Assessing the Association Between Postsecondary Education and Earnings and Provision of College and University Training to Individuals With Intellectual and Developmental Disabilities Served by Vocational Rehabilitation

by

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Assessing the Association Between Postsecondary Education and Earnings and

Provision of College and University Training to Individuals With Intellectual

and Developmental Disabilities Served by Vocational Rehabilitation

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ABSTRACT

The purpose of this study was to assess the provision of college and university training by Vocational Rehabilitation (VR), and the association between certificate or degree completion and weekly earnings among individuals with intellectual and developmental disability (IDD) served by the federal-state VR system. The research aimed to specifically look at the provision of this service to individuals with IDD in the state of California compared to other states and U.S. territories where VR services are provided. Vocational Rehabilitation is a federal-state resource that can provide service coordination and financial support to individuals with disabilities with a goal to maximize the likelihood of employment. One VR service available to clients is college and university training. While only a small percentage of individuals with IDD have received college support from VR, there is increasing interest in postsecondary education as a means to improve employment outcomes for individuals with IDD.

The study encompassed four primary research questions and employed a quantitative methodological approach using a series of extant data files from the U.S. Department of Education Rehabilitation Services Administration-911 (RSA-911). RSA-911 data from federal fiscal years 2006 through 2014 were used to answer the research questions, with some questions based upon data from a single year, while other questions made use of data from several years. The study revealed several significant findings, which led to recommendations for practice and research. Research recommendations suggested methodological approaches beyond the use of RSA-911 which could potentially provide more information on access to postsecondary education and employment outcomes among individuals with IDD.
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CHAPTER 1—INTRODUCTION TO THE RESEARCH

The purpose of this chapter is to provide a contextual overview of the study by addressing the statement of the problem, significance of the study, the study’s purpose, research questions used in the study, operational definitions employed throughout the study, and delimitations and limitations of the study.

Introduction

Nationwide, there is a need for young adults to earn postsecondary degrees and credentials for the United States to compete in a global marketplace (College and Career Readiness and Success Center, 2013). Throughout the 20th century, the United States ranked as the world’s most educated citizenry with political and economic prominence (Organisation for Economic Co-operation and Development [OECD], 2011). As an indicator, in 1990 the United States ranked first in the number of individuals ages 25 to 34 who attained 4-year degrees (White House, 2015). By 2011, only 41% among individuals in that age range possessed an associate degree or higher in the United States (OECD, 2011). It is estimated that by 2020, 35% of employment opportunities will require a bachelor’s degree and 30% will require an associate degree or some college experience (Carnevale, Smith, & Strohl, 2013). Of the 30 fastest growing occupations in the United States, more than half of those will require a college degree (Obama, 2009). With the President’s 2020 initiative for the United States to once again have the highest proportionate number of college graduates (White House, 2015), it is imperative that everyone, including individuals with disabilities, be a part of this initiative.

The 2020 higher education goal in President Obama’s 2009 remarks not only include college graduates, but also has a goal for all Americans to complete a minimum
of 1 year of college or postsecondary training (White House, 2015). Additionally, the Obama Administration developed a data tool, The College Scorecard, which provides information on an institution’s progress in areas such as cost, graduation rate, student loan debt, loan repayment, and student earning potential (University of Washington, 2015).

The past quarter century has shown an increased gap in wages among highly educated workers and less educated workers. Individuals who lack required skills and education needed for the workforce will continue to see decline in job opportunities and wages (U.S. Department of Labor, Bureau of Labor Statistics [BLS], 2015). According to the U.S. Department of Education, National Center for Education Statistics (NCES, 2015), adults between the ages of 25 and 34 with a bachelor’s degree earn almost twice as much as those who have not earned a high school credential, 62% more than those whose highest level of education is a high school diploma, and 29% more than those whose highest level attained is an associate degree (NCES, 2015).

**California Higher Education System**

The higher education system in California consists of the California Community Colleges, California State University, the University of California, the Student Aid Commission, and additional entities. The 2015-2016 California budget for higher education included a total of $29.2 billion, partially generated from local property tax, the general fund, and other sources of funding (State of California, 2015).

Approximately 1,100 community colleges exist in America with 40% of all college students enrolled at these institutions (White House, 2015). Community colleges are publicly supported institutions that provide students with undergraduate transfer
opportunities, basic skills, and vocational training (State of California, 2015). Community Colleges are in unique positions to partner with the workforce and provide training, particularly in areas of advanced manufacturing, health information technology, and nursing (White House, 2015). In California, there are 113 campuses, 72 districts, and 72 educational centers serving students at the community college level. The community college system transferred 105,346 students to 4-year institutions of higher education, and awarded 62,318 certificates and 107,472 degrees during the 2013-2014 academic year. The technical education provided in the California community colleges prepares students to meet the workforce needs and demands of the economy. Serving more students than the 4-year, University of California (UC) or California State University (CSU) system, the California community college (CCC) system has enhanced its emphasis on student success and completion in recent years, focusing on student outcomes in the areas of effective orientation, assessment, placement, counseling, and planning (State of California, 2015).

The CSU system is diverse and is one of the largest university systems in the nation. It offers undergraduate instruction, master’s level graduate instruction, and doctoral degrees in certain areas of study. It also plays a critical role in preparing students for the California workforce, awarding more degrees in engineering, business, agriculture, communications, health, and public administration than any other higher education system in California. The CSU system awarded 103,000 degrees in 2013-2014, and more than 50% of California’s teachers received their education from CSU’s. One-half of California’s bachelor’s degrees are awarded by the CSU’s, in addition to one-third of
California’s earned master’s degrees. There are 23 CSU campuses in the state (State of California, 2015).

The UC system consists of 10 campuses, and serves as the higher education system primarily responsible for awarding doctoral and professional degrees. There are approximately 249,000 undergraduate and graduate students receiving education from the UC system (State of California, 2015). The California Master Plan, as adopted in 1960, differentiated functions of public higher education in California, making the UC system the server of the top one-eighth of the California high school graduating class. The CSU was to select the top one-third, and CCC’s were to serve anyone who could potentially benefit from instruction (UC Office of the President, 2007).

**Statement of the Problem**

Among individuals with and without disabilities, there are significant disparities in labor force participation, employment rates, and earnings. For people with disabilities who are employed, there is little opportunity for career advancement (Siperstein, Parker, & Drascher, 2013). According to the U.S. Department of Labor, Bureau of Labor Statistics (BLS, 2015), 17.1% of people with disabilities were employed in 2014, but in contrast, the employment-population ratio was 64.6% for persons without disabilities. Individuals with disabilities comprise 9% of the student population in higher education (Wolanin & Steele, 2004) and have historically been underrepresented in the workforce and in postsecondary education settings (Tincani, 2004). While implementation of federal legislation has called for an increase in participation by students with disabilities in higher education, these students continue to be less likely to achieve an educational degree than those without a disability (Wolanin & Steele, 2004).
Individuals with disabilities who complete college continue to be employed at a lower rate than those without disabilities, regardless of attaining a degree (National Collaborative on Workforce and Disability for Youth and Workforce Strategy Center, 2009). For youth with intellectual disabilities (ID), there is even greater disparity in education and employment outcomes. Youth with ID have lower rates of preparation for work after high school and lower rates of employment and postsecondary education participation, among all disability groups (Migliore, Butterworth, & Hart, 2009). Among individuals with intellectual and developmental disabilities (IDD), only 23% go on to 2- and 4-year colleges after high school (Grigal, Hart, & Migliore 2011), with 81% of people with IDD being served in segregated nonwork settings (Butterworth et al., 2012). The National Longitudinal Transition Study NLTS-2 (Newman, Wagner, Cameto, Knokey, & Shaver, 2010) and the U.S. Bureau of Labor Statistics (BLS, 2009) show gaps of 55% in overall employment and 62.7% in mean income between the general population and individuals with ID. However, the interest in accessing postsecondary education as a way to improve employment outcomes for individuals with ID is growing (Migliore et al., 2009). As an example, Moore and Schelling (2015) found improved outcomes in education and employment for individuals with ID who participated in postsecondary education programs and noted the exponential emergence of such support programs in the United States over the course of the last decade.

More than 240 postsecondary education programs designed to support students with ID now exist nationwide (Jones et al., 2015). In addition, a framework for the inclusion of students with ID in higher education was developed by a special interest group of the University of Massachusetts Boston Institute for Community Inclusion
Think College project. This framework illustrates the meaning behind inclusive practices in higher education and provides a checklist and evaluation tool for program facilitators and individuals involved in increasing access for students with ID (Jones et al., 2015).

For individuals with autism, the National Foundation on Autism Research (2014) noted that more individuals with this diagnosis will be entering college and the job market. Autism is one of the most common childhood disorders in the United States, with 84% falling under the age of 22. According to Autism Speaks, an advocacy and autism science organization founded in 2005, 1.5 million people have the condition of autism in the United States, with more than 50,000 transitioning into adulthood each year. However, a number of studies reflect the challenges individuals with autism spectrum disorder (ASD) face in securing and maintaining competitive employment (Barnhill, 2007). Unemployment, underemployment, and employment in unsuited positions are likely outcomes for this group of individuals (Hurlbutt & Chalmers, 2004; Müller, Schuler, Burton, & Yates, 2003; Robertson, 2010; Romoser, 2000; Seltzer et al., 2011). As a result, high levels of job switching and fragmented work histories can have a significant impact on career development and accessing ongoing employment.

Individuals with ASD may also suffer from financial insecurity, isolation, and depression as a result of these experiences (Goode, Rutter, & Howlin, 1994; Müller et al., 2003). S. Baldwin, Costley, and Warren’s (2014) study expanded upon and confirmed that, despite the willingness and capacity of individuals with autism, they suffer significant labor market challenges and lack of awareness in available support in the employment setting. Migliore and Zalewska (2012) noted with the increased numbers of individuals
diagnosed with autism, in the coming years state vocational rehabilitation programs will likely see an increase in the number of youth with autism seeking employment services.

While state and federal policies promote competitive, integrated employment among individuals with IDD, employment rates are still low, and many individuals receive services in facility-based, nonwork programs. Research suggests that 74% of adults who are receiving services from state developmental disability agencies attend facility-based, nonwork programs instead of accessing employment (Metzel, Boeltzig, Butterworth, Sulewski, & Gilmore, 2007). It was estimated that 114,000 were attending sheltered workshops in 2004 with numbers on the rise (Braddock, Hemp, & Rizzolo, 2005). In 1995, Gilmore, Schuster, Timmons, and Butterworth (2000) found that the average weekly earnings of those whose cases were closed as employed by Vocational Rehabilitation (VR) were earning $147.56 per week. Ten years later, the weekly earnings increased to $200 (Migliore & Butterworth, 2008).

**Legislative Impact**

Since the 1970s, legislation has called for changes in education and the workforce, inclusive of individuals with disabilities. The Rehabilitation Act of 1973 was the first significant change in law to promote full participation and self-sufficiency among individuals with disabilities. The Rehabilitation Act Amendments in 1992 encouraged the diversification in service delivery and choice in services geared towards employment. The Americans with Disabilities Act (ADA) was a civil rights law signed in July of 1990, and was a significant piece of legislation designed to address disability discrimination in the United States. To name a few areas of impact, the anti-discriminatory policy supported individuals with disabilities through changes in facilities structure, mass
transportation, public accommodations, and hiring practices (BLS, 2015). Twenty-five years after the passing of the ADA, changes that uphold the spirit of the ADA are occurring (Kessler Foundation, 2015). This landmark legislation transformed society’s thinking about disability and the rights of individuals with disabilities (Schroeder, 2015). The *Olmstead v. L. C.* case (1999) emphasized integrated services with integrated employment as the preferential outcome over placement in facility-based programs (Migliore & Butterworth, 2008).

In 2014, the Centers for Medicare and Medicaid Services introduced new rules leading to significant changes for day services and residential settings that receive Medicaid funding as part of Home and Community Based Services for individuals with disabilities. Increased community access, optimization of choice in life decisions, and greater opportunity to competitive employment were among some of the requirements that took effect in March of 2014. The implications of this federal policy will likely lead to greater integration and inclusion in the community setting (HCBS Advocacy Coalition, 2015).

The 1998 Workforce Investment Act (WIA) developed One-Stop Career Centers as a consolidation effort of employment services and programs for individuals with disabilities. The Ticket to Work and the Work Incentives Improvement Act in 1999 focused on social security beneficiaries with an aim to increase access to employment services. In July of 2014, President Barack Obama signed the Workforce Innovation and Opportunity Act (WIOA) into law, which replaced WIA and amended the Rehabilitation Act. This legislation places greater emphasis on opportunities for individuals with disabilities in employment and increases services for transition-age
youth with disabilities through improvement in workplace skills, exploration of career interests, and access to work experience (U.S. Department of Education [DOE], 2014). The Workforce Innovation and Opportunity Act also established The Advisory Committee on Increasing Competitive Integrated Employment for Individuals with Disabilities to advise the Secretary of Labor in three key areas, one being identification of ways to increase competitive, integrated employment outcomes for individuals with IDD and defined as having the most significant disabilities (BLS, 2015).

With VR being one of the largest federal programs to support employment outcomes among individuals with disabilities, it is essential to monitor the outcomes of the VR program to increase the likelihood of full participation and self-sufficiency for individuals with disabilities, inclusive of those with IDD (Migliore & Butterworth, 2008).

The Higher Education Opportunities Act of 2008 (HEOA) reauthorized and amended the Higher Education Act of 1965 and included several new provisions impacting youth and adults access to postsecondary education. Examples of the new provisions were the development of model demonstration programs referred to as Transition and Postsecondary Education Programs for Students with Intellectual Disabilities (TPSIDs) through the Office of Postsecondary Education, designed to enhance, create, or expand high quality educational experiences for individuals with IDD. A national coordinating center at the Institute for Community Inclusion at the University of Massachusetts Boston was developed to provide technical assistance and evaluation of the programs (Grigal & Hart, 2010). In addition, criteria for financial aid were waived for students with ID enrolled in specific institutions of higher education with a designation of comprehensive transition and postsecondary program. A student with ID could have
access to the federal Pell Grant and work study programs if satisfactory progress in the program is maintained (Smith Lee, 2009).

**Significance of the Study**

The role education beyond high school plays in determining economic well-being has substantially grown over the past two decades. The primary reason for this shift is due to labor market demand for workers with higher levels of education (Marcotte, Bailey, Borkoski, & Kienzl, 2005). Empirical research conducted over the years indicates causal effects of postsecondary education on earnings with labor market returns were found, whether or not students completed degrees (Marcotte et al., 2005). The 2012 American Community Survey estimated 31% of people with disabilities had some college attainment or an associate degree (Cornell University, 2013).

A significant number of individuals with disabilities live at or near the poverty line with limited earning potential and financial reserves to address financial burdens that can potentially arise (Kaye, 1998). The ranges are broad in terms of income and asset level, educational attainment, employment status, and other economic indicators, among individuals with disabilities. However, among all Americans, individuals with disabilities are the poorest (M. L. Baldwin, 1999; Risher & Amorosi, 1998). Disability Statistics reported that 26.9% of noninstitutionalized Californians with disabilities between the ages of 21 and 64 were below the poverty line in 2013, as compared to 28.4% throughout the nation (Cornell University, 2013). While public support programs such as Supplemental Security Income (SSI) and Social Security Disability Insurance (SSDI) exist, these programs limit earning potential and perpetuate poverty, not taking
into consideration that people with disabilities incur more costs throughout their lifetime related to their disability (Schroeder, 2015).

Little information is available regarding the socioeconomic position of individuals with intellectual disabilities, but the information that is available reflects high levels of poverty among those with intellectual disability, particularly those living independently or with their families. High unemployment rates among adults with intellectual disabilities in the United States and a number of other countries have been reported (Emerson, 2007). A Human Research Institute (2012) survey of 11,599 adults with IDD found that only 14.7% were in competitive employment. With higher levels of poverty and increased exposure to poverty, one should expect an increased likelihood of health-related problems and social exclusion (Emerson, 2007).

Purpose of the Study

The purpose of this study was to assess the association between postsecondary education and earnings among individuals with IDD who participated in the Vocational Rehabilitation (VR) system in the state of California and to assess the proportion of rehabilitation cases of individuals with disabilities with the service provision of college and university training by VR. Vocational Rehabilitation is a program designed to assist individuals with disabilities who are eligible for support services with gaining and retaining employment relevant to a person’s skills and abilities (Department of Human Services [DHS], 2014). Vocational Rehabilitation is a critical entity to improving employment outcomes among individuals with disabilities. More than $2.5 billion annually is spent through the state and federal rehabilitation services program to help individuals with disabilities access and retain employment (U.S. Government
Accountability Office [GAO], 2005). As one of the largest federal programs aimed to translate federal policies into practice, the VR program operates in 50 states, the District of Columbia, and in the five U.S. territories. In addition to employing approximately 11,000 counselors, VR contracts with local community rehabilitation programs to support employment efforts (Migliore & Butterworth, 2008). To assist in obtaining employment outcomes, VR may provide financial support to those pursuing education and training with an end goal of securing employment (Gilmore, Schuster, Zafft, & Hart, 2001). The California State Rehabilitation Council (SRC) 2014 Annual Report noted 97,673 individuals received VR services in the state during the federal fiscal year, with 36,556 new applicants in federal fiscal year 2014.

California has a long-standing commitment to serving individuals with IDD, many of whom are served through the state developmental disability system. In October of 2013, the California Employment First Policy was signed into law by Governor Jerry Brown (Kapp & Raynor, 2014). Forty-six states have taken some level of action towards the development of an employment first policy with 32 states having taken formal policy action (Louisiana Developmental Disability Council, 2014). The California Employment First Policy law aims to make employment a high priority among working age individuals with developmental disabilities, and California is one of the many states that has instituted an Employment First Policy (Kapp & Raynor, 2014). The policy addresses postsecondary education, vocational, or technical training, as a means to career advancement or achieving competitive, integrated employment (State Council on Developmental Disabilities [SCDD], 2014).
Consistent with California’s Employment First Policy, the California Department of Rehabilitation (DOR), California Department of Developmental Services (DDS), and California Department of Education (CDE) entered into a memorandum of understanding (MOU) in December of 2014 which stated that the highest priority will be given to integrated, competitive employment for individuals with IDD regardless of the severity of disability. Integrated, competitive employment is intended to be the first option, but individuals may choose other options such as pursuing postsecondary education, vocational, technical training, and internship programs as a way to advance their career or achieve integrated and competitive employment outcomes. Since development of the MOU, the entities are creating what will be the California Competitive Integrated Employment (CIE): Blueprint for Reform for Individuals With Disabilities (DOR, 2015).

California has made many strides in developing educational opportunities to enhance career pathways for individuals with IDD. The Department of Education granted funding to 27 postsecondary education institutions for comprehensive Transition Postsecondary Programs for Students With Intellectual Disability (TPSID) through the 2008 Higher Education Opportunity Act. Of the 27 awardees, 3 were in the state of California. In addition, collaboration among the California Community College Chancellor’s Office, Department of Rehabilitation (DOR), and the UCLA Tarjan Center, led to the development of postsecondary education programs at five community college districts providing vocational training and education with the goal of increasing employment outcomes among individuals with intellectual disabilities and autism (Kapp & Raynor, 2014).
Another example of California’s commitment to supporting individuals with IDD in employment and postsecondary education was through the enactment of Section 4688.21 of the California Welfare and Institutions Code in July of 2011. This law permitted the development of customized day services to support adults with developmental disabilities, commonly referred to as Tailored Day Services (TDS). Two areas in which this customization could occur is in the development and maintenance of employment, and to pursue postsecondary education. Individuals supported by the state developmental disability system can access this service through their local Regional Centers, which are private, nonprofit organizations that contract with the state developmental disability system (i.e., the California Department of Developmental Services). In 2014, 276,788 individuals were served by this statewide system (State of California, Department of Developmental Services [DDS], 2015).

California was chosen as one of the eight Projects of National Significance through the Administration on Intellectual and Developmental Disabilities (AIDD) to focus on employment among youth with intellectual and developmental disabilities. The California Employment Consortium for Youth (CECY) seeks to “stimulate policy change and build capacity in California state systems and local communities to increase the number of youth and young adults with intellectual and other developmental disabilities in integrated competitive employment” (Tarjan Center at UCLA, 2014, p. 1).

**Research Questions**

The study aimed to identify the association between postsecondary education and weekly earnings among individuals with IDD served by VR in the state of California, and to assess the provision of college and university training to individuals with IDD, while
their vocational rehabilitation case was open. The research questions addressed
differences in earnings outcomes among those who attained a certificate or degree and
those who did not. The questions assessed differences in earnings between those with
IDD who had successful employment outcomes and who did and did not advance to a
higher level of education. The questions also examined proportionate differences with
respect to the provision of college and university training to individuals, while their
vocational rehabilitation case was open. Published literature and policy reflects an
emphasis on postsecondary education among individuals with IDD from 2006 to present,
which led to research interest examining the longitudinal impact of the provision of
postsecondary education support since that time. There was value in comparing efforts
of the California VR system to the rest of the nation, given the recent legislative efforts
that have taken place within the state of California. The questions have relevance to
educators, the VR system, organizations supporting individuals in education and
employment, and policymakers. The questions addressed in this study are:

**Q1:** Of the individuals with IDD whose vocational rehabilitation cases with the
California Department of Rehabilitation were closed successfully during
federal fiscal years 2010 through 2014, is there a statistically significant
difference between the average weekly earnings at closure of individuals who
earned a certificate or degree and individuals who did not earn a certificate or
degree?

**Q2:** Of the individuals who earned a certificate or degree and whose vocational
rehabilitation cases with the California Department of Rehabilitation were
closed successfully during federal fiscal years 2010 through 2014, are there
statistically significant differences between the average weekly earnings at
closure of individuals with the following four primary causes of impairment:
autism, cerebral palsy, epilepsy, and intellectual disability?

Q3: Of individuals who were provided with vocational rehabilitation services by
the California Department of Rehabilitation and whose cases were closed
between federal fiscal years 2006 and 2014, proportionately, are there
significant year-to-year differences between the proportion of rehabilitation
cases receiving college or university training that have or do not have a
primary cause of disability of IDD?

Q4: Of the individuals with IDD who were provided with vocational
rehabilitation services by the state-federal vocational rehabilitation system
and whose cases were closed during federal fiscal year 2014, are there
statistically significant differences between the proportion of rehabilitation
cases provided with college or university training in California and in all
other states and territories combined?

**Scope of Study**

The study focused on individuals with the primary diagnosis of autism, cerebral
palsy, epilepsy, and intellectual disability, as these specific disabilities encompass the
broader term of intellectual and developmental disability (IDD). In addition, the study
focused on individuals with IDD served by the VR system who had a case closed during
Federal Fiscal Year 2014, which limited access to the data to the time period October 1,
2012 through September 30, 2014 to assess the impact of postsecondary education on
earnings. This was the most recent year of available data at the time the study
Data employed in this study were derived from the Rehabilitation Services Administration’s RSA-911 data, which includes programmatic and demographic information for each person who has exited the VR system in the given period ($N = 589,402$). The study also used RSA-911 data from federal fiscal years 2006 through 2014 to examine differences in the proportions of individuals with respect to the provision of college and university training, while individuals’ vocational rehabilitation cases were open.

RSA-911 is maintained by the Rehabilitation Services Administration (RSA) as a monitoring system of VR outcomes and is available to researchers upon request. The dataset encompasses data on all individuals with disabilities served by VR and closed within a given FY, but the scope was narrowed for the purpose of this study to focus on individuals with a primary diagnosis of IDD. Statistical testing and surveys on RSA-911 (FY 2003) led to the conclusion of the U.S. Government Accountability Office (2005) that the dataset is sufficiently accurate.

The RSA is in the Office of Special Education and Rehabilitative Services in the U.S. Department of Education. The purpose of RSA is to provide oversight of grant programs supporting individuals with physical or mental disabilities in obtaining employment and living a more independent life. These programs may obtain the goal through support services including counseling, job training, psychological and medical services, and additional individualized services. Priority is given to those with the most significant disability, and the major Title I formula grant program is funding disseminated to state vocational rehabilitation services providing employment related services to
individuals with disabilities (U.S. Department of Education, Office of Special Education and Rehabilitative Services, 2014).

**Definition of Terms**

The following terms are commonly used throughout the study. Given that terms defining disability and employment are used differently in literature depending on their context, the definitions provided reflect their meaning in this particular study.

*Autism:* “Is a neurodevelopmental disorder with multiple etiologies defined as a syndrome causing gross and sustained impairment in social interaction and communication with restricted and stereotyped patterns of behavior, interests, and activities that appear prior to the age of three” (DDS, 2015, p. 17).

*Cerebral palsy:* Includes two types of motor dysfunction: (a) nonprogressive lesion or disorder in the brain occurring during intrauterine life or the perinatal period and characterized by paralysis, spasticity, or abnormal control of movement or posture, which is manifest prior to 2 or 3 years of age, and (b) other significant motor dysfunction appearing prior to age 18 (DDS, 2015).

*Closure:* Data collected in RSA-911 at the conclusion of VR services.

*College or university training:* Full-time or part-time academic training above the high school level leading to a degree (associate, baccalaureate, graduate, or professional), a certificate or other recognized educational credential. Such training may be provided by a four-year college or university, community college, junior college, or technical college.

(U.S. Department of Education, Office of Special Education and Rehabilitation Services, RSA, 2013, p. 24)
Competitive employment: Employment in an integrated setting. This includes state-managed Business Enterprise Programs (BEP) or self-employment on a full-time or part-time basis where an individual is compensated at or above minimum wage. Minimum wage is the Federal or State minimum wage based on whichever is higher (RSA, 2013). This is documented as:

- 0  Not Competitively Employed
- 1  Competitively Employed

Developmental disability:

A “developmental disability” is a condition that originates before an individual reaches age 18; continues, or can be expected to continue indefinitely; and constitutes a substantial impairment in three or more areas of major life activity. Developmental disabilities include Intellectual Disability, Autism, Epilepsy, Cerebral Palsy, and disabling conditions closely related to Intellectual Disability (formerly Mental Retardation) or requiring treatment similar to that required by people with Intellectual Disability. (DDS, 2015, p. 2)

Educational attainment at time of application: The level of education an individual has attained at the time of application for Vocational Rehabilitation Services (RSA, 2013). This is documented as:

- 0  No Formal Schooling
- 1  Elementary education (Grades 1-8)
- 2  Secondary education, no high school diploma (Grades 9-12)
- 3  Special education certificate of completion/diploma or in attendance
- 4  High school graduate or equivalency certificate (regular education students)
5 Postsecondary education, no degree
6 Associate degree or Vocational/Technical Certificate
7 Bachelor’s degree
8 Master’s degree or higher

*Educational attainment at time of case closure:* The level of education an individual has attained at the time their service record was closed by Vocational Rehabilitation (RSA, 2013). Given the nature of this study, the data will only include those who fall into codes five through eight. This is documented as:

0 No Formal Schooling
1 Elementary education (Grades 1-8)
2 Secondary education, no high school diploma (Grades 9-12)
3 Special education certificate of completion/diploma or in attendance
4 High school graduate or equivalency certificate (regular education students)
5 Postsecondary education, no degree
6 Associate degree or Vocational/Technical Certificate
7 Bachelor’s degree
8 Master’s degree or higher

*Employment:* Refers to: “a case closure with employment lasting 90 days in any of the types of status: employment with or without support in integrated settings, homemaker, Business Enterprise Program, and unpaid family worker.”

*Employment with supports in an integrated setting:* Refers to full- or part-time employment in an integrated setting with ongoing support services for individuals with
significant disabilities. Compensation may be at, below, or above minimum wage (RSA, 2013).

Employment without supports in an integrated setting: Full- or part-time employment in an integrated setting without ongoing support services and does not include self-employed individuals. This includes work performed for salary wages, tips, commission, or piece-rates, below, at, or above minimum wage (RSA, 2013).

Epilepsy: Can be defined as a common neurological disorder (Hauser, Annegers, & Kurland, 1993) resulting in unprovoked, recurrent seizures. Seizures are defined as excessive and abnormal discharge of a set of neurons of the brain (Hauser, Annegers, & Kurland, 1991).

Intellectual disability: “A disability characterized by significant limitations both in intellectual functioning (reasoning, learning, problem solving) and in adaptive behavior, which covers a range of everyday social and practical skills. This disability originates before the age of 18” (American Association on Intellectual and Developmental Disabilities [AAIDD], 2013, p. 1).

Postsecondary education (PSE): Refers to education after the high-school level.

Significant disability: As defined by RSA refers to

a) who has a physical or mental impairment that seriously limits one or more functional capacities (such as mobility, communication, self-care, self-direction, interpersonal skills, work tolerance, or work skills) in terms of an employment outcome; b) whose VR can be expected to require multiple VR services over an extended period of time; and c) who has one or more physical or mental disabilities resulting from amputation, arthritis, autism, blindness, burn injury,
cancer, cerebral palsy, cystic fibrosis, deafness, head injury, heart disease, hemiplegia, hemophilia, respiratory or pulmonary dysfunction, mental retardation, mental illness, multiple sclerosis, muscular dystrophy, musculo-skeletal disorders, neurological disorders (including stroke and epilepsy), spinal cord conditions (including paraplegia and quadriplegia), sickle cell anemia, specific learning disability, end-stage renal disease, or another disability or combination of disabilities determined on the basis of an assessment for determining eligibility and VR needs to cause comparable substantial functional limitation. (RSA, 2013, pp. 47-48).

Successful rehabilitation: Vocational Rehabilitation service closure with an employment outcome to include integrated employment, self-employment, state-agency managed business enterprise, homemaker, and unpaid family worker.

Vocational Rehabilitation counseling and guidance: Refers to: Discrete therapeutic counseling and guidance services that are necessary for an individual to achieve an employment outcome, including persona adjustment counseling, counseling that addresses medical, family, or social issues, vocational counseling, and any other form of counseling and guidance that is necessary for an individual with a disability to achieve an employment outcome. This service is distinct from the general counseling and guidance relationship that exists between the counselor and the individual during the entire rehabilitation process. (RSA, 2013, p. 29)
*Weekly earnings at application:* Recorded as the amount of money (to the nearest dollar) earned by the individual in a typical week at the time of application (RSA, 2013).

*Weekly earnings at closure:* Recorded as the amount of money (to the nearest dollar) earned by the individual in a typical week after achieving the employment outcome. Income includes salary, wages, tips, and commission prior to payroll deductions from local, State, and Federal income taxes, and Social Security payroll tax. Earnings also include those acquired by individuals who are self-employed (RSA, 2013).

**Delimitations of the Study**

The following four delimitations were used in the study. The first delimitation relates to the first three research questions focusing on individuals in the dataset being served in the state of California. As previously mentioned, RSA-911 includes data throughout the United States and U.S. territories. The study focused on the status of Californians in the areas of education and employment served by Vocational Rehabilitation. Therefore, individuals outside of California were excluded from the first three research questions.

The second delimitation was a study focus on individuals with intellectual and developmental disabilities. As the research aims to identify the impact of education on employment and earnings among this population, other disabilities were excluded from the study to answer the first two questions, and the inclusion of other primary sources of impairment were used in the study as part of a comparison group to answer research question four.
Limitations of the Study

The following section addresses limitations of the study that are important considerations when interpreting results, conclusions, and recommendations. As with all use of extant data, the research is limited to information available in the dataset being used. The study employed an ex post facto research design using data from RSA-911. Therefore, research questions that may have been asked related to specific Vocational Rehabilitation funded services were not addressed, as it was beyond the scope of information available in the dataset. In addition, independent variables used in the study could not be randomly assigned or manipulated. As a result, making causal inferences regarding the provision of services such as postsecondary education support leading to improved employment outcomes cannot be stated with certainty using the dataset.

Data generated in RSA-911 is a result of information input by VR counselors and other staff employed by Vocational Rehabilitation agencies. While an 18 crosschecks system was developed by RSA to reduce the risk of error, it should be noted that incorrect input of information can still take place and should be considered a limitation of the study.

RSA-911 is a large dataset, but it only accounts for individuals who received Vocational Rehabilitation services with a case closed in FY 2006 through 2014 years. It does not account for individuals with intellectual and developmental disabilities who accessed postsecondary education, received educational support, obtained employment upon degree completion, and did not receive VR services. Therefore, the outcomes cannot be generalized to those individuals.
Summary

Supporting the participation of people with disabilities in the labor market is a priority area of concern among federal and state policymakers (Kiernan, Hoff, Freeze, & Mank, 2011; National Association of Councils of Developmental Disabilities [NACDD], 2011). Despite the concern in this area, a significant gap still exists between people with disabilities and people without disabilities in the area of employment (Butterworth et al., 2012). The rate of employment for people with disabilities is significantly lower than people without disabilities (Kessler Foundation, 2015), with 33.4% of working-age adults with disabilities between the ages of 18 and 64 employed compared to the 72.8% of working-age adults without disabilities (U.S. Census Bureau, 2010). People with IDD experience greater levels of unemployment, underemployment, poverty, and low wages compared to individuals without disabilities.

A significant way in which a person can increase their employability is through postsecondary education (BLS, 1999; GAO, 1997; Horn & Berktold, 1999; Roy, Dimigen, & Taylor, 1998). In the next decade, more than half of new jobs will require a postsecondary certificate or degree, and individuals with professional certificates, associate degrees, baccalaureates, and graduate level degrees will continue to receive higher levels of wage growth and job opportunities than those without postsecondary education certificate and degree attainment (NCES, 2011). Yet, youth with IDD have the lowest rate of workforce preparation, education, and work experience than any other disability group (Migliore et al., 2009). However, there is growing interest across the nation in postsecondary education as a means to improve key life areas and employment outcomes for youth with IDD. Access to postsecondary education for students with ID
are becoming more widespread in the United States (Grigal et al., 2015; Hart, Grigal, Sax, Martinez, & Will, 2006). While the academic demands of postsecondary education may be viewed as a barrier to success for people with IDD, it is important to note that individuals with IDD are currently enrolled in postsecondary education institutions at both the undergraduate and graduate level (Butterworth et al., 2012).

The following chapter will provide a review of the literature as it relates to the study. An exploration of the impact of higher education on earnings among the general population, the status of individuals with disabilities in postsecondary education and employment, and the role of VR in promoting successful outcomes will be explored.
CHAPTER 2—REVIEW OF THE LITERATURE

This chapter provides an overview on the impact of postsecondary education on earnings for the general population, while discussing the current status of individuals with disabilities in the areas of education and employment. A theoretical framework to support the study is also included. Relevant literature addressing the impact postsecondary education has on expanding employment opportunities and earnings among individuals with disabilities is discussed, as well as services through vocational rehabilitation that can aid in supporting education as a path to employment outcomes is covered in this chapter. More specifically, postsecondary education participation among individuals with intellectual and developmental disabilities (IDD) will be explored as the study aims to assess the impact higher levels of education has on earnings among persons with IDD. To begin, a review of literature related to the positive correlation of higher education and higher earnings will be discussed.

The Positive Correlation Between Higher Education and Higher Earnings

In recent years, questions have risen in regards to whether higher education is a worthwhile investment (Baum & Ma, 2007). A longitudinal data estimate finds that young college graduates have 1.85 greater odds of accessing employment and 22% higher earnings than those who do not complete high school (Shandra & Hogan, 2008). The following section provides a review of research reflecting a positive association between higher levels of education and higher earnings among the general population. The research in this section reflects returns on the education investment, not only among degree completers, but also among individuals who attended college and did not earn a degree.
Higher education provides a wide range of personal and financial benefits, in addition to lifelong returns on the investment. Taxpayers and society as a whole benefit when access to postsecondary education is available to more citizens. Access can lead to increased tax revenues, higher productivity rates, and less dependence on social support programs. Uneven rates of participation should be a matter of concern to public policymakers and to others who are directly and indirectly impacted (Baum & Ma, 2007). Baum and Ma (2007) evaluated the benefit of higher education for individuals and society and found a positive correlation between higher education and earnings, a higher likelihood of employer-provided pension benefits and health insurance, and significant increase in the earnings gap over time between high school graduates and college graduates. They also discovered higher levels of education leading to lower poverty and unemployment rates, with less dependence on public benefit programs. While the report did not evaluate higher education participation among individuals with disabilities, it did demonstrate that despite increased educational opportunities, there are significant differences in participation based on parent education level, family income, and other demographic characteristics.

Baum and Ma (2007) found that, in 2005, the median earnings of a person with some college experience without an earned degree were 18% higher than a person with a high school diploma. A person with an associate degree earned 29% more than a high school graduate. A full-time worker with a 4-year college degree earned on average 62% more than a full-time year-round worker with a high school diploma, and those with a master’s degree earned almost twice as much as those with a high school diploma. The societal benefit from college completion led to a payment of 134% more in federal taxes
and 80% in federal, state, and local taxes, compared to those whose highest educational attainment was a high school diploma. In regards to the poverty rate, in 2005, the rate for a person with a bachelor’s degree was 3.6%, which was approximately one-third of the rate for high school graduates. Only 15% of people with some college experience compared to 19% of high school graduates lived in households participating in Medicaid. The number dropped to 12% for those with an associate degree and 6% for those with a bachelor’s degree.

The study provides an increased understanding of the value of education on our society and our progress, or lack thereof, of providing access to it for all individuals. As the recognition of its benefits become clearer, increased awareness on the persistent gaps in participation in postsecondary education among people from different backgrounds becomes more relevant, so that all can reap the benefits postsecondary education provides to society as a whole (Baum & Ma, 2007).

Building upon Kane and Rouse’s (1995) research using data collected 20 to 30 years prior, Marcotte and colleagues (2005) used the 2000 National Education Longitudinal Survey to estimate community college education effects on earnings. The study emphasized the role 2-year institutions can play in economic and workforce development with their enrollment of 40% of the higher education student population and the limited knowledge available on the impact of these institutions. Through evaluation of a cohort of 7,021 students who attended community college in the 1990s between the ages of 25 and 27 in 2000, the researchers were able to assess the impact of students’ community college experience on cohort wages. The researchers stated that over the past two decades, shifts in the labor market structure and demand show favor towards higher
levels of education. This information increases the need for understanding how education beyond high school can influence economic well-being.

Marcotte and colleagues (2005) measured years of postsecondary study comparing individuals who did not earn a degree and degree completers to estimate the returns on postsecondary education. There was substantial evidence in the findings reflecting a positive impact community college education had on earnings. The effects not only translated to those who earned an associate degree but also increased earnings for those who attended college and did not earn a credential. Kane and Rouse’s (1995) findings reflected 15% to 25% higher economic returns with a community college degree versus a high school diploma and a 5% to 8% increase in earnings among those who attended 2- and 4-year institutions with only 1 year of course work. Similarly, Marcotte and colleagues estimated 7.9% higher annual earnings among men who earned a certificate versus men whose highest level of education was a high school diploma. The percentage increased to approximately 14.7% for men who earned an associate degree. For men who earned a baccalaureate, the number increased to an estimated 49.1% increase in annual earnings. Percentages were higher for women with an 11.1% annual increase for certificate earners compared to their peers and 47.6% more with an associate degree. Despite the differences between men and women, the researchers found overall returns on community college education to be substantial.

Grubb (2002a) explored the economic benefits of postsecondary education below the baccalaureate degree by examining states that used Unemployment Insurance to collect wage record data. The results reflected substantial benefits for individuals who enrolled in specific occupational areas and who completed certificates and degrees. Use
of wage record data has led some state community college and job training programs to put their target efforts towards particular jobs with higher wages and high growth and demand (Grubb, 2002a).

To demonstrate economic benefit from postsecondary education in California, Grubb (2000b) highlighted Friedlander’s (1993) study on Santa Barbara and Grossmont Community Colleges, where wages were reviewed 3 years postcollege. Associate degree earners were found to earn 20% more than certificate degree holders, who in turn earned slightly higher than 5% more than individuals who left college with fewer than 12 units completed. In looking 1 year after college, there was not much difference in the comparison of earnings among associate degree earners and those without credentials, and their earnings were roughly the same prior to leaving college. This leads to the belief that factors such as level of education can lead to variance in earnings over time (Grubb, 2002b).

Overall, the results reflect economic benefit from participation in postsecondary education, particularly for those who earn a certificate or associate degree. The state and local data also reflect that the positive outcomes materialize quickly, as significant increases in earnings show 3 years after completion of college. This may lead to even greater effects over time (Grubb, 2002b).

**Individuals With Disabilities in Education and Employment**

**Education**

Many professions consider degree attainment necessary to meet the qualifications to earn higher wages, and for workforce positions, increasing the likelihood of employment in specialized positions (Tiffany & Kominski, 2011). Yet, educational
attainment among youth with disabilities has not kept pace with the rise of higher
education in the United States (O’Neill et al., 2015). In 2007, 66% of the general
population proceeded to postsecondary education upon completion of high school. Only
25% of students with disabilities continued their education post high school (Snyder,
Dillow, & Hoffman, 2009).

In 2011, The National Center for Education Statistics reported results on students
with disabilities served at 2- and 4-year degree-granting institutions during the 2009-2010
academic year. With enrollment growth of students with disabilities in postsecondary
education (Newman et al., 2010) and legislation such as the Americans with Disabilities
Amendment Act (2008) and the Higher Education Opportunities Act (2008), increasing
interest in researching higher education accessibility for these students has ensued. Of the
1600 Title IV eligible 2- and 4-year institutions surveyed throughout the country, there
was a 91% (unweighted) and 89% (weighted) response rate. Among other areas covered
by the survey, respondents reported on the number of students with disabilities in the
2008-2009 academic year, types of accommodations provided, educational and
accessibility materials provided to students and faculty, as well as the extent to which the
institution works with their state VR system. The findings resulted in 707,000 students
with disabilities enrolled during the 2008-2009 academic year, with 88% of the 2- and
4-year institutions enrolling students with disabilities. One-third of the institutions
reported either formally or informally working with the state VR to a minor extent, with
an additional 26% reporting working with VR to a moderate extent. The public 2-year
institutions led the largest percentage reporting working with VR to a moderate extent
(Raue & Lewis, 2011).
The Kessler Foundation (2015) partnered with the University of New Hampshire to conduct a nationally representative survey on people with disabilities and employment. Seeking to understand the ways in which people with disabilities strive for employment and overcome barriers related to employment, they surveyed 3,013 individuals over the phone, receiving a 13% response rate. The most frequent reported disability was cognitive disability (63.2%). The findings indicated 22.1% were college graduates, and a significant number of individuals had some college experience (27.5%). The survey demonstrated 47.1% of people with disabilities who are not working are preparing for work by going to college or school. This is one of the primary ways in which people with disabilities prepare for work, with 41.1% reporting not having enough education or training for employment. Yet, 38.5% of these individuals are seeking to overcome this barrier.

Using National Longitudinal Transition Study-2 data, which is a data set that generalizes nationally the outcomes of youth with disabilities in transition from secondary education to adulthood, Newman and Madaus (2015) examined a cohort of 3,190 students with disabilities who reported having enrolled in postsecondary education. The results indicated that 51% of young adults with disabilities attended postsecondary education within 8 years of exiting high school. The largest number attended 2-year institutions (36%), followed by 23% who attended career technical education (CTE), and 15% who attended 4-year institutions.

Sevak, Houtenville, Brucker, and O’Neill (2015) examined the individual characteristics of people with disabilities who fare better in employment outcomes. Utilizing 2009-2011 data from the American Community Survey conducted by the
U.S. Census Bureau, they used demographic information and characteristics such as marriage status and educational attainment to assess differences in outcomes. Their findings indicated that employment outcomes decline with age among people with disabilities and improve with characteristics such as marital status (married) and higher levels of educational attainment. The most dramatic results from their research indicated that the adjusted employment gap varies with higher levels of education. The disability employment gap is highest at 37 percentage points when a person with a disability’s highest level of education is graduation from high school and is lowest at 24 percentage points when a person has a graduate or professional degree. Results from the survey have implications for public policy and practice, as these areas can be leveraged to support educational opportunities among people with disabilities (Sevak et al., 2015).

In 2014, the Workforce Innovation and Opportunity Act (WIOA) was signed into law, replacing the Workforce Investment Act (1998) and amended the Rehabilitation Act of 1973. This was noted as one of the most substantial reforms to the U.S. workforce system in the past 15 years. It builds upon the legacy and action of the ADA, while expanding opportunities for people with disabilities to be successful in training programs and in accessing employment. This law encourages greater collaboration among federal, state, and local programs to increase participation and access in education, the workforce, and rehabilitation services (BLS, 2015). In addition, one change to the Rehabilitation Act programs is the emphasis on the service provision to youth with disabilities, which is now individuals between the age range of 16 and 24. The Workforce Innovation and Opportunity Act requires VR agencies allocate at minimum 15% of their funds to pre-employment transition programs for youth with disabilities to support the transition
from secondary education to postsecondary education and competitive, integrated employment (DOE, 2014).

**Employment**

In 2012, 74% of working-age adults were employed compared to only 33% of people with disabilities (Houtenville, 2013). The National Organization on Disability/Harris survey (Risher & Amorosi, 1998) found that, while 75% of unemployed individuals with disabilities indicated they would like to have a job, only 30% of working-age adults are employed full- or part-time compared to 80% of individuals without a disability. The Kessler survey (Kessler Foundation, 2015) found that of the 68.4% of people with disabilities who are striving to work as defined by working, looking for work, or having worked prior to the onset of their disability, 60.7% work more than 40 hours per week, and 40.6% indicate the desire to increase their working hours. When asked how important work is to them, 60.9% of the respondents indicated “very important.” In addition, 16.5% reported earning less than others in similar positions, but 38.6% of these individuals were overcoming this barrier. The survey demonstrates that people with disabilities are indeed striving to work.

The major sources of income for people with disabilities in addition to conventional sources of income, such as employment and interest payments, are programs designed for people with disabilities like private disability insurance, Supplemental Security Income (SSI), and Social Security Disability Insurance (SSDI; Batavia, 1997). The median earnings of a person with a disability are 60% of the earnings of someone without a disability, and the chance of having lower levels of income is increased with the presence of a disability (McNeil, 1997). The National Longitudinal Transition Study
indicated that 35% of young adults, (21-25 years of age) with intellectual disability and autism were employed, compared to the U.S. Bureau of Labor Statistics (2009) average employment rate of 90.2%, with 40.3% of those with intellectual disability earning less than the 2009 federal minimum wage of $7.25 an hour and 91.7% earning less than $10.50 an hour (Newman et al., 2010).

The Advisory Committee on Increasing Competitive Integrated Employment for Individuals With Disabilities (2015) developed from WIOA led to several key areas of focus on competitive, integrated employment for individuals with IDD. In the committee’s interim report, they note data confirming individuals with IDD and other significant disabilities earn subminimum wages more than the number of individuals with IDD earning competitive wages. The report also emphasized the need for substantial improvement in workforce participation and the removal of employment barriers to ensure full societal inclusion and self-sufficiency (BLS, 2015).

Migliore and Landa (2013) used the American Community Survey (ACS) to assess employment outcomes of youth with cognitive disabilities over an 8-year period (2004-2011). Their analysis revealed a disparity in employment rates between youth without disabilities and youth with cognitive disabilities. They found a decline in employment from 28% to 18% in the given time period for youth with cognitive disabilities, and while there was also a decline in employment for peers without a disability, the employment rate was higher at 37%. This disparity was found within each state and nationally. The data speak to the critical need to close the employment gap between youth with cognitive disabilities and their peers without disabilities. Migliore
and Landa emphasized the need for youth with cognitive disabilities to engage in work early to support workforce participation later in adulthood.

There are two main factors associated with the persistence in employment disparities among people with and without disabilities (Kessler Foundation, 2015). One factor is public support programs through Social Security policy that may discourage individuals from seeking full-time employment (Autor & Duggan, 2006; Burkhauser & Stapleton, 2003; Houtenville, Stapleton, Weathers, & Berkhauser, 2009). Research also indicated that there may be a perception from the labor market that people with disabilities cannot complete the tasks related to the job (Domzal, Houtenville, & Sharma, 2008; Houtenville & Kalargyrou, 2012).

**Poverty Among Individuals With Disabilities as a Social Justice Issue**

Work plays a critical role in the psychological and physical well-being of individuals with and without disabilities (Chan, Leahy, & Saunders, 2005). In a comparison of employed and unemployed, those who are unemployed experience higher levels of substance abuse, anxiety, depression, and lower scores on measures of self-esteem and quality of life. Among individuals with disabilities, unemployment and poverty are pervasive (Batavia & Beaulaurier, 2001).

Economic self-sufficiency and stability largely depend on the capacity of individuals to maintain financial stability. Individuals with disabilities as a group have the lowest education levels, lowest average incomes, and are among the highest poverty rates in the nation (Batavia & Beaulaurier, 2001). Batavia and Beaulaurier (2001) developed a theoretical framework for understanding the risk of poverty among people with disabilities. This research was the first attempt to develop such a framework for
understanding the financial vulnerability of individuals with disabilities. Noting the 1998 National Organization on Disability (NOD)/Harris survey, people with disabilities are three to four times more likely than people without disabilities to live in poverty. The survey also found that 33% live in households where the earnings are less than $15,000; with only 12% of people without disabilities living in households at this income (Risher & Amorosi, 1998).

Additionally, Batavia and Beaulaurier (2001) noted that education can lead to the road of opportunity and success and is particularly relevant for people with disabilities. The more significant the disability, the more that skills gained through education can compensate for loss of functional capacity, while offering employment opportunity that might not otherwise have been available. Education can have the highest return on income and is a promising strategy for employment for people with disabilities. However, it is known that people with disabilities do not achieve the same levels of education as those without disabilities. It is important to note that even those with disabilities who have more substantial income and are highly educated have been adversely affected by financial shocks and high costs associated with their disability.

The researchers assert that financial analysis of income and assets alone are not predictors of a person with a disability’s long-term financial security and that an understanding of factors that might affect financials over time should be considered. Batavia and Beaulaurier’s (2001) framework for predicting disability poverty risk took into consideration the complex interaction of personal, social, and environmental factors that can have some type of an effect on a person’s income and expenses. Among personal factors are intellectual ability, education, skills, values, and motivation.
Social factors include informal and formal supports. Environmental factors take into consideration the physical environment, discrimination, and policy.

Batavia and Beaulaurier (2001) state while empirical studies may be needed to test the model presented, it does shed light on potential predictors of financial security for individuals with disabilities. They further articulate that while people with disabilities are among the most financially vulnerable and at greatest risk for poverty, more research is needed to determine the relationship among the personal, social, and environmental factors and financial vulnerability among those with disabilities. This information can have an impact at multiple levels. At the individual level, it can help people with disabilities and their families recognize risk factors and avoid them. For professionals, it can aid in the support provided to people with disabilities by empowering them to become financially secure and avoid poverty, and, at the policy level, it can create employment, health care, tax, and income maintenance policy (Batavia & Beaulaurier, 2001). The researchers suggest quantifying risk factors and identifying coping mechanisms used to reduce vulnerability should be explored.

**Human Capital Theory and Earnings**

In modern labor markets, education plays a central role. A significant number of studies in different countries and time periods equate better-educated individuals to less unemployment, employment in more prestigious occupations, and higher-earning wages than their less educated counterparts (Card, 1999). Many of these studies related to education and wage determination are embedded in Mincer’s (1974) human capital earnings function, which equates earnings to a theoretical model based on schooling choice and postschool training decisions. This earnings variation based on age and
education has been known since the early 1950s (Card, 1999). Human capital can be expressed as characteristics or any stock of knowledge a worker has that contributes to their productivity. Labor economics can think of the set of marketable skills a worker has as capital, where workers made a variety of investments. The advantage of this definition is that it allows thinking of schooling, training, and a variety of other characteristics to be viewed as human capital investments (Acemoglu & Autor, n.d.). Human capital theory suggests that individuals and society reap economic benefits from the investment in people. While human capital investment may often reference health and nutrition (Schultz, 1981), the link to education for empirical analysis also emerges as a prime human capital investment. One important empirical reason for this is that education can be measured in years of tenure and quantitative dollar costs (Johnes, 1993). Literature related to human capital theory distinguishes among several types and means of education levels (Sweetland, 1996). However, in most of the instances, the assumption is that education improves or increases economic capabilities of people (Schultz, 1971). The types and means of education are often diverse, but the same can be said for educational benefits. There are perceived benefits to an individual’s health and nutrition, but education tends to effect population placing a control on growth and increases quality of life (Becker, 1993).

Most economics of education studies incorporate principles of human capital theory, and its advancement and conceptualization is often linked to economists given that economic growth, investments, and benefits are staples of economic thought. It is difficult to find a body of economics of education literature and human capital theory literature separate from each other, and a research agenda including the applications of
human capital theory can prove essential to education policy process (Sweetland, 1996). The next section explores the postsecondary education impact on earnings among individuals with IDD.

**The Impact of Postsecondary Education on Earnings Among Individuals With IDD**

Moore and Schelling (2015), utilizing the 2009 National Longitudinal Transition Study 2 (NLTS-2), examined employment outcomes of individuals with intellectual disabilities who were graduates of two postsecondary education programs and compared graduates of these programs to individuals with intellectual disabilities who did not participate in a postsecondary education program. In addition, U.S. Bureau of Labor Statistics (2009) data were used to compare the programs to the general population employment rate. To facilitate a richer qualitative exposition of the research question, the chosen programs had diametric opposition to each other in university association, location, and program type. One program was identified as integrated, and the other was identified as specialized. The researchers aimed to compare the income and employability levels of the 26 graduates from the two programs and those differences among individuals with intellectual disabilities who did not participate in a postsecondary education program. Bronfenbrenner’s (1979) seminal research in the theory of ecological development was used as a framework due to various ecological levels that impact a student’s development.

Through administrative interviews, student surveys, and public data, it was discovered that the employment rate among individuals who participated in the postsecondary education programs was higher than the U.S. Bureau of Labor Statistics
(2009) and NLST-2 comparison group who did not access a postsecondary education program. The survey used response categories of “since high school,” “the last two years,” and “currently employed” to determine employment status. An 11% increase in employment for both postsecondary education programs in comparison to the national data was noted for the employment status “since high school” category. There was a 46.5% increase in employment for graduates of both programs using the “last two years category,” and 36% employment increase for the integrated program under “currently employed.” The specialized program reflected a 54% increase in employment compared to the national data. In terms of overall employment of the graduates, 73% were employed in the integrated program and 91% of the graduates of the specialized program.

The study demonstrated that postsecondary education program participation had significant positive employment outcomes in all three time scopes (since high school, in the past 2 years, and currently employed) for those who participated in both programs compared to individuals in the NLST-2 comparison group.

Similarly, in a compilation of contributing articles in the 2014 *TASH Connections* Issue focused on employment pathways, Cone, Day, Whitmore, and Taylor (2014) shared two examples of postsecondary education programs in Tennessee. The authors stated young adults with IDD who have some postsecondary education experience have a higher likelihood of obtaining competitive employment, are less dependent on on-the-job supports, have higher wages, increased self-esteem, and have stronger social networks. The authors highlighted three main program models outlined by *Think College*, an organization based at the University of Massachusetts, Boston, focused on developing
and improving options in higher education for individuals with IDD. The models are used to describe postsecondary education programs serving individuals with IDD.

First, the *mixed/hybrid model* encompasses activities and/or courses where students with disabilities participate with students without disabilities, while also participating in targeted courses with other students with disabilities. The *substantially separate model* describes programs where students attend classes only with other students with disabilities, and are often referred to as transition or “life skills” courses. The *inclusive model* demonstrates program models where students with disabilities receive individualized services and supports in their college courses, certificate programs, and/or degree programs. Each model has varying ranges of services and supports within (Grigal & Hart, 2010). Prior to 2009, no such program models existed in Tennessee to support students with IDD in higher education. Such programs have been linked to promote career development and increase the likelihood of success in employment when the programs are well designed (Flannery, Benz, Yovanoff, Kato, & Lindstrom, 2011). Due to the advocacy efforts of organizations, family members, state agencies, and school districts, Vanderbilt’s Next Steps program (Grigal & Hart, 2010) and IDEAL program at Lipscomb University were launched (Cone et al., 2014).

Next Steps’ approach, through an array of internship offerings during program participation, career planning, and employment person-centered planning has led to an 80% employment rate among graduates of the program. IDEAL, although too new to yield employment outcomes from the program, has an overarching goal of the program to equip students for better employment options. Through internships and externships, students in IDEAL build a work history and will have a minimum of four work
experiences prior to completing the program (Cone et al., 2014). The authors conclude that participation in postsecondary education programs designed to serve students with IDD leads to increased independence, a richer social life, and strengthens employment pathways.

Utilizing data from the 2010 American Community Survey (ACS), Smith, Grigal, and Sulewski (2012) used data to determine the impact of postsecondary education on employment outcomes for youth with and without disabilities. The researchers discussed the transition from adolescence to adulthood to include postsecondary education, employment, or both, with youth with disabilities potentially transitioning from school district services and supports to those such as vocational rehabilitation or intellectual and developmental disability agencies. While youth with disabilities, including cognitive disabilities, access postsecondary education at lower rates than those without disabilities, the findings indicate that postsecondary education access had a positive association with employment, resulting in more youth with disability, including cognitive disability, being employed.

The findings suggest that supporting or creating programs that increase access to postsecondary education for youth with disabilities could have a positive impact on economic and long-term employment outcomes. This increased access could lead to more individuals depending less on poverty prevention programs such as SSI and greater contribution to payroll taxes. The study suggests further research should explore the relation between postsecondary enrollment and concurrent enrollment, in addition to the causation between employment and education and the linkage for service provision and policy (Smith et al., 2012).
Migliore and Butterworth’s (2008) study reflected that 38% of individuals with intellectual disabilities who utilized vocational rehabilitation for employment services but did not attend postsecondary education were employed. The number increased to 48% with some postsecondary education experience, and increased to 58% for those who earned a degree.

**Vocational Rehabilitation Services to Promote Successful Employment Outcomes**

The vocational rehabilitation system is administered through the U.S. Department of Education with a goal to provide services such as diagnosis, assessment, assistive technology, and job search assistance that maximize employment outcomes. Individuals with disabilities who need assistance in attaining employment may be found eligible for services, which aim to build the necessary skills and supports that aid in a person becoming employed (Lawer, Brusilovskiy, Salzer, & Mandell, 2009). Gilmore, Schuster, and colleagues (2001) examined the provision of postsecondary education by VR utilizing RSA-911 data from federal fiscal year 1997. Through comparative analysis, they examined the extent to which individuals within VR were provided with services to support postsecondary education to individuals with and without disabilities in the general population’s participation in postsecondary education. The researchers aimed to identify the extent to which postsecondary education services were provided by VR, the rate of individuals receiving the services, and the association between receipt of these services and employment outcomes, such as earnings and hours worked.

Findings indicated that individuals receiving postsecondary education services from VR did have higher earnings and higher rates of competitive employment. They
also worked more hours in a given week. Twenty-one percent of individuals served by VR received postsecondary education services (college or university training; business/vocational services). The competitive employment rate was 9% higher for people who received some form of postsecondary service provided by VR. People with intellectual disabilities received the fewest postsecondary education services.

O’Neill and colleagues (2015) examined effects of college or university training provided by VR through propensity score matching based on baseline demographic variables using a classification and regression tree (CART) method. Six homogenous subgroups were created and analyzed using RSA-911 data from FY 2011. An overall sample of 178,290 individuals with disabilities whose cases were successfully closed (status 26) demonstrated that people with sensory or physical disabilities (40.26%) had a higher propensity for the provision of college and university training than individuals with psychiatric or intellectual and developmental disabilities (18.24%).

The overall sample indicated that VR provided college and university training to 12% of their clients. The subgroup comprised of intellectual and developmental disabilities (72.5%) and psychiatric disabilities (27.5%) between the ages of 16 and 25 had a propensity score estimate of 18% and earned more money each week than those in this subgroup who did not receive the provision of college and university training. Among all subgroups, earnings were higher than those who did not receive the provision of college or university training by VR. A medium effect size reflected a $95.26 increase in weekly earnings, supporting the benefit of providing college and university training to clients who can benefit from the service. In addition, the impact showed the most benefit to young adults with disabilities (16-25), individuals with psychiatric disabilities, and
individuals with intellectual and developmental disabilities, among other demographic variables. This evidence informs the field of rehabilitation that college and university training is a viable option to pave the way to better employment opportunities, financial security, and a better quality of life, regardless of disability.

Dutta, Gervey, Chan, Chou, and Ditchman (2008) used RSA-911, FY 2005 data to examine the effect Vocational Rehabilitation services has on employment outcomes for people in the United States with mental, physical, and sensory/communicative impairments, which are the primary disability categories included in the dataset. Identification of personal factors and service patterns that may contribute to the enhancement of employment outcomes in each of the disability subgroups was completed, and research questions aimed to answer how demographic variables and cash or medical benefit provisions relate to employment outcomes. Additionally, the study identified vocational rehabilitation services directly related to employment outcomes for people who were served. An emphasis on evidenced-based practice to identify the approaches that work best to predict the high probability of successful employment outcomes has been of particular interest to the Rehabilitation Services Administration (RSA), along with the integration of clinical expertise and client perspective. Yet, little information prior to this study was available on the service patterns and personal factors that contribute to employment success.

The findings in the Dutta and colleagues (2008) study indicated that vocational rehabilitation services are indeed associated with competitive employment outcomes. Examples of specific service patterns associated with this outcome included diagnostic and treatment services and education for those with sensory and physical impairments.
Those who were more educated had an increased chance at employment success and people with physical impairments who also received university training had a likelihood of being employed at 1.22 times higher of a rate than those without the service of university training.

Paid employment experiences during high school or shortly after completion of secondary education is an important step toward economic self-sufficiency in adulthood (Migliore & Winsor, 2013). Migliore and Winsor (2013) examined the extent to which young adults with intellectual disabilities accessed VR services to assist in obtaining employment and examined their exits from the VR system from 2002 to 2011. They noted a total of 33,540 young adults with intellectual disabilities between the ages of 16 and 30 exited the VR system in 2011. These individuals accounted for 13% of all case closures for individuals in this age range. Their findings from the study drew conclusions for the need of state administrators to closely monitor support services provided to young adults with intellectual disabilities to ensure they are adequately supported in their state. In addition, exploration of higher VR engagement rates in certain states could support state administrators’ discovery of potential promising practices that could be adopted elsewhere. Efforts to reach out to young adults with intellectual disabilities who want gainful employment may lead to a progression toward economic self-sufficiency among these youth (Migliore & Winsor, 2013).

**Trends in Vocational Rehabilitation Outcomes**

In a longitudinal study, Migliore and Butterworth (2008) assessed VR trends in outcomes from 1995 to 2005 with a focus on adults with developmental disabilities. Despite federal initiatives such as the Rehabilitation Act of 1973, 1992 amendments to
the act to streamline service delivery, and the 1998 Workforce Investment Act, adults with disabilities continue to represent lower employment rates and income. Given VR’s role in translating these policies emphasizing employment into practice, monitoring the outcomes of the VR program supports improvement in performance and increases the likelihood that people with disabilities will achieve full participation and self-sufficiency in society. Migliore and Butterworth aimed to identify the trends in integrated employment closures, trends in timeframe from application to closure in integrated employment, trends in earnings, and the correlation between VR outcomes and socioeconomic factors. Data were obtained from RSA-911 and focused on people with developmental disabilities whose cases were closed with VR agencies throughout the United States and U.S. territories in FY’s 1995 through 2005, excluding FY 2006 due to the unavailability of data. The primary developmental disabilities considered for the study were: intellectual disability, autism, cerebral palsy, and epilepsy, and by targeting these disability categories served by VR, the research mirrored a prior study conducted by Gilmore and colleagues (2000) in trends from 1985 through 1995 (Migliore & Butterworth, 2008).

In response to the researchers’ questions, the number of closures in employment was 15% less than 2005, which is likely due to RSA no longer considering extended employment as an employment outcome. Extended employment refers to sheltered workshops which are now categorized as training in preparation programs (DOE, 2001). Weekly earnings in integrated employment reflected a 3% increase from 1995 at an average of $200. The average time for closure was 714 days from application. The researchers noted that the time from application to closure was substantially greater if
the applicants were students, with an average of 993 days for students in 2005.

Socioeconomic factors impacted VR closures in integrated employment, suggesting 48% of the variance of the unemployment rate being linked to unemployment among the general population. The gap between the earnings of adults with disabilities and the general population widened over time. Earnings at closure were close to the poverty line threshold (U.S. Census Bureau, 2007). Reasons for low income at the time of closure in employment link to being placed in entry-level positions with low hourly wages, with only 8% of people in integrated employment earning more than $10 per hour (Migliore & Butterworth, 2008).

Migliore and Butterworth (2008) recommended the identification of high performing state VR agencies with greater outcomes to share practices. They called for increased collaboration with developmental disability organizations, enhanced leadership among disability personnel, increased efforts during negative socioeconomic times, and an increase in monitoring outcomes. The researchers recommended a shift from the national level to the state VR level. It was noted that an investment from VR in improving strategies to achieve better employment outcomes not only during the expansion of economy but even more so during recession. The recognition of the shortage in workforce due to baby boomer retirement could be seen as an opportunity to expand VR program outcomes (Migliore & Butterworth, 2008).

The Experiences of Individuals With Autism in the Vocational Rehabilitation System

Lawer and colleagues (2009) assessed the experiences of individuals with autism who utilized vocational rehabilitation services in the United States. Of the 382,221 adults
between the ages of 18-65, 1,707 were diagnosed with Autism Spectrum Disorder (ASD). The outcome variables used in this study were cases closed due to vocational rehabilitation believing that the person was too severely disabled to benefit from services, obtainment of competitive employment at the time of case closure, and total amount spent by vocational rehabilitation. In addition to examining individuals with ASD experiences with vocational rehabilitation services, individuals with intellectual disability and specific learning disability were used to provide comparisons.

Services provided to individuals with ASD were found to be the most expensive among all other disability groups examined, with intellectual disability being the second highest, and those with ASD were found to be denied services mostly due to being considered too severely disabled. However, adults with autism and intellectual disability were more likely at case closure to be employed than individuals with specific learning disability, with individuals with autism being employed at a higher rate (42%). Study results also indicate the good news that Vocational Rehabilitation proves to be a successful service system for individuals with ASD and other disabilities and suggest that individuals with ASD would likely benefit from participation from Vocational Rehabilitation and should be encouraged to participate.

**Summary**

Higher levels of educational attainment have generally been linked to higher earnings and increased rates of employment among people with disabilities (Hollenbeck & Kimmel, 2008; Ipsen, 2006; Mwachofi, Broyles, & Khaliq, 2009). It is also well known that there is a large employment gap between people with and without disabilities (Sevak et al., 2015), and people with disabilities are noted to have substantially lower
percentages of educational attainment, with 4% attaining a professional or graduate degree, 9% attaining a baccalaureate degree, and 23% having not graduated from high school. However, the gap in employment for people with disabilities consistently declines with greater educational attainment, which could indicate that people with disabilities have more to gain from postsecondary education completion than those without a disability. It could also potentially mitigate disability impact through access to care, health insurance, and job quality (Sevak et al., 2015).

Given the positive outcomes of postsecondary education on employment, it is critical to understand barriers to accessing postsecondary education and services that can assist individuals with disabilities in postsecondary education to reach employment goals (Gilmore, Schuster, et al., 2001). Strong evidence reflects the impact postsecondary education has on employment outcomes. With this information, VR could improve employment outcomes through supporting eligible persons in furthering their education (Gilmore, Schuster, et al., 2001).

Postsecondary education has the potential to increase the employability of individuals with intellectual disabilities, as it does for the general population (Gilmore, Schuster, et al., 2001; Migliore & Butterworth, 2008; Wehman & Yasuada, 2005). Dr. Meg Grigal stated, “Going to college is and always has been connected to greater employment and higher wages. It is likely given the opportunity, and the means to document outcomes, that students with intellectual disabilities would mirror these trends” (Grigal & Hart, 2010, p. 2).
CHAPTER 3—RESEARCH METHODOLOGY

Introduction

This chapter will restate the purpose of the study, in addition to describing the research design, research questions, data collection approach, and data analysis strategies employed in the study. A statement of the delimitations and limitations of the study is provided in this chapter as it relates to the methods employed. The emphasis of Chapter 3 is on the research methodology inherent to the study.

Restatement of the Purpose of the Study

The purpose of the study was to assess the association between postsecondary education and weekly earnings among individuals with intellectual and developmental disabilities (IDD) who were also served by the California Vocational Rehabilitation (VR) system. In addition to evaluating the association between postsecondary education and earnings, the study examined the proportion of rehabilitation cases of individuals with the provision of college by VR. More specifically, the study focused on this service provision to individuals with IDD.

Vocational Rehabilitation is a federal-state resource that can provide rehabilitation services, service coordination, and financial support to individuals with disabilities. The rehabilitation services delivery system has a goal of maximizing the likelihood of successful vocational outcomes for individuals with disabilities. While VR success can include a variety of outcomes, the emphasis has largely been placed on competitive employment in the labor market (Bolton, 1987; Brabham, Mandeville, & Koch, 1998). Rehabilitation research has aimed to identify variables influencing or predicting successful employment outcomes for rehabilitation clients for the past 50 years (Bolton,
Bellini, & Brookings, 2000). The belief is that understanding predictors of successful outcomes can increase the success rate of individuals served by VR (Bolton et al., 2000).

There are three service phases of the VR process which include: (a) intake and evaluation, (b) plan development, and (c) service provision. One of the services available to clients is college or university training, which is defined as:

full-time or part-time academic training above the high school level leading to a degree (associate, baccalaureate, graduate, or professional), a certificate, or other recognized educational credential. Such training may be provided by a four-year college or university, community college, junior college, or technical college.

(RSA, 2013, p. 30)

While VR may or may not cover the entire cost of fees and tuition associated with postsecondary education enrollment, it can be used as a resource when resources such as financial aid have been exhausted and a need for financial support still exists (Gilmore, Schuster, et al., 2001). RSA-911 has been used to examine postsecondary education participation among individuals served by VR. In 1997, 35% of people whose cases were closed by VR were identified as having participated in postsecondary education, and VR provided postsecondary education services to 21% of the cases closed during that federal fiscal year. Among the individuals who received postsecondary education, 14.5% entered the VR system with some level of postsecondary education (Gilmore, Bose, & Hart, 2001).

Postsecondary education is increasingly being viewed as an integral step to higher quality employment outcomes, yet a small a small percentage of individuals with intellectual disability (ID) receive educational support from this entity. In 2010, only 3%
of people with ID increased their highest level of education during the time their case was open with VR (Butterworth et al., 2012). A Neubert, Moon, and Grigal (2004) study on activities of students with significant disabilities in postsecondary settings found that a small number of the students in their sample (163 students) were participating in college-level credit courses, with many auditing classes or taking noncredit courses.

There is a close link between postsecondary education attainment, lifetime earnings, and economic self-sufficiency (American Council on Education, 1999; Disability Rights Advocates, 1997). Given the relationship between education and earnings, it is imperative to determine the impact certificate and degree attainment can have on individuals with IDD. A correlation between postsecondary education support and positive outcomes on earnings could lead to greater federal-state financial support for students with IDD in earning certificates, associate degrees, baccalaureates, and beyond.

**Research Design**

A research design can be understood as an intersection of inquiry or strategies, philosophy, and specific methods or procedures of research. In planning a study, researchers should think through these various components (Creswell, 2009). The *postpositive* philosophical world view can also be considered the scientific method or science research, and holds that we cannot be “positive” about our claims when assessing the actions of humans or behavior. *Postpositivism* is most commonly found in quantitative research and reflects the need to identify and assess causes that may potentially influence outcomes. Objectivity is essential to competent inquiry, and examination of method and conclusion for bias are inherent to postpositivist studies.
(Phillips & Burbules, 2000). For the purpose of this study, a postpositivist approach was utilized throughout this ex post facto study.

An ex post facto (or causal comparative) research design was used to identify associations between postsecondary education and earnings among individuals with intellectual disability, autism, cerebral palsy, and epilepsy served by the California VR system. In addition, this approach was used to examine the proportions of rehabilitation cases of individuals with the provision of college, while their vocational rehabilitation case was open with VR. Ex post facto is a common type of design in rehabilitation research. Ex post facto research uses characteristics a subject already has in place before a study begins, also referred to as attribute independent variables. The variation in the independent variable is predetermined, and the purpose of ex post facto research is to see if there is a relationship between variables. Establishing or discovery of relationships between the variables is the focus of this type of research (Ary, Jacobs, Sorensen, & Walker, 2006).

The study employed a quantitative research approach for multiple purposes. Individuals were assigned to group membership based on personal attributes. Due to the rehabilitation intervention, individuals included in the study were identified through secondary analysis of the U.S. Department of Education Rehabilitation Services Administration-911 (RSA-911) data files. RSA-911 data can be obtained from the U.S. Department of Education. Personally identifying information is removed from the data set before it is shared with researchers. RSA-911 data contains records of all cases closed within a given federal fiscal year and is a national set of records containing information from all state-federal rehabilitation agencies in all U.S. states, the District of
Columbia, and U.S. territories. Case services data were received in the form of a large text file and imported into the Statistical Package for the Social Sciences (SPSS) application for analysis.

**Research Questions**

The following questions were used in the study to assess the association between postsecondary education and weekly earnings and to examine the proportions of rehabilitation cases of individuals with the provision of college by VR.

RQ1: Of the individuals with IDD whose vocational rehabilitation cases with the California Department of Rehabilitation were closed successfully during federal fiscal year 2010 through 2014, is there a significant difference between the average weekly earnings at closure of individuals who earned a certificate or degree and individuals who did not earn a certificate or degree?

RQ2: Of the individuals who earned a certificate or degree and whose vocational rehabilitation cases with the California Department of Rehabilitation were closed successfully during federal fiscal year 2010 through 2014, are there significant differences between the average weekly earnings at closure of individuals with the following four primary causes of impairment: autism, cerebral palsy, epilepsy, and intellectual disability?

RQ3: Of individuals who were provided with vocational rehabilitation services by the California Department of Rehabilitation and whose cases were closed between federal fiscal years 2006 and 2014, are there significant year-to-year differences between the proportions of rehabilitation cases who received college or university training who had or did not have a primary cause of disability of IDD?
RQ4: Of the individuals with IDD who were provided with vocational rehabilitation services by the state-federal vocational rehabilitation system and whose cases were closed during federal fiscal year 2014, are there statistically significant differences between the proportions of rehabilitation cases provided with college or university training in California and in all other states and territories combined?

**Description of the Sample**

Vocational Rehabilitation systems and agencies are federally mandated to report individual-level information to the United States Department of Education, which is compiled in the Rehabilitation Services Administration (RSA-911) dataset. The study was based upon RSA-911 data, which includes cases closed during federal fiscal years 2006 through 2014 (October 1, 2006 through September 30, 2014), including programmatic and demographic information for each person who has exited the Vocational Rehabilitation system in the given period ($N = 5,343,753$). Federal fiscal year 2014 was the most recent year of available data from RSA at the time this study was conducted. The study also utilized RSA-911 data spanning federal fiscal years 2006 through 2014 to answer research question 3. This time frame was selected in an effort to measure the effect of legislation and policy developed during this time period. As an example, the Higher Education Opportunities Act was enacted in 2008 and reauthorized the Higher Education Act of 1965. This legislation included provisions to improve access to postsecondary education for individuals with intellectual disabilities (Jones et al., 2015).

The study encompassed a variety of inferential tests due to the multiple outcome variables analyzed. The outcome variables employed in the study were weekly earnings
at the time of case closure and the provision of college and university training by VR.

The continuous outcome variable of weekly earnings at the time of case closure permitted examination of the mean earnings clients in specific disability categories at the time their case was closed with VR. Vocational Rehabilitation counselors enter the amount of money (to the nearest dollar) a person earned weekly after the employment outcome has been achieved. This includes all wages, salaries, tips, and commission earned before payroll taxes, in addition to earnings received for individuals who are self-employed (RSA, 2013). The categorical outcome variable related to college or university training as previously stated is a potential service provision of VR and is documented by the VR counselor as the code for vendors/providers and the code source of funding. Codes for Vendors/Services Providers are recorded as 0 = Not provided; 1 = Provided directly by State VR agency; 2 = Provided by Community Rehabilitation Programs in the Public Sector (owned and managed by Federal, State, or local government, such as those run by State VR agencies); 3 = Provided by Community Rehabilitation Programs in the Private Sector (owned and managed by nongovernmental entities, such as individuals, associations, corporations, etc.); 4 = Provided by One-stop Employment/Training Centers; 5 = Provided by other Public Sources; 6 = Provided by other Private Sources. Codes for Source of Funding are documented as: 0 = Not provided; 1 = VR funds; 2 = Non-VR Sources; 3 = Combination of VR and Other Sources.

The independent variables used in the study were related to the cause/sources of impairment and educational attainment at the time of case closure. The categorical variable was based on causes/sources of impairment, including autism, cerebral palsy, epilepsy, and intellectual disability. These specific causes/sources of impairment were
chosen due to the aim to identify vocational rehabilitation disability codes that would fall under the umbrella term developmental disability, as identified by the American Association on Intellectual and Developmental Disabilities (AAIDD, 2013). The RSA-911 dataset allows for the coding of primary disability and secondary disability. Vocational Rehabilitation counselors enter the four digit code under primary disability that best describes the individual’s physical or mental impairment that results in a substantial impediment to employment attainment. The first two digits account for the primary disability, and the second two digits account for the individual’s causes/sources of impairments. It is important to note that RSA-911 codes “Intellectual Disability” as “Mental Retardation.” Rosa’s Law was signed by President Barack Obama in October of 2010, and, under this law, the classification of Mental Retardation was changed to Intellectual Disability. This change in classification is currently not reflected in RSA 9-11 data, but for the purpose of this study, the term Intellectual Disability will be used throughout.

The second, categorical independent variable related to an individual’s educational attainment at the time of case closure. This is coded as “Level of Education Attained At Closure” in RSA-911, and the following codes are used to define level of education attained: 0 = No formal schooling; 1 = Elementary education (Grades 1-8); 2 = Secondary education, no high school diploma (Grades 9-12); 3 = Special education certificate of completion/diploma or in attendance; 4 = High school graduate or equivalency certificate (regular education students); 5 = Postsecondary education, no degree; 6 = Associate degree or Vocational/Technical Certificate; 7 = Bachelor’s degree; 8 = Master’s degree or higher. It is important to note that the study consisted of
individuals entering the VR system with varying levels of education. The research questions addressed individuals who completed one of the documented levels of education previously described. However, the range of individuals included in the study may have entered the VR system with no formal postsecondary education or may have entered with some level of postsecondary education.

The sample consisted of Rehabilitation Services Administration (RSA-911) closures for FFY 2010 through 2014 for research questions 1 and 2 and includes RSA-911 data from FFY 2006 through FFY 2014 (October 1, 2005 through September 30, 2014) to answer research question 3. Research question 4 encompassed closures from FFY 2014 (October 1, 2013 through September 30, 2014). These federal fiscal years were used to identify the proportions of rehabilitation cases of individuals with respect to the provision of college and university training by VR, particularly in relation to the provision to individuals with IDD as a comparison to all other disabilities.

Research Questions and Data Analysis Strategies

This section of Chapter 3 provides the analysis strategies employed to answer each question. The analysis included review of descriptive statistics related to causes/sources of impairment, VR service provision of college and university training, level of education at the time of case closure, competitive employment outcomes, and weekly earnings at the time of case closure.

Research question 1 employed a $t$ test to examine differences in mean weekly earnings between individuals with IDD who advanced to certificate or degree completion while their rehabilitation case was open, and individuals with IDD who did not advance to certificate or degree completion. A $t$ test is a basic statistical test used to analyze group
differences and is appropriate when there are two groups, and the outcome variable is quantitative. Given the question aims to identify mean differences in earnings among individuals with IDD who advanced to certificate or degree completion and those who did not, this was an appropriate statistical analysis to answer this question in the study. The group consisting of those who did not advance to certificate or degree completion included individuals with IDD who received no college and those who received some college but did not complete a degree. Additionally, individuals who earned degrees or certificates, but the change in education level did not take place while the case was open with VR, were considered a part of the group who did not advance.

Research question 2 employed a one-way Analysis of Variance (ANOVA) to examine differences in earnings between individuals with a primary cause of impairment of one of four different types of IDD who advanced to certificate or degree completion. Analysis of Variance is an appropriate test when the question aims to identify differences between groups. This statistical tool is used when there are more than two groups, and the outcome variable is quantitative. Since the question aims to identify differences in weekly earnings between individuals with a diagnosis of autism, intellectual disability, epilepsy, and cerebral palsy who have completed postsecondary education, this was the most appropriate tool to use in answering the question.

A 2 X 9 chi-square analysis was used in research question 3 to detect any significant year-to-year differences in the proportion of rehabilitation cases of individuals with IDD receiving the provision of college by California VR compared to those without IDD who were provided college by California VR during federal fiscal years 2006 through 2014. A 2 X 2 chi-square analysis was used in research question 4 to detect any
significant differences in the proportions of rehabilitation cases of individuals with IDD with the provision of college or university training in California compared to the provision of college to individuals with IDD in all other VR states and territories combined during federal fiscal year 2014. Chi-square tests of significance are used to compare observed and expected frequencies. This is a widely used test of difference when dealing with nominal data.

**Delimitations of the Study**

The first delimitation relates to the exclusion of specific causes/sources of impairments from the study to answer research questions 1 and 2 related to the association between postsecondary education and earnings. It was inherent to the study to identify individuals with a primary cause of impairment of autism, cerebral palsy, epilepsy, or intellectual disability and remove other disability categories from the analysis to answer the first two questions.

The second delimitation was the exclusion of case records outside of the state of California to answer research questions 1, 2, and 3. As the study placed emphasis on the California VR system, it was essential to exclude data pertaining to rehabilitation cases in other U.S. states, the District of Columbia, and U.S. territories where VR services are provided. As research question 4 aimed to provide a comparative analysis of college/university training service provision between the state of California and all other areas where VR services are administered, the delimitation did not apply to this question.

The third delimitation related to the emphasis on college completion. Rehabilitation Services Administration (RSA-911) data have nine categories in level of
education attainment at the time of case closure. Given the study’s focus on college completion, the three categories used to define college completion were:

1. Associate degree or Vocational/Technical Certificate
2. Bachelor’s degree
3. Master’s degree or higher.

The fourth delimitation related to the exclusion of case closures deemed “unsuccessful” (status 28) from research questions 1 and 2. It was inherent to the study to exclude individuals from the study whose cases were not closed with the status of employment (26) in answering these questions, as those who were closed unsuccessfully are not likely to have earnings at closure. In addition, the study delimited the data to individuals whose cases were closed as competitively employed in these two questions. Competitive employment is defined by RSA as “employment in an integrated setting, self-employment or a state-managed Business Enterprise Program (BEP) that is performed on a full-time or part-time basis for which an individual is compensated at or above the minimum wage” (RSA, 2013, p. 38). While this delimitation applied to the first two research questions, it was not applicable to research questions 3 and 4, which examined the provision of college to VR participants. Research questions 3 and 4 included all types of closures in examining this provision of service.

**Limitations Inherent in the Study**

An ex post facto design was employed in the study which means randomization and manipulation of the independent variables was not possible as the variation in the variables of interest had occurred in the past. A potential weakness of the study could be the inability to manipulate or randomize variables, as one may be able to do in an
experimental study. Inferring a causal relationship between the independent variables and outcome variables is difficult due to the lack of control in this type of study and, as a result, these types of studies are generally regarded as having lower levels of internal validity than randomized experiments (Ary et al., 2006).

The study was also dependent on data collected by another entity. While RSA-911 is useful in examining outcomes of the VR system, interpretation must be limited to how data were collected and how collectors of the data defined their terms. As an example, the dataset does not provide information as to who may have wanted postsecondary education services but was not provided or who may have not wanted such services.

Another limitation of the study is the inability to include individuals who had a certificate or degree at the time of application and earned an additional certificate or degree at the same level while their case was open with VR. The data were recorded in a manner that precludes one from identifying these individuals.

The study also does not account for individual characteristics that may influence postsecondary degree completion or the provision of Vocational Rehabilitation services. As an example, the study does not consider severity of disability, greater access to VR services or other social service supports, motivation, or ability to advocate for needed services and supports.

**Summary**

Vocational Rehabilitation services are designed to help people with disabilities achieve gainful employment (Mwachofi et al., 2009). Individuals with significant mental or physical impairments that result in a substantial impediment to employment who can
benefit from VR services may be eligible. Records from all state VR systems are aggregated at the national level by the Rehabilitation Services Administration U.S. Department of Education in a data file commonly referred to as RSA-911 (RSA, 2013). RSA-911 can be a useful dataset in evaluating outcomes of the system (Gilmore, Schuster, et al., 2001), as it consists of approximately 600,000 case closures in a given fiscal year.

One way in which an individual can increase their employability is through postsecondary education (BLS, 1999; GAO, 1997; Horn & Berktold, 1999; Roy et al., 1998). Vocational Rehabilitation can be a good source of support for people with disabilities who wish to access higher education (Gilmore, Bose, et al., 2001). Hart, Zafft, and Zimbrich (2001) found that students who have significant disabilities, and who also received services in postsecondary settings, had improved outcomes in the area of employment. In addition, the literature demonstrates increasing expectations that individuals with intellectual and developmental disabilities should be given the option to go to college (Grigal & Hart, 2010).

This study examined the association between postsecondary education and earnings among individuals with IDD, and assessed the provision of college or university training by VR. Four inferential tests were used to answer the research questions. Extant data were used to assess service delivery to and outcomes of individuals served within the given federal fiscal years. The following chapter will present results of the analyses employed in the study.
CHAPTER 4—RESULTS

Introduction

The purpose of this chapter is to report the findings based on the analyses used and described in the research methodology. Chapter 4 is organized into four sections. In the first section, descriptive statistics related to the variables inherent to the analysis are presented. The second section provides the analyses and findings for each of the four research questions employed in the study, in addition to descriptive statistics specific to each research question. The questions aimed to address differences in two primary areas: (a) the association between weekly earnings and advancement to certificate and degree completion; and (b) the provision of college and university training by Vocational Rehabilitation (VR). The first two research questions use data from federal fiscal years 2010 through 2014. Research question 3 uses data from federal fiscal years 2006 through 2014. Research question 4 uses data from federal fiscal year 2014. Research question 4 is the only research question analyzing rehabilitation cases of individuals inside and outside of the state of California. The first three questions focus on rehabilitation cases of individuals served by California VR. The research questions use data for analysis of individuals with and without intellectual and developmental disabilities, reported weekly earnings, advancement to certificate or degree completion, and service provision of college and university training by VR. The third section provides a summary of the inferential analyses employed in the study. The final section summarizes the results, and states limitations of the study. Chapter 5 offers a discussion of the implications of the findings.
Description of Variables

The following section provides a description of the variables inherent to the study and information related to why specific federal fiscal years (2006 through 2014) were included in the study. Table 1 provides descriptive statistics for the number of rehabilitation cases that were closed in the given federal fiscal year. Data encompassed all rehabilitation cases regardless of primary cause of impairment and includes all U.S. states and territories where VR services were provided.

Table 1

*Number of VR Case Closures (Frequency) in Each Federal Fiscal Year (2006 Through 2014) in RSA-911*

<table>
<thead>
<tr>
<th>Federal fiscal year</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>617,149</td>
</tr>
<tr>
<td>2007</td>
<td>600,188</td>
</tr>
<tr>
<td>2008</td>
<td>618,054</td>
</tr>
<tr>
<td>2009</td>
<td>588,970</td>
</tr>
<tr>
<td>2010</td>
<td>612,537</td>
</tr>
<tr>
<td>2011</td>
<td>589,773</td>
</tr>
<tr>
<td>2012</td>
<td>579,312</td>
</tr>
<tr>
<td>2013</td>
<td>589,402</td>
</tr>
<tr>
<td>2014</td>
<td>548,368</td>
</tr>
<tr>
<td>Total</td>
<td>5,343,753</td>
</tr>
</tbody>
</table>

Data files from federal fiscal years 2006 through 2014 encompassing closed rehabilitation cases of individuals (\(N = 5,343,753\)) were used to conduct inferential tests of the four research questions included in the study. It is important to note that all nine
years were not used to answer each question. Data inclusive of federal fiscal years 2010-2014 were used in research questions 1 and 2 to examine differences in weekly earnings between the two groups defined by educational attainment and type of disability. These years were chosen given the legislative efforts made in recent years to include individuals with IDD in postsecondary education. Additionally, these years were aggregated to address the relatively small number who fit within this category each year. Research question 3 analyzed data from federal fiscal years 2006 through 2014 and compared individuals with IDD and other disability groups with respect to the provision of college and university training by California VR. Data from federal fiscal year 2014 were used to compare individuals with IDD served by California VR to individuals with IDD served by VR in all other states and territories with respect to the provision of college and university training.

**Agency Code**

The agency code variable was used to determine who was served by VR in the state of California to answer the first three research questions. Each State VR agency is represented by a three-digit code (CA = 006) in RSA-911 (RSA, 2013).

**Primary Cause of Disability**

The RSA-911 dataset contains a variable identifying the primary cause of disability for each case. Individuals are classified into one of 38 categories. The primary cause of disability/source of impairment variable was used to determine who had a primary source of impairment of intellectual and developmental disability (autism, cerebral palsy, epilepsy, or intellectual disability). Analysis of secondary disability was not conducted as part of this study.
Weekly Earnings at Case Closure

The weekly earnings of individuals with IDD whose cases were closed successfully in federal fiscal years 2010 through 2014 were examined to assess differences between those who advanced to certificate and degree completion while their case was open with VR in California and those who did not. Weekly earnings at closure of individuals with intellectual disability, autism, cerebral palsy, and epilepsy who completed certificates and degrees were also examined to assess differences in mean earnings between the four disability groups. Descriptive statistics illustrating weekly earnings at closure compared to weekly earnings at application are included among the results.

Hours Worked in a Week at Closure

Hours Worked in a Week at Closure was recorded for those who achieved an employment outcome, and this figure includes salaries, wages, tips, and earnings from self-employment (RSA, 2013). Descriptive statistics summarizing hours worked per week at closure are provided later in this chapter.

Type of Closure

Analysis for the first two research questions was delimited to individuals with IDD who also had a successful employment closure with VR. This is recorded as a one-digit code which represents when in the process a person exited the VR system (exited with an employment outcome) and exited with a successful employment outcome, which was inherent in defining the study population or research question 1 and 2. Research questions 3 and 4 encompassed all types of closure status (No previous closure within 36 months; Closed while the individual was an applicant, but before a
determination of eligibility; Closed while the individual was an applicant, but during or a after a trial work experience/extended evaluation; Closed after the individual achieved an employment outcome; Closed after individual received services, without an employment outcome; Closed after an individualized plan for employment (IPE) was signed, but before receiving services; Closed from an order of selection wait list; Closed after a determination of eligibility, but before an IPE was signed (RSA, 2013).

**Level of Education at Application and at Case Closure**

Level of Education at Application and Level of Education at Case Closure are recorded as a one-digit code. In addressing research questions 1 and 2, the study was delimited to individuals with IDD whose cases were closed during federal fiscal years 2010 through 2014 who advanced to certificate or degree completion while their case was open with VR. Individuals were included in the study if they earned an Associate Degree or Vocational/Technical Certificate, Bachelor’s Degree, or Master’s Degree or higher. Individuals were considered to have advanced if they completed a certificate or degree above their level of education at time of application. Advancement was specific to research questions 1 and 2 in this study.

**Inferential Statistical Analyses**

The following section provides inferential statistical analyses for the four research questions employed in the study. The research questions in this study provide analyses of individuals with and without intellectual disabilities, and address the primary areas of weekly earnings upon successful rehabilitation case closure and provision of college and university training by VR.
Research Question 1

Of the individuals with IDD whose vocational rehabilitation cases with the California Department of Rehabilitation were closed successfully during federal fiscal years 2010 through 2014, is there a significant difference between the average weekly earnings at closure of individuals who earned a certificate or degree while their rehabilitation case was open and individuals who did not earn a certificate or degree?

An independent samples t-test was performed to examine whether there were significant differences between the average weekly earnings at successful case closure of individuals with IDD who did and did not advance to certificate or degree completion while their rehabilitation case was open with VR. This hypothesis was tested at a significance level of .01. Some individuals may have earned an equivalent or lower level certificate or degree while their case was open with VR, but were not included in the group who did advance because they could not be identified in the dataset. The outcome variable was a continuous variable reported by the VR counselor as the weekly earnings at closure for each successful closure. The sample consisted of 8,272 who did not advance to certificate or degree completion and 247 who did advance to certificate or degree completion. Prior to conducting the t-test, standardized scores (z-scores) were computed for weekly earnings at the time of case closure and weekly earnings exceeding four standard deviations from the mean were identified as outliers and were excluded from the analysis. This procedure was necessary to eliminate univariate outliers that may skew results (Mertler & Vannatta, 2013). Levene’s Test of Homogeneity of Variance indicated that the assumption of homogeneity was violated. In response, the Welch’s t-statistic was used due to equal variances not being assumed. While there was a
violation of the assumption of normality, the distributions were similarly positively skewed. Given the robustness of the $t$-test, nonnormality with respect to distribution does not affect the probability of a type-II error and the normality prerequisite with a two-tailed $t$-test can be disregarded (Boneau, 1960; Sawilowsky & Blair, 1992).

The mean weekly earnings for individuals with IDD who did not advance was $197.03 (SD = $112.57), while the mean earnings for individuals with IDD who did advance was $343.06 (SD = $168.60). The combined mean hours worked in a week at case closure for both groups was $n = 26.95$. The $t$-test for equality of means indicated there was a statistically significant difference between the groups ($t = 13.52$, $df = 252.59$, $p < 0.001$). This difference represented a large effect size (Cohen’s $d = 1.0187$).

Descriptive statistics for this independent samples $t$-test are summarized in Tables 2 through 5.

Table 2 provides descriptive statistics illustrating the number of individuals with IDD served in California whose rehabilitation cases were successfully closed in federal fiscal years 2010 through 2014 divided by gender. Descriptive statistics include the number served and percentage of the population with IDD within the given federal fiscal years.

Table 3 provides descriptive statistics indicating the number of individuals with IDD who were successfully closed within each federal fiscal year. Each year includes individuals with IDD who did advance to a higher level certificate or degree and those who did not advance. Descriptive statistics include the frequency (count) and the percentage of the 5-year total in each federal fiscal year and include individuals served by California VR.
Table 2

*Number of Individuals With IDD Based on Gender (Male/Female)*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>5,956</td>
<td>69.9</td>
</tr>
<tr>
<td>Female</td>
<td>2,563</td>
<td>30.1</td>
</tr>
<tr>
<td>Total</td>
<td>8,519</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3

*Number of Individuals (Frequency and Percentage) With IDD Successfully Closed Within Each Federal Fiscal Year in California*

<table>
<thead>
<tr>
<th>Federal fiscal year</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>1,698</td>
<td>19.9</td>
</tr>
<tr>
<td>2011</td>
<td>1,624</td>
<td>19.1</td>
</tr>
<tr>
<td>2012</td>
<td>1,553</td>
<td>18.2</td>
</tr>
<tr>
<td>2013</td>
<td>1,680</td>
<td>19.7</td>
</tr>
<tr>
<td>2014</td>
<td>1,965</td>
<td>23.1</td>
</tr>
<tr>
<td>Total</td>
<td>8,519</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4 indicates the number of rehabilitation cases whose primary cause of impairment was autism, cerebral palsy, epilepsy, or intellectual disability, and who were also successfully closed in federal fiscal years 2010 through 2014. Descriptive statistics encompass individuals with a primary disability of IDD who were served by California VR.

Table 5 provides descriptive statistics summarizing education level at the time of case closure during federal fiscal years 2010 through 2014. The level of education ranged
Table 4

Number of Individuals (Frequency and Percentage) With IDD Based on Primary Cause of Impairment (Autism, Epilepsy, Cerebral Palsy, Intellectual Disability)

<table>
<thead>
<tr>
<th>Primary case of impairment</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism</td>
<td>1,346</td>
<td>15.8</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>504</td>
<td>5.9</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>375</td>
<td>4.4</td>
</tr>
<tr>
<td>Intellectual disability</td>
<td>6,294</td>
<td>73.9</td>
</tr>
<tr>
<td>Total</td>
<td>8,519</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 5

Level of Education at Case Closure Among Individuals With IDD During Federal Fiscal Years 2010 Through 2014

<table>
<thead>
<tr>
<th>Education level at closure</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No formal schooling</td>
<td>11</td>
<td>.1</td>
</tr>
<tr>
<td>Elementary education (Grades 1-8)</td>
<td>70</td>
<td>.8</td>
</tr>
<tr>
<td>Secondary education, no high school diploma (Grades 9-12)</td>
<td>482</td>
<td>5.7</td>
</tr>
<tr>
<td>Special education certificate of completion/ attendance</td>
<td>4,049</td>
<td>47.5</td>
</tr>
<tr>
<td>High school grad or GED (regular education)</td>
<td>2,634</td>
<td>30.9</td>
</tr>
<tr>
<td>Postsecondary education, no degree</td>
<td>694</td>
<td>8.1</td>
</tr>
<tr>
<td>Associate degree or Vocational/Technical certificate</td>
<td>295</td>
<td>3.5</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>251</td>
<td>2.9</td>
</tr>
<tr>
<td>Master’s degree or higher</td>
<td>33</td>
<td>.4</td>
</tr>
<tr>
<td>Total</td>
<td>8,519</td>
<td>100.0</td>
</tr>
</tbody>
</table>
from no formal schooling to Master’s degree or higher. Descriptive statistics include frequency and percentage for each level of education.

**Research Question 2**

Of the individuals who earned a certificate or degree and whose vocational rehabilitation cases with the California Department of Rehabilitation were closed successfully during federal fiscal years 2010 through 2014, are there significant differences between the average weekly earnings at closure of individuals with the following four primary causes of impairment: autism, cerebral palsy, epilepsy, and intellectual disability?

A one-way ANOVA was performed to assess the differences in weekly earnings between the four primary causes of impairment encompassing IDD (autism = 81, cerebral palsy = 88, epilepsy = 43, intellectual disability = 58). This test was conducted using a significance level of .01. The independent variable had four levels based on primary primary cause of impairment. As in research question 1, standardized scores (z-scores) were used to identify outliers four or more standard deviations from the mean in order to eliminate univariate outliers. Rehabilitation cases in this analysis were only those that were successfully closed within the given federal fiscal years and those where the individual advanced to certificate or degree completion while their case was open with VR. There was no violation of the assumption of homogeneity of variance. There were no statistically significant differences between the weekly earnings of rehabilitation cases with the four different types of primary causes of impairment. The assumption of normality was violated, but ANOVA is considered a robust test for nonnormal, highly skewed distributions and tolerates normality assumption violations well (Norman, 2010).
This led to the decision to proceed with the analysis. The ANOVA was not significant \((3, 266) = 1.936, p = .124\). As a result, the null hypothesis was retained, and the means of the four groups were considered equal. Descriptive statistics for the one-way ANOVA are summarized in Tables 6 and 7.

Table 6

*Frequency, Mean Weekly Earnings, and Standard Deviations for the Four Primary Causes of Impairment (Autism, Cerebral Palsy, Epilepsy Intellectual Disability)*

<table>
<thead>
<tr>
<th>Impairment</th>
<th>(N)</th>
<th>Mean ($)</th>
<th>SD ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism</td>
<td>81</td>
<td>390.26</td>
<td>265.98</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>88</td>
<td>440.91</td>
<td>273.46</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>43</td>
<td>413.77</td>
<td>235.96</td>
</tr>
<tr>
<td>Intellectual disability</td>
<td>58</td>
<td>341.00</td>
<td>197.09</td>
</tr>
<tr>
<td>Total</td>
<td>270</td>
<td>399.93</td>
<td>252.00</td>
</tr>
</tbody>
</table>

Table 7 provides descriptive statistics on the number of individuals with IDD who were successfully closed in each federal fiscal year (2010 through 2014). Descriptive statistics encompass those with successful case closures who advanced to a higher level of education.

**Research Question 3**

Of individuals who were provided with vocational rehabilitation services by the California Department of Rehabilitation and whose cases were closed between federal fiscal years 2006 and 2014, are there significant differences between the proportions of rehabilitation cases who received college or university training who had or did not have a primary cause of disability of IDD?
Table 7

Number of Individuals (Frequency and Percentage) With IDD Successfully Closed and
Advanced to Certificate or Degree Completion Within Each Federal Fiscal Year

<table>
<thead>
<tr>
<th>Federal fiscal year</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>36</td>
<td>13.3</td>
</tr>
<tr>
<td>2011</td>
<td>36</td>
<td>13.3</td>
</tr>
<tr>
<td>2012</td>
<td>52</td>
<td>19.3</td>
</tr>
<tr>
<td>2013</td>
<td>67</td>
<td>24.8</td>
</tr>
<tr>
<td>2014</td>
<td>79</td>
<td>29.3</td>
</tr>
<tr>
<td>Total</td>
<td>270</td>
<td>100.0</td>
</tr>
</tbody>
</table>

A 2 X 9 chi-square test of independence was performed to determine if there were significant year-to-year differences among the proportions of rehabilitation cases of individuals with and without IDD who received college training between federal fiscal years 2006 and 2014 ($n = 48,121$). This analysis encompassed only individuals whose cases were closed during these federal fiscal years who received college and university training funded in part or completely by VR. The statistical test to demonstrate whether or not there were significant differences among the proportions is the Pearson Chi-Square test (Hinton, Brownlow, McMurray, & Cozens, 2004). The test was conducted using a significance level of .01. In order to determine the specific years when the proportions differed by an amount greater than what would be expected by chance, adjusted standardized residuals were utilized. Those years with adjusted standardized residuals exceeding a value of 2.33 were identified as significantly different. The results of the chi-square test were significant ($\chi^2 = 80.517$, $df = 8$, $p < 0.001$), which indicated that there were statistically significant differences among the proportions of rehabilitation
cases that received college or university training for individuals who did or did not have a primary cause of disability of IDD. In particular, federal fiscal years 2009 (adjusted residual = 2.8), 2011 (adjusted residual = 3.9), 2013 (adjusted residual = 3.6), and 2014 (adjusted residual = 6.9) demonstrated statistical significance. Federal fiscal years 2009 and 2011 were years when the proportions of individuals with IDD receiving college were lower than would be expected by chance and federal fiscal years 2013 and 2014 were years when the proportions individuals with IDD who received college were higher than would be expected by chance.

Of the total population receiving college or university training, 95.5% were cases without a primary cause of impairment of IDD, and 4.5% were cases with a primary cause of impairment of IDD during federal fiscal years 2006 through 2014. Table 8 provides the frequencies and percentages of individuals with IDD who received the provision of college and university training in the given federal fiscal year.

**Research Question 4**

Of the individuals with IDD who were provided with vocational rehabilitation services by the state-federal vocational rehabilitation system whose cases were closed during federal fiscal year 2014, are there statistically significant differences between the proportions of rehabilitation cases provided with college or university training in California and in all other states and territories combined?

A 2 X 2 chi-square test of independence was performed to examine the proportion of rehabilitation cases with the provision of college and university training in California compared to the proportion of rehabilitation cases with the provision of college and university training in all other VR state and territory agencies for cases closed during
Table 8

*Cross-Tabulation of College and University Service Provision in California From 2006 Through 2014 (Individuals With and Without IDD)*

<table>
<thead>
<tr>
<th>Federal fiscal year</th>
<th>IDD Frequencies</th>
<th>IDD Percentages</th>
<th>Not IDD Frequencies</th>
<th>Not IDD Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>208</td>
<td>4.1</td>
<td>4,911</td>
<td>95.9</td>
</tr>
<tr>
<td>2007</td>
<td>209</td>
<td>4.5</td>
<td>4,483</td>
<td>95.5</td>
</tr>
<tr>
<td>2008</td>
<td>296</td>
<td>4.3</td>
<td>6,636</td>
<td>95.7</td>
</tr>
<tr>
<td>2009*</td>
<td>149</td>
<td>3.6</td>
<td>3,987</td>
<td>96.4</td>
</tr>
<tr>
<td>2010</td>
<td>212</td>
<td>4.0</td>
<td>5,148</td>
<td>96.0</td>
</tr>
<tr>
<td>2011*</td>
<td>171</td>
<td>3.4</td>
<td>4,858</td>
<td>96.6</td>
</tr>
<tr>
<td>2012</td>
<td>202</td>
<td>4.5</td>
<td>4,288</td>
<td>95.5</td>
</tr>
<tr>
<td>2013*</td>
<td>412</td>
<td>5.2</td>
<td>7,475</td>
<td>94.8</td>
</tr>
<tr>
<td>2014*</td>
<td>291</td>
<td>6.5</td>
<td>4,185</td>
<td>93.5</td>
</tr>
<tr>
<td>Total</td>
<td>45,971.0</td>
<td>95.5</td>
<td>4.5</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Note.* Statistically significant years are identified with an asterisk.

The federal fiscal year 2014. Individuals in the analysis were selected with a primary diagnosis of IDD and included all levels of closure status (autism = 15,324; cerebral palsy = 4,793; epilepsy = 4,027; intellectual disability = 37,735). The level of significance used for the test was .01. The results were statistically significant $\chi^2 (223.117, df = 1, p < 0.001)$. Of the total population with IDD served in federal fiscal year 2014, 3.2% received the service provision of college and university training, either in part or all by VR. In California, 7.2% received college and university training supported by VR, compared to 2.9% in all other states and U.S. territories combined. Table 9 provided the
Table 9

Frequencies and Percentages of College and University Training Service Provision in California and All Other VR States and U.S. Territories During Federal Fiscal Year 2014 (Individuals With IDD)

<table>
<thead>
<tr>
<th>Location</th>
<th>Not provided—not provided by VR</th>
<th>Provided—some or all by VR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>3,763</td>
<td>291</td>
</tr>
<tr>
<td>%</td>
<td>92.8</td>
<td>7.2</td>
</tr>
<tr>
<td>Not CA</td>
<td>56,141</td>
<td>1,684</td>
</tr>
<tr>
<td>%</td>
<td>97.1</td>
<td>2.9</td>
</tr>
<tr>
<td>Total</td>
<td>59,904</td>
<td>1,975</td>
</tr>
<tr>
<td>%</td>
<td>96.8</td>
<td>3.2</td>
</tr>
</tbody>
</table>

frequencies and percentages for individuals with IDD who received college and university training supported by VR in California compared to all other states and U.S. territories combined.

Summary

The study sought to explore associations between provision of college training and weekly earnings for individuals with IDD supported by VR. Four primary questions were addressed, with three encompassing multi-year data analysis. Descriptive statistics related to primary cause of impairment, gender, level of education, service provision, and number served in each federal fiscal year were provided. While the study encompassed rehabilitation cases without a primary cause of impairment of autism, cerebral palsy, epilepsy, and intellectual disability, emphasis on individuals with IDD served by VR was a focus of the study.

There were four key findings from the study, and three of the research questions demonstrated statistically significant results. First, there were significant differences
between weekly earnings of individuals with IDD who did and did not advance to higher levels of education while their vocational rehabilitation case was open ($t = 13.52$, $df = 252.59$, $p < 0.001$). When assessing the differences in weekly earnings between individuals who advanced to certificate and degree completion and had a primary cause of impairment of IDD, the ANOVA demonstrated no statistical significance between the four groups ($3, 266) = 1.936$, $p = .124$). However, analysis of the results still led to a key finding with implications for practice which is discussed in final chapter. There were also significant year-to-year differences in the provision of college and university training to individuals with IDD and without IDD in California ($\chi^2 = 80.517$, $df = 8$, $p < 0.001$).

Lastly, there was statistical significant in proportion of rehabilitation cases of individuals with IDD with the provision of college and university training when comparing California to all other states and territories combined ($\chi^2 = 223.117$, $df = 1$, $p < 0.001$).

**Limitations of the Study**

There were some limitations of the study. First is that the RSA-911 data file does not account for individuals who enter the VR system at a higher level of education and earn an additional certificate or degree at the same level or a lower level. The data file is also subject to human error, as information is entered by rehabilitation professionals, and some information is subject to individual interpretation. In addition, analysis was limited to what was available in the data file and the way variables are defined. As an example, earnings are listed as wages per week, but perhaps hourly wage would provide more insight on actual earnings. The data file also does not reflect earnings of an individual who obtained employment after case closure but advanced to a higher level of education while their case was open. Finally, employment outcomes, educational advancement, and
provision of college and university training cannot be generalized to the general public, as the study only encompassed those who were served by the federal-state VR system.

The proceeding chapter will provide implications based on the findings, potential areas for future research, and concluding thoughts related to the research.
CHAPTER 5—DISCUSSION

Introduction

The current Administration has a goal for the United States to have the highest proportion of college graduates by 2020 and for every American to complete at least 1 year of postsecondary education or training. There is recognition that this decade will generate employment opportunities requiring a level of education beyond a high school diploma and that college graduates earn almost twice as much as their counterparts whose highest level of education is a high school diploma (White House, 2015). Through investments in financial assistance, student loan debt management support, lower student loan interest rates, and educational tax credits, it is clear that this Administration is one that values higher education for all, inclusive of individuals with disabilities.

The purpose of the study was to examine the provision of postsecondary education by VR in light of federal-state legislative initiatives from 2008 through 2014 to increase opportunities for individuals with IDD, and to examine whether these policies have influenced service delivery with increased support of continued education. Additionally, the study explored the association between certificate or degree completion and weekly earnings of individuals with IDD served by the federal-state VR system. The research aimed to specifically look at the provision of college for individuals with IDD in the state of California compared to other states and U.S. territories where VR services are provided and focused on the employment outcomes of individuals with IDD in California.

To answer the four research questions in the study, a quantitative methodology was employed using a series of data files from the U.S. Department of Education Rehabilitation Services Administration known as RSA-911 encompassing case closures
in a given federal fiscal year. RSA-911 data from federal fiscal years 2006 through 2014 were used to answer the research questions, with some questions based upon data from a single year, while other questions made use of data from several years, as detailed in Chapter 4. The study focused on individuals with a primary cause of impairment of autism, cerebral palsy, epilepsy, or intellectual disability. Other disabilities were included in the study but primarily used as a comparison group as part of the analysis.

While limited research reflects some of the benefits of postsecondary education for individuals with IDD in regards to earnings and overall quality of life, no study has specifically looked at individuals with IDD in relation to receipt of services provided by VR to support access to postsecondary education and certificate or degree completion in the state of California. The following section provides a discussion of the findings from the study, followed by recommendations based on those findings.

**Key Findings**

Key findings included in this study are based on several rationales related to statistical and practical significance and implications for: rehabilitation professionals in a variety of rehabilitation settings; educators in secondary and postsecondary education who may serve individuals with IDD; policymakers who have the potential to influence stakeholders and practice; and individuals with IDD and their families who may be seeking access to postsecondary education and employment. Study results indicated areas of statistical and nonstatistical significance. However, all results led to findings that would be of interest to stakeholders.
Finding #1: The Association Between Education and Earnings

The first key finding was relevant to Research Question 1 where weekly earnings of individuals with IDD were analyzed comparing one group who advanced to higher levels of education \((n = 247)\) while their case was open with VR to another group not advancing to higher levels of education \((n = 8272)\) while their case was open with VR. The results were statistically significant \((t = 13.52, df = 252.59, p < 0.001)\) with a large effect size \((1.0187)\). There was a mean difference in weekly earnings of $146.03 between those who advanced their education to a degree or certificate while their case was open and those who did not, with those who advanced their education having higher mean weekly earnings.

The association between higher weekly earnings and advancement to a higher level of education cannot definitively be linked to certificate or degree completion. However, it does demonstrate that perhaps educational attainment can contribute to higher earnings (Baum & Ma, 2007). As indicated by previous research, the income gap continues to rise between college graduates and high school graduates, and there is correspondence between higher levels of education and lower levels of poverty, unemployment, and less reliance on public assistance programs (Baum & Ma, 2007). As Baum and Ma (2007) found, there is a high rate of return from higher education, not only for an individual, but for society as a whole.

The findings indicated a significant difference between the weekly earnings of those who advanced to a higher level of education and those who did not advance. However, the results also reflected a relatively small proportion of rehabilitation cases of individuals during federal fiscal years 2010 through 2014 who advanced to a higher level
of education and who had a successful rehabilitation outcome \((n = 247)\). Only 6.8% of the individuals with IDD whose rehabilitation cases were closed successfully, closed within the Associate degree or Vocational/Technical Certificate, Bachelor’s degree, and Master’s degree or higher groups. A number of individuals with IDD had a level of education of postsecondary education, no degree \((n = 694)\). Additional descriptive statistics related to level of education reflected a high number of rehabilitation closures with an education level of special education certificate of completion/attendance \((n = 4,049)\) and high school grad or GED \((n = 2,634)\) in California. While the results focused on certificate and degree completion upon successful rehabilitation case closure, these groups of individuals that fall within the special education certificate of completion/attendance and higher school grad or GED category could be on the cusp of additional educational attainment through additional support from VR. These individuals could be provided with information on education and training programs and services VR can offer to aid in accessing postsecondary education opportunities. Gilmore, Schuster, and colleagues (2001) identified in their research that individuals with the provision of college and university training by VR had higher rates of employment, higher earnings, and worked more hours in a given week. O’Neill and colleagues (2015) provided similar results with individuals with developmental and psychiatric disabilities with the provision of college and university training by VR earning more than the comparative subgroup who did not receive the provision of college by VR. As indicated by the work of Batavia and Beaulaurier (2001), education paves the way to opportunity and can compensate for loss of functional capacity as a result of one’s disability.
This key finding demonstrates that individuals with IDD who advanced to higher levels of education while their case was open with VR do indeed have higher earnings than their counterparts who have not advanced. For the VR system, increased provision could improve employment outcomes, which is central to the mission of the organization (Dutta et al., 2008). Higher education institutions would also benefit from the VR provision of college to students through system collaboration and improved student outcomes as reflected by increases in certificate and degree completion. Most importantly, the individual benefits from the financial assistance, increased support, increased earnings potential, and less reliance on social systems of support.

**Finding #2: Earnings of Individuals With IDD Who Advanced to Higher Levels of Education**

The second key finding emerged through the examination of wages among individuals with autism, cerebral palsy, epilepsy, and intellectual disability who advanced to a higher level of education and had a successful employment outcome upon case closure with VR. This question aimed to assess whether or not there were any differences between weekly earnings among individuals who were categorized under the four primary causes of impairment. Results of the ANOVA indicated that there was no statistically significant difference in weekly earnings between individuals with autism, epilepsy, cerebral palsy, and intellectual disability \((3, 266) = 1.936, p = .124\). While the results were not statistically significant, there was a relatively large spread in the distributions of the mean weekly earnings of the disabilities (autism = $390.26, SD $265.98; cerebral palsy = $440.91, SD $273.46; epilepsy = $413.77, SD $235.96; intellectual disability = $341.00, SD $197.09), and proportionately relative to what individuals with disabilities
earn, these differences may have impact in a person’s quality of life. As an example, the mean weekly earnings of a person with IDD who did not advance to a higher level of education but had a successful employment outcome was $197.03, which is significantly less than the earnings of those who did advance ($343.06).

Given the homogeneity in disability type and level of educational attainment among this subgroup, the large spread in distribution between the mean weekly earnings is particularly interesting. One would anticipate that given the homogeneity among the subgroups, there would be greater similarity in weekly earnings. Factors potentially contributing to the spread in distribution may be related to variation in hours worked in a given week. The spread could also be related to differences in the type of certificate/degree or occupational clusters. While it is not possible to definitely state what contributed to the variability, it does lend itself to an interesting finding among a relatively similar subgroup according to the data and provides a direction for future inquiry.

The results from this analysis also reflected a small number of individuals who advanced to a higher level of education while their case was open with VR (autism = 81, cerebral palsy = 88, epilepsy = 43, intellectual disability = 58) during federal fiscal years 2010 through 2014 given the total number of successful rehabilitation case closures of individuals with IDD during these federal fiscal years ($n = 8,519). The findings of Gilmore, Schuster, and colleagues (2001) indicated that individuals with intellectual disabilities received the fewest postsecondary education services which were similar to the results of this study. O’Neill and colleagues (2015) found that only 12% of VR clients received the provision of postsecondary education services in FFY 2011. It is
difficult to ascertain why only small percentages are receiving the service provision of college by VR, but what can be demonstrated through the findings of these studies is that earnings were higher among those who received college, and competitive employment outcomes were better than those who did not (Gilmore, Schuster, et al., 2001; O’Neill et al., 2015).

**Finding #3: The Provision of College in California**

Regarding provision of college and university training to individuals with IDD, an analysis comparing the proportions of rehabilitation cases of individuals with and without a primary cause of impairment of IDD that were provided college during federal fiscal years 2006 through 2014 \( (n = 48,121) \) was conducted, and statistically significant differences emerged from the analysis. The results indicated that proportions differed from what would be expected to occur by chance in 4 of the 9 years \( (\chi^2 = 80.517, df = 8, p < 0.001) \). Federal fiscal years where the adjusted standardized residual exceeded the 2.33 value were noted as significantly different. Most notable were federal fiscal years 2009 (adjusted standardized residual = 2.8) when 3.6% of the closed cases provided with college were individuals with a primary cause of impairment of IDD, 2011 (adjusted standardized residual = 3.9) when 3.4% of the closed cases provided with colleges were individuals with IDD, 2013 (adjusted standardized residual = 3.6) when 5.2% of the closed cases provided with college were individuals with IDD, and 2014 (adjusted standardized residual = 6.9) when 6.5% of the closed cases provided with college were individuals with IDD. The total population of IDD with provision of college and university training by VR during the given federal fiscal years was 4.5%. This was the
average across all 9 years of individuals with IDD who received the provision of college by VR in California.

In looking at the latter federal fiscal years included in the study (2013 and 2014) and higher proportions of rehabilitation cases of individuals with IDD receiving the provision of college by VR, this could reflect legislative impact through increased provision of services. As an example, implementation of the Higher Education Opportunities Act of 2008 promoting access to postsecondary education among individuals with IDD may have led to program development and partnership among state entities and higher education institutions. Certainly, individuals with IDD have benefitted from this 2008 legislation through increased access to federal aid such as the Pell Grant, Federal Work Study Programs, and Supplemental Education Opportunity Grants. It also led to the authorization of a model demonstration program, and a coordinating center that serves as a hub for information and technical assistance on inclusive postsecondary education settings for individuals with IDD (Smith Lee, 2009). Given the number of rehabilitation cases of individuals with IDD where college is provided, an increase of this provision could be reflected in the coming federal fiscal years as a result of these legislative efforts beginning in 2008 and continued efforts related to improving outcomes for individuals with the most significant disabilities through WIOA. The duration of rehabilitation cases where college is involved could contribute to the lag we might see between implementation of policies and the intended outcomes of these policies. The case duration for individuals receiving postsecondary education support from VR tend to be longer (Nakaji, 2014).
The Workforce Innovation and Opportunity Act speaks specifically to increased collaboration at the federal, state, and local level to increase the participatory level of individuals with disabilities in areas such as education and employment (BLS, 2015). The law also mandates a percentage of VR dollars to be spent on youth with disabilities moving from secondary education to postsecondary education and employment (DOE, 2014). While draft regulations were released in April of 2015 outlining parameters of the law, the development of this policy will ultimately lead to changes within the service delivery system, likely in support of greater educational opportunities for all individuals with disabilities (Office of the Federal Register, 2015).

**Finding #4: The Provision of College During Federal Fiscal Year 2014**

Research Question 4 analyzed the proportion of rehabilitation case closures, comparing the provision of college to individuals with IDD by VR in California ($n = 291$) to the provision of college to individuals with IDD by VR in all other U.S. states and territories ($n = 1684$) during federal fiscal year 2014. Results indicated significant differences ($\chi^2 = 223.117, df = 1, p < 0.001$) reflecting a higher proportion of rehabilitation cases with the service provision in California at 7.2% compared to 2.9% in all other U.S. states and territories. The results do not necessarily indicate that California VR is outperforming all other areas where VR services are provided, but it does reflect a promising practice of the provision of college in California by the federal-state entity. However, the total percentage of rehabilitation case closures in the given federal fiscal year (2014) receiving the provision of college and university training was 3.2%, inclusive of California. This is a relatively small number given that the total number of individuals
with IDD whose cases were closed nationwide during federal fiscal year 2014 was 61,879.

Based on the percentage of individuals with IDD receiving the provision of college by VR and their employment outcomes, more individuals could and should reap the benefits of this service provision. As Dutta and colleagues (2008) identified, VR services lead to improved employment outcomes, and higher levels of education are associated with an increased likelihood of employment success. Research repeatedly reflects positive employment outcomes from increased educational attainment for people with disabilities (Hollenbeck & Kimmel, 2008; Ipsen, 2006; Mwachofi et al., 2009; Sevak et al., 2015; Shandra & Hogan, 2008). Armed with this information, VR and other developmental disability service agencies would do well to look to postsecondary education as a means to increase competitive employment for individuals with IDD.

Study results produced statistically significant results for three of the four research questions with key findings indicating increased earnings among those with IDD who completed certificates and degrees, year-to-year differences in service provision of college and university training for those with and without IDD in California, and differences in provision of college among individuals with IDD in California compared to all other U.S. states and territories combined. The findings from this study cannot definitively link postsecondary education degree completion to better employment outcomes, but they do demonstrate a need for further exploration of the benefits of college and completion if it has the potential to lead to higher earnings among individuals with IDD.
Human Capital Theory and Individuals With IDD

The research was formulated with a conceptual framework of human capital theory, particularly related to the economic impact of education. Sweetland (1996) stated, “A research agenda including human capital theory applications may prove essential to supporting the education policy process” (p. 342). The theory itself suggests that individuals and society may potentially reap benefits from investing in people (Sweetland, 1996), and, in many cases, education can improve or increase the economic capabilities of people (Schultz, 1971). Similarly, education initiatives have depended on economic reasoning to gain support for education programs developed over the years (Danzberger, Kirst, & Usdan, 1992).

Legislative efforts such as the Higher Education Opportunities Act (2008), California Employment First Policy (SCDD, 2014), and Workforce Innovation and Opportunity Act (2014) all call for increased opportunities for people with IDD and individuals with the most significant disabilities to have access to education, training, and employment opportunities to improve their economic outlook. The study results reflect the potential for improved outcomes in earnings and employment when federal and state resources are utilized to support postsecondary education. Furthermore, the findings indicate a relatively small proportion of the IDD population receiving this level of support from federal-state entities that have the capacity and ability to fund such educational opportunities. Education does have an economic component, but it may be difficult to measure that economic relationship with certainty. Human capital theory provides an empirical framework that begins to describe the relationship between education and economic impact and can be used amongst diverse disciplines (Sweetland, 1996), as it
has been used in this study to assess the association between postsecondary education and earnings and service provision for individuals with IDD in California and elsewhere.

The conceptual framework utilized in this study assisted in the analysis in two ways. First, the Human Capital Theory’s economic foundation and emphasis on interaction between education and earnings is closely tied to research questions 1 and 2 where analysis of the association between certificate or degree completion and weekly earnings was conducted. Additionally, as the theory speaks to the difficulty of ascertaining the impact education has on earnings, similarly, so does this study. This preliminary study simply shows that those who have completed a certificate or college had higher earnings, but additional research would need to be more experimental in nature and examine multiple interventions that could be linked to increased earnings.

Secondly, as Sweetland (1996) documented the potential theoretical influence in policy decisions and practice, this study emphasized federal and state legislative efforts that could influence provision of services to individuals with IDD. While the mutual benefits to society and individuals are not definitive based on this study, it is a continuation of research rooted in this framework that can potentially inform individuals with IDD, policymakers, professionals, and educators working with individuals with IDD. While further exploration of theories embodying the concept of the study may exist, this particular framework proved to be most appropriate in analysis and examination of findings.

The foundation of this economic theory is its benefit to individuals and society as a whole when investments are made in people. Through the application of its theoretical principles, it should be acknowledged that the application of this theory to individuals
with IDD would lead to similar results. For policymakers, subscription to Human Capital Theory may lend itself to constituent influence and buy-in on the potential benefits of investing in individuals with IDD through the provision of higher education, which could ultimately shift paradigms, practices, and outcomes. For educational institutions, adoption of this conceptual framework would lead to universal principles and applications that foster ideas that all students, inclusive of students with disabilities, can have successful education and employment outcomes when investments in individuals are made. Rehabilitation professionals should view this as an opportunity to improve system outcomes, but as a means to best support individuals utilizing services. As counselors and other developmental disability professionals aim to offer an array of options to their constituents, it is critical that they understand and acknowledge the potential implications of those services. This framework could encourage a paradigm shift for VR counselors and other developmental disability professionals who have limited knowledge of the benefits of college or who have historically underestimated the capabilities of the individuals they serve. Perhaps the most critical is this framework application for the individual with IDD who is aiming to understand a relatively complex system with numerous service provision options. An awareness of the potential benefits of increased education and the option of receiving support in this area leads to increased advocacy on the part of the individual and a sense of leadership in the service delivery.

**Recommendations**

Based on the findings presented in this chapter, there are several recommendations for practice that may be utilized, not only among rehabilitation professionals within VR, but also among developmental disability organizations,
secondary and postsecondary education professionals supporting students with IDD in the educational environment, policymakers, and individuals with IDD and their families.

**Recommendations for VR Agencies and Rehabilitation Professionals**

**Increased service provision and professional development around college.**

The findings indicated a statistically significant difference in earnings between individuals who did and who did not advance to certificate and degree completion while their case was open with VR, with those who advanced having higher earnings. The findings also reflected the current landscape of college and university service provision by VR among individuals with and without IDD. With increased consideration of case services such as college and university training as part of the IPE development, rehabilitation counselors can provide individuals who express interest in industries requiring additional training and education with postsecondary education and training options within their given community. This may particularly offer benefits to individuals with IDD whose education level is limited to a special education certificate, high school diploma or GED equivalent, or postsecondary education without completing a degree. Rehabilitation professionals need to be knowledgeable of college options, in addition to particular industries that generate greater employment opportunities and higher wages as a means to ensure informed choice when offering services to individuals with IDD. This would likely require increased training and professional development to rehabilitation professionals enabling them to best articulate college options. Better collaboration between the VR agency and college and university community would ensure appropriate pooling of resources and a general understanding of each entity’s role in supporting student success.
**Educational program partnership and development.** Given the small proportion of cases of individuals who received the provision of college and who advanced to certificate and degree completion, VR agencies should consider the employment outcomes of those who did advance and the limited provision of college reflected in this study. Greater consideration should be given to expanding local level development of educational partnership programs that would support more students with IDD completing certificates and degrees. Moore and Schelling (2015) discovered that participation in postsecondary education programs had significant positive employment outcomes for individuals with intellectual disabilities compared to the general population employment rate. Smith and colleagues (2012) found that programs that increase access to postsecondary education could have long-term economic and employment outcomes. Vocational Rehabilitation’s increased participation in these efforts could be an instrumental contribution to the success of more individuals with IDD.

While small scale efforts may be occurring at the state and local level through pilot project formation, greater development of these programs could lead to wider results demonstrating whether or not those who get college and university training consistently have better employment outcomes than their counterparts. In order for VR agencies to increase local development of educational partnership programs, they must bring in key entities who understand the educational system. Collaborators must include local colleges and universities, in addition to input from state systems such as the California Community College Chancellor’s Office, the University of California Board of Regents, and the California State University Board of Trustees. Additional stakeholders, such as community developmental disability organizations, who have a broader understanding of
the needs of this population and strategies for support in a variety of settings, are instrumental in expanding the opportunities for individuals with IDD.

**Monitoring data and legislative trends.** Rehabilitation professionals should monitor the trend reflected in research question 3 results, where an increase in college and university training service provision by VR was most prominent during federal fiscal years 2013 and 2014. Given the length of these rehabilitation cases when individuals are pursuing certificates and degrees, it could be that this service provision increases over the years. This may hold true as legislation such as the Higher Education Opportunities Act, WIOA, the California Employment First Policy, and the California Department of Education, Department of Developmental Services, and Department of Rehabilitation finalize a blueprint to support competitive, integrated employment for individuals with IDD. Language in the blueprint to include postsecondary education as a path to employment is likely in its development and rehabilitation professionals, along with other practitioners with the potential to support students with IDD would benefit from being informed of trends and legislative and policy impact that could improve student completion outcomes in California.

**The benefits and best practices of the service provision of college.** Findings in research question 4 indicate a higher proportion of rehabilitation cases of individuals with IDD receiving the provision of college by California VR (7.2%) compared to the proportion of rehabilitation cases of individuals with IDD receiving the provision of college in all other U.S. states and territories where VR services are provided (2.9%). We still see a relatively low national percentage of individuals with IDD who accessed
college and university training support from VR (3.2%) of cases closed during federal fiscal year 2014.

While this higher percentage does not indicate California is outperforming all other VR service areas, it does indicate that California has increased utilization of this service provision and can perhaps shed light on best practices or the benefits of use of this service provision for states reporting lower percentages of college and university training support. Similarly, California VR agencies could look to states where this service provision is higher than in California. Migliore and Butterworth (2008) emphasized the value of VR agencies identifying high-performing states with greater outcomes sharing best practices in addition to monitoring outcomes.

**Recommendations for Developmental Disability Services and Practitioners**

**The option of college.** It is becoming increasingly important for developmental disability systems and practitioners to bring their attention to the increased support and interest in higher education for individuals with IDD. As advocates for more education and training influence policy in the direction of greater provision and support to individuals with IDD who aspire to have the college experience, it will become necessary for primary systems of support to understand these implications to practice. Rehabilitation professionals will be expected to have a broader range of knowledge around college options, but developmental disability practitioners will be tasked with the same due to the rising expectations of their constituents. It would be to the benefit of these practitioners to collaborate with VR agencies and local colleges and universities to simultaneously increase their understanding of the college systems and the array of offerings that exist within these systems. This system’s collaboration aligns with federal
policy, and would likely lead to an expansion of options for individuals who are looking for something beyond traditional services and supports.

**Funding college.** In relation to the first finding, state developmental disability entities should consider policy initiatives that would allow opportunities to fund postsecondary education and training among individuals with IDD. Exploration of the allocation of resources and blended funding options as a means of pooling resources should be given greater consideration. One cannot expect a single service entity such as VR to be the only responsible party for providing the option of college to individuals with IDD. As indicated, federal legislation and state initiatives are shifting systems in the direction of increased collaboration and partnership to improve employment outcomes for individuals with disabilities. The Government Accountability Office found that increased collaboration at the federal level between the Department of Education, Health and Human Services, Social Security Administration, and Department of Labor could lead to less challenge in accessing services among transition age youth with disabilities (GAO, 2012). This shift could lead to joint efforts among federal-state VR and state developmental disability systems to share in the costs among dually served clients. This would require enhanced professional development models and training for both systems to modify funding structures, streamline processes, and to understand the labor market needs in terms of an educated and trained workforce.

**Recommendations for Educators**

The findings lead to significant implications and recommendations for VR agencies, rehabilitation professionals, and developmental disability practitioners. In
addition, educators in secondary and postsecondary education should bring their attention to the shift in supporting individuals with IDD in college.

**Referring for outside services.** The findings reflected the proportion of the rehabilitation cases of individuals with IDD who received the service provision of college, completed certificates or degrees, and had higher earnings than their counterparts who did not advance to a higher level of education. Given this information, educators can see the potential benefit from VR service utilization and encourage students with disabilities to access these resources for financial support and increased assistance. Given WIOA’s emphasis on transition age youth with disabilities between the ages of 16 and 24, this should encourage educators in secondary education to seek VR services for students and identify ways in which greater collaboration could occur prior to their completion of school. Colleges and universities may also see benefit in the development of contractual agreements with VR to enhance services and supports to students with IDD within the college.

**Working with individuals with IDD.** Individuals with IDD have the ability to be successful in college and earn certificates and degrees. They also have great potential with accessing and maintaining employment. However, successful outcomes are sometimes dependent on having higher expectations and creating a supportive environment that understands the individuals they serve. As rehabilitation professionals and developmental disability professionals will be tasked with understanding the lay of the land in college and university settings, educators should recognize the implications from the study, as it may require shifts in instructional methods and utilization of universal strategies of support. It will require an understanding of community resources
and their contribution to student performance and success in the educational environment. Success will require educator interaction with these systems to deepen the level of understanding of teaching students with IDD.

**Recommendations for Policymakers**

**Policymaker analysis of VR trends in service provision and outcomes.** As VR agencies, rehabilitation professionals, and developmental disability systems and practitioners were encouraged to monitor trends in the rehabilitation outcomes, policymakers can best articulate the significance of service provision and expansion of its provision through the monitoring of these trends. Through active engagement with VR, developmental disability entities, and educational system data, they can best articulate the message of their constituents with data to support the passage of law and implementation of policy.

Policymakers are at the forefront of systems change, as they package the message of their constituents with an intention to create laws that meets local and state level need. Repeatedly, this study cites federal and state legislation that could potentially increase service provision to individuals with IDD in the areas of education and employment. As the needs of individuals change and economic trends change the landscape of workforce needs, it will be just as critical for policymakers to stay in touch with shifts and developments within the field of developmental disability.

**Recommendations for Individuals With IDD and Family Members**

With each recommendation, perhaps what is most critical is the translation of legislation, service options, and the coordination of these services from a multi-level approach to individuals with IDD and their families. It becomes most unfortunate when
opportunities exist and the potential users of services lack knowledge in obtaining access to the very services that could lead to positive outcomes. It also becomes a matter of concern when the individual and family members do not have the expectation that college is and should be an option.

Engaging in the conversation. This is a pivotal period in California history, particularly as it relates to opportunities for individuals with IDD and improved employment outcomes. As legislation and policy is being developed around systems collaboration and initiating approaches viewed as best practices through a blueprint of reform, individuals with IDD and their families are called to action to sit at the table, share their stories, and contribute to the systems change. Through stakeholder input, individuals and their families can influence the future service delivery system and reap the benefits. Individuals with IDD and their families must take advantage of this opportunity to stay informed on systems change progress and opportunities provided at the federal, state, and local level to provide feedback. Opportunities exist through online feedback, conference calls, webinars, and forums. Additionally, individuals and their families should take note of legislators and leaders who are behind these initiatives and reach out with recommendations for changes that may potentially improve outcomes. The voice of individuals who may benefit from the services must be included to gain a richer perspective on support needs and gaps in access to services.

Summary

The findings from the study led to recommendations for VR agencies, rehabilitation professionals, developmental disability systems and practitioners, policymakers, and individuals with IDD and their families. The recommendations
encourage professional development and training, monitoring of outcomes, systems collaboration, and considerable contribution from all parties to improve outcomes in the areas of education and employment for people with IDD. As each stakeholder has contributions to make that could transform service delivery and pave the way to greater access, all stakeholders have the responsibility of communicating roles, responsibilities, and service implementation to achieve the greatest outcomes. As individuals with IDD and their families must stay engaged, all providers of services to individuals with IDD should be tasked with sharing information and maximizing service utilization within their system.

**Recommendations for Future Research**

The study findings illuminated areas for future research, which can be expected from a researcher perspective that is inquiry-oriented (Wolcott, 1990). When exploring college and university service provision and earnings by VR among individuals with IDD as part of this study, analysis was limited to what was available in the RSA-9111 data file. Therefore, this section provides recommendations for future research primarily utilizing RSA-911 data, and shares research recommendations that may require additional methodological approaches to further glean information on the association between postsecondary education and employment outcomes.

**Research Recommendations Utilizing RSA-911**

First, the RSA-911 data file for federal fiscal year 2014 contains new variables that were not available in previous years that would allow for a more detailed analysis of postsecondary education provision and employment outcomes. As an example, the 2014 data file allows for input and tracking involvement of other organizations that may be
providing college support to an individual while their case is open with VR. Identifying specific agencies would open the doors to investigation of outcomes among those who were served by other organizations. Future research should analyze the provision of college or college-related services either in part or all by other community based organizations as a comparative analysis to those who only received the provision of college by VR. The 2014 federal fiscal year data file provides hourly wage information, which was not available in previous years. Future research should aim to identify wages of individuals with IDD in particular fields of study upon successful rehabilitation closure. This would lead to information reflecting specific industries generating higher wage employees. The variables to conduct this type of investigation exist in the data set, and counselors should continue to collect this information to examine information related to employment rates, earnings, and occupational classifications so that individuals with IDD can make choices informed with more data. Additionally, federal fiscal year 2014 contains a variable for rehabilitation cases of individuals by zip code. Researchers should examine specific VR districts or service areas where provision of college is higher and employment outcomes in these particular areas. This would lead to identification of specific locations in California with marked progress, which would ultimately assist in identifying best practices within those communities that could be modeled in other parts of the state. Lastly, federal fiscal year 2014 contains a variable for age at application. Given the emphasis of services to transition age youth in WIOA, future research should examine provision of college to transition age youth between the ages of 16 to 24 to determine case duration and rehabilitation outcomes of these youth. This could be done utilizing the new variable of \textit{age at application} to assess provision of college to youth and
employment outcomes of this subgroup. Future research should examine the association between services and supports provided and completion of certificates and degrees. The changes to RSA-911 are allowing for more detailed analysis for researchers who are particularly interested in the location of individuals, their age, earnings, and access to resources beyond VR.

This research employed an emphasis on rehabilitation outcomes in the state of California, which was inherent to the study. With regard to successful employment outcomes among individuals with IDD, future research should examine the employment outcomes in California compared to other states where education policy could potentially impact VR and state practices as it relates to individuals with developmental disabilities. This would better inform the practice within California and other VR states and territories aiming to support individuals with IDD in postsecondary education through identification of high performing states and assessment of practices that could lead to improved outcomes.

**Research Recommendation Utilizing Additional Methodological Approaches**

RSA-911 is a useful tool with an intention to provide information on the progress made under the Rehabilitation Act of 1973 under a given federal fiscal year. While it contains demographic information, sources of support, employment outcomes, and reason for case closures, it does have limitations in what it can provide in terms of best understanding the association between postsecondary education and earnings among individuals with IDD. Future research should explore a combination of methodological approaches to further understand the association for this population. Researchers should consider surveying individuals with IDD who completed certificates and degrees to
identify utilization of resources for support while in college and the employment outcomes of those individuals, as everyone may not be a receiver of VR services. Researchers could also utilize data from colleges and universities in relation to certificate and degree completion and type of disability.

As mentioned, high performing states with greater employment outcomes should be examined for best practices. This would ultimately need to be done outside of the use of RSA-911 data files. In addition, qualitative research on the personal characteristics of students with IDD who complete college would inform practice and shift service delivery and support mechanisms that may lead to student success in education and in employment. As educational partnership programs were highlighted within the study, future research should examine the education and employment outcomes of individuals with IDD who participated in these postsecondary education programs in California to determine which programs have greater outcomes and what may be leading to those outcomes.

**Conclusion**

Through analysis of research questions related to service provision and degree completion among consumers of VR services, the study revealed four key findings and 10 recommendations for VR agencies, rehabilitation professionals, developmental disability systems and practitioners, educators, policymakers, and individuals with IDD and their families. The intention of this study is to inform disability professionals supporting individuals with IDD in postsecondary education and employment on the current landscape and potential shifts in service delivery due to federal and state
legislative efforts. It is the greatest hope that individuals with IDD and their families may learn of the options available to them stemming from policy, practice, and this study.

President Obama and his Administration are diligently working to make education more accessible, attainable, and more affordable for all Americans. This work is critical to meet the 2020 higher education goal established and to meet the needs of today’s workforce (White House, 2015). Attending college is becoming a minimum requirement for individuals to get a good job and be successful in the workforce (Grigal et al., 2015). Yet, we know that students with intellectual disabilities have the poorest access to college and employment outcomes out of all disability groups (Newman, Wagner, Cameto, & Knokey, 2009; Windsor & Butterworth, 2007). As we assess the current landscape of individuals with IDD, we need to not lose sight of the White House Completion Initiative and federal and state policies that are ultimately aiming to increase access to individuals with disabilities, inclusive of those with the most significant disabilities.

In 2010 at the University of Texas, President Barack Obama delivered a speech where he stated, “I want everybody here to remember, at each and every juncture throughout our history, we’ve always recognized that essential truth that the way to move forward, in our own lives and as a nation, is to put education first” (Dunham, 2010, p. 1). Through the examination of the provision of college to individuals with IDD and assessment of the employment outcomes of these individuals who completed certificates and degrees, may the notion of postsecondary education as a path to greater employment outcomes for individuals with intellectual and developmental disabilities be considered as an option as part of the overall higher education goal of our nation.
REFERENCES


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