables, young adults who lived in a suburban setting were 10 percentage points more likely to be employed than young adults who lived in an urban area. The result of this analysis is statistically significant, $r(1,271) = .42, p < .05$.

State characteristics. The second sub-category of contextual factors were characteristics of the state. Only two sources included these characteristics in their analysis. Honeycutt, Thompkins, Bardos & Stern (2013) found that a number of State VR program characteristics were significantly correlated with the proportions of youth from that state that closed from VR with employment. Specifically, Honeycutt et al. (2013) reported that the state percentage of VR clients who were transition-age youth with a disability was positively correlated with the proportion of youth who closed from VR with employment. The results of this correlation were statistically significant, $r = .249, p < .05$. Next, the state VR grant allotment per working- age person with a disability was

Table 2.5. Contextual Factors that Impact Employment for Young Adults with Disabilities Receiving Services from VR

Factor	(+/-)	Systematic Literature Review Source																	Total
		Peer Reviewed Article						NLTS & NLTS-2								RSA-911		CPS	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Geographic Characteristics</i>																			
Suburban	+							X											1
<i>VR State Program Characteristics</i>																			
VR Grant Allotment per Client	+																	X	1
VR Mean Cost per Client	+																	X	1
VR Youth Caseload Proportion	+																	X	1
<i>Availability of Employment</i>																			
State Unemployment Rate	+							X										X	2
Total		-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	4	6

Note. See Table 2.1 source key for a list of references. Sources 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, & 16 did not report any contextual factors that impacted employment outcomes. Positive and negative symbols represent the direction of the relationship of the factor on predicting an employment outcome.

positively correlated with the proportion of youth who closed from VR with employment. The results of this correlation were statistically significant, $r = .351, p < .05$. Lastly, the state mean cost of purchased services per youth served was negatively correlated with the proportion of youth who closed from VR with employment. The results of this correlation were statistically significant, $r = -.377, p < .05$.

In summary, the state percentage of VR clients who were transition-age, and the state VR grant allotment per working age-person with a disability were positively associated with a higher proportion of youth who closed from VR with competitive employment. On the other hand, the states mean cost of purchased services per youth served was negatively associated with a higher proportion of youth who closed from VR with competitive employment.

Labor market factors. The third sub-category was the availability of employment. Only two sources included these characteristics in their analysis. First, D'Amico (1991) reported local unemployment rate was a significant predictor of post-secondary employment status. Specifically, young adults who lived in location that had an unemployment rate of 6% or less were employed a greater percentage of time than those who were from an area where the unemployment rate was between 6.1% and 8%, and more than 8% (56% compared to 46% and 43% respectively). When conducting a multivariate analysis of competitive employment taking into account individual and family, school and community variables, young adults who were from a location that had an unemployment rate of 10% were 6 percentage points less likely to be employed than young adults were from a location that had an unemployment rate of 5%. The results of this analysis were statistically significant, $r(1,271) = .05, p < .05$. Additionally, in their

analysis of state-level statistics on the outcomes for a cohort of youth who applied for VR services between 2004 through 2006, Honeycutt, et al. (2013) reported that the annual state unemployment rate was negatively correlated with the proportion of youth who closed form VR with employment, $r = -.334, p < .05$. In summary, the higher the rate of unemployment, the more difficult it was for young adults with disabilities to find competitive employment (D'Amico, 1991; Honeycutt et al., 2013).

Summary of findings from the systematic review of the literature. The findings from the systematic review of the literature suggest that there are a number of variables that contribute to young adults with disabilities receiving services from VR achieving competitive employment. Each of the factors that were identified were coded into one of the four categories identified in the NLTS theoretical framework: (1) individual and family characteristics, (2) in-school experiences and outcomes, (3) post-school experiences and outcomes, and (4) contextual factors. The evidence supporting those factors is clear, however, they results also suggest that further investigation and validation of the role these factors play in predicting employment outcomes for young adults with disabilities receiving services from VR is needed.

Research Questions

The NLTS conceptual framework and review of the literature suggest that employment outcomes for young adults with disabilities are influenced by (a) individual and family characteristics, (b) experiences and outcomes while enrolled in high school, (c) experiences and outcomes after leaving high school, and (d) other contextual factors (Fairweather, et. al., 1984). My systematic review of the literature revealed two primary gaps in the research that this study fills. First, I observed that there were only a limited

number of peer-reviewed sources identifying predictors of employment for young adults with disabilities receiving services from VR. This was surprising to me, because in recent years RSA has placed an emphasis on increasing supports for young adults with disabilities (Honeycutt et al., 2013). The findings from my study address this gap by contributing to the evidence base of variables that predict VR closure outcomes for young adults with disabilities. Second, I observed, that of the six peer-reviewed articles that I identified; all of them focused on a specific sub-group of the population of young adults with disabilities receiving services from VR (i.e., a single disability group, or participants in a specific transition program). The results from my study address these gaps in the literature by providing a broader level of evidence about the variables that predict VR closure status among young adult with disabilities across disability groups.

Based on the results of the systematic review of the literature, I developed four theoretically driven research questions. Please note that due to the limitations of my data set, I was unable to include any family variables in the study.

1. How do individual characteristics (age, sex, race, disability, impediments to employment, and receipt of SSI) predict VR closure status among young adults with disabilities receiving services from VR?
2. How do in-school experiences and outcomes (participation in the Youth Transition Program, working at application, and high school completion at application) predict VR closure status above and beyond individual characteristics among young adults with disabilities receiving services from VR?
3. How do post-school experiences and outcomes (number of VR services, below median days to closure, and some post-secondary education) predict VR closure

- status above and beyond individual characteristics and in-school experiences and outcomes among young adults with disabilities receiving services from VR?
4. How do contextual factors (community type and federal fiscal year) predict VR closure status above and beyond individual characteristics, in-school experiences and outcomes, and post-school experiences and outcomes among young adults with disabilities receiving services from VR?

My research questions are based on the theoretical framework from NLTS; however, are somewhat constrained by the data available to me and the setting in which my research has been conducted. I have slightly adapted the NLTS theoretical framework to be more specific to my data and research setting. Figure 2.1 provides a visual representation of the revised conceptual model for this study.

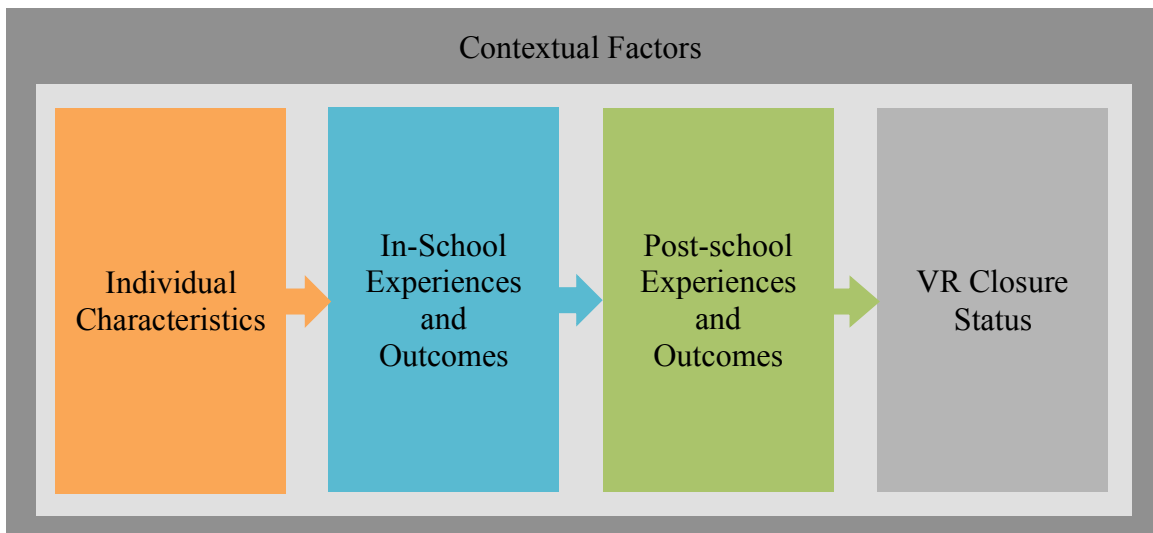


Figure 2.1. *Adapted NLTS theoretical framework used in this study.*

CHAPTER III

METHODS

The purpose of this study was to identify factors that predict VR closure outcomes for young adults with disabilities in Oregon who received services from VR between 2003 and 2013. More specifically, this study used logistic regression to answer four research questions aimed at increasing our understanding of how individual characteristics, in-school experiences and outcomes, post-school experiences and outcomes, and contextual factors influence VR closure status. In this chapter, I include information about the source of my data, participants, outcomes and predictor variables, missing data, and analytic procedures.

Data Source

The data used in this study is a subset of existing data from Oregon VR. The database includes de-identified records of young adults with disabilities (under the age of 21) that, (a) applied for VR Services between 6/1/2003 and 6/1/2013, (b) were determined eligible, (c) had a completed Individualized Plan for Employment (IPE), and (d) had closed from VR services.

VR is a cooperative state and federal program that is designed to facilitate employment opportunities for people with disabilities. VR serves individuals with physical or mental disabilities who have a barrier to employment and a desire to obtain work that matches their skills, potential, and interests (McDonough & Revell, 2010). Individuals are typically referred to VR through a variety of referral sources, including but not limited to, schools, public and private organizations, correctional institutions, and self-referrals. VR offers a variety of services to assist people with disabilities to prepare

for, obtain and maintain employment. The services that are provided by VR depend on the individual's needs and circumstances, but may include: assessment; counseling and guidance; independent living services; assistive technology; training; and job placement. ("Office of Vocational Rehabilitation Services," n.d., para. 1-5). Under the *Rehabilitation Act of 1973*, VR agencies are required to coordinate with education officials to help facilitate receipt of in-school services to post-school services for eligible individuals with disabilities (Rehabilitation Act of 1973).

Each individual who applies for Vocational Rehabilitation Services in Oregon is entered into the integrated case management database called Oregon Rehabilitation Case Automation System (ORCA), where individual demographics, services, and employment outcome data are recorded and tracked. The purpose of ORCA is not for scientific inquiry, but rather it is used as an evaluation and performance monitoring tool at the local, state and national level. ORCA includes access for field and district offices to case information, online caseload statistics, reporting, reminders of due dates and impending actions, documentation for all federal and state reports, and reliable and easily accessed source of data for budgeting, planning and reporting (Oregon Blue Book, n.d.). For example, an individual VR counselor would use ORCA to track service provision and progress for an individual client on their caseload. At the local level, a VR Branch Manager could summarize rehabilitation outcomes for clients served within the branch.

In this study, I have examined existing ORCA data to answer my research questions. This data was made available to the Secondary Special Education and Transition research group in the College of Education as a part of a contract to provide program evaluation services for VR. The data were housed in an active database and

required support from a VR database analyst to develop the tables of variables for my study. I worked with the database analyst to understand the structure of the database and identify variables that I could access. Using my review of the literature to guide my decisions, I requested from the database analyst custom datasets that included individual, in-school, post-school and contextual variable for young adults who applied for services between 2003 and 2013.

The tables containing the selected variables were converted into .sav (IBM SPSS software) files and merged. The majority of variables were string variables and were recoded into categorical (or dichotomous) variables prior to merging. Additionally, prior to merging, date, age and new categorical variables were computed. New variables that were computed include age, race, primary disability, multiple disabilities, impediments to employment, high school completion at closure, number of VR services, on or below median days to closure, working at application, post-secondary education at closure, the community type (e.g., rural, micropolitan, metropolitan), and federal fiscal year of closure. Verification of the successful computation of each variable was thoroughly investigated using descriptive statistics and statistical consultation with a fellow graduate student. Once the database included all of the variables for analysis, the sample was restricted by my specific inclusion criteria and extraneous variables were deleted.

Participants

Participants include young adults with disabilities (under the age of 21) who applied for VR Services between 6/1/2003 and 6/1/2013, were determined eligible, had a completed Individualized Plan for Employment (IPE), and had closed from VR services. Only individuals who had a completed IPE were selected to be included in this study

because an IPE defines VR services and an individual cannot receive a positive closure outcome without an IPE in place. Similarly, only individuals who had closed from VR services were included in my sample because VR closure status is the dependent variable in my study. In total there were 4,443 participants who met the inclusion criteria. The original database included 9,117 unique records. Thus, 4,674 (or 51%) records did not meet the inclusion criteria because participants either: (a) applied for services outside of the selected time frame (n = 111), (b) were not determined eligible for VR services (n = 681), (c) did not have a completed IPE (n = 2,819), or (d) had not yet closed with VR (n = 1,063). Demographic characteristics for the entire sample are presented in table 3.1.

Table 3.1. Demographic Characteristics (n = 4,443)

Variable	n	%
Sex		
Male	2,712	61.0
Female	1,731	39.0
Race		
White	4137	93.1
Not-White	305	6.9
Missing	1	<0.1
Primary Disability		
SLD	1,602	36.4
Mental Illness	503	11.4
ID	462	10.5
Autism	421	9.6
Other Cog. Imp.	415	9.4
ADHD	412	9.4
Physical/Mob.	284	6.5
Sensory/Comm.	257	5.8
TBI	47	1.1
Missing	40	0.9
Multiple Disabilities		
Yes	2,674	60.7
No	2,327	52.9
Missing	40	0.9

Table 3.1 (continued).

Variable	n	%
Impediments to Employment.*		
Communication	1889	42.9
Interpersonal	2,266	51.5
Mobility	455	10.3
Self-Care	1,371	31.1
Self-Direction	2,255	51.2
Work Skills	3,759	85.4
Work Tolerance	1,299	29.5
Missing	40	0.9
SSI		
Yes	825	18.6
No	3,618	81.4
YTP		
Yes	3,038	68.4
No	1,405	31.6
High School Completion		
Yes	3,466	78.0
No	977	22.0
Average #VRS	4,443	4.22 ^b
Below Median DTC		
Yes	1,569	35.3
No	2,874	64.7
Some Post-School Education		
Yes	548	12.3
No	3,895	87.7
Community Type		
Rural	248	5.6
Micropolitan	898	20.2
Metropolitan	3,296	74.2
Missing	1	<0.1
FFY Closure		
2003	35	0.8
2004	275	6.2
2005	455	10.2
2006	510	11.5
2007	601	13.5
2008	524	11.8
2009	363	8.2
2010	452	10.2
2011	528	11.9
2012	524	11.8
2013	176	4.0

Table 3.1 (continued).

Note. Other Cog. Imp. = Other cognitive impairment; Physical/Mob. = Physical or mobility impairment; Sensory/Comm. = Sensory or communication impairment; Impediments to Emp. = Impediments to employment; SSI = social security income; YTP = youth transition program participant; High School Completion = high school completion certificate at closure; average #VRS = average number of VR services provided; FFY = federal fiscal year. Missing data are indicated only on variables where missing data is present (race, primary disability, multiple disabilities, and impediments to employment). *Percentages for impediments to employment equal greater than 100% because an individual may have more than one impediment.

Variables

Outcome variable. The outcome variable for this study is VR closure status at the individual's date of exit. VR closure status is a naturally dichotomous variable and includes two outcomes: (1) closed rehabilitated, and (2) closed other than rehabilitated. Section 7 (11) of the Rehabilitation Act (1973) defines a closed rehabilitated outcome when an individual is entering into full-time or part-time employment in the integrated labor market, has satisfied the vocational outcome of supported employment, or has any other vocational outcome that is determined appropriate by the Secretary of Education (e.g., self-employment, telecommuting, or business ownership; Rehabilitation Act, 1973). This means that individuals who are closed rehabilitated may be employed in three ways: (1) full or part time employment in an integrated labor market, (2) supported employment, or (3) other employment such as self-employment. If individuals do not meet the criteria to be closed rehabilitated, they are closed as "other than rehabilitated". There are no standardized guidelines for when it is appropriate to close a case as other than rehabilitated; instead, the decision is left up to the VR counselor. VR Closure has been re-coded from a string variable to a reference-coded variable where 0 represents a

VR closure outcome other than rehabilitated and 1 represents a VR closure outcome of rehabilitated.

Predictor variables. Based upon the review of the literature, 16 hypothesized predictor variables were identified. These variables include factors that have been grouped into one of the four categories identified by the NLTS theoretic framework: (a) individual factors, (b) in-school experiences, (c) post-school experiences, and (d) contextual factors. The variables that were included in the ORCA data set did not include any family factors. Thus, this research addressed only individual factors from the NLTS theoretical framework. The 16 hypothesized predictor variables are described below.

Individual factors. Individual factors include age, sex, race/ethnicity, primary disability, multiple disabilities, impediments to employment, and receipt of Social Security Income (SSI) at application. Each of these factors are described in more detail below.

Age. The age variable represents the age of an individual at the time that they applied for VR services. The age variable has been computed by measuring the time in years between an individual's birth date and their application date. The VR counselor is responsible for entering both the individuals' date of birth and their date of application into the ORCA data collection system. For the purpose of this dissertation, age was entered as a continuous variable and rounded to the nearest two decimal places. The average age of applicants was 18.56 ($SD = 1.03$; Min = 12.88, Max = 20.97).

Sex. The sex variable represents an individual's reported sex, and is entered by the VR counselor into the ORCA data collection system as either male or female. Previous research suggests that females are less likely to obtain a positive VR closure outcome

(e.g., D'Amico, 1991; Geisen & Cavanaugh, 2012), thus for the purpose of this dissertation I will test effect of being female on the VR closed rehabilitated closure outcome, where males are coded at 0 and females coded as 1. Sex was a string variable that was recoded.

Race. The race variable represents an individuals' reported race, and is entered by the VR counselor into the ORCA data collection system which contains five choices: (1) White, (2) Native American, (3) Asian, (4) Black, or (5) Hawaiian. An individual may have more than one reported race. In this study, the effect of being a race other than White on VR closure status will be tested. Individuals who are white are coded as 0, and those who are other than white are coded as 1.

Primary disability. Primary disability was coded using a combination of specific variables in the ORCA data base. In order for an individual to be determined eligible to receive services from VR, they must have a documented disability (Rehabilitation Act of 1973). To document an individual's disability, ORCA uses a system of 19 impairment codes and 70 disability cause/source codes; where a unique combination of these two codes is used to describe an individual's disability (i.e., "cognitive impairment (impairment)/ specific learning disability (cause)", or "hearing loss (impairment)/ congenital condition or birth injury (cause)"). The impairment code categorizes the function that prevents the client from obtaining employment, and the disability cause/source code indicates the cause of that impairment (Barcikowski, personal communication, January 21, 2014). All records include both a disability impairment code and a disability cause/source code.

The 19 impairment codes that were present in my sample included: (1) blindness; (2) cognitive; (3) communication; (4) deafness and blindness; (5) deafness, communication auditory; (6) deafness, communication visual; (7) general physical debilitation; (8) hearing loss, communication auditory; (9) hearing loss, communication visual; (10) manipulation; (11) mobility; (12) mobility and manipulation; (13) other hearing; (14) other mental; (15) other orthopedic; (16) other physical, (17) other visual; (18) psychosocial, and (19) respiratory.

The 39 cause/source codes (of 70 possible in the VR system) that were present in my sample included: (1) accident/injury; (2) accident/injury, not TBI; (3) alcohol abuse or dependence; (4) amputations; (5) anxiety disorder; (6) arthritis and/or rheumatism; (7) asthma or allergies; (8) attention-deficit-hyperactivity-disorder; (9) autism; (10) blood disorder; (11) cancer; (12) cardiac or circulatory system; (13) cause unknown; (14) cerebral palsy; (15) congenital condition or birth injury; (16) cystic fibrosis; (17) depressive and other mood disorders; (18) diabetes mellitus; (19) digestive; (20) drug abuse or dependence; (21) eating disorders; (22) epilepsy; (23) genitourinary system disorders; (24) HIV and AIDS; (25) intellectual disability; (26) mental illness; (27) multiple sclerosis; (28) muscular dystrophy; (29) Parkinson's disease, neurological; (30) personality disorders; (31) physical disorders and conditions; (33) polio; (34) respiratory disorders; (35) schizophrenia or other psychotic disorder; (36) specific learning disability; (37) spinal cord injury; (38) stroke; and, (39) traumatic brain injury.

Based upon the presence of 19 impairment codes, and 39 disability cause/source codes in my sample, there are a theoretical maximum of 1,330 possible unique disability impairment and cause/source code combinations. However, in my sample, there were

only 213 unique combinations. Ten (out of 213 possible) of the most common unique disability impairment and cause/source combinations within my sample represented 71% of participants and included: (1) cognitive impairment/ specific learning disability (32.6% of my sample); (2) cognitive impairment/intellectual disability (9.5%); (3) cognitive impairment/ADHD (5.8%); (4) cognitive impairment/autism (5.4%); (5) cognitive impairment/congenital condition or birth injury (4.6%); (6) cognitive impairment/cause unknown (3.9%); (7) other mental impairment/depressive and other mood disorders (2.5%), (8) other mental impairment/specific learning disabilities (2.3%); (9) other mental impairment/ADHD (2.0%); (10) psychosocial impairment/autism (1.9%).

Additionally, an individual may have multiple – as many as twenty – unique disability impairment and cause/source codes. Within the data base, each of an individual’s multiple unique combinations of codes are assigned a disability ranking. This ranking indicates which of the multiple unique combinations of codes has the most significant impact on the individual’s ability to obtain employment (Barcikowski, personal communication, January 21, 2014). For the purpose of this dissertation, the unique disability impairment and cause/source combination of codes that had the largest impact on an individual’s ability to obtain employment was labeled as primary disability impairment and cause/source code.

After the primary disability impairment and cause/source combination code was identified for each individual, the 213 possible unique combinations were then collapsed into nine primary disability categories. These disability categories include: ADHD, Autism, Intellectual Disability, Mental Illness, Other Cognitive Impairments, Physical and Mobility Impairments, Sensory or Communication Impairments, Specific Learning

Disability, and Traumatic Brain Injury. The primary disability categories were chosen based upon matching the language from the disability impairment and cause/source codes with disability labels used in IDEA and VR. This approach was modeled after previous research using VR data (Cimera, 2009) that used a similar approach. I coded and recoded each of the 213 unique combinations into the nine primary disability categories, reviewed the decisions for accuracy three times, and a member of my dissertation committee also reviewed these codes before I recoded the variables in my data base.

Since, the majority of participants were coded with a primary disability of “Specific Learning Disability,” I tested the effect of each disability on VR closure status using individuals with a specific learning disability as a reference group. In order to do this, a unique variable was computed for each primary disability category that indicated whether or not an individual had that disability (0 = no, 1 = yes). Subsequently, by leaving SLD out of my model, the multivariable analysis treated the missing variable as the baseline to compare all others (Pedauzer, 1997).

Multiple Disabilities. Having more than one disability has been shown to have a negative relationship on the employment outcomes of young adults with disabilities (Giesen & Cavanaugh, 2012). I tested the effect of having more than one disability on a VR closed rehabilitated closure status. Individuals who had one disability cause/source code were coded as 0 and those who had more than one disability cause/source code were coded as 1. Of the sample, 52.4% had one disability, 46.7% had more than one disability, and 0.9% were missing disability information. There were 40 records missing disability information.

Impediments to Employment. According to the Oregon Vocational Rehabilitation Administrative Rules, “a ‘substantial impediment to employment’ refers to a physical or mental impairment that, in light of medical, psychological, vocational, educational, communication, and other related factors, hinders an individual from preparing for, entering into, engaging in, or retaining employment consistent with the individual’s unique strengths, resources, priorities, concerns, abilities and capabilities” (OAR 582-001-0010, 43). An impediment to employment is determined by a VR counselor and is a part of the eligibility determination process for receiving services from VR; without an impediment to employment an individual cannot receive services from VR. An impediment to employment is described by a VR counselor using 74 items that fall within seven domains: (1) communication, (2) interpersonal, (3) mobility, (4) self-care, (5) self-direction, (6) work skills, and (7) work tolerance. For example, one of the 74 items may be “communication: not understood by others”, “communication: no telephone”, or “interpersonal: history of conflict with co-workers”. An individual may have more than one impediment to employment. For the purpose of this dissertation, I analyzed the effect of each of the seven domains and not of each of the 74 specific items within domains. Because an individual may have an impediment to employment in more than one of the seven domains, the effect of each of the seven domains were tested independently during analysis; where a 0 indicates not having that specific impediment to employment and a 1 indicates having that specific impediment. The most common impediment among the sample was work skills (84.6%) and the least common impediment was mobility (10.2%).

Receipt of SSI. Information about whether an individual received Social Security Income (SSI) benefits is collected by the VR counselor and entered into the ORCA database. SSI is a nationwide entitlement program for persons with limited income and resources that is administered by the Social Security Administration (SSA). Individuals are eligible for SSI if they have a monthly income that does not exceed the relevant SSI rate for his or her state. As of the time of writing (Fall 2014) the relevant SSI rate for a single individual living in Oregon was \$721/month. (U.S. Social Security Administration, 2014). Research has demonstrated the young adults with disabilities who are receiving public financial assistance may be less likely to achieve a positive VR outcome than those who are not (Hayward & Schmidt-Davis, 2000; Geisen & Cavanaugh, 2012; Migliore et al., 2012).

For the purpose of this dissertation, I tested the effect that being a recipient of SSI has on VR closure status, where a 0 is indicated for individuals who were not receiving SSI benefits at the time of application and a 1 signifies that that individual was receiving SSI benefits at the time of application. Of the sample, 18.6% were receiving SSI Benefits at the time of application and 81.4% were not.

In-school experience factors. In-school experiences include participation with Oregon Youth Transition Program (YTP), and having earned a high school completion certificate at closure. Each of these factors are described in more detail below.

Youth Transition Program. The Oregon Youth Transition Program (YTP) is a statewide transition program that serves as an enhanced VR service for some young adults with disabilities in Oregon. YTP is a collaborative effort between Vocational Rehabilitation, the Oregon Department of Education, the University of Oregon and local

school districts. Participating schools apply for competitive grants that fund an in-school Transition Specialist to identify and provide transition services to young adults with disabilities who are determined eligible for VR services (Benz, Lindstrom & Yovanoff, 2000). Within the ORCA database, VR counselors indicate whether or not an individual participated in YTP services. I tested the effect of participating in YTP on VR closure status against those who did not have a record of receiving YTP. Individuals who had not participated in YTP were coded as 0, and those who had participated in YTP were coded as a 1. Of the sample, 68.4% were participants of the YTP, and 31.6% had no record of participation in YTP.

High school completion at closure. High school completion at closure was computed from the ORCA variable “Closure Education Level” which includes nine levels: (1) no formal education; (2) elementary education (grades 1-8), (3) secondary education, no HS diploma (grades 9-12), (4) special education completion certificate; (5) high school graduate or equivalency certificate; (6) post-secondary education, no degree or certificate, (7) AA degree or Vocational-Technical school certificate; (8) bachelor’s degree, and (9) master’s degree or higher. For the purpose of this dissertation, I computed a variable to test the effect of high school completion at closure on VR closure status. Individuals who had received a special education completion certificate or higher (level 4 and above) were considered to have completed high school and were coded as a 1 for that variable. Individuals who had not received any formal education, had received up to elementary education, or had received but did not complete high school were coded as a 0. Of the sample, 78.0% had completed high school or higher at the time of VR closure and 22.0% had not.

Post-school experience factors. Post-school experiences include the number of services provided, median number of days to closure and having received at least some post-secondary education at closure. Each variable is described in detail below.

Number of Services Provided. The number of services an individual received from VR was computed from 27 separate variables that indicated if an individual received one of 27 specific services. The 27 services received by young adults in my sample included: (1) assessment (64.8%), (2) other services (60.2%), (3) transportation services (49.3%), (4) VR counseling and guidance (36.5%); (5) job placement assistance (32.1%), (6) job search assistance (26.7%), (7) job readiness training (17.7%), (8) occupational/vocational training (17.6%), (9) on-the-job supports (15.4%), (10) information and referral services (15.1%), (11) college or university training (11.1%), (12) diagnoses and treatment of impairments (9.9%), (13) job development (9.9%), (14) job preparation (9.4%), (15) on-the-job training (7.8%), (16) job placement (7.6%), (17) job retention (6.5%), (18) rehabilitation technology (5.8%), (19) basic remedial or literacy training (4.8%), (20) job coaching (4.7%), (21) disability related augmentative skills training (4.1%), (22) maintenance (2.9%), (23) miscellaneous training (2.9%), (24) interpreter services (2.4%), (25) technical assistance services (<1%), (26) personal attendant services (<1%), (27) reader services (<1%). For the purpose of this dissertation, the number of services provided was entered as a continuous variable (from 0 to 16), where 0 indicates no record of services. The sample, on average received 4.22 services ($SD = 2.47$).

Below the median number of days to closure. Previous research suggests that individuals who closed below the median number of days in VR services will be more likely to obtain a positive closure outcome (Migliore et al,2012). The total number of

days between an individual's application date and their closure date were calculated across all participants. A variable was then computed to test the effect of closing below the median number of days on VR closure status. Individuals who had closed with VR at or above the median number of days were coded as a 0 and those who had closed below the median number of days were coded as a 1. The median was used as the measure of central tendency for this variable to account for individuals who may have extreme values on either end of the spectrum. The median number of days to closure for the sample was 490 days, or 1.36 years. There were 35.3% of the sample that closed below the median number of days to closure, and 64.7% that closed above the median number of days to closure.

Some post-secondary education at closure. Coded similarly to high school completion at closure, some post-secondary education at closure was computed using the "Closure Education Level". There are nine levels of "Closure Education Level", including: (1) no formal education; (2) elementary education (grades 1-8), (3) secondary education, no HS diploma (grades 9-12), (4) special education completion certificate; (5) high school graduate or equivalency certificate; (6) post-secondary education, no degree or certificate, (7) AA degree of Vocational-Technical school certificate; (8) bachelor's degree, and (9) master's degree or higher. For the purpose of this dissertation, I computed a variable to test the effect of some post-secondary education at closure on VR closure status. For individuals who had less than some post-secondary education this variable was been coded as 0. For those who had at least some post-secondary education or higher, this variable was coded as a 1. Upon closure from VR, 12.3% of the sample had participated in some post-secondary education, and 87.7% had not.

Contextual factors. Contextual factors include community demographics from the counties within Oregon where services were provided, and the federal fiscal year when an individual closed with VR.

Community type. Oregon counties include a range of community types that range from urban environments such as Portland (population over 1 million) to rural environments such as Sumpter (population less than 250). The literature suggests that the population density where an individual resides may impact their overall employment outcome (D'Amico, 1991). In an effort to demonstrate the effect of community demographics on the employment outcomes of young adult VR consumers, I coded the county where an individual received services into one of three types: metropolitan, micropolitan, or rural. Counties were coded following the Metropolitan Statistical Area (MSA) definition set by the U.S. Office of Management and Budget and used by the U.S. Census Bureau and other federal government agencies (U.S. Census Bureau, 2014). Following the MSA definition, a metropolitan area was defined as a county with at least one large urban area that has a population of 50,000 people or more. A micropolitan area is a county that has at least one urbanized area with a population of 10,000 people or more, but less than 50,000 people. Lastly, a rural area is a county that does not meet the criteria for being a metropolitan or a micropolitan. A 2013 MSA map published by the Oregon Office of Rural Health was used to code each of Oregon's counties as either a metropolitan, micropolitan, or rural. For the purpose of this dissertation, I tested the effect of MSA on VR closure outcomes using rural as a reference variable for metropolitan and micropolitan areas. Individuals who received services in a Metropolitan area were coded as 1 for this variable. Those living in a micropolitan county were coded

2 for this variable, and those in a Rural country were coded as 3 for this variable. Of the sample, 74.2% received services from a VR Branch office in a metropolitan area, 20.2% received services from a branch in a micropolitan area, 5.6% were served in a rural area, and less than 0.1% had missing data. There was one record missing information on the county where services were provided.

Federal fiscal year of closure. The federal fiscal year (FFY) at closure was included as a variable in this study to better understand the impact of receiving services in a specific year. The federal fiscal year represents the period between July 1 and June 30 of the following calendar year (for example, July 1, 2011- June 30, 2012). The database includes records with closure dates between FFY2003 and FFY2013; 11 years of data. I used deviation from the means coding to compare the effect of the FFY when an individual closed to the grand mean. Deviation from the means coding “expresses the effect as the deviation of the ‘group mean’ from the ‘overall mean’” and “in the case of logistic regression the ‘group mean’ is the logit for the group and the ‘overall mean’ is the average logit” (Hosmer, Lemeshow & Sturdevant, 2013, p. 59). The results of this coding will report the average effect of FFY of closure on VR closure status, and will allow for a comparison of the effect of each individual FFY with the overall effect of FFY. Any significant deviation will identify FFY’s in which the odds of obtaining a particular VR closure status were more or less than the overall effect of FFY at a statistically significant level. FFY07 had the highest percentage of VR closures (13.8%) from the sample, and FFY03 had the lowest (0.8%)

Missing Data

Prior to beginning the logistic regression process, I conducted several analyses to determine any patterns of missing data. Following suggestions from Allison (2002) all missing data were reported and patterns of missing data were investigated. First, missing data were examined for patterns. There are three primary types of missing data, including: missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR; Allison, 2002). I was unable to use Little's test of MCAR since it is designed to be used on datasets with continuous variables, and this dataset mostly contains variables that are dichotomous or categorical. Further, readily available statistical tests that determine if data are MAR or MNAR are not available. Standards of practice suggest that one can manually explore patterns of missing data through correlation tables and chi-square tests to determine if there are any statistically significant group differences between those records with missing values and those without. In order to do this, I created a dummy variable for each variable that contained missing values, indicating whether or not an individual had a missing value for that variable. Those who had a missing value were recoded as 1 and those without a missing value were recoded as 0. I developed a correlation table of these variables with each of the other variables included in analysis and identified problematic correlations (i.e., using Pearson's r bivariate zero-order correlations using Cohen's [1992] standards for small [.20], medium [.50] and large effects [.80]). Additionally, a chi-square test was independently run with each of the missing value variables and each of the variables that were included in the analysis. The result of the correlation table and chi-square's revealed that there were three non-random patterns of missing values.

The first non-random pattern of missing values occurred with the variable “working at application”. In total, 31.3% of records were missing data for the variable working at application. Using bivariate analysis, I discovered that a clear pattern of missing data emerged when looking at the relationship between missing data and the year that an individual applied for VR services. For individuals who applied for VR services between 2003 and 2006 no data were missing, in 2007 there was one individual missing this data, and for those who applied between 2008 and 2013, between 77% and 89% of individuals were missing data in the field. This pattern suggests a shift in the way that these data were collected and/or entered into ORCA over the 10 year period these data were collected, hence, raising concerns about the reliability of this variable as a predictor in the model. Because of the non-random missing data of this variable, it was excluded in analysis. I provide a more comprehensive discussion of this decision in the limitations section.

The second non-random pattern of missing data included the demographic variables - primary disability, multiple disabilities, and impediments to employment. Each of the records that had missing values for one of these variables also held missing values for the other two. The total number of missing values for these three variables was 40 (0.9% of the sample). It is not clear why there were 40 records that did not have information about disability and impediments to employment information. Chi-square tests revealed no statistically significant differences between individuals with and without missing data for any individual, in-school, post school or contextual variables included in my model. Because the missing values represent such a small percentage of the sample,

the 40 participants with missing records for the variables disability, multiple disabilities, and impediments to employment were excluded completely from analysis.

The third non-random pattern of missing values occurred with race, where there was one missing value. It is not clear why there was one record from the master table that did not have race information. Because the missing value represents such a small percentage of the sample, the record containing a missing value for race was excluded from analysis.

Cell Size

While logistic regression is robust to the assumption of normality, problems with model convergence can arise when there are empty cells (Hosmer, et al., 2013). During univariate analysis each of the cell sizes were examined to assure there were no empty cells.

Analysis

Logistic regression. Logistic regression is an appropriate analytic technique for modeling dichotomous or categorical outcomes (Hosmer & Lemeshow, 1989, 2000; Hosmer et al, 2013; Peng & So, 2002). Additionally, logistic regression does not require that data meet multivariate normal distribution with equal and variances and covariance, making it less restrictive than other techniques used for modeling dichotomous or categorical outcomes (Peng & So, 2002). In this study, the dependent variable is dichotomous (VR closure status rehabilitated or other than rehabilitated), and the independent variables are dichotomous, categorical or continuous. Thus, I have chosen to use logistic regression to optimize the prediction of VR closure status using a set of theoretically driven predictor variables that align with the NLTS theoretical framework.

Logistic regression is frequently used in social science research because the interpretations of the estimated beta (i.e., odds ratios or OR) are generally easy to understand because people are familiar with terms such as "twice as likely", or "less likely" (Peng & So, 2002). OR represent the probability that an event will occur, to the probability that the event will not occur (Peng, & So, 2002). Odds ratios for a particular independent variable are represented on a scale from 0 to infinity, where an OR between 0 and 1 suggests less odds that the event will occur, and an OR greater than 1 suggests an increase in the odds that the event will occur (Hosmer, et al., 2013). In the next two sections I describe the model building strategy that I used for this study and how the results were interpreted.

Model building strategy. Building an appropriate regression model is equally as important as accurately interpreting the results of the final model and there are a number of different strategies that can be used in logistic regression. I selected Hosmer, et al.'s (2013) purposeful selection of covariate model building strategy, which includes independent variables that have a significant or near significant bivariate relationship to the dependent variable (Hosmer et al., 2013). I followed Hosmer et al.'s (2013) seven-step procedures outlined in their text, and following these steps, developed a new model for each of my four research questions.

First, I completed a careful single-variable examination of each independent variable using a standard contingency table (Hosmer et al., 2013). Variables that were statistically significant at the bivariate level at a probability level of .20 or less were identified as candidates for the first multivariable model. Next, I fit a multivariable logistic regression model and removed variables that were not statistically significant at a

probability level of .01 or less (Hosmer et al., 2013). In the third step, I compared the results from the first model with those from the larger model. During this step I added back into my model, variables that were excluded during the second step, but determined to cause a change in the estimated coefficients of greater than 20% in other variables. This change indicates that the variable that was excluded adds a meaningful contribution to the model. Next, I added each variable that was omitted from either step 1 or step 2 back into my model, one at a time, to check if it was significant in the presence of other variables; no variables were added to any of my four models during this step. During the fifth step, I tested the assumption of linearity for continuous variables by creating a categorical variables based upon the quartiles of the continuous variables, entering those variables into the multivariate model, plotting the estimated coefficients of the upper three quartiles against the midpoints of the upper three quartiles, and visually inspecting the plot to identify the most logical parametric shape. In all cases, the assumption of linearity was met. In the second to last step, I tested all plausible interaction effects by examining their bivariate relationship with the dependent variable, and adding the interaction effect to the main effects model if it was statistically significant to a traditional level ($p. \leq .01$ for this study; Hosmer et al., 2013). Multiple interaction effects were determined statistically significant. Subsequently, I then added all of the independent variables back into my model because of their theoretical importance and examined these variables to see if any of them were statistically significant (Hosmer et al., 2013). Lastly, during the seventh step, I determined the fit of the logistic regression model using the Hosmer & Lemeshow goodness of fit test and Nagelkerke's pseudo R^2

goodness of fit test. I also used these tests determine whether or not the fit for each model was an improved fit over the previous model.

Interpreting the results of the fitted model. There are several statistics that are reported when conducting a logistic regression in SPSS and used for interpretation. These statistics include: (1) the regression coefficient, (2) standard error, (3) the Wald test, (4) the probability value, the (5) estimated beta coefficient, or OR, and (6) the confidence interval of the estimated beta coefficient. These six statistical terms were reported and used for interpretation of the final model. For the purpose of this dissertation the probability value was set to .01, where a probability of less than .01 is required to be considered statistically significant. I made this decision because of the large sample size included in the analysis and a desire to reduce the probability of a type I error.

CHAPTER IV

RESULTS

In this chapter, I present the results of my analysis of a data set of 4,443 young adults with disabilities (21 years old or under) who applied for VR Services between 7/1/2003 and 6/30/2013, were determined eligible, and had a completed Individualized Plan for Employment (IPE). I present contingency tables between my independent and dependent variables and outline the analyses that answered each of the four research questions to determine how individual characteristics, in-school experiences, post-school experiences, and contextual factors contributed to models predicting VR closure outcomes.

Descriptive Statistics

In this section, I present the variables included in my analysis including the outcome variable and all predictor variables.

Outcome variable. The outcome variable for this study was VR closure status, with two levels: (1) closed rehabilitated; and (2) closed other than rehabilitated. Of the 4,443 individuals who met the inclusion criteria (e.g., applied for VR services, were determined eligible, had an individual plan for employment, and closed from VR services), 39.2% closed other than rehabilitated and 60.8% closed rehabilitated. There were no missing values for the outcome variable.

Predictor variables by VR closure status. To describe the sample included in this study and to identify any potential zero-cells (i.e., no events in one or more cells of a contingency table), each of the demographic factors included in this study were organized by the outcome variable.

Individual characteristic variables. The individual characteristics included: age, sex, race, primary disability, multiple disabilities, impediments to employment, and receipt of SSI at application (see Table 4.1).

Table 4.1. Individual Characteristic Variables by VR Closure Status

Variable	Rehab (n = 2,701)		Other (n = 1,729)		Total (n = 4,443)		Sig.
	n	% ^a	n	% ^a	n	% ^a	
Average Age	1,742	18.6 ^b	2,701	18.5 ^b	4,443	18.6 ^b	.089
Sex							
Male	1,712	63.4	1,000	57.4	2,712	61.0	.000***
Female	989	36.6	742	42.6	1,731	39.0	
Race							
White	2,534	93.8	1,603	92.1	4137	93.1	.025
Non-White	167	6.2	138	7.9	305	6.9	
Missing	–	–	–	–	1	<0.1	
Primary Disability							
SLD	1,077	40.3	525	30.4	1,602	36.4	.000***
Mental Illness	244	9.1	259	15.5	503	11.4	
ID	277	10.4	185	10.7	462	10.5	
Autism	265	9.9	156	9.0	421	9.6	
Other Cog. Imp.	253	9.5	162	9.4	415	9.4	
ADHD	243	9.1	169	9.8	412	9.4	
Physical/Mob.	150	5.6	134	7.8	284	6.5	
Sensory/Comm.	145	5.4	112	6.5	257	5.8	
TBI	20	0.7	27	1.6	47	1.1	
Missing	–	–	–	–	40	0.9	
Multiple Disabilities							
Yes	1,176	44.0	900	52.1	2,674	60.7	.001***
No	1,498	56.0	829	47.9	2,327	52.9	
Missing	–	–	–	–	40	0.9	
Impediments to Emp.							
Communication	1,155	43.2	734	42.5	1889	42.9	.627
Interpersonal	1,280	47.9	986	57.0	2,266	51.5	.000***
Mobility	261	9.8	194	11.2	455	10.3	.120
Self-Care	749	28.0	622	36.0	1,371	31.1	.000***
Self-Direction	1,342	50.2	913	52.8	2,255	51.2	.090
Work Skills	2,320	86.8	1,439	83.2	3,759	85.4	.001***
Work Tolerance	710	26.8	589	34.1	1,299	29.5	.000***
Missing	–	–	–	–	40	0.9	

Table 4.1. (continued).

Variable	Rehab (n = 2,701)		Other (n = 1,729)		Total (n = 4,443)		Sig.
	<i>n</i>	% ^a	<i>n</i>	% ^a	<i>n</i>	% ^a	
SSI							
Yes	420	15.5	405	23.2	825	18.6	.000***
No	2,281	84.5	1,337	76.8	3,618	81.4	

Note. SLD = Specific learning disability; ID = Intellectual disability; Other Cog. Imp. = Other cognitive impairment; ADHD = Attention deficit hyperactivity disorder; Physical/Mob. = Physical or mobility impairment; Sensory/Comm. = Sensory or communication impairment; Impediments to Emp. = Impediments to employment. Missing data are indicated where missing data is present. ^a Percentage, unless marked. ^b Mean. *** $p. \leq .001$.

In-school experience variables. Table 4.2 provides all in-school experience variables by VR closure status. In-school experiences included participation in the Oregon Youth Transition Program (YTP) and having obtained a high school completion certificate by the time of VR closure (HSC).

Table 4.2. In-School Experience Variables by VR Closure Status

Variable	Rehab (n = 2,701)		Other (n = 1,729)		Total (n = 4,443)		Sig.
	<i>n</i>	%	<i>N</i>	%	<i>n</i>	%	
YTP							
Yes	1,964	72.7	1,074	61.7	3,038	68.4	.000***
No	737	27.3	668	38.3	1,405	31.6	
HSC							
Yes	2,172	80.4	1,294	74.3	3,466	78.0	.000***
No	529	19.6	448	25.7	977	22.0	

Note. Note. YTP = Youth Transition Program participant; HSC = High School completion at closure. There were no missing data for these variables. *** $p. \leq .001$.

Post-school experience variables. Table 4.3 includes post-school experience variables by VR closure status. Post-school experiences included the number of VR services received, closing with VR below the median number of days to closure, and receiving some post-secondary education.

Contextual variables. Table 4.4 presents contextual factor variables by VR closure status. Contextual factors included the community type where VR services were provided (rural micropolitan, metropolitan), and the FFY when an individual closed VR services (FFY 2003- FFY 2013).

Table 4.3. *Post-School Experience Variables by VR Closure Status*

Variable	Rehab (n = 2,701)		Other (n = 1,729)		Total (n = 4,443)		Sig.
	n	% ^a	n	% ^a	n	% ^a	
Average #VR Services	2,701	4.66 ^b	1,742	3.54 ^b	4,443	4.22 ^b	.000***
Below Median DTC							
Yes	1,097	40.6	472	27.1	1,569	35.3	.000***
No	1,604	59.4	1,270	72.9	2,874	64.7	
Some Post-School Ed.							
Yes	322	11.9	226	13.0	548	12.3	.298
No	2,379	88.1	1,516	87.0	3,895	87.7	

Note. Average #VRS = average number of VR services; Below Median DTC = Below median days to closure; Some Post-School Ed. = Some post-school education at closure. There were no missing data for these variables. ^a Percentage, unless marked. ^b Mean.*** $p. \leq .001$.

Table 4.4. *Contextual Variables by VR Closure Status*

Variable	Rehab (n = 2,701)		Other (n = 1,729)		Total (n = 4,443)		Sig.
	n	%	n	%	n	%	
Community Type							
Rural	151	5.6	97	5.6	248	5.6	.682
Micropolitan	538	19.9	360	20.7	898	20.2	
Metropolitan	2,012	74.5	1,284	73.8	3,296	74.2	
Missing	–	–	–	–	1	<0.1	
FFY Closure							
2003	22	0.8	13	0.7	35	0.8	.000***
2004	186	6.9	89	5.1	275	6.2	
2005	305	11.3	150	8.6	455	10.2	
2006	362	13.4	148	8.5	510	11.5	
2007	386	14.3	215	12.3	601	13.5	
2008	309	11.4	215	12.3	524	11.8	
2009	171	6.3	192	11.0	363	8.2	
2010	242	9.0	209	12.0	452	10.2	

Table 4.4. (continued).

Variable	Rehab (n = 2,701)		Other (n = 1,729)		Total (n = 4,443)		Sig.
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
2011	306	11.3	222	12.7	528	11.9	
2012	317	11.7	207	11.9	524	11.8	
2013	94	3.5	82	4.7	176	4.0	

Note. FFY Closure = Federal fiscal year of VR closure. Missing data are indicated where missing data is present. *** $p. \leq .001$.

Collinearity

Collinearity in regression analysis occurs when two or more predictor variables evidence a high degree of correlation (Pedhazur, 1997). When collinearity is present, it decreases the reliability of the analysis by increasing the standard error, resulting in an unstable estimate and potentially misleading results (Pedhazur, 1997). One strategy for diagnosing collinearity is to review the bivariate zero-order correlations, or Pearson's r . Bivariate zero-order correlations range between -1 and 1, where a value of 0 represents complete separation and a value of +/-1 represents complete collinearity. When the bivariate zero-order correlations reach values nearing .8, they are considered to be problematic (Pedhazur, 1997). For the purpose of this dissertation, I reviewed the bivariate zero-order correlations and using Cohen's (1992) standards for small (.20), medium (.50) and large (.80) effects determined that collinearity poses no problem for analysis as the range of bivariate zero-order correlations were between .001 and .400. Missing data for bivariate zero-order correlations were treated using listwise deletion. Table 4.5 presents the bivariate zero-order correlations among dependent variables.

Table 4.5. *Bivariate zero-order correlation matrix of predictor variables*

Var.	AGE	SEX	NW	DIS	COM	INT	MB	SC	SD	WS	WT	SSI	YTP	HSC	VRS	DTC	PSE	MSA
AGE	–																	
SEX	-.01	–																
NW	-.03*	-.02	–															
DIS	-.14**	.10**	-.01	–														
COM	.08**	-.11**	-.03*	-.10**	–													
INT	.14**	-.07**	.01	-.32**	.12**	–												
MOB	.10**	.01	-.02	-.05**	.11**	.08**	–											
SC	.17**	-.03	-.03*	-.28**	.06**	.30**	.22**	–										
SD	.08**	-.07**	-.02	-.24**	.06**	.17**	.07**	.27**	–									
WS	-.04**	.01	-.01	.14**	.03*	-.12**	.02	-.03*	.09**	–								
WT	.08**	.02	-.01	-.14**	-.01	.12**	.18**	.15**	.03*	-.09**	–							
SSI	.29**	-.03*	-.07**	-.19**	.13**	.13**	.20**	.25**	.13**	.01	.12**	–						
YTP	-.40**	.03	.05**	.14**	-.01	-.16**	-.04**	-.13**	-.04**	.15**	-.13**	-.15**	–					
HSC	.17**	-.02	.01	-.03	-.02	.02	-.01	.01	.04*	.01	.01	.06**	-.08**	–				
VRS	.04*	.03	-.02	-.02	-.03	.08**	.07**	.08**	.04**	.05**	.01	.02	.01	.06**	–			
DTC	.14**	-.02	-.03	.03*	-.01	-.03	-.04*	.01	-.03	-.02	-.07**	-.04*	-.08**	-.04*	-.11**	–		
PSE	.01	.06**	-.02	.07**	-.02	-.05**	-.01	-.09**	-.11**	-.06**	.01	-.05**	-.06**	.20**	.07**	-.14**	–	
MSA	-.14**	-.01	.04**	.11**	.02	-.09**	-.02	-.04**	-.03	.05**	.01	-.04*	.19**	-.06**	-.04*	-.01	.05**	–
FFY	-.06**	-.01	.03*	-.08**	.08**	.01	-.02	-.09**	.01	-.09**	.10**	.04*	.02	-.02	-.21**	-.21**	.04*	.04*

Note. NW = not-white; DIS = primary disability; MULT = multiple disabilities; COM = communication impediment to employment; INT = interpersonal impediment to employment; MOB = mobility impediment to employment; SC = self-care impediment to employment; SD = self-direction impediment to employment; WS = work skill impediment to employment; WT = work tolerance impediment to employment; SSI = Social Security Income at application; YTP = Youth Transition Program participant; HSC = high school completion at closure; VRS = number of VR services received; DTC = above median days to closure; PSE = some post-school education at closure; MSA = metropolitan statistical area where services were received; FFY = Federal Fiscal year closed. Listwise n = 4401. * p <.05, ** p <.01.

Research Question 1

How do individual characteristics (age, sex, race, disability, impediments to employment, and receipt of SSI) predict VR closure status among young adults with disabilities who have received services from VR between 2003 and 2013?

The purpose of research question 1 was to examine the effect of individual characteristics on predicting a VR closure status of rehabilitated.

Fitting the logistic regression model. The single variable logistic regression models are provided in Table 4.6, and the final model is presented in Table 4.7.

Table 4.6. *Individual Characteristics Single-Variable Logistic Regression Models Predicting VR Closure Rehabilitated (n = 4,401)*

Variable	β (S.E.)	Wald Test statistic	e^{β} [95% CI]	Sig.
Age	-0.05 (.03)	2.90	0.95 [0.89, 1.01]	.089*
Sex (female)	-0.26 (.06)	15.89	0.77 [0.69, 0.87]	.000***
Race (not-white)	-0.26 (.12)	5.01	0.77 [0.61, 0.98]	.025*
Mental Illness vs. SLD	-0.78 (.10)	56.11	0.46 [0.37, 0.56]	.000***
ID vs. SLD	-0.32 (.11)	8.37	0.73 [0.59, 0.90]	.004**
Autism vs. SLD	-0.19 (.11)	2.73	0.83 [0.66, 1.03]	.098*
Other Cog. Imp. vs. SLD	-0.28 (.11)	5.74	0.76 [0.61, 0.95]	.017*
ADHD vs. SLD	-0.36 (.11)	9.82	0.70 [0.56, 0.87]	.002**
Physical/Mob. vs. SLD	-0.60 (.11)	21.63	0.55 [0.42, 0.71]	.000***
Sensory/Comm. vs. SLD	-0.46 (.18)	11.36	0.63 [0.48, 0.83]	.001***
TBI vs. SLD	-1.02 (.30)	11.55	0.36 [0.20, 0.65]	.001***
Multiple Disabilities	-0.33 (.06)	27.79	0.72 [0.64, 0.82]	.000***
Communication	0.03 (.06)	0.24	1.03 [0.91, 1.17]	.627
Interpersonal	-0.37 (.06)	35.15	0.69 [0.61, 0.79]	.000***
Mobility	-0.16 (.10)	2.45	0.86 [0.70, 1.04]	.117*
Self Care	-0.37 (.07)	30.93	0.69 [0.61, 0.79]	.000***
Self-Direction	-0.11 (.06)	2.88	0.90 [0.80, 1.02]	.090*
Work Skills	0.28 (.09)	10.46	1.32 [1.12, 1.56]	.001***
Work Tolerance	-0.36 (.07)	28.39	0.70 [0.61, 0.80]	.000***
SSI	-0.50 (.08)	41.05	0.61 [0.52, 0.71]	.000***

Note. All cases with missing data were removed from the database prior to running these single-variable logistic regression models. * $p \leq .20$, ** $p \leq .01$, *** $p \leq .001$.

Table 4.7. *Individual Characteristics Final Logistic Regression Model Predicting VR Closure Rehabilitated (n = 4,401)*

Variable	β (S.E.)	Wald	e^{β} [95% CI]	Sig.
Sex (female)	-0.28 (.07)	18.29	0.76 [0.67, 0.86]	.000***
Mental Illness vs. SLD	-0.45 (.12)	14.25	0.64 [0.51, 0.81]	.000***
TBI vs. SLD	-0.89 (.30)	8.62	0.41 [0.23, 0.74]	.003**
Interpersonal	-0.21 (.07)	8.45	0.81 [0.70, 0.93]	.000***
SSI	-0.41 (.09)	20.64	0.67 [0.56, 0.79]	.000***
Self Care	-0.16 (.07)	4.38	0.85 [0.73, 0.99]	.036
Phys/Mob vs. SLD	-0.36 (.15)	5.91	0.70 [0.53, 0.93]	.015
Multiple Disabilities	-0.14 (.07)	4.05	0.86 [0.76, 1.00]	.044
Work Tolerance	-0.16 (.07)	4.82	0.85 [0.73, 0.98]	.028
Age	0.05 (.03)	2.33	1.05 [0.99, 1.12]	.127
Race (not-white)	-0.20 (.12)	2.66	1.05 [0.64, 1.04]	.103
ID vs. SLD	-0.05 (.12)	0.14	0.82 [0.75, 1.21]	.709
Autism vs. SLD	0.05 (.13)	0.12	0.96 [0.81, 1.34]	.724
Other Cog. Imp. vs. SLD	-0.11 (.13)	0.93	0.89 [0.71, 1.02]	.336
ADHD vs. SLD	-0.17 (.12)	1.98	0.84 [0.67, 1.07]	.159
Sensory/Comm. vs. SLD	-0.26 (.14)	3.36	0.77 [0.58, 1.02]	.067
Physical/Mob. vs. SLD	0.13 (.11)	1.38	1.14 [0.92, 1.41]	.240
Self-Direction	-0.03 (.07)	0.16	0.97 [0.85, 1.11]	.687
Work Skills	0.12 (.09)	1.68	1.13 [0.94, 1.36]	.195

** $p. \leq .01$, *** $p. \leq .001$

The results of the Hosmer and Lemeshow test for the final model were χ^2 (8, 4,401) = 5.76, $p. = .674$, suggesting an adequate model fit. Additionally, the goodness of fit Nagelkerke pseudo $R^2 = .048$. I determined through observations of goodness of fit tests that the final model was an improvement over the previous models.

Results of the fitted model. The results of the final model suggest that there are five individual variables that work together to predict a vocational rehabilitation closure status: *sex, mental illness primary disability, TBI primary disability, having an interpersonal impediment to employment, and receiving SSI at application*. Each of these variables is negatively associated with a positive VR closure status,

meaning that individuals who exhibit these characteristics have a lower likelihood of achieving a positive VR outcome. Statistically significant primary disabilities (*Mental Illness* and *TBI*) were compared to individuals who have *SLD* as a primary disability because I dummy coded the categorical disability category using *SLD* as the reference group.

Sex. When controlling for the effects of all other individual characteristics, the odds ratio for females achieving a VR closure status of rehabilitated was 0.76, suggesting females were less likely to achieve a positive VR closure status than their males counterparts, $\beta = -.28$, $SE = .07$, $Wald = 18.29$, $p < .001$, $Exp(\beta) = 0.76$, 95% CI [0.67, 0.86].

Mental illness. Similarly, the odds ratio for individuals with a primary disability of mental illness achieving a VR closure status of rehabilitated was 0.64, suggesting these individuals were less likely to achieve a positive VR closure status than young adults with a primary disability of *SLD*, $\beta = -.45$, $SE = .12$, $Wald = 14.25$, $p < .001$, $Exp(\beta) = 0.64$, 95% CI [0.51, 0.81].

Traumatic brain injury (TBI). The odds ratio for young adults with a primary disability of *TBI* achieving a VR closure status of rehabilitated was 0.41. These results suggest that young adults with *TBI* were less likely to achieve a positive VR closure status than young adults with a primary disability of *SLD*, $\beta = -.89$, $SE = .30$, $Wald = 8.62$, $p < .01$, $Exp(\beta) = 0.41$, 95% CI [0.23, 0.74].

Interpersonal impediment to employment. Young adults with an interpersonal impediment to employment were less likely to achieve a VR closure status of rehabilitated than young adults without an interpersonal impediment to

employment. The odds ratio for these young adults achieving a positive VR closure status was 0.81, $\beta = -.21$, $SE = .07$, Wald = 8.45, $p < .001$, $\text{Exp}(\beta) = 0.81$, 95% CI [0.70, 0.93].

Receipt of SSI at application. Lastly, the odds ratio for young adults who had received SSI at the time of application achieving a VR closure status of rehabilitated was 0.67. These results suggest that individuals who were receiving SSI at the time of application were less likely to achieve a positive VR closure status than young adults who were not, $\beta = -.41$, $SE = .09$, Wald = 20.64, $p < .01$, $\text{Exp}(\beta) = 0.67$, 95% CI [0.54, 0.79].

Additional comments. Other variables that were included in the model because they changed the magnitude of the regression coefficient by more than 20%, but were not themselves statistically significant predictors of the outcome when holding the other variables constant, included *having a self-care impediment to employment*, *having a physical or mobility impairment as a primary disability*, *having multiple disabilities*, and *having work tolerance as an impediment to employment*. These variables remained in the model because during third step of the Hosmer, et al., (2013) model building strategy it was determined that they provided an important adjustment to the variables that remained in the model. I will also note that *all* plausible interaction effects (an interaction that could actually happen) were tested during the development of the final model and none were statistically significant ($p \leq .01$).

Research Question 2

How do in-school experiences (participating in YTP and earning a high school completion certificate) predict VR closure status among young adults with disabilities

who have received services from VR between 2003 and 2013, above and beyond individual characteristics (age, sex, race, disability, impediments to employment, and receipt of SSI)?

The purpose of my second research question was to examine the effect of in-school experiences on predicting a VR closure status of rehabilitated, when controlling for statistically significant individual factors.

Fitting the logistic regression model. For research question 2, I followed the same seven-step logistic regression model fit procedure that was followed in research questions 1. Table 4.8 presents the single variable logistic regression models for the independent variable tested during the research question, and table 4.9 presents the final model for this research question.

Table 4.8. In-School Experience *Single-Variable* Logistic Regression Models Predicting VR Closure Rehabilitated ($n = 4,401$)

Variable	β (S.E.)	Wald	e^{β} [95% CI]	Sig.
YTP	0.51 (.06)	59.46	1.66 [1.46, 1.89]	.000***
HS Completion Cert.	0.35 (.07)	23.10	1.42 [1.23, 1.64]	.000***

Note. YTP = Youth Transition Program; HS Completion Cert. = High school completion certificate at closure. *** $p \leq .001$.

Table 4.9. In-School Experience *Final* Logistic Regression Model Predicting VR Closure Rehabilitated ($n = 4,401$)

Variable	β (S.E.)	Wald	e^{β} [95% CI]	Sig.
Sex (female)	-0.29 (.07)	19.78	0.75 [0.66, 0.85]	.000***
Mental Illness vs. SLD	-0.38 (.12)	10.11	0.68 [0.54, 0.86]	.001***
TBI vs. SLD	-0.83 (.31)	7.44	0.43 [0.24, 0.79]	.006**
Interpersonal	-0.19 (.07)	6.72	0.83 [0.72, 0.96]	.010**
SSI	-0.41 (.09)	21.09	0.66 [0.55, 0.79]	.000***
Self Care	-0.14 (.08)	3.25	0.87 [0.75, 1.01]	.072
Phys/Mob vs. SLD	-0.28 (.15)	3.53	0.76 [0.57, 1.01]	.060
Multiple Disabilities	-0.13 (.07)	3.33	0.88 [0.77, 1.01]	.068
Work Tolerance	-0.15 (.07)	4.17	0.86 [0.74, 0.99]	.041
YTP	0.78 (.16)	24.26	2.18 [1.60, 2.97]	.000***

Table 4.9. (continued).

Variable	β (S.E.)	Wald	e^β [95% CI]	Sig.
HS Completion Cert.	0.72 (.15)	23.66	2.06 [1.54, 2.76]	.000***
YTP*HSC	-0.45 (.17)	6.65	0.64 [0.46, 0.90]	.010**
Age	0.09 (.04)	6.56	1.10 [1.02, 1.18]	.010**
Race (not-white)	-0.17 (.12)	1.90	0.84 [0.66, 1.08]	.168
ID vs. SLD	-0.05 (.12)	0.14	0.96 [0.75, 1.21]	.708
Autism vs. SLD	0.04 (.13)	0.11	1.04 [0.81, 1.34]	.741
Other Cog. Imp. vs. SLD	-0.09 (.12)	0.63	0.91 [0.72, 1.15]	.428
ADHD vs. SLD	-0.14 (.12)	1.28	0.87 [0.69, 1.11]	.258
Sensory/Comm. vs. SLD	-0.19 (.15)	1.67	0.83 [0.62, 1.10]	.196
Physical/Mob. vs. SLD	0.13 (.11)	1.25	1.13 [0.91, 1.41]	.263
Self-Direction	-0.04 (.07)	0.26	0.97 [0.84, 1.11]	.612
Work Skills	0.09 (.10)	0.81	1.09 [0.90, 1.31]	.368

** $p. \leq .01$, *** $p. \leq .001$

The results of the Hosmer and Lemeshow test for the final model were χ^2 (8, 4,401) = 4.71, $p. = .788$. The null hypothesis failed to be rejected, suggesting an adequate model fit. The Nagelkerke pseudo R^2 goodness of fit-test suggest that the final model from the second research question (Nagelkerke $R^2 = .067$) is a better fit than the model from the first research question (Nagelkerke $R^2 = .048$). All of the plausible interaction effects were tested during step five of the Hosmer, et al., (2013) model building strategy and one interaction effect was determined statistically significant in the final model (*YTP*HSC*; described in more detail below).

Results of the fitted model. The results of the final model for the second research question suggest that both of the in-school experience factors work together in combination with the individual factors that were included in the first model to predict a vocational rehabilitation closure status. These variables include: *participant of YTP*, and *having completed high school by the time of VR closure*. The results of this model suggest that there are seven cross-construct factors (i.e.,

combined from both individual factors and in-school experience factors) that work together to predict a vocational rehabilitation closure status. Those variables include: *sex, mental illness primary disability, TBI primary disability, having an interpersonal impediment to employment, receiving SSI at application, participant of YTP, having completed high school by the time of VR closure, and the interaction effect between having completed high school and participating in YTP, and age*). The individual factors (*sex* through *receiving SSI*) were each negatively related to the outcome of a VR closed rehabilitated status. The in-school experience factors were each positively related to the outcome of a VR closed rehabilitated status. Please note that *age* was not statistically significant in the final model for the first question, but was after adding in-school experiences. These changes indicate that the addition of in-school experience variables into the model provides an important adjustment to the effect of *age*. Additionally, it was determined using the Nagelkerke R^2 goodness of fit test that this model is a better fit to the data than the model for the first research question.

Sex. When controlling for the effects of all other individual and in-school experience factors constant, the odds ratio of being female was 0.75, suggesting that young women were likely to achieve a positive VR closure status than males, $\beta = -.29$, $SE = .07$, $Wald = 19.78$, $p < .001$, $Exp(\beta) = 0.75$, 95% CI [0.66, 0.85]. This is a slightly lower odds ratio than was identified for being female in the first research question ($Exp(\beta) = 0.76$, 95% CI [0.67, 0.86]).

Mental illness. Similarly, the odds ratio of achieving a positive VR closure status for young adults with a primary disability of mental illness was 0.69, $\beta = -.38$, $SE = .12$,

Wald = 10.11, $p < .001$, $\text{Exp}(\beta) = 0.68$, 95% CI [0.55, 0.86]. This is a slightly higher odds ratio than was identified for mental illness in the first research question ($\text{Exp}(\beta) = 0.64$, 95% CI [0.51, 0.81]).

TBI. The odds ratio of young adults with a primary disability of TBI achieving a VR closure status of rehabilitated was 0.43. These results suggest young adults with TBI were less likely than those with a primary disability of SLD to achieve a positive VR closure status, $\beta = -.83$, $SE = .31$, Wald = 7.44, $p < .01$, $\text{Exp}(\beta) = 0.43$, 95% CI [0.24, 0.79]. The odds ratio is slightly smaller than that from the first research question for TBI when adding in-school experiences ($\text{Exp}(\beta) = 0.41$, 95% CI [0.23, 0.74]).

Interpersonal impediment to employment. The odds ratio of young adults with an interpersonal impediment to employment achieving a positive VR closure status was .83, suggesting these young adults are less likely to achieve a positive VR closure status than those without that impediment, $\beta = -.19$, $SE = .07$, Wald = 6.72, $p < .01$, $\text{Exp}(\beta) = 0.83$, 95% CI [0.72, 0.96]. This is a slightly higher odds ratio than was identified for having an interpersonal impediment to employment in the first research question ($\text{Exp}(\beta) = 0.81$, 95% CI [0.70, 0.93]).

Receipt of SSI at application. Similarly, the odds ratio of individuals who were receiving SSI at the time of application achieving a VR closure status of rehabilitated was 0.66. These results suggest that these young adults are less likely to achieve a positive VR closure status than young adults who were not receiving SSI at the time of application, $\beta = -.41$, $SE = .09$, Wald = 21.09, $p < .001$, $\text{Exp}(\beta) = 0.66$, 95% CI [0.55, 0.79]. This is a slightly lower odds ratio than was identified for SSI in the first research question ($\text{Exp}(\beta) = 0.67$, 95% CI [0.56, 0.79]).

Participation in Youth Transition Program (YTP). Participating in the Youth Transition Program was associated with an odds ratio of 2.18, suggesting increased likelihood of achieving a VR closure status of rehabilitated compared to individuals who did not participate in YTP, $\beta = .78$, $SE = .16$, $Wald = 24.26$, $p < .001$, $Exp(\beta) = 2.18$, 95% CI [1.60, 2.97].

High school completion certificate. Similarly, having a high school completion certificate at the time of VR closure was associated with an odds ratio of 2.06. These results suggest that young adults who had earned a high school completion certificate by the time of VR closure were more likely to achieve a positive VR closure status than young adults who did not, $\beta = .72$, $SE = .15$, $Wald = 23.66$, $p < .001$, $Exp(\beta) = 2.06$, 95% CI [1.54, 2.76].

Interaction between YTP and high school completion certificate. Lastly, there was a statistically significant interaction effect between participating in the Youth Transition Program and having a High School completion certificate at VR closure. The odds ratio of individuals who had participated in YTP and had a high school completion certificate at closure achieving a VR closure status of rehabilitated was 0.64, $\beta = -.45$, $SE = .17$, $Wald = 6.65$, $p \leq .01$, $Exp(\beta) = 0.64$, 95% CI [0.46, 0.90]. I provide a potential explanation for this interaction in the discussion section.

Age. The variable *age* was not statistically significant in the model developed to answer the first research question ($p = .127$); however, was statistically significant once the effects of in-school experiences were added into the model. This indicates that the contribution of in-school experiences into the model make an important change in the effect of other variables in the model (i.e., *age*). The relationship of the effect of *age* on

positive VR closure status is small and positive, $\beta = .09$, $SE = .04$, $Wald = 6.56$, $p \leq .01$, $Exp(\beta) = 1.10$, 95% CI [1.02, 1.18].

Additional comments. Other variables that were included in the model because they were carried over from the model developed for the first research included *having a self-care impediment to employment, having a physical or mobility impairment as a primary disability, having multiple disabilities, and having work tolerance as an impediment to employment.* These were included in the model even though they became non-significant because they were determined to provide a meaningful contribution to the model developed to answer the first research question. All plausible interaction effects were tested and the one that was significant (YTP*HSC) was included in the model.

Research Question 3

How do post-school experiences (number of VR services and closing VR services below the median number of days) predict VR closure status among young adults with disabilities who have received services from VR between 2003 and 2013, above and beyond individual characteristics (age, sex, race, disability, impediments to employment, and receipt of SSI) and in-school experiences (participating in YTP and earning a high school completion certificate)?

The purpose of research question three was to examine the effect of post-school experiences on predicting a VR closure status of rehabilitated, when controlling for statistically significant individual factors and in-school experiences.

Fitting the logistic regression model. For research question 3, I followed the same seven-step logistic regression model fit procedure that was followed in research questions 1 and 2. The single variable logistic regression models for the independent

variable tested during the research question are provided in Table 4.10, and the final model for this research question is presented in Table 4.11.

Table 4.10. *Post-School Experience Single-Variable Logistic Regression Models Predicting VR Closure Rehabilitated (n = 4,401)*

Variable	β (S.E.)	Wald	e^{β} [95% CI]	Sig.
Number of VR Services	0.20 (.01)	204.70	1.22 [1.19, 1.25]	.000***
Below Median DTC	0.61 (.07)	83.75	1.84 [1.62, 2.10]	.000***
Post-Secondary Educ.	-0.97 (.09)	1.08	0.91 [0.76, 1.09]	.298

Note. DTC = Days to closure. *** $p < .001$.

Table 4.11. *Post-School Experience Final Logistic Regression Model Predicting VR Closure Rehabilitated (n = 4,401)*

Variable	β (S.E.)	Wald	e^{β} [95% CI]	Sig.
Sex (female)	-0.34 (0.07)	23.28	0.72 [0.63, 0.82]	.000***
Mental Illness vs. SLD	-0.45 (0.13)	12.76	0.64 [0.50, 0.82]	.000***
TBI vs. SLD	-1.00 (0.33)	9.47	0.37 [0.19, 0.69]	.002**
Interpersonal	-0.26 (0.08)	11.57	0.77 [0.66, 0.90]	.001***
SSI	-0.36 (0.10)	14.59	0.70 [0.58, 0.84]	.000***
Self Care	-0.25 (0.08)	9.15	0.78 [0.67, 0.92]	.002**
Phys/Mob vs. SLD	-0.33 (0.16)	4.40	0.72 [0.53, 0.98]	.036
Multiple Disabilities	-0.19 (0.07)	6.88	0.83 [0.72, 0.95]	.009**
Work Tolerance	-0.08 (0.08)	1.06	0.92 [0.79, 1.08]	.304
YTP	0.79 (0.17)	22.79	2.20 [1.59, 3.04]	.000***
HS Completion Cert.	0.74 (0.16)	22.36	2.10 [1.54, 2.85]	.000***
YTP*HSC	-0.43 (0.18)	5.72	0.65 [0.46, 0.93]	.017
Number of VR Services	0.25 (0.02)	268.35	1.28 [1.24, 1.32]	.000***
Below Median DTC	0.81 (0.08)	119.48	2.26 [1.95, 2.61]	.000***
Age	0.02 (0.04)	0.42	1.03 [0.95, 1.10]	.517
Race (not-white)	-0.26 (0.13)	3.82	0.77 [0.60, 1.00]	.051
ID vs. SLD	-0.01 (0.13)	0.01	0.99 [0.77, 1.27]	.926
Autism vs. SLD	0.11 (0.13)	0.66	1.12 [0.86, 1.45]	.415
Other Cog. Imp. vs. SLD	-0.07 (0.13)	0.31	0.93 [0.73, 1.19]	.578
ADHD vs. SLD	-0.15 (0.13)	1.46	0.86 [0.67, 1.10]	.227
Sensory/Comm. vs. SLD	-0.35 (0.15)	5.30	0.70 [0.52, 0.95]	.021
Physical/Mob. vs. SLD	0.08 (0.12)	0.45	1.08 [0.86, 1.36]	.501
Self-Direction	-0.05 (0.07)	0.46	0.95 [0.83, 1.10]	.498
Work Skills	0.00 (0.10)	0.00	1.00 [0.82, 1.21]	.997
Post-Secondary Educ.	-0.16 (0.11)	2.45	0.85 [0.69, 1.04]	.118

** $p \leq .01$, *** $p \leq .001$

The results of the Hosmer and Lemeshow test for the final model were $\chi^2 (8, 4,401) = 5.77, p. = .673$. The null hypothesis failed to be rejected, suggesting an adequate model fit. The Nagelkerke pseudo R^2 goodness of fit-test suggest that the final model from this third research question (Nagelkerke $R^2 = .181$) is a better fit than the model from the first and second research question (Nagelkerke $R^2 = .048$ & $.067$).

Results of the fitted model. The results of the final model for the third research question suggest that two of the three post-school experiences factors work together in combination with factors from the final model from the second question to predict VR closure status. These variables include: the number of VR services received, and having below the median number of days to VR closure. The results of this model suggest that there are eleven cross-construct factors (i.e., combined from individual, in-school experience, and post-school experience factors) that work together to predict a vocational rehabilitation closure status. These nine factors include: *sex, mental illness primary disability, TBI primary disability, having an interpersonal impediment to employment, receiving SSI at application, having self-care as an impediment to employment, having multiple disabilities, participant of YTP, having completed high school by the time of VR closure, the number of VR services received, and having below the median number of days to VR closure*. The individual factors were each negatively related to the outcome of a VR closed rehabilitated status. The in-school experience factors were each positively related to the outcome of a VR closed rehabilitated status. And, the post-school experience factors were each positively related to the outcome of VR closed rehabilitated

status. Please note that the variables *having a self-care impediment to employment* and *multiple disabilities* were statistically significant in this final model; however, were not statistically significant in final models for the first or second research questions. Similarly, the variables *YTP*HSC* and *age* had been statistically significant in previous models; however, were not statistically significant in the final model for this research question. The changes in statistical significance for these four variables (*self care, multiple disabilities, YTP *HSC, and age*) suggest that the addition of post-school experience variables make an important modification to the effect of these variables. Further, all plausible interaction effects were tested and no new interaction effects were determined to be statistically significant. The Nagelkerke R^2 suggest that the model developed for this research question is a better fit to the data than the models developed for either of the previous two research questions.

Sex. When controlling for the effects of all other individual, in-school experience, and post-school experience factors, the odds ratio of females achieving a positive VR closure status was 0.72, suggesting a females were less likely to achieve a VR closure status of rehabilitated than males, $\beta = -.34$, $SE = .07$, Wald = 23.28, $p < .001$, $\text{Exp}(\beta) = 0.72$, 95% CI [0.63, 0.82]. This is a lower odds ratio than was identified for being female in the first research question ($\text{Exp}(\beta) = 0.76$, 95% CI [0.67, 0.86]).

Mental Illness. Similarly, the odds ratio of young adults with a primary disability of mental illness achieving a VR closure status of rehabilitated was 0.64. These results suggest young adults with a primary disability of mental illness were less likely to

achieve a positive VR closure status than young adults with a primary disability of SLD, $\beta = -.45$, $SE = .13$, $Wald = 12.76$, $p < .001$, $Exp(\beta) = 0.64$, 95% CI [0.50, 0.82]. This is no change in odds ratios from the first research question for this variable.

TBI. The odds ratio of young adults with a primary disability of TBI achieving a positive VR closure status was 0.37, suggesting these individuals are less likely to achieve a VR closure status of rehabilitated than young adults with a primary disability of SLD, $\beta = -1.00$, $SE = .33$, $Wald = 9.47$, $p < .01$, $Exp(\beta) = 0.37$, 95% CI [0.19, 0.69]. This is a lower odds ratio than was identified for being female in the first research question ($Exp(\beta) = 0.41$, 95% CI [0.23, 0.74]).

Interpersonal impediment to employment. The odds ratio of achieving a VR closure status of rehabilitated for young adults with an interpersonal impediment to employment was 0.77. These results suggest young adults with an interpersonal impediment to employment were less likely to achieve a positive VR closure status than young adult without this impediment to employment, $\beta = -.26$, $SE = .08$, $Wald = 11.57$, $p = .001$, $Exp(\beta) = 0.77$, 95% CI [0.66, 0.90]. This is a slightly lower odds ratio than was identified in the first research question ($Exp(\beta) = 0.79$, 95% CI [0.68, 0.92]).

Receipt of SSI at application. The odds ratio of individuals who were receiving SSI at the time of application achieving a VR closure status of rehabilitated was 0.70, suggesting young adults who were receiving SSI at the time of application were less likely than those who were not to achieve a positive VR closure status, $\beta = -.36$, $SE = .10$, $Wald = 14.59$, $p < .001$, $Exp(\beta) = 0.70$, 95% CI [0.58, 0.84]. This is a slightly higher odds ratio than was identified in the first research question ($Exp(\beta) = 0.67$, 95% CI [0.56, 0.79]).

Self-care impediment to employment. Individuals who had a self care impediment to employment had an odds ratio of 0.78 for achieving a VR closure status of rehabilitated, $\beta = -.25$, $SE = .08$, $Wald = 9.15$, $p < .01$, $Exp(\beta) = 0.78$, 95% CI [0.67, 0.92]. This individual factor was not statistically significant in either of the final models previously tested for research questions one or two.

Multiple disabilities. The odds ratio of young adults with multiple disabilities achieving a positive VR closure status was 0.83, suggesting that those with multiple disabilities were less likely to achieve a VR closure status of rehabilitated than those with only one primary disability, $\beta = -.19$, $SE = .07$, $Wald = 6.88$, $p < .01$, $Exp(\beta) = 0.83$, 95% CI [0.72, 0.95]. This individual factor was not statistically significant in either of the final models previously tested for research questions one or two and was only statistically significant when adding post-school experiences.

YTP. Participating in the Youth Transition Program was associated with an odds ratio of 2.20 on VR closure status, suggesting an increased likelihood of achieving a VR closure status of rehabilitated for those who participated in YTP than those who did not, $\beta = .79$, $SE = .16$, $Wald = 22.79$, $p < .001$, $Exp(\beta) = 2.20$, 95% CI [1.59, 3.04]. This is a slightly higher odds ratio than was identified for in the second research question ($Exp(\beta) = 2.18$, 95% CI [1.60, 2.90]).

High school completion certificate. Having a high school completion certificate at the time of VR closure was associated with an odds ratio of 2.10 on VR closure status, suggesting individuals who had earned a high school completion certificate were more likely to achieve a positive VR closure outcomes than young

adults who had not, $\beta = .74$, $SE = .16$, $Wald = 22.36$, $p < .001$, $Exp(\beta) = 2.10$, 95% CI [1.54, 2.85]. This is a slightly higher odds ratio than was identified for high school completion certificate in the second research question ($Exp(\beta) = 2.06$, 95% CI [1.54, 2.76]).

The number of VR services. The number of VR services received by an individual was also a statistically significant predictor of VR closure status with an odds ratio of 1.28 on VR closure status. For each increase of one in the number of VR services received, an individual was 1.28 times more likely to achieve a VR closure status of rehabilitated, $\beta = .25$, $SE = .02$, $Wald = 268.35$, $p < .001$, $Exp(\beta) = 1.28$, 95% CI [1.24, 1.32]. For example, an individual who received four services (the median number of services received) was 1.28 times more likely to achieve a VR closure status of rehabilitated than an individual who received three services. Similarly, that same individual was 3.84 times more likely to achieve a VR closure status of rehabilitated than an individual who received only one service.

Closure on or below the median number of days to closure. Lastly, the odds ratio of individuals who closed from VR in the median number of days to closure or fewer (490 days, or 1.34 years) achieving a VR closure status of rehabilitated was 2.26. These results suggest individuals who closed from VR the median number of days to closure or fewer were more likely to achieve a VR closure status of rehabilitated than those who did not, $\beta = .81$, $SE = .08$, $Wald = 119.48$, $p < .001$, $Exp(\beta) = 2.29$, 95% CI [1.95, 2.61].

Additional comments. Other non-statistically significant variables were included in the model because they remained from the final model of the first or second research

questions. One of the non-statistically significant variables, the interaction term between YTP and high school completion certificate at closure, was statistically significant during the final model of the second research question but not in the final model for this third research question. Similarly, the variable *age* was statistically significant in the final model for the second research question, but not in the final model for this research question. Additionally, two individual variables, *self-care* and *multiple disabilities* were not statistically significant in the final model of the first research question but were statistically significant in the final model of this research question. The changes in statistical significance for these variables suggest that the addition of post-school experience variables provided an important adjustment to the overall model. This is also supported by an increase in the Nagelkerke R^2 goodness of fit test from .048 in the first model to .067 in the second model, to .181 in this model.

Research Question 4

How do contextual factors (community type and federal fiscal year of closure) predict VR closure status among young adults with disabilities who have received services from VR between 2003 and 2013, above and beyond individual characteristics (age, sex, race, disability, impediments to employment, and receipt of SSI), in-school experiences (participating in YTP and earning a high school completion certificate), and post-school experiences (number of VR services and closing VR services below the median number of days)?

The purpose of research question four was to examine the effect of contextual factors on predicting a VR closure status of rehabilitated, when controlling for

statistically significant individual factors, in-school experiences, and post-school experiences.

Fitting the logistic regression model. For my fourth research question, I followed the same seven-step logistic regression model fit procedure as in research questions 1, 2 and 3. The single variable logistic regression models for the independent variable tested during this research question are provided in Table 4.12, and the final model for this research question is presented in Table 4.13.

Table 4.12. Contextual Variables *Single-Variable* Logistic Regression Models Predicting VR Closure Rehabilitated ($n = 4,401$).

Variable	β (S.E.)	Wald	e^{β} [95% CI]	Sig.
Micropolitan vs Rural	0.01 (.14)	0.01	1.01 [0.77, 1.31]	.961
Metropolitan vs Rural	-0.04 (.15)	0.08	0.96 [0.72, 1.28]	.781
FFY03	0.26 (.14)	3.80	1.32 [1.00, 1.74]	.051*
FFY04	0.30 (.10)	9.40	1.35 [1.12, 1.64]	.002**
FFY05	0.29 (.08)	11.65	1.33 [1.13, 1.57]	.001**
FFY06	0.42 (.08)	26.44	1.53 [1.30, 1.79]	.000***
FFY07	0.19 (.08)	6.43	1.21 [1.05, 1.41]	.011*
FFY08	-0.02 (.08)	0.07	1.02 [0.88, 1.19]	.786
FFY09	-0.29 (.09)	10.57	0.75 [0.63, 0.89]	.001**
FFY10	-0.13 (.08)	2.42	0.88 [0.74, 1.03]	.120*
FFY11	-0.01 (.08)	0.03	0.98 [0.84, 1.15]	.876
FFY12	-0.07 (.08)	0.82	1.07 [0.92, 1.26]	.366

* $p. \leq .20$, ** $p. \leq .01$, *** $p. \leq .001$.

Table 4.13. Contextual Variables *Final* Logistic Regression Model Predicting VR Closure Rehabilitated ($n = 4,401$)

Variable	β (S.E.)	Wald	e^{β} [95% CI]	Sig.
Sex (female)	-0.17 (0.10)	3.20	0.84 [0.70, 1.02]	.073
Mental Illness vs. SLD	-0.44 (0.13)	11.67	0.65 [0.50, 0.83]	.001***
TBI vs. SLD	-0.99 (0.33)	8.83	0.37 [0.20, 0.72]	.003**
Interpersonal	-0.23 (0.08)	8.86	0.79 [0.68, 0.92]	.003**
SSI	-0.61 (0.13)	22.30	0.54 [0.42, 0.70]	.000***
Self Care	-0.38 (0.09)	17.08	0.68 [0.57, 0.82]	.000***
Phys/Mob vs. SLD	-0.29 (0.16)	3.43	0.75 [0.55, 1.02]	.064

Table 4.13. (continued).

Variable	β (S.E.)	Wald	e^{β} [95% CI]	Sig.
Multiple Disabilities	-0.11 (0.09)	1.41	0.90 [0.75, 1.07]	.236
Work Tolerance	-0.02 (0.08)	0.07	0.98 [0.84, 1.14]	.789
YTP	0.90 (0.17)	28.15	2.45 [1.76, 3.42]	.000***
HS Completion Cert.	0.74 (0.16)	21.46	2.09 [1.53, 2.86]	.000***
YTP*HSC	-0.49 (0.18)	6.99	0.62 [0.43, 0.88]	.008**
Number of VR Services	0.26 (0.02)	259.36	1.30 [1.26, 1.35]	.000***
Below Median DTC	0.76 (0.08)	95.52	2.15 [1.84, 2.50]	.000***
FFY04	0.42 (0.14)	9.29	1.52 [1.16, 1.99]	.002**
FFY09	-0.33 (0.10)	10.44	0.72 [0.59, 0.88]	.001***
FFY08	-0.52 (0.12)	20.14	0.60 [0.48, 0.75]	.000***
Sex*Mult	-0.32 (0.14)	5.35	0.73 [0.56, 0.95]	.021
SSI* Self-Care	0.51 (0.18)	8.26	1.67 [1.18, 2.36]	.004**
Age	0.02 (0.04)	0.26	1.02 [0.95, 1.10]	.613
Race (not-white)	-0.27 (0.13)	4.28	0.76 [0.59, 0.99]	.039
ID vs. SLD	-0.09 (0.13)	0.51	0.91 [0.70, 1.18]	.475
Autism vs. SLD	0.08 (0.14)	0.36	1.09 [0.83, 1.42]	.546
Other Cog. Imp. vs. SLD	-0.11 (0.13)	0.80	0.89 [0.70, 1.15]	.372
ADHD vs. SLD	-0.13 (0.13)	1.02	0.88 [0.68, 1.13]	.312
Sensory/Comm. vs. SLD	-0.39 (0.16)	6.04	0.68 [0.49, 0.92]	.014
Physical/Mob. vs. SLD	0.07 (0.12)	0.36	1.08 [0.85, 1.36]	.548
Self-Direction	-0.06 (0.07)	0.62	0.94 [0.82, 1.09]	.433
Work Skills	0.03 (0.10)	0.10	1.03 [0.85, 1.26]	.751
Post-Secondary Educ.	-0.16 (0.11)	2.28	0.85 [0.69, 1.05]	.131
Micropolitan vs Rural	-0.33 (0.16)	4.08	0.72 [0.53, 0.99]	.043
Metropolitan vs Rural	-0.04 (0.15)	0.08	0.96 [0.72, 1.28]	.774
FFY03	0.08 (0.35)	0.05	1.08 [0.55, 2.13]	.821
FFY05	0.00 (0.11)	0.00	1.00 [0.80, 1.24]	.979
FFY06	0.19 (0.11)	2.95	1.20 [0.97, 1.49]	.086
FFY07	-0.09 (0.10)	0.78	0.92 [0.76, 1.11]	.377
FFY10	-0.14 (0.11)	1.85	0.87 [0.70, 1.07]	.173
FFY11	0.00 (0.10)	0.00	1.00 [0.82, 1.22]	.994
FFY12	0.13 (0.10)	1.72	1.14 [0.94, 1.39]	.189

.** $p \leq .01$, *** $p \leq .001$

The results of the Hosmer and Lemeshow test were $\chi^2(8, 4,401) = 10.602, p = .225$. The null hypothesis failed to be rejected, suggesting an adequate model fit.

The Nagelkerke pseudo R^2 goodness of fit-test suggest that the final model from this fourth research question (Nagelkerke $R^2 = .195$) is a slightly better fit than the

model from the first and second research question (Nagelkerke $R^2 = .048, .067, \& .181$).

Results of the fitted model. The results of the final model for the fourth research question suggest that three of the twelve factors that were added work together in combination with factors from each of the previous models to predict VR closure rehabilitation status. The contextual variables that were added to answer the fourth research questions are *federal fiscal year of closure* variables and include the federal fiscal years 2004, 2009, and 2008. Additionally, two of all plausible interaction effects added into the model using Hosmer et al.'s (2013) process were statistically significant. The results from this model suggest that there are 14 cross-construct factors (i.e., combined from individual, in-school experience, post-school experience, and contextual factors) that work together to form a model for predicting a vocational rehabilitation closure status among young adults with disabilities receiving services from VR in Oregon. These 13 factors include: *mental illness primary disability, TBI primary disability, having an interpersonal impediment to employment, receiving SSI at application, having self-care as an impediment to employment, participant of YTP, having completed high school by the time of VR closure, the number of VR services received, having closed on or below the median number of days to VR closure, having closed in FFY2004, having closed in FFY2009, having closed in FFY2008, and the interaction effect that exists between receiving SSI at application and having self-care as an impediment to employment*. The individual factors were each negatively related to the outcome of a VR closed rehabilitated status. The in-school experience factors were each

positively related to the outcome of a VR closed rehabilitated status. The post-school experience factors were each positively related to the outcome of VR closed rehabilitated status. Two of the three federal fiscal years of closure (FFY2008 and FFY2009) were negatively related to the outcome of a VR closed rehabilitated. One (FFY2004) was positively related. Please note that *sex* identified as a statistically significant individual predictor of VR closure outcomes when answering the first research questions; however, *sex* is not statistically significant in the final model for this fourth research question. Similarly, the variable *self-care* was not statistically significant in the final model for the first research question; but, was statistically significant in the final model of this fourth research question. Additionally, the interaction effect between receipt of SSI at application and having a self-care impediment to employment was not significant in the final model of the first research question, but is statistically significant in the final model of this fourth research question. The changes in these variables statistical significance suggest that the addition of contextual factors into the model make an important change to their effect. All plausible interaction effects were tested and only those that were statistically significant were included in the model.

Mental illness. When controlling for the effects of all other individual, in-school experience, post-school experience, and contextual factors constant, having a primary disability of mental illness was associated with an odds ratio of 0.65 on VR closure status. These result suggest that young adults with a primary disability of mental illness were less likely to achieve a positive VR closure status than those with a primary disability of SLD, $\beta = -.44$, $SE = .13$, $Wald = 11.67$, $p < .001$, $Exp(\beta) =$

0.65, 95% CI [0.50, 0.83]. This is a slightly higher odds ratio than was identified in the first research question ($\text{Exp}(\beta) = 0.64$, 95% CI [0.51, 0.81]).

TBI. The odds ratio of achieving a positive VR closure status for young adults with a primary disability of TBI was 0.37. These results suggest that young adults with a primary disability of TBI were less likely to achieve a VR closure status of rehabilitated than young adults with a primary disability SLD, $\beta = -.99$, $SE = .33$, $Wald = 8.83$, $p < .01$, $\text{Exp}(\beta) = 0.37$, 95% CI [0.20, 0.72]. This is a lower odds ratio than was identified in the first research question ($\text{Exp}(\beta) = 0.41$, 95% CI [0.23, 0.74]).

Interpersonal impediment to employment. Additionally, having an interpersonal impediment to employment was associated with an odds ratio of 0.79 on VR closure status, suggesting a decreased likelihood of achieving a VR closure status of rehabilitated compared to individuals without an interpersonal impediment to employment, $\beta = -.23$, $SE = .08$, $Wald = 8.86$, $p < .01$, $\text{Exp}(\beta) = 0.79$, 95% CI [0.68, 0.92]. This is a slightly lower odds ratio than was identified in the first research question ($\text{Exp}(\beta) = 0.81$, 95% CI [0.70, 0.93]).

Receiving SSI at application. The odds ratio of individuals who were receiving SSI at the time of application achieving a VR closure status of rehabilitated was 0.54, suggesting that these young adults were less likely to achieve a positive VR closure outcomes than young adults who were not receiving SSI at the time of application, $\beta = -.61$, $SE = .13$, $Wald = 22.30$, $p < .001$, $\text{Exp}(\beta) = 0.54$, 95% CI [0.42, 0.70]. This is a lower odds ratio than was identified in the first research question ($\text{Exp}(\beta) = 0.67$, 95% CI [0.56, 0.79]).

Self-care impediment to employment. The odds ratio of individuals who had a self-care impediment to employment achieving a VR closure status of rehabilitated was 0.68. These results suggest a decreased likelihood of achieving a VR closure status of rehabilitated for young adults with a self-care impediment to employment compared to young adults without this impediment, $\beta = -.38$, $SE = .08$, $Wald = 17.08$, $p < .001$, $Exp(\beta) = 0.68$, 95% CI [0.57, 0.82]. Self-care was not a statistically significant predictor of positive VR closure status in the final model of the first research question.

YTP. Participating in the Youth Transition Program was associated with an odds ratio of 2.45 on VR closure status, suggesting that young adults who participated in YTP were more likely to achieve a positive VR closure status than those who did not, $\beta = .90$, $SE = .16$, $Wald = 28.15$, $p < .001$, $Exp(\beta) = 2.35$, 95% CI [1.76, 3.42]. This is a higher odds ratio than was identified in the second research question ($Exp(\beta) = 2.18$, 95% CI [1.60, 2.79]).

High school completion certificate. Having a high school completion certificate at the time of VR closure was associated with an odds ratio of 2.09 on VR closure status, suggesting an increased likelihood of achieving a VR closure status of rehabilitated compared to individuals without a high school completion certificate at exit, $\beta = .74$, $SE = .16$, $Wald = 21.46$, $p < .001$, $Exp(\beta) = 2.09$, 95% CI [1.53, 2.83]. This is a slightly higher odds ratio than was identified in the second research question ($Exp(\beta) = 2.06$, 95% CI [1.54, 2.76]).

Interaction between YTP and high school completion certificate. There was a statistically significant interaction effect between participating in the Youth Transition Program and having a High School completion certificate at VR closure. Individuals who

had participated in YTP and had a high school completion certificate at closure had an odds ratio of 0.64, suggesting they were less likely to close VR rehabilitated than those who did not demonstrate both of those characteristics, $\beta = -.45$, $SE = .17$, Wald = 6.65, $p \leq .01$, $\text{Exp}(\beta) = 0.64$, 95% CI [0.46, 0.90].

Interaction between SSI and self-care impediment to employment. Lastly, there was a statistically significant interaction effect between receiving SSI at application and having a self-care impediment to employment. This interaction was not statistically significant in any of the other final models and suggests that when controlling for the effects of individual characteristics, in-school experiences and outcomes, post-school experiences and outcomes, and contextual factors, individuals who both received SSI at application and had a self-care impediment to employment had an odds ratio of 1.67, suggesting they are more likely to achieve a VR closure status of rehabilitated than individuals who did not demonstrate both of those characteristics, $\beta = 0.51$, $SE = .18$, Wald = 8.26, $p \leq .01$, $\text{Exp}(\beta) = 1.67$, 95% CI [1.18, 2.36].

Number of VR services. The number of VR services received by an individual was a statistically significant predictor of VR closure status with an odds ratio of 1.30. For each increase of one in the number of VR services received by an individual there was an 1.30 times increase in the likelihood that they would achieve a VR closure status of rehabilitated, $\beta = .26$, $SE = .02$, Wald = 259.36, $p < .001$, $\text{Exp}(\beta) = 1.30$, 95% CI [1.26, 1.34]. For example, an individual who received four services (the median number of services received) was 1.30 times more likely to achieve a VR closure status of rehabilitated than an individual who received three services. Similarly, that same individual was 3.90 times more likely to achieve a VR closure

status of rehabilitated than an individual who received only one service. This is a slightly higher odds ratio than was identified for this variable in the third research question ($\text{Exp}(\beta) = 1.28$, 95% CI [1.26, 1.35]).

Closure on or below the median number of days to closure. The odds ratio of young adults who closed from VR in fewer than the median number of days to closure achieving a positive VR closure status was 2.15, suggesting these young adults were more likely to achieve a VR closure status of rehabilitated compared to those who closed VR services beyond the median number of days to closure, $\beta = .76$, $SE = .08$, $\text{Wald} = 95.52$, $p < .001$, $\text{Exp}(\beta) = 2.15$, 95% CI [1.84, 2.86]. This is a lower odds ratio than was identified in the final model of the third research question ($\text{Exp}(\beta) = 2.26$, 95% CI [1.95, 2.61]).

FFY2004. Closing from VR services during the 2004 federal fiscal year was associated with an odds ratio of 1.52 on VR closure status, suggesting an increased likelihood of achieving a positive VR closure status compared to those who closed in any other year, $\beta = .42$, $SE = .14$, $\text{Wald} = 9.29$, $p < .001$, $\text{Exp}(\beta) = 1.52$, 95% CI [1.16, 1.99].

FFY2008. The odds ratio of closing VR rehabilitated if a young adult closed VR services during the 2008 federal fiscal year was 0.73, suggesting a decreased likelihood of achieving a VR closure status of rehabilitated for these young adults when compared to those who closed in any other year, $\beta = -.52$, $SE = .12$, $\text{Wald} = 5.35$, $p < .01$, $\text{Exp}(\beta) = 0.73$, 95% CI [0.56, 0.95].

FFY2009. Similarly, the odds ratio of a young adult closing VR rehabilitated if they closed VR services during the 2009 federal fiscal year was associated with

an odds ratio of 0.73, suggesting decrease in the likelihood of achieving a VR closure status of rehabilitated compared to those who closed in any other year, $\beta = -.33$, $SE = .10$, $Wald = 10.44$, $p < .001$, $Exp(\beta) = 0.72$, 95% CI [0.59, 0.88].

Interaction between SSI and self care impediment to employment. With an odds ratio of 1.67, the results of this analysis suggest that the interaction effect between receiving SSI at application and having a self-care impediment to employment leads to a increased likelihood of individuals who demonstrate both of these characteristics achieving a positive VR closure status compared to those who did not demonstrate both of those characteristics, $\beta = .51$, $SE = .18$, $Wald = 8.26$, $p < .01$, $Exp(\beta) = 1.67$, 95% CI [1.18, 2.36].

Additional comments. One of the non-statistically significant variables, *sex*, was statistically significant in the final models of the first three research questions, but was not in the final model of this fourth research question. Additionally, the variable *self-care* was not statistically significant in the final model of the first research question, but was statistically significant in the final model of the fourth research question. These changes once again demonstrates that the addition of contextual variables into a model predicting positive VR closure status for young adults with disabilities provides an important adjustment on the effects of other factors. This is also supported by an increase in the Nagelkerke R^2 goodness of fit test from .048 in the first model to .067 in the second model, to .181 in the third model, to .195 in this model.

Summary of Results

In summary, four logistic regression models were developed using Hosmer et al.'s (2013) model building approach. The first model tested the effects of individual

characteristics on VR closure status. The second model tested the effects of in-school experiences on VR closure status while controlling for the effects of individual characteristics. The third model tested the effects of post-school experiences on VR closure status while controlling for the effects of individual characteristics and in-school experiences. The fourth model tested the effects of contextual factors on VR closure status while controlling for the effects of individual characteristics, in-school experiences, and post-school experiences. Seven variables were identified that decrease the probability of young adults with disabilities achieving a positive VR closure status: (1) being female; (2) having a primary disability of mental illness; (3) having a primary disability of traumatic brain injury; (4) having an interpersonal impediment to employment; (5) receiving SSI at application; (6) closing VR services during federal fiscal year (FFY) 2008; and (7) closing VR services during FFY 2009. Five variables were identified that increase the probability of young adults with disabilities achieving a positive VR closure status: (1) participation in the Oregon Youth Transition Program; (2) earning at least a high school completion certificate by closure; (3) receiving a higher number of VR services; (4) closing VR services on or below the median number of days to closure; and (5) closing VR services during FFY 2004 (see Table 4.14). In the next chapter, I discuss how these findings related to my hypotheses and what their implications are for research and practice.

Table 4.14. Summary of Statistically Significant Predictors of a Positive VR Closure Status from Each of the Four Research Questions ($n = 4,401$)

Variable	β (S.E.)	Wald	e^{β} [95% CI]	Sig.
Sex (female)	-0.28 (.07)	18.29	0.76 [0.67, 0.86]	.000***
Mental Illness vs. SLD	-0.45 (.12)	14.25	0.64 [0.51, 0.81]	.000***
TBI vs. SLD	-0.89 (.30)	8.62	0.41 [0.23, 0.74]	.003**
Interpersonal	-0.21 (.07)	8.45	0.81 [0.70, 0.93]	.000***
SSI	-0.41 (.09)	20.64	0.67 [0.56, 0.79]	.000***
YTP	0.78 (.16)	24.26	2.18 [1.60, 2.97]	.000***
HS Completion Cert.	0.72 (.15)	23.66	2.06 [1.54, 2.76]	.000***
YTP*HSC	-0.45 (.17)	6.65	0.64 [0.46, 0.90]	.010**
Number of VR Services	0.25 (0.02)	268.35	1.28 [1.24, 1.32]	.000***
Below Median DTC	0.81 (0.08)	119.48	2.26 [1.95, 2.61]	.000***
FFY04	0.42 (0.14)	9.29	1.52 [1.16, 1.99]	.002**
FFY09	-0.33 (0.10)	10.44	0.72 [0.59, 0.88]	.001***
FFY08	-0.52 (0.12)	20.14	0.60 [0.48, 0.75]	.000***

** $p. \leq .01$, *** $p. \leq .001$

CHAPTER V

DISCUSSION

The purpose of this study was to identify predictors of Vocational Rehabilitation (VR) closure status among young adults with disabilities receiving services from VR. Predictor variables were conceptualized and selected using the four overarching constructs of the National Longitudinal Transition Study (NLTS) theoretical framework: (1) individual and family characteristics, (2) in-school experiences, (3) post-school experiences, and (4) contextual factors. I tested the predictive effect of variables from each of the four constructs using logistic regression and identified statistically significant variables that predicted a positive VR closure. It's important to note that because I did not have any family variables to include from the existing data set in my model, the first construct "individual and family characteristics" only included "individual characteristics"

Results from my sample of 4,443 young adults with disabilities who received services from VR between 2003 and 2013 suggest that specific variables included in my model were both positively and negatively associated with achieving a positive VR closure status. The following four individual characteristics were negatively associated with achieving a positive VR closure status: (a) being female; (b) having a primary disability of mental illness; (c) having an interpersonal impediment to employment; and (d) receiving SSI at application. The following two in-school experiences were positively associated with achieving a positive VR closure status: (a) participation in YTP, and (b) earning at least a high school completion certificate by closure. The following two post-school experiences were positively associated with achieving a positive VR closure

status: (a) receiving a higher number of VR services, and (b) closing VR services at or below the median number of days to closure. The following contextual factor was positively associated with achieving a positive VR closure status: (a) closing VR services during the 2004 FFY. Lastly, the following contextual factors were negatively associated with achieving a positive VR closure status: (a) closing VR services during the 2008 FFY; and, (b) closing VR services during the 2009 FFY.

The findings from my study support the hypothesis that individual characteristics, in-school experiences, post-school experiences, and contextual factors significantly predict positive VR closure status. The results from my study also provide a unique contribution to the field because of the limited research that describes outcomes for all young adults with disabilities receiving services from VR. The majority of peer-reviewed sources investigating predictors of VR closure outcomes among young adults with disabilities have investigated outcomes for young adults with specific disability types. In total, two of the six studies included in my literature review focused on individuals with visual impairments (Geisen & Cavanaugh, 2012; McDonnell & Crudden, 2009), one on individuals with autism (Migliore et al., 2012), one on individuals with learning disabilities (Gonzalez et al., 2009), one on individuals with ADHD (Shaller et al., 2006), and one was specific to participants in a community college short-term training program (Flannery et al., 2011)

Although the results of my study provide insight into variables that are statistically significant predictors of positive VR closure status among young adults with disabilities, they do not provide evidence to describe why these relationships exist. For this, I turn to previous research and theory to help frame my discussion.

Individual Predictors of VR Closure Status

Prior research suggests that individual and family variables are significantly related to post-school outcomes for young adults with disabilities (D'Amico, 1991; Hayward & Schmidt-Davis, 2000; Cameto, 2005; Flannery et al., 2011). In this study, I used logistic regression to test the effect of individual characteristics that were available in my data set on predicting VR closure status for young adults with disabilities. The individual characteristics that were tested in my model included: age at VR closure, sex (being female), race (not-white), primary disability, having multiple disabilities, impediments to employment (communication, interpersonal, mobility, self-care, self-direction, work skills, and work tolerance), and receipt of SSI at the time of application. The results from my model suggest that five of the 13 individual characteristics included in my model were statistically significant predictors of VR closure status. These characteristics include: sex (being female), having a primary disability of mental illness, having an interpersonal impediment to employment, and receiving SSI at application. The results from my model suggest that all of these statistically significant individual characteristics are negative predictors of achieving a positive VR closure status. Contrary to previous studies indicating that age; race; having an orthopedic impairment, hearing impairment, visual impairment, speech or language impairment, other health impairment, or intellectual disability, having multiple disabilities, and having a low personal care function are significantly related to post-secondary employment (Flannery et al., 2011; Giesen & Cavanaugh, 2012; Newman et al., 2009), findings from my study did not reveal any statistically significant relationships for these variables.

Sex. The findings from my research are consistent with previous research reporting that females with disabilities are less likely to achieve positive post-secondary employment outcomes than their male counterparts (D'Amico, 1991; D'Amico & Blackorby, 1992; Hayward & Schmidt-Davis, 2000; Migliore et al., 2012; Geisen & Cavanaugh, 2012). For example, Geisen and Cavanaugh (2012) found in their sample of 2,282 young adults with visual impairments from RSA-911, that females were 18% less likely to be competitively employed than males. Similarly, Migliore et al. (2012) found in their sample of 2,913 young adult with autism who received VR services that males were 1.53 times more likely to be in an integrated employment setting than females. The findings from my study are consistent with these earlier studies, and suggest that females are 24% less likely than males to achieve a positive VR closure status. My findings provide additional evidence that young women with disabilities continue to enter the workforce at a lower rate than their male counterparts.

There are multiple possibilities for why young women with disabilities may be entering the workforce at a lower rate than young men. One possible explanation is that there is a history of occupational segregation that exists for both women and individuals with disabilities (Blau, Brummunt, Liu, 2013; Maroto & Pettinichhio, 2014). Data show that both young women and individuals with disabilities have historically been employed at lower rates than young men and individuals without disabilities (U.S. Department of Labor Women's Bureau, n.d.; U.S. Department of Labor, 2013). When the effects of being both a young woman *and* an individual with a disability are combined, it's no surprise to me that we see a decreased likelihood of employment. I hypothesize that the

effects of being a member of both of these two historically marginalized groups is additive and the results of my research support this hypothesis.

Mental illness vs SLD. My findings also suggest that young adults with mental illness are 30% less likely to achieve a positive VR closure status than young adults with a primary disability of SLD. These findings are supported by the results from a study using data from VR; yet, contradict those found in studies using data from the NLTS-2. Flannery et al. (2011) used a combination of VR, department of education, and other non-extant data to report that individuals with psychiatric disabilities were less likely complete some level of a positive post-secondary outcome (receipt of occupational certificate, employed at exit in a career-related job, maintained employment for 90 days). Conversely, Stanford et al., (2011) and Wagner et al., (2009) used NLTS-2 data and found that young adults with emotional disturbance were more likely to be employed than young adults with orthopedic impairments.

One possible explanation for the differences in findings across studies could be the unique ways that each of these studies (including my own) defined young adults who are experiencing mental illness. One study included only young adults with documented psychiatric disabilities (Flannery et al. 2011), two studies included individuals with an IDEA diagnosis of emotional disturbance (Stanford et al., 2011; Newman et al., 2009), and I included a different system to define mental illness based upon a combination of well-documented primary disabilities that were mental health related (i.e., drug and/or alcohol abuse or dependence, depressive mood disorder, anxiety disorder, etc.). Until researchers are better able to standardize definitions for individuals with this broad array of mental health challenges, our understanding of variables that contribute to their post-

secondary outcomes will likely continue to vary. Irrespective of the way that young adults with mental health concerns are categorized, the findings from my study reveal important information about the employment outcomes of young adults experiencing mental illness; an area of study with limited research. Young adults experiencing mental illness as a primary disability may be less likely to achieve a positive VR closure status than young adults with SLD because of the impact that mental illness has on their functioning across multiple environments (i.e., school, home, work; Center for Disease Control, 2011; National Research Council and Institute of Medicine, 2009).

TBI vs. SLD. In my study, having a primary disability of TBI was associated with a 55% decreased likelihood of achieving a positive VR closure status when compared to young adults with SLD; this is the largest negative effect of any predictor in my study. Interestingly, my systematic literature review did not lead me to believe that employment outcomes would vary for young adults with TBI. None of the literature that I reviewed for my study suggested that individuals with TBI experience disparate employment outcomes when compared to individuals with other disabilities. Furthermore, although TBI has been recognized by IDEA as a disability category since 1991, research on transition outcomes for this population is just beginning to emerge (Todis, Gland, Bullis, Ettel & Hood, 2011). One possible explanation for why VR closure outcomes varied significantly for individuals with TBI could be that the unique cognitive and behavioral characteristics of these individuals are not fully understood and require further investigation as to guide strategies and interventions for supporting the post-secondary outcomes of these young adults (Togher, McDonald, & Code, 2014; Todis, et al., 2011). The findings from my study provide new and emerging evidence that young

adults with TBI are less likely to find success within the VR system than young adults with SLD.

Interpersonal impediment to employment. Only one of the seven impediments to employment included in my study was statistically significant, namely interpersonal impediment to employment. My findings report that young adults with disabilities with an interpersonal impediment to employment are 19% less likely to achieve a positive VR closure status than those who do not have this impediment. These findings only partially mirror those of other research that suggests functional limitations and skills barriers are related to poorer post-secondary outcomes among young adults with disabilities (Cameto, 2005; Flannery et al., 2011). Based upon previous research, I would have expected that all of the seven impediments to employment (communication, interpersonal, mobility, self-care, self direction, work skills, work tolerance) entered into my model would be statistically significant (because these variables all represent some kind of a functional limitation or skills barrier). However, the results from my study suggest that having an interpersonal impediment to employment was the only impediment to employment that had a statistically significant relationship to VR closure status, and that the relationship is negative.

My research offers a new level of detail on categories of impediments to employment that decrease the likelihood of young adults with disabilities obtaining employment, and suggests that individuals with interpersonal impediments to employment are less likely than those without this impediment to obtain employment. Previous research on young adults with disabilities suggests that young adults with disabilities who also have deficits in social, communication and other interpersonal skills

are at a greater risk of being able to find employment (Carter, et al., 2009; Bornhofen & McDonald, 2008). One possible explanation for this finding is that the characteristics associated with an interpersonal impediment to employment (i.e., inability to interact in a socially acceptable manner at work, unable to determine appropriate social responses to others, a spotty or intermittent work history, and/or unable to effectively resolve conflicts with co-workers) (personal communication, Barcikowski, June 3rd, 2013) are at odds to many of the characteristics that employers seek when hiring an employee. According to the National Association of Colleges and Employers (2011) survey of employers, the characteristics that employers most look for when hiring an employee include an individual's ability to work in a team and problem solving.

Receipt of SSI at application. Previous research has demonstrated that young adults with disabilities receiving public financial assistance are less likely to participate in the work force (Hayward & Schmidt-Davis, 2000; Geisen & Cavanaugh, 2012; Migliore et al., 2012). Geisen and Cavanaugh (2012) found that young adults with visual impairments who were receiving SSI at application were 59% less likely to be competitively employed compared to those who were not receiving SSI. Similarly, Migliore, et al. (2012) found young adults with autism who were not Medicaid or Medicare recipients were 1.29 times more likely to be competitively employed than those who were not. The results from my study align with these findings and suggest that individuals who were recipients of SSI at application were 37% less likely to have a positive VR closure status than those who did not receive SSI. . One possible explanation for this findings is economic disincentives that exist for recipients of SSI to join the workforce (Hemmeter, 2009; Geisen & Cavanaugh, 2012; O'Day & Stapleton, 2009).

Hemmeter (2009) reports in his Social Security Bulletin that although policy is attempting to address this phenomenon by introducing incentives and supports, individuals who are receiving SSI are at risk of losing their SSI benefit as they increase their participation in the workforce. Similarly, Geisen and Cavanaugh (2012) posit that some recipients of SSI may just assume that they cannot work because of their disability. Furthermore, O'Day & Stapleton (2009) suggest that SSI policy improvements are especially important because young adults with disability may more eagerly consider employment than older populations because they have not “become fully entrenched in dependency” (p.1).

In-School Experiences Predicting VR Closure Status

In-school experiences have been demonstrated to significantly predict post-school outcomes for young adults with disabilities (Geisen & Cavanaugh, 2012; McDonnall & Capella, 2009; D'Amico, 1991; D'Amico & Blackorby, 1992). Using logistic regression to test the effects of in-school experiences when holding constant individual characteristics, I identified that both of my in-school experience variables were statistically significant predictors of a positive VR closure status. The two in-school experience variables that were included in my model were: (1) participation in YTP; and (2) high school completion certificate or higher at VR closure. The results from my study confirm previous research suggesting that in-school experiences are important variables in predicting post-school employment outcomes and provide a new level of insight into the role of two of these variables.

Participation in the Youth Transition Program (YTP). The results from my study suggest that young adults with disabilities who participate in YTP are more than

twice as likely to achieve a positive VR closure outcome than those who do not; this is the second largest positive effect identified in my study, second only to earning a high school completion certificate. The purpose of YTP is to prepare young adults with disabilities for post-secondary employment, education or training by providing them with an enhanced pattern of transition services and supports (Lindstrom & Poppen, 2010; Oregon Vocational Rehabilitation Services [OVR] State Plan for Services, 2014). The enhanced pattern of VR transition services and supports differ from those offered to non-YTP participants in a number of ways.

YTP is a collaborative program that operates through a partnership with local schools, the Oregon Department of Education, the University of Oregon, and Oregon VR (Lindstrom & Poppen, 2010; Oregon Vocational Rehabilitation Services Program, 2014). This partnership pays for an in-school staff member (a Transition Specialist) who helps young adults navigate the transition services that are provided from both the local schools and VR (Oregon Vocational Rehabilitation Services Program, 2014). Every two years, local schools enter a competitive application process with VR to become a YTP site (Oregon Vocational Rehabilitation Services Program, 2014). A collaborative agreement is established between those sites that are selected and specifies that local schools who participate in YTP are responsible to provide an established set of enhanced transition services and supports, meet specific performance benchmarks that are set by VR, and contribute a one-third monetary match and deliver YTP activities (Oregon Vocational Rehabilitation Services Program, 2014). The enhanced transition services and supports include: (a) career and transition planning activities that are focused on the students post-school goals, and develop self-determination; (b) instruction in vocational, independent

living and social skills; (c) career development activities; (d) structured work experiences and paid employment opportunities during a student's participation in the program; and, (e) the provision of follow-up services and supports for one-year after a young adult completes the program to ensure that they are able to maintain their post-secondary employment, education or training Oregon Vocational Rehabilitation Services Program, 2014). The performance benchmarks that local schools are held accountable to include: (a) the total number of VR applicants solicited through each program; (b) the percentage of those applicants who are determined eligible and complete an individual plan for employment (IPE); (c) the percentage of young adults who exit the program engaged in either post-secondary employment, education or training; and, (d) the percentage of young adults who exit VR closed rehabilitated (Oregon Vocational Rehabilitation Services Program, 2014).

The results from my study suggest that the enhanced transition services and supports that are provided to young adults who participate in YTP increase the likelihood that they will achieve a positive VR closure status.

High school completion certificate. Research has shown that young adults with high school completion certificates are more likely to achieve positive post-secondary outcomes than students who do not complete high school (Kortering, 2012; McDaniel & Kuehn, 2012; Rabren et al., 2002). Specifically, among young adults who participated in NLTS, D'Amico (1991) reported that young adults with disabilities who graduated from high school were 17% percentage points more likely to be competitively employed than those who had dropped out. Subsequently, D'Amico (1992) reported that these findings remained true for students who had been out of high school for between two and five

years. The results from my study are consistent with those from D'Amico (1991 & 1992) and suggest that young adults who have a high school completion certificate are 2.12 times more likely to achieve a positive VR closure status than those who do not. One possible explanation for this finding is that having a high school completion certificate is often a minimum requirement when applying for a job. Furthermore, the skills and knowledge that are developed during high school can be helpful in earning and maintaining employment. Kortering (2012) suggests that high school completion is an important milestone in the lives of individuals with disabilities because it is in high school that these students have their final opportunity to receive education and training that will help them to be prepared to entering adult hood. The results from my study provide additional evidence on the impact of high school completion certificates on successful post-secondary outcomes for students with disabilities.

Interaction effect between YTP and HSC. The results of my study revealed a significant interaction term between participation in YTP and having a high school completion certificate, suggesting that individuals who both participated in YTP and had a high school completion certificate were 36% less likely to achieve a positive VR closure status than young adults who: (a) participated in YTP and did not have a high school completion certificate; (b) had a high school completion certificate but did not participate in YTP; and (c) did not participate in YTP and did not have a high school completion certificate. The interpretation of this interaction term is difficult because complete information about a student's outcomes is missing. Research suggests that having a high school completion certificate is a predictor of employment, but that it is also a predictor of engaging in post-secondary education (D'Amico, 1991). At the same

time, an intended outcome of YTP is to prepare young adults with disabilities to engage in positive post-secondary education or training (Lindstrom & Poppen, 2010; OVR State Plan for Services, 2014). Within the VR system, enrollment in post-secondary education or training is not included within the definition of VR closed rehabilitated, and those who go on to pursue post-secondary education or training are closed as other than rehabilitated. I propose that a possible explanation for why young adults with disabilities who have completed high school and were participants in YTP are less likely to achieve a positive VR closure status, is because they are more likely to go on to be engaged in post-secondary education or training. This hypothesis, however, cannot be tested based upon the level of detail that is provided in the dataset.

Post-School Experiences Predicting VR Closure Status

The research suggests that post-school experiences play an important role in helping young adults with disabilities achieve positive post-secondary outcomes. The result from my study confirm previous literature (e.g., Flannery et al., 2011; Migliore et al., 2012) and suggest that VR services individuals receive and the number of days of services are significant predictors of their success. Contrary to previous research, participating in some post-secondary education by VR closure was not a predictor of existing VR with a positive employment outcome.

Number of VR services. Previous research has demonstrated that the types of services provided by VR can predict positive closure outcomes among young adults with disabilities (Schaller et al., 2006; McDonnall & Crudden, 2009; Flannery et al., 2011; Migliore et al., 2012; Geisen & Cavanaugh, 2012). Specifically, job placement, general or vocational supports, college services, job search assistance, miscellaneous training, VR

counseling, financial support, and assistive technology are services that predict positive VR closure outcomes among young adults with disabilities (Schaller, et al., 2006; McDonnall & Crudden, 2009; Flannery et al., 2011; Migliore et al., 2012; Geisen & Cavanaugh, 2012). The results from my study are consistent with the previous research, and suggest that for each increase of one in the number of VR services that a young adult receives from VR, their likelihood of achieving a positive VR closure outcome increases by 1.27. For example, young adults who received 4 services (the median number of services received) were 1.27 times more likely to achieve a VR closure status of rehabilitated than an individual who received three services. Similarly, these same individuals were 3.81 times more likely to achieve a VR closure status of rehabilitated than individuals who received only 1 service.

To interpret these findings, it's first important to understand the context in which VR services are provided to young adults with disabilities. The services that are provided to a young adult with disabilities are chosen from a menu of possible services available through VR to help individuals overcome barriers to employment. Possible services include assessment services, transportation services, on the job supports, VR counseling and guidance, job search assistance, job placement assistance, college or university training, etc. The VR counselor selects and coordinates the services that are provided with input from the young adults and any additional service providers who are a part of that individuals transition team (i.e., other coordinating agencies such as the local schools or developmental disabilities office). (Hager & Sheldon, 2006).

The results from my study suggest a functional relationship between the number of services that young adults with disabilities receive and a positive VR closure outcome.

The findings support the idea that services young adults with disabilities receive from VR are effectively helping them to obtain employment. One possible explanation for this finding is that the services that are being provided are targeting the specific barriers that a young adult has in obtaining employment. My findings provide new evidence into the importance of VR services in helping young adults find work; however, the data does not provide evidence as to which services are most effective or how those services were chosen.

Days to closure. My findings show that young adults with disabilities who closed services with VR on or below the median number of days in my sample (490 days or 1.34 years) were 2.29 times more likely to achieve a positive VR closure outcome than those who did not. These findings are consistent with previous research from Migliore et al. (2012) which found that young adults with autism who closed below the median number days in their sample (820 days or 2.25 years) were 1.54 times more likely to be competitively employed than those who did not. The results from my research suggest that the duration of time that an individual remains an active VR client is a predictor of VR closure status. This finding suggests that the impact of VR services is greatest during the first 490 days of a young adult's participation in the program. Additionally, given that I found that a higher number of VR services was also attributed to positive VR closure status, perhaps young adults who approach their participation with VR in a purposeful way are more likely to complete the program with a positive outcome.

Contextual Factors Predicting Positive VR Closure

Previous research has demonstrated that contextual factors play an important role in predicting positive post-secondary outcomes for young adults with disabilities

(Gilmore, Schuster & Butterworth, 2001; Chan et al, 2013). Using logistic regression, I investigated the effect of community type (i.e., rural, micropolitan, or metropolitan) and federal fiscal year of closure on young adults with disabilities achievement of a positive VR closure status. The results from my study confirm previous research that employment outcomes for young adults with disabilities follow trends that are in alignment with the trends in the general United States labor market (Gilmore et al., 2001; Chan et al, 2013), but do not support research that has shown that outcomes for students vary by the types of communities where they receive services (D'Amico, 1991).

Federal Fiscal Year (FFY). The findings from my study suggest that there were three FFY's between 2003 and 2013 when young adults with disabilities were significantly more or less likely to close with a positive VR closure status. Specifically, (a) young adults who closed during the 2004 FFY were 1.52 times more likely to close with a positive VR closure outcome than those who closed during any other year; and (b) young adults who closed during the 2008 and 2009 FFY were 25% and 37% less likely to close with a positive VR closure status, respectively. One possible explanation for why these significant differences emerged is that FFY was used as a proxy variable for understanding labor market influences and that the employment outcomes of young adults with disabilities are a function of the economic trends in the general labor market.

There is evidence to suggest that the job rate for individuals for disabilities follows the same basic trends as the job rates for individuals without disabilities (U.S. Bureau of Labor Statistics, n.d.). Furthermore, previous research has demonstrated that VR closure outcomes rise and decline with the performance of the general economy (Gilmore et al., 2001; Chan, et al, 2013).

FFY 2004. During the four years between July 2003 and June 2007, the Oregon unemployment rate dropped more than three full percentage points, from 8.6% to 5.1%, (U.S. Bureau of Labor Statistics, n.d.). About one third of this drop, 1.1%, was experienced during the 2004 FFY (U.S. Bureau of Labor Statistics, n.d.). The results from my study are consistent with the literature and demonstrate that when the unemployment rate is decreasing young adults with disabilities are more likely to find employment.

FFY 2008 and 2009. Additionally, between December 2007 and June 2009, the United States experienced one of only ten recessions to impact the U.S. economy during the last 60 years (U.S. Bureau of Labor Statistics, 2012). During these years, the number of job openings, or unfilled jobs, in the U.S. decreased 44% from its pre-recession peak in March 2007 (U.S. Bureau of Labor Statistics, 2012). The unemployment rates in Oregon followed the same trend seen at the federal level and rose sharply from 5.1% in June 2007 to 11.6% in June of 2009 (U.S. Bureau of Labor Statistics, n.d.). The results from my study are consistent with the literature that suggests VR closure outcomes rise and decline with the performance of the general economy, and that this rise in unemployment in Oregon during the 2008 and 2009 FFY had a statistically significant effect on the VR closure outcomes of young adults with disabilities.

These findings contribute important information to the VR field because they validate that the functional relationship between the general labor market and employment outcomes for individuals with disabilities also holds true for young adults with disabilities. Further, these findings highlight the importance of including contextual

factors as covariates in subsequent research investigating the effects of predictor variables.

Integration of Findings Across Research Questions

The NLTS theoretical framework suggests that individual and family, in-school, post-school, and contextual factors work in combination to support young adults with disabilities achieving positive post-secondary outcomes. I tested a series of four hypotheses using this framework among a sample of young adults with disabilities receiving services from VR. The results from my study are consistent with my apriori hypotheses that individual, in-school, post-school and contextual factors have a statistically significant influence on closure outcomes for young adults with disabilities receiving services from VR. Further, my findings provide a new level of evidence and specificity about which variables within each of these four broad constructs are significant predictors of positive closure outcomes. I've utilized a risk and protective factors framework to integrate the findings from each of my four-research questions across some larger key themes and issues.

Risk and protective factors. First, there are six variables in my study that decrease the probability of an individual achieving a positive VR closure status; I will call these characteristics “risk factors”. Risk factors include being female, having mental illness or TBI as a primary disability, having an interpersonal impediment to employment, being a recipient of SSI, closing from VR in FFY 2008, and closing from VR in FFY 2009. Similarly, there are four variables that increased the probability of an individual achieving a positive VR closure status; I will call these characteristics “protective factors”. Protective factors include, participating in YTP, having a high

school completion certificate, receiving a higher number of VR services, closing from VR services below the median number of days from the sample, and closing from VR in FFY 2004. (Figure 5.1). Using a risk and resiliency framework provides a clear demonstration of variables that increase the likelihood of young adults achieving a positive VR closure status, as well as those variables that may inhibit such an outcome.

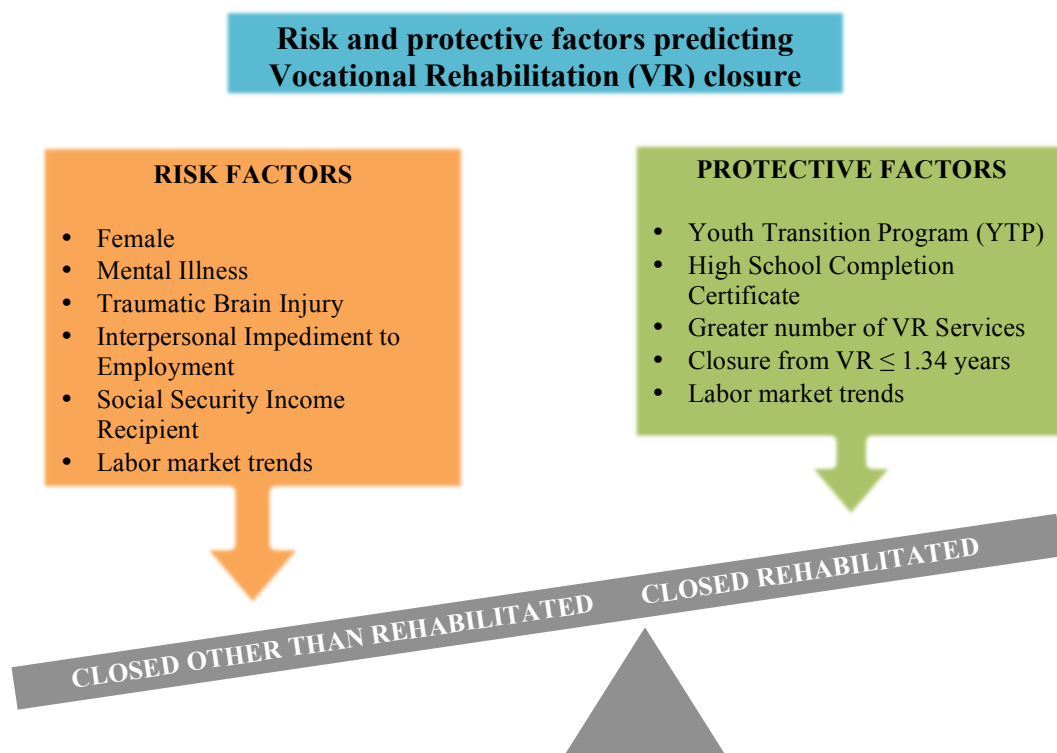


Figure 5.1. Risk and protective factors predicting VR closure status

Risk factors. Through my review of the significant findings, I noticed some important commonalities across variables that may help to explain the meaning of these data. First, when looking at the negative predictors of VR closure status, I observed that

the majority of risk factors were individual characteristics. Further, after reviewing the literature about post-secondary outcomes for individuals who demonstrate one or more of these characteristics, I observed that it is common for young adults who exhibit these individual characteristics to have deficits in non-cognitive skills areas (Lindstrom, Harwick, Poppen & Doren, 2010; Carter, Trainor, Sun & Owns, 2009; Kortering, 2012; Togher, McDonald, & Code, 2014; and, Church, Jagers & Taylor, 2012). Non-cognitive skills are defined as individual attributes and characteristics such as self-esteem, self-efficacy, self-advocacy, self-determination, social skills, soft skills, interpersonal skills, problem solving, personality traits, etc. (Heckman, 2008). Examples from the research include that for young women with disabilities having low levels of self-efficacy, self-esteem and self-advocacy can negatively impact their ability to secure positive post-secondary outcomes (Lindstrom et al., 2012). Moreover, young adults with emotional disturbance are more likely than students with SLD to demonstrate social and behavioral challenges that interfere with their ability to find and maintain employment (Carter et al., 2009). Non-cognitive skills have been shown to play an important role in facilitating employment outcomes for young adults with disabilities (Heckman, 2008; Lindstrom, et al., 2012; Carter, et al., 2009). Thus, the results of my study lead me to believe that one possible explanation for why individuals who demonstrate these characteristics are less likely to achieve a positive VR closure status may be related to deficits in non-cognitive skills. It's important to note that this is simply one possible explanation for interpreting my findings and that I did not have any access to data on non-cognitive skills in this study.

Transition services and supports. Although my study has identified a number of risk factors for young adults with disabilities, there were also protective factors that increased the likelihood of these young adults achieving a positive VR outcome. With the exception of trends in the labor market, I observed that the protective factors identified in my research are related to the transition services and supports that young adults participated in before and after applying for VR services (e.g., earning a high school completion certificate, participating in YTP, receiving a greater number of VR services, and closing VR services less than or equal to the median number of days in the sample). Young adults who participate in transition services and supports may be more likely to achieve a positive VR closure outcome for several reasons. One possible explanation is that the transition services and supports that they received helped them to overcome a clear set of structural barriers that were preventing them from successfully entering the workforce (i.e., mobility and accessibility, accommodations and supports, etc.; Stapleton, et al., 2010; Rabren, Hall, & Brown, 2003). Additionally, it's also possible that participating in transition services and supports helped these young adults to overcome deficits in non-cognitive skills in order to increase their employability. Research has shown that skill development opportunities (i.e., participating in YTP or receiving a higher number of VR services) can increase non-cognitive skills, such as vocational self-efficacy, that are needed to obtain and maintain employment (Lindstrom, Kahn, & Lindsey, 2013; Sheftel, Lindstrom, & McWhirter, 2014; Lindstrom, Doren, Post, & Lombardi, 2013). These findings have important implications at the local, state, and national level and provide evidence for continuing to develop transition services and supports in order to improve positive post-secondary outcomes.

Limitations

Limitations of my study include: (a) utilization of extant data; (b) the use of proxy variables to represent four theoretical constructs; (c) an inability to draw causal relationships; and (d) issues with generalization of the findings. This research was conducted using data that was, (a) entered by local VR counselors around the state of Oregon, and (b) used to evaluate performance on several indicators at the state and national level. Additionally, because this research was conducted using extant data that was collected for state and federal reporting requirements, some variables have changed over time, making them difficult to compare over a period of time. Although none of the variables that were included in my study had been changed or redefined during the period of time of my investigation, there were important variables (i.e., working at application) that were unable to be included in my analysis because they had changed during the period of my study. Also, because the data were extant, my analysis was limited to those variables available in the data set. Lastly, there were missing data that needed to be addressed within my sample.

A second limitation is that proxy variables from the data set were used to build four theoretically driven constructs: (1) individual characteristics; (2) in-school experiences; (3) post-school experiences; and (4) contextual factors. There were many variables that could have been included in the model to fully represent each construct, but these variables (e.g. self-determination) were not collected within the existing dataset. For example, the individual and family construct had to be modified to just include individual characteristics because no family variables were available within the dataset. Further, only a limited number of variables in other constructs could be tested. For

example, in-school experiences only included participation in YTP and high school completion certificate; in reality, the in-school experiences construct should include more in-depth information on the career development activities that were offered to that young adult, what type of setting that young adult received their education, and other extra curricular activities they completed. This issue was also a concern for post-school experiences and contextual factors, where only a limited number of variables made up each construct. The use of proxy variables used to build constructs was theoretically guided and these constructs should be interpreted with caution.

Third, because of the absence of a control group, no causal relationships can be drawn from my study. In order to demonstrate a causal relationship between variables an experimental group must be used (Shadish, Cook & Campbell, 2002).

Fourth, because my sample included young adults with disabilities who received services from VR in Oregon, the findings should be interpreted with caution when being generalized a broader population. Similarly, the findings do not demonstrate a direct relationship to all positive post-school outcomes, but rather a small portion of positive post-school outcomes (VR closure status of rehabilitated; indicating that an individual has been working for 90 days in a position earning more than minimum wage).

Additionally, only a small number of young adults with TBI as a primary disability are represented in my sample ($n = 47$; 1.1%). This is a limitation because the small number of these events may interfere with the reliability of my findings. King & Zeng (2001) report that when there are small numbers of events in a sample (<1%), such as the small number of participants in my sample with TBI as a primary disability,

logistic regression analyses strategies often underestimate the event probabilities, resulting in decreased reliability. Thus, these results should be interpreted with caution.

Implications for Research

First, it would be valuable to replicate this study with a variety of samples of young adults with disabilities who have received services from VR. For example, these analyses could be replicated using data from other state VR agencies, national level VR data, and with specific sub-populations of young adults who have received services from VR (i.e., females, individuals with mental illness, etc.). Replicating this study with different samples will provide an opportunity to contribute to a broader understanding of the predictors of VR closure status among young adults with disabilities across multiple settings. Both of the identified outcomes associated with replication of my study have the potential to lead to improved practices that will support the post-secondary outcomes of these young adults with disabilities.

A second implication for research is to investigate *why* the variables that I found to be significant predictors of VR closure status either increased or decreased the likelihood of young adults with disabilities achieving a positive VR closure status. The findings from my study were descriptive in nature and were limited in their ability to fully describe how and why these characteristics may lead to an increased or decreased likelihood of achieving a positive VR closure status. Future research should utilize the results of my study to investigate potential mediators of post-secondary outcomes for young adults with disabilities receiving services from VR who exhibit the risk factor characteristics identified in my study, such as communication skills, vocational self-efficacy or self-determination. I propose, that based upon existing research about these sub-populations,

non-cognitive skills should be considered as potential mediators of positive post-secondary outcomes for these young adults.

Using the results from my study, future research should investigate why transition services and supports improve student outcomes. More specifically, future research should take steps to investigate the specific transition services and supports that are provided to young adults with disabilities who participate in VR and identify those services that are most effective. As of the time of writing, VR offers a menu of 27 different services and supports and the results from my study suggest that individuals who receive a greater number of services are more likely to be closed rehabilitated. Because of limitations with my data analysis, I was unable to test the effects of specific services on program outcomes; however, future research should identify which of the services that are being provided are most effective to inform practice and policy.

Further, in addition to exploring variables that predict VR closure status among young adults with disabilities, researchers also need to develop evidence based practices that will help to support positive young adult VR outcomes. The results from my study suggest that targeted interventions should be developed and tested to support VR closure outcomes for young women, those with primary disabilities of mental illness or TBI, those with interpersonal impediments to employment, and those who are recipients of SSI at application. Additionally, the findings from my research provide emerging evidence that transition programming and supports such as YTP and the number of VR services positively impact VR outcomes. Research should further investigate these emerging practices in order to more clearly explore the elements of transition programming and supports that facilitate positive VR outcomes (i.e., essential features, types of services,

characteristics of those who participate in these kinds of services versus those who do not, etc.) and potential avenues for replication.

Implications for Practice

Results from my study show that young adults with disabilities who exhibit five specific individual characteristics (i.e., female, mental health or TBI as primary disability, interpersonal skills impediments to employment, receipt of SSI at application) are less likely to achieve a positive VR closure outcome than those who do not. Service providers and agencies (including VR) working with young adults with disabilities who are accessing VR services should be made aware that young adults who exhibit these characteristics are at-risk for not achieving a positive VR closure outcome, and should take steps to provide additional supports and services to these young adults to increase their chances of success (i.e., enroll them in YTP if possible, support their earning a high school completion certificate, provide a greater number of VR services, etc.). Based upon my findings, professional development opportunities should be implemented that train Special Educators, Vocational Rehabilitation staff, and other service providers about known strategies to support the post-secondary outcomes of young adults who demonstrate these characteristics. One example of such a professional development opportunity would include educating teams of transition practitioners about the barriers young women with disabilities face in achieving positive post-secondary outcomes (i.e., vocational outcome expectations, self-determination, etc.) and providing them with strategies that they can use with this population of young adults to facilitate post-secondary education. Further, results from my study reinforce the need to develop strategies that address the unique circumstances for individuals receiving SSI, including

the development of policy that eliminates the economic disincentives for these individuals to enter the labor market.

Additionally, my results provide emerging evidence that participating in YTP, earning a high school completion certificate, receiving a larger number of VR services, and closing VR services on or before the median number of days to closure (490 days, or 1.34 years) are variables that lead to an increased likelihood in young adults achieving a positive VR closure status. The implications of these findings suggest that practitioners should continue to provide the same level of transition supports and services that they have been providing over the ten-years studied in this analysis. Further, it is important for policy makers and administrators to see the impact of these services and direct resources that allow for these practices to be expanded or replicated. For example, YTP is not currently offered in every school in Oregon, and based upon the results of my study, the state of Oregon should investigate strategies for implementing YTP in every school district in Oregon. Additionally, I suggest that national and state level VR agencies seek out opportunities to better understand and replicate effective transition services and supports in other states.

The results of my study come at an important time and may be able to help inform the delivery and implementation of two recent federal policy initiatives. The first of the two initiatives is the *Workforce Innovation and Opportunities Act of 2014* (WIOA) that replaces the *Workforce Investment Act of 1998* and amends the *Rehabilitation Act of 1973*. WIOA was signed into law by President Obama in July 2014 and is aimed at increasing opportunities for individuals with disabilities who face barriers to employment. However, different than its predecessors, WIOA places a more substantial

emphasis on the connection between education and career preparation. WIOA mandates that state VR agencies make pre-employment transition services (PETS) available to all students with disabilities and that they set aside at least 15% of their federal VR program funds to deliver PETS (Workforce Innovation and Opportunities Act of 2014). PETS include: (1) job exploration and counseling; (2) work-based learning experiences; (3) counseling on opportunities for enrollment in comprehensive transition or postsecondary educational programs at institutions of higher education; (4) workplace readiness training to develop social skills and independent living; and (5) instruction in self-advocacy, which may include peer mentoring (Workforce Innovation and Opportunities Act of 2014). The results from my study have the potential to inform the delivery and implementation of WIOA in two distinct ways. First, the results from my study suggest that young adults who exhibit specific demographic characteristics are less likely to achieve a positive VR closure outcome (i.e., being female, having a mental illness, TBI having an interpersonal impediment to employment). These findings may help VR agencies to identify groups of young who would benefit most from enhanced transition programming and supports that will be implemented because of WIOA. Second, the results from my study suggest that young adults who receive specific transition services and supports are more likely to achieve a positive VR closure outcome (i.e., participate in an enhanced VR service such as YTP, earn a high school completion certificate, receive a greater number of VR services, and close from VR on or below the median number of days to closure). These findings can help to guide VR in making decisions about which transition services and supports are most effective at supporting post-secondary outcomes for young adults with disabilities.

The second initiative that may be informed by the findings from my study is the PROMISE (Promoting Readiness Of Minors in Supplemental Security Income) initiative. The PROMISE initiative is a federal initiative that is focused on decreasing reliance on SSI by improving the education and employment outcomes of children receiving SSI and their families. With the hopes of achieving its goal by improving coordination between service providers, the PROMISE initiative has awarded six multi-year model demonstration grants to five states and one consortium of six states. (U.S. Department of Education, 2014). The results from my study support the need to provide targeted transition services and supports to young adult recipients of SSI because they are less likely to achieve positive VR closure outcomes. Similarly, my findings also suggest that coordination between agencies to provide transition services and supports (i.e., provision of enhanced VR services through YTP) can be an effective strategy for improving outcomes. These results may help to guide the future delivery of transition services and supports directed at supporting young adult recipients of SSI.

Conclusion

Young adults with disabilities are less likely than their non-disabled peers to be positively engaged after high school. Theory suggests that individual and family characteristics, in-school experiences, post-school experiences and contextual factors all play a contributing role in shaping the success of these young adults. My study used logistic regression to test the effect of variables from each one of these theoretical constructs on a sample of young adults with disabilities receiving services from VR. The study identified eleven variables that statistically significantly predicted a positive VR closure status. The following six individual variables were negatively associated with

achieving a positive VR closure status: (a) being female; (b) having a primary disability of mental illness or TBI; (c) having an interpersonal impediment to employment; and (d) receiving SSI at application. The following two in-school experiences were positively associated with achieving a positive VR closure status: (a) participation in YTP, and (b) earning at least a high school completion certificate by closure. The following two post-school experiences were positively associated with achieving a positive VR closure status: (a) receiving a greater number of VR services, and (b) closing VR services below the median number of days to closure. The following contextual factor was positively associated with achieving a positive VR closure status: (a) closing VR services during the 2004 FFY. Lastly, the following contextual factors were negatively associated with achieving a positive VR closure status: (a) closing VR services during the 2008 FFY; and, (b) closing VR services during the 2009 FFY. These findings support the hypothesis that individual characteristics, in-school experiences, post-school experiences, and contextual experiences are statistically significantly related to achieving a positive VR closure status and provide an important contribution to the secondary special education and transition literature.

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