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**EXAMINING PREDICTORS AND DIFFERENCES OF VOCATIONAL
REHABILITATION OUTCOMES AMONG PEOPLE OF COLOR WITH TRAUMATIC
BRAIN INJURY**

A Dissertation in

Counselor Education

by

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Abstract

This study investigated vocational rehabilitation (VR) outcomes among people of color with traumatic brain injury (TBI) who were served in a state-federal VR agency during fiscal year (FY) 2010 as extracted from the Rehabilitation Services Administration (RSA) 911 national database. Using a hierarchical logistic regression analysis, this study examined predictors of successful competitive employment outcomes based on consumer demographic information, types of services, and case expenditures. Education level at application, job placement, on-the-job supports, maintenance, occupational/vocational training, and counseling/guidance were found to be statistically significant, positive predictors of VR outcomes, while receiving support through Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI) were found to be statistically significant, negative predictors. Chi-square tests of independence, Kruskal-Wallis H tests, and a Bonferroni correct test revealed no statistically significant differences between race/ethnicity and closure type, employment status at closure, weekly earnings and hours worked at closure, acceptance rates, length of time for eligibility determination, case expenditures, and unsuccessful closure reasons. Implications for VR counselors and future research are included.

Table of Contents

LIST OF TABLES	x
LIST OF FIGURES	xi
ACKNOWLEDGEMENTS	xii
CHAPTER ONE: INTRODUCTION	1
Prevalence of Disability in the United States	1
Epidemiology of Traumatic Brain Injury in the United States	2
TBI Facts and Sequelae	2
TBI and Race	3
Current Demographics of the United States	4
Racial/Ethnic Disparities within the Healthcare System	5
Racial/Ethnic Disparities among Persons with TBI	5
Disparities in the Emergency Room and Acute Rehabilitation	6
Disparities in Outcomes Up to 1 Year Post-Injury	7
Historical Highlights of the Vocational Rehabilitation System	8
Statement of Purpose	10
Research Questions	11
Definition of Terms	13
Black	13
Competitive Employment	13
Latino/a	13
Order of Selection	14
RSA-911 Database	14

Successful VR Outcome	14
VR Statuses	14
Summary	15
CHAPTER TWO: LITERATURE REVIEW.....	16
TBI and the VR System	16
TBI and VR Outcomes	16
Race and Ethnicity	17
Age	18
Gender	19
Education	20
Public Support at Application	21
Job Search Assistance, Job Placement, and On-the-Job Supports	22
College/University Training	23
Occupational/Vocational Training	25
Counseling and guidance	25
Assistive Technology	25
Assessment	26
Maintenance	26
Transportation	27
Case Expenditures	27
Weekly Earnings after Case Closure	28
Summary of TBI and VR System	29
Outcomes and Acceptance Rates of General Disabilities within the VR System	33

Outcomes and the VR System	35
Race and Ethnicity	35
Age	37
Education	37
Job Search Assistance, Job Placement, and On-the-Job Supports	38
College/University Training	39
Occupational/Vocational Training	39
Counseling and guidance	40
Assessment	40
Maintenance	40
Transportation	41
Case Expenditures	41
Weekly Earnings and Hours Worked After Case Closure	42
Types of Employment	43
Summary of Outcomes and the VR System	44
Acceptance Rates and the VR System	46
Race and Ethnicity	46
Gender	48
Education	48
Significant Disability	49
Source of Support	50
Unsuccessful Closure Reasons	51
Summary of Acceptance Rates and the VR System	51

CHAPTER THREE: METHODOLOGY	54
Hypotheses	54
Research Design	55
Sampling	56
Instrument	58
Data Collection Procedures	58
Dependent Variables	59
Independent Variables	60
Race/Ethnicity Status	60
Age	60
Gender	60
Level of Education Attained at Application	60
Significant Disability	61
Primary Source of Support at Application	61
Vocational Rehabilitation Counseling and Guidance	61
College or University Training	62
Occupational/Vocational Training	62
On-the-Job Training	62
Job Readiness Training	62
Job Search Assistance	62
Job Placement	62
On-the-Job Supports	62
Transportation Services	62

Maintenance Services	63
Rehabilitation Technology	63
Data Analysis	63
CHAPTER FOUR: RESULTS	67
Introduction	67
Sample Demographics	67
Descriptive Statistics for Key Variables	71
Hypotheses	73
Hypothesis One	74
Hypothesis Two	76
Hypothesis Three	79
Hypothesis Four	83
Hypothesis Five	85
Hypothesis Six	88
Hypothesis Seven	95
Hypothesis Eight	97
Summary of Findings	100
CHAPTER FIVE: DISCUSSION	103
Summary of Descriptive Statistics	103
Hypothesis One	105
Hypothesis Two	106
Hypothesis Three	107
Hypothesis Four	108

Hypothesis Five	110
Hypothesis Six	110
Hypothesis Seven	112
Hypothesis Eight	113
Limitations	117
Sample Sizes	117
Generalizability	118
Coding Errors	118
Implications for Rehabilitation Counselors	118
Implications for Future Research	120
REFERENCES	124
APPENDICES	139
A: Vocational Rehabilitation Process Diagram	139
B: State of Application for Services	140
C: Amount of VR Services Provided by Race/Ethnicity	142
D: Cross-tabulation of Race/Ethnicity by Reason for Closure	145
E: Cross-tabulation of SSI/SSDI by Type of Closure	147
F: TBI and VR Outcomes Literature Overview	149

List of Tables

Table 1: Statistical Tests, Dependent, and Independent Variables	66
Table 2: Race/Ethnicity	68
Table 3: Highest Education Level at Application	69
Table 4: Top Ten States of Application for Services	70
Table 5: Type of Closure	71
Table 6: Descriptive Statistics for Key Variables	72
Table 7: Cross-tabulation of Race/Ethnicity by Type of Closure	75
Table 8: Cross-tabulation of Race/Ethnicity by All Types of Employment	77
Table 9: Cross-tabulation of Race/Ethnicity by Employment with and without Supports	78
Table 10: Descriptive Statistics of Race/Ethnicity and Hours Worked/Weekly Earnings	79
Table 11: Kruskal-Wallis Analysis of Race/Ethnicity and Hours Worked/Weekly Earnings ...	83
Table 12: Cross-tabulation of Race/Ethnicity by Acceptance	84
Table 13: Kruskal-Wallis Analysis of Race/Ethnicity and Amount of Time for Eligibility Determination	87
Table 14: Kruskal-Wallis Analysis of Race/Ethnicity and Case Expenditures	90
Table 15: Descriptive Statistics of Race/Ethnicity and Case Expenditures by Group	91
Table 16: Most and Least VR Services Provided by Race/Ethnicity	92
Table 17: Bonferroni Correction of Case Expenditures and Race/Ethnicity	94
Table 18: Cross-tabulation of Race/Ethnicity by Reason for Closure (Unable to Locate, Refused Services, Failure to Cooperate, All Other Reasons)	96
Table 19: Hierarchical Logistic Regression Results	99
Table 20: Hypotheses, Statistical Tests, and Outcomes	102

List of Figures

Figure 1: Hours Worked Per Week at Closure81

Figure 2: Weekly Earnings at Closure82

Figure 3: Amount of Time for Eligibility Determination (in Days)86

Figure 4: Cost of Purchased Services89

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Chapter 1: Introduction

Prevalence of Disability in the United States

According to the 2010 U.S. Census Bureau, there are approximately 54 million people who have a disability, representing 19% of the population. Particularly, 5% of children between the ages of 5 to 17 have a disability, 10% of adults between the ages of 18 to 64 have a disability, and 38% of adults 65 years of age or older have a disability. By gender, 12.4% of females have a disability compared to 11.7% of males. In considering racial differences within disability, Brault (2008) reported that the prevalence of Blacks (non-Latinos) with a disability was greater (20.5%) than any other group, including Whites (19.7%), Latinos (13.1%), and Asians (12.4%). Although there are a variety of disabilities and illnesses that persons report, as it pertains to individuals 15 years or older, there are 16.1 million or 7% of the population who have some type of impediment with cognitive functioning or a mental or emotional impairment that intervenes with daily living activities (U.S. Census Bureau, 2010).

While disabilities can have important implications on a person's quality of life, one aspect that is clearly evident concerns employment, its economic antecedents, and educational outcomes. For example, the employment rate in 2005 for persons of working age (i.e. those between 16 and 64 years) included 13.3 million Americans with disabilities (Brault, 2008). Further, 46% of those with a disability between the ages of 21 to 64 years were employed compared to 84% of those without a disability (Brault, 2008). The median monthly earnings for people with a severe disability, ages 21 to 64, were \$1,458 compared to \$2,250 for those with non-severe disability, and \$2,539 for those without a disability (Brault, 2008). Finally, regarding educational levels, it was reported that 28% of those 25 years and older with a disability had earned less than a high school education compared to 12% of those without a disability (Brault,

2008). Comparatively, on 13% of those with a disability who are 25 years and older had earned a bachelor's degree or higher compared to 31% of those without a disability (Brault, 2008).

Epidemiology of Traumatic Brain Injury in the United States

TBI facts and sequelae. The epidemic of brain injuries is prevalent in all countries in the world. Traumatic brain injury (TBI), a form of acquired brain injury, occurs following a sudden jolt or blow to the head. According to the Brain Injury Association of America (BIAA; 2009), an estimated 1.7 million people sustain a brain injury every year (one every 15 seconds) and another 5.3 million (more than 2% of the total population) are currently living with the long-term effects. The leading causes of TBI include falls (35.2%), motor vehicle accidents (17.3%), colliding with a moving or stationary object (16.5%), assaults (10%), and sport-related injuries (446,788; BIAA, 2009). In addition, there are over 400,000 hospitalizations and over 75,000 deaths due to a brain injury, representing one-third of all injury related deaths (BIAA, 2009). Although a brain injury is the leading cause of death until age 44 and ranks 4th in deaths for all age groups, the risk of experiencing a brain injury is higher among adolescents and people over 75 years of age (BIAA, 2009). Additionally, men are twice more likely to experience a brain injury than women (BIAA, 2009).

The most common symptoms of TBI include headaches, dizziness, impaired memory, slower thinking, irritability, sleep disturbances, fatigue, anxiety, depression, reductions in cognitive endurance, and physical challenges, which can all lead to impediments in a person's return to their normal, pre-injury daily living activities for years down the road. These barriers could intrude in the areas of employment, school, social interactions, interpersonal relationships, and leisure activities, all of which are related to an individual's overall well-being. In fact, past literature suggests that returning to employment can be one of the most challenging aspects of

recovery for persons who have sustained a TBI (Parker, 1987; Possl, Jurgensmeyer, Karlbauer, Wenz, & Goldenberg, 2001). Understandably, employment has also consistently been found to be a significant predictor of quality of life and rate of recovery for people with a TBI (Abrams, Barker, Haffey, & Nelson, 1993; Arango-Lasprilla et al., 2008; Krankowski, 1993; O'Neill et al., 1998; Wehman, Targett, West, & Kregel, 2005; Zasler, 1997).

TBI and race. It is been well established that race/ethnicity, particularly for people of color, continues to be a risk factor for TBI (Arango-Lasprilla et al., 2009; Arango-Lasprilla et al., 2011; Arango-Lasprilla et al., 2008; Gary et al., 2010; Niemeier & Arango-Lasprilla, 2007). In comparison to Whites, Blacks (non-Latino) in the general population have shown to be disproportionately affected by TBI (Wehman, Targett, Yasuda, McManus, & Briel, 2007). In addition, a report concluded by Faul, Xu, Wald, and Coronado (2010) of the Centers for Disease Control and Prevention shows that Whites surpass Blacks (non-Latinos), American Indian/Alaska Native (AI/AN), Asian/Pacific Islanders, and Others/Unknown in emergency room department visits and hospitalizations following a TBI-related injury even though Blacks (non-Latinos) have a 35% higher rate of sustaining a TBI than Whites (Bazarian, Pope, McClung, Cheng, & Flesher, 2003; Jager, Weiss, Coben, & Pepe, 2000). Also, TBI is the second leading cause of death for individuals identifying as AI/AN at a rate of more than twice (1000 per 100,000 annually) than that found among the general population (up to 250 per 100,000 annually; Centers for Disease Control and Prevention, 2002; Nelson, Rhoades, Noonan, Manson, & AI-SUPERPPF Team, 2007; Whitfield & Lloyd, 2008). Latinos also show high rates of TBI at 262 per 100,000 compared to the general population (Cardoso, Romero, Chan, Dutta, & Rahimi, 2007).

Current Demographics of the United States

The United States Census Bureau reported a total population of 308.7 million in 2010, which is based on citizens and non-citizens counted at their residence, people temporarily away from their permanent U.S. residence, and people without a permanent residence (U.S. Census Bureau, 2010). In comparison to the 2000 U.S. Census Bureau statistics, this reflects a population growth of 9.7% (27.3 million). Differences in gender were noted at almost an even split with 50.9% identifying as female and 49.1% identifying as male in the 2010 U.S. Census Bureau statistics (Howden & Meyer, 2011). In contrast, the age structure of the U.S. population greatly varies with 20.1% reported to be between the ages of 0-14 years, 66.8% between the ages of 15-64, and 13.1% ages 65 or older (U.S. Census Bureau, 2010).

Regarding the racial and ethnic composition of the U.S., the 2010 U.S. Census provides supporting evidence of an emerging population transformation with a 10% decline (from 75% to 65%) from the 2000 U.S. Census Bureau statistics of individuals who self-identify as White. More specifically, in 2010, the Latino population in the U.S. rose by 43% (i.e., increase from 35.3 million to 50.5 million) from that which was calculated in the year 2000. Other racial and ethnic groups also demonstrated an increase including Asians (3.6% to 4.8%), Blacks (non-Latino; 12.3% to 12.6%), and Native Hawaiian/Other Pacific Islanders (.1% to .2%). In contrast, those identifying as White (non-Latino) showed the slowest growth by only 1% from 2000 to 2010, however, from a comprehensive perspective, there was a decrease from 69% to 64% in the overall representation of the population (Humes, Jones, & Ramirez, 2011). This also supports the assertion made in the 2000 U.S. Census Bureau report that people of color will likely comprise at least half of the population by the year 2050 (Grieco & Cassidy, 2001).

Racial/Ethnic Disparities within the Healthcare System

Since 2003, U.S. Congress has mandated that the Agency for Healthcare Research and Quality (AHRQ) submit annual public reports. Two of these reports include the National Healthcare Quality Report (NHQR), which addresses the quality of health care administered to patients in the U.S., and the National Healthcare Disparities Report (NHDR), which discusses racial and socioeconomic disparities within the delivery of health care services. Both reports affirm that health care services continue to be unequally distributed in the U.S., especially for people of color with Blacks (non-Latinos) receiving the worst (e.g., access to services, timeliness of services, quality of services) care in comparison to Whites in 41% of the quality measures. Latinos also fared worse than Whites in 39% of the quality measures followed by AI/AN in 30% of the quality measures. Likewise, disparities were also reported in access to healthcare. Overall, Latinos had the worse access to healthcare when compared to Whites as demonstrated in 63% of the access measures, followed by AI/AN in 62% of the access measures, Blacks (non-Latinos) in 32% of the access measures, and Asians in 17% of the access measures. Regarding the course of progress in quality and access measures through the years, the NHDR reports a median rate of change 2.5% improvement each year since 2003 for quality; however, when it comes to access to healthcare, the median rate change was -.8% which indicates no improvement over time (NHDR, 2011).

Racial/Ethnic Disparities among Persons with TBI

Racial and ethnic disparities within the healthcare system have also been found among people with TBI beginning from the emergency room and up to the first year post injury. Although the findings of the below studies elicit varying results, a consistent theme found throughout is that people of color with TBI fare worse than Whites.

Disparities in the emergency room and acute rehabilitation. At least 96% of the 1.7 million people who sustain a brain injury every year will receive initial treatment in an emergency room setting (Langlois, Rutland-Brown, & Thomas, 2006). Although there is a limited amount of literature that explores racial and ethnic disparities during emergency room care among people of color who sustained a brain injury, a 2003 study found that Latinos were six times more likely to receive unnecessary services, such as a nasogastric tube, which is a tube used for feeding and administering drugs for patients with abdominal complications and not a common procedure used for patients with a brain injury (Bazarian, Pope, McClung, Cheng, & Flesher, 2003). This becomes a major concern as it can lead to further complications, such as a collapsed lung, which will only prolong the recovery process. Reasons for this finding were not reported, however, Bazarian et al. (2003) proposed that language barriers between Latino patients who speak little to no English and emergency room staff could be a factor. Language barriers may also contribute to an over-testing of Latino patients as well as the extensive waiting period to see a physician who is able to communicate in the patient's and their family's native language (Bazarian et al., 2003). Another study found that even though Blacks (non-Latinos) were 35% more likely to sustain a brain injury compared to Whites, they were less likely to have appropriate follow up with a primary physician following initial discharge from the emergency room (Bazarian, Hartman, & Delahunta, 2000).

In a national sample of trauma patients, it was found that people of color with a brain injury were less likely to receive treatment at acute rehabilitation facilities upon discharge from an emergency room even after controlling for insurance status (Shafi et al., 2007). Using the same sample, Bowman et al. (2007) specifically found that Black (non-Latino) and Latino patients were less likely to be discharged to an acute rehabilitation center than Whites, however,

they did not find any differences between Asian patients and White patients. In contrast, Staudenmayer, Diaz-Arrastia, de Oliveira, Gentilello, and Shafi (2007) found in a sample of 211 patients with TBI (both White and non-White; $n = 145$ and $n = 66$, respectively) that patients of color with TBI were just as likely to be placed in acute rehabilitation facilities following initial trauma discharge as White patients. Additionally, Shafi and Gentilello (2008) found no significant differences between patients of color and White patients from emergency room assessment, diagnostic, treatment, and discharge. Shafi et al. (2007), however, found on average that patients of color with TBI received six fewer days of inpatient rehabilitation than White patients with TBI.

Disparities in outcomes up to 1 year post-injury. Staudenmayer et al. (2007) found disparities with functional outcomes several months after discharge from acute rehabilitation. Patients of color with TBI reported a higher percentage of dependency on others for various functional domains including standard of living, leisure activities, and returning to work or school despite having the same physical, cognitive, and financial outcomes as Whites. Shafi et al. (2007) found that patients of color were significantly more likely to have moderate to severe functional impairments as a result of TBI than White patients during an eighth to ninth month follow-up. Thus, it is suggested that the previous finding of patients of color receiving almost a week less of inpatient rehabilitation may have an effect on the clinical disparity found in this follow up as well as possible loss of insurance following inpatient rehabilitation (Shafi et al., 2007).

Comparably, Sherer et al. (2003) found that Blacks (non-Latinos) with TBI were 2.76 times more likely to be nonproductive at 1 year post-injury than Whites, whereas other ethnic groups were almost two times more likely to be nonproductive at 1 year post-injury. Moreover,

Sherer et al. (2003) also noted that education level, pre-injury productivity, and violent causes of injury (which was more prevalent for Blacks [non-Latino] in this study) significantly contributed to the poorer productivity outcomes for Blacks (non-Latino) with TBI as well as other ethnic groups at 1 year post-injury. Arango-Lasprilla et al. (2007) also reported similar findings in their study. After controlling for post-traumatic amnesia, age, injury severity, pre-injury educational level, pre-injury employment, and pre-injury marital status, they found that Blacks (non-Latino) and Latinos with TBI had significantly worse outcomes at 1 year post-injury than Whites. When comparing the two ethnic groups, they reported that Blacks (non-Latino) with TBI had higher odds of having worse functional outcomes at 1 year post-injury compared to Latinos (Arango-Lasprilla et al., 2007). Contrarily, Rosenthal et al. (1996) found no statistically significant differences with functional outcomes between people of color and Whites with TBI, however, they did observe lower social integration and productivity among people of color compared to Whites at 1 year post-injury.

Historical Highlights of the Vocational Rehabilitation System

Customarily, the term vocational rehabilitation (VR) is ascribed to helping people with physical or mental disabilities prepare for, find, and maintain appropriate employment positions, most notably through a trained VR counselor (Wright, 1980). Since the establishment of public VR agencies for civilian populations, as initiated through the Smith-Fess Act of 1920, hundreds of thousands of people with disabilities in the U.S., including survivors of TBI, have received employment related services and as a result, have experienced successful return to work outcomes (Rubin & Roessler, 1995; Szymanski & Parker, 2003). The services provided through VR agencies are designed to provide consumers with the appropriate training, evaluations, and any other services, such as job placement assistance, job coaching, employment

accommodations, tools, or maintenance needed to help consumers either return to their former employment or seek new employment. Thus, the fundamental goal of VR is to not only help people with disabilities to seek and keep employment, but to also prevent the onset of secondary disabilities (Jenkins, Patterson, & Szymanski, 1998).

Historically, the Rehabilitation Act of 1973 was one of the first acts to recognize and remove institutional barriers to employment for people with disabilities through affirmative action programs established under Title V. In particular, Section 501 focused on hiring practices and Section 504 made it illegal to discriminate against persons with physical or mental disabilities in agencies receiving federal funding. Section 504 also authorized the establishment of the Client Assistance Program (CAP), which advises VR applicants and clients of their rights to services under the Rehabilitation Act of 1973. The concept of individualizing services for each client was also established under Section 504 through the development of the Individualized Written Rehabilitation Plan (IWRP; Disability Awareness, n.d.).

In 1992, Section 21 of the Rehabilitation Act Amendments was implemented to address the higher rates of disability and inequitable treatment of racial and ethnic groups, particularly Blacks (non-Latino), in state-federal VR agencies across the United States. In comparison to Whites, a higher percentage of Black (non-Latino) applicants with disabilities were denied acceptance for VR services or had their cases closed prior to reaching a successful, rehabilitated outcome. Thus, additional funding was put into place under Titles II, III, VI, and VII of the Rehabilitation Act of 1973 to enhance the outcome of services to people of color as well as increase the percentages of racial and ethnic groups applying for VR services (Giesen, Cavanaugh, & Sansing, 2004; Rehabilitation Services Administration, 1993).

Wilkerson and Penn (1938) have often been cited as being the first investigators to examine participation of VR services among Blacks (non-Latino; Giesen et al., 2004; Kundu & Schiro-Geist, 2006; Martin, 2010; Mwachofi, 2008; Williams, 2008). Their study investigated the extent to which Blacks (non-Latino) in high populous states (16 Southern states including Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia; and 7 Northern states including Illinois, Massachusetts, Michigan, New Jersey, New York, Ohio, and Pennsylvania) were provided federally-funded VR services during 1936 and 1937. Subsequently, in the 16 Southern states, it was noted that 248 were cases of Black (non-Latino) consumers compared to 2,780 cases of White consumers. From the Northern states, 142 cases of Black (non-Latino) consumers were closed successfully compared to 4,503 cases for White consumers. Although this study is limited in its findings, it provided initial evidence that Blacks (non-Latino) have experienced substantially lower rates of successful rehabilitation outcomes compared to Whites. Following Wilkerson and Penn's (1938) findings, as will be described later in the narrative, there have been a series of studies to corroborate their initial study.

Statement of Purpose

Although access to state-federal VR agencies is equally open to the public, rates of eligibility, types of services provided, and becoming successfully rehabilitated are disproportionate for people of color. Within the past 15 years, there has been a consistent body of literature to suggest that a person's phenotype and ethnicity may play a significant role in the VR process and outcomes (Jackson & Wilson, 2001; Robinson & Klein, 2008; Rosenthal, 2004; Wilson, 2002; Wilson, 2005; Wilson, Harley, & Alston, 2001; Wilson, Jackson, & Doughty,

1999; Wilson & Senices, 2005). More recently, new evidence suggests that racial and ethnic disparities within the VR process also exist for people with TBI (Cardoso, Romero, Chan, Dutta, & Rahimi, 2007; Kolakowsky-Hayner, 2010; Rahimi et al., 2009; Whitfield & Lloyd, 2008).

While evidence of racial and ethnic disparities in the VR process have been established between people of color with TBI and Whites, no such relationship has been established solely among people of color with TBI. Additionally, nearly every study that has focused on racial/ethnic disparities within the VR system have mostly centered on differences found among Blacks (non-Latino) with disabilities while other groups of color have been lumped together as one (Arango-Lasprilla et al., 2007; Rosenthal, Wilson, Ferrin, & Frain, 2005; Wehman, Targett, Yasuda, McManus, & Briel, 2007; Wilson, 2002). Accordingly, the primary purpose of this study is to examine disparities in the VR process among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. Specifically, VR acceptance rates, types of services, case expenditures, outcomes, types of employment achieved, hourly wages, and number of hours worked will be investigated among people of color with TBI. Thus, persons identified as White, non-Latino with TBI will be excluded from this study.

Research Questions

1. Is there a difference among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI in exiting the system with a Status 26 (successfully closed)?
2. Among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI who reach a Status 26, is there a difference in the types of employment achieved (i.e., employment

without supports in integrated setting, self-employment [except BEP], state-agency managed Business Enterprise Program [BEP], and employment with supports in integrated settings)?

3. Among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI who reach a Status 26, is there a difference in the hours worked and weekly earnings?
4. Is there a difference in acceptance rates for VR services (i.e., Status 10) among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI?
5. Is there a difference in the amount of time to determine eligibility (i.e., Statuses 04, 06, 10) among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI?
6. Is there a difference in case expenditures among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI?
7. Is there a difference in reasons for unsuccessful closures (i.e., Statuses 08, 28, 30) among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI?
8. How does consumer demographic information, types of services, and case expenditures predict employment outcomes among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islander with TBI?

Definition of Terms

Black. Persons identified as *African-American* in previous studies will be referred to as *Black* in this study. Recently, there has been a growing movement by Blacks in America to reject the use of being labeled as African-American and to embrace the term *Black* as the former term can be “a misleading connection to a distant culture” (Washington, 2012, para. 2), particularly since the label African-American can be an inappropriate term for certain groups (e.g., Jamaicans, Puerto Ricans, Haitians). Further, a 2011 survey showed a stronger preference to identify as Black (42%) as opposed to African-American (35%; Taranto, 2012). Therefore, *Black* will be the chosen term used throughout this study.

Competitive employment. Within the VR system, competitive employment is defined as employment obtained by an individual with a disability in an integrated setting that pays at minimum wage or higher and is comparable to employment positions held by persons without disabilities.

Latino/a. When referring to people who identify as part of a Latin American group, the term *Latino/a* will be used in place of *Hispanic* throughout this study. The term *Hispanic* was formulated in the 1970s by the U.S. Census Bureau to refer to people of Spanish-speaking origin. Over the years there has been much controversy about whether to identify as Hispanic or Latino, however, there continues to exist a divided opinion (Smart & Smart, 1996). Whereas Hispanic accentuates Spain and is often used as a catchall term that reduces a heterogeneous group into homogeneity, Latino “encompasses the wide range of cultures, ethnic backgrounds, languages, and races found among the 20-plus nations that make up this population,” (Quiñones -Mayo, Wilson, & McGuire, p. 20). For these reasons, *Latino* will be the preferred term used in this study.

Order of selection. This is a three level classification system [Category One for eligible individuals with two or more significant disabilities, Category Two for eligible individuals with significant disabilities, Category Three for eligible individuals with non-significant disabilities] used in some states when it is anticipated that there will not be enough funds to fully serve all eligible individuals.

RSA-911 database. This is a national and public database that is managed by Rehabilitation Services Administration. The information collected for RSA-911 pertains to demographics, VR services, and VR outcomes of each individual who has applied for state-federal VR services within the U.S.

Successful VR outcome. A VR outcome is considered successful when a consumer obtains and maintains competitive employment for at least 90 days.

VR statuses. Below is a list of the status codes used to describe service delivery interventions and outcomes used in the VR process as defined by Rehabilitation Services Administration (RSA). The codes listed are as follows:

Status	Definition
02	Applicant - Indicates than an individual has applied for VR services
04	Eligible Waiting List – Individual is on the Order of Selection waiting list
08	Closed before Eligibility – Individual has been determined ineligible for VR services or withdrew the application prior to an eligibility determination
10	Eligible (Acceptance) – The VR Counselor has certified how the individual’s disabilities result in a substantial impediment to employment, and that the individual can benefit from rehabilitation services in terms of an employment outcome.
12	Individual Plan for Employment (IPE) – An IPE is complete, as jointly developed by the VR Counselor and the individual to address vocational

and related issues identified as substantial impediments to employment, and no services have been provided.

- 26 Rehabilitation – Successful case closure
- 28 Closed after Rehabilitated – Closed not rehabilitated after the IPE has started (at least one IPE service was provided).
- 30 Closed before Rehabilitated – Closed not rehabilitated after eligibility (status 10) and before IPE services had begun (status 12).

A diagram of a typical VR process is provided on Appendix A.

Summary

Given this narrative, racial inequalities continue to be a significant issue within the state-federal VR program. This problem becomes especially imperative for people of color with TBI who must navigate through this system as part of their recovery. Using data already collected from the fiscal year (FY) 2010 RSA-911 database, this study will examine vocational rehabilitation outcomes, service delivery, and case dollar expenditures among people of color with TBI. The following literature review will provide a foundation for the research questions stated above.

Chapter 2: Literature Review

This study investigates whether differences exist in outcomes and service patterns between non-White consumers with TBI in state-federal VR agencies across the U.S. This chapter will analyze and synthesize related literature regarding: (a) TBI and VR outcomes (b) racial and ethnic disparities in VR outcomes for people of color with disabilities, and (c) VR acceptance rates for people of color with disabilities. Specifically, this review will highlight on various client and service variables that were investigated throughout the studies for their effectiveness and influence on VR outcomes and VR eligibility determinations.

TBI and the VR System

TBI and VR Outcomes

It is well known that people who sustain a TBI experience significant difficulties with obtaining or returning to work. In fact, it is estimated that only 30-40% of people with TBI actually return to work (Johnstone et al., 2003). Further, the Traumatic Brain Injury National Data Center (2005) estimates that more than 66% of persons with TBI who were employed at the onset of their injury subsequently become unemployed at 1, 5, and 10 years post-injury. Thus, remaining unemployed for long periods of time can lead this population to have significant reductions in personal resources (i.e., income, savings) and an increasing dependence on public assistance (Johnstone et al., 2003).

Most of the research on employment outcomes among people with TBI has only explored the effects of this disability in the general population. Hence, this field of research offers limited information regarding the effects of TBI on people who apply for and/or complete services through a state-federal VR agency. This aspect becomes important as it has been suggested that active participation in VR services can be a strong predictor of successful employment for people

with disabilities more than personal characteristics, skill level, or medical and psychological information (Johnstone, Schopp, Harper, & Koscuilek, 1999). Of the information that is available, however, many have analyzed and identified several client-related predictors of employment, which range from demographic variables to service related variables. In the following paragraphs, the variables identified from specific studies related to TBI and VR outcomes will be examined.

Race and ethnicity. From the literature found regarding state-federal VR outcomes among people with TBI, race and ethnicity was one of the most explored variables. Cardoso, Romero, Chan, Dutta, and Rahimi (2007) made comparisons of VR outcomes between Whites and Latinos with TBI as analyzed from the FY 2005 RSA-911 dataset. They found that 55% ($n = 2,961$) of Whites with TBI closed in a Status 26 compared to 49% ($n = 214$) of Latinos. Additionally, Cardoso et al. (2007) also looked at rates for Whites and Latinos with TBI who closed in a Status 28 (closed not rehabilitated after the Individualized Plan of Employment [IPE] has started after one VR services listed on the IPE was provided) and reported that 51% ($n = 223$) of Latinos closed in Status 28 compared to 45% ($n = 2,443$) of Whites with TBI. Thus, the odds that White consumers who accessed VR outcomes and reached a Status 26 were 1.27 times greater than for Latinos with TBI, which was statistically significant (CI: 1.04-1.54, $p < 0.05$; Cardoso et al., 2007).

In another study that also used FY 2005 RSA-911 data, Rahimi et al. (2009) compared VR outcomes between Whites and Blacks (non-Latino) with TBI. They reported similar findings from Cardoso et al.'s (2007) study for Whites who reached a Status 26 (55%; $n = 2,961$), but for Blacks (non-Latino) with TBI, they found that only 46% ($n = 370$) were closed in Status 26. On the other hand, 54% ($n = 443$) of Blacks (non-Latino) with TBI were closed in Status 28

compared to 45% ($n = 2,433$) of Whites. Hence, the odds for Whites with TBI who used state-federal VR services to reach a successful employment outcome were 1.46 times greater than the rate for Blacks (non-Latino), which was also statistically significant (CI: 1.26-1.69, $p < 0.05$; Rahimi et al., 2009).

Using RSA-911 data from FY 2004, Catalano, Pereira, Wu, Ho, and Chan (2006) analyzed the effects of race on employment outcomes for consumers with TBI. Results indicated that Whites with TBI had the highest rates of competitive employment (53%), followed by Native Americans (50%), Asians (44%), Blacks (non-Latino; 42%), and Latinos (41%). In another study that examined vocational outcomes between American Indians/Alaska Natives (AI/AN; $n = 285$) and non-AI/AN ($n = 11,032$) with TBI as taken from the FY 2006 RSA-911 data, it was reported that 46% of those in the AI/AN group were closed as successfully rehabilitated compared to 53% of those in the non- AI/AN group (Whitfield & Lloyd, 2008).

Johnstone et al. (2003) examined the racial differences in VR outcomes among 75 consumers (62 White, 13 Black, non-Latino with TBI) who participated in services for at least two years at a Missouri Division of VR agency. In contrast to the previous literature, they found that 23% of Blacks (non-Latino) had reached a successful employment outcome at case closure compared to 18% of Whites. This finding, however, was not statistically significant. Likewise, in 2002, Lustig, Strauser, Weems, Donnell, and Smith examined vocational outcomes in a sample of 49 consumers with TBI who had received services through the Tennessee Division of Rehabilitation Services and found no statistically significant difference between those who had reached a successful employment outcome and those who did not based on race or ethnicity.

Age. This variable was also one of the most investigated variables in the literature of persons with TBI who had participated in state-federal VR services. Following a Chi-square

analysis, Lustig et al. (2003) found a statistically significant difference in outcomes based on age from their sample of consumers with TBI. More specifically, those who had reached a successful outcome tended to be younger ($M = 27.5$) while those who were older ($M = 33.7$) were found to be unemployed. Using a logistic regression analysis, Cardoso et al. (2007) found age to be a statistically significant predictor of successful VR outcomes in that consumers who were younger (between the ages of 16-34 years) were more likely to have a successful outcome ($OR = 0.87$; 95% CI: 0.77-0.97) than those who were older (between the ages of 35-54 years; 13% reduction in odds). Rahimi et al. (2009) also found that consumers with TBI between the ages of 35 to 54 years had a 1% reduction in odds of reaching a Status 26 than consumers who were between the ages of 16 to 34 years, which was also statistically significant ($OR = .993$; 95% CI: .98-.99). On the contrary, Skeel, Bounds, Johnstone, Lloyd, and Harms (2003) analyzed associations of age on a group of 78 adults with TBI (ages 18-57 years) who participated in VR services at a Missouri Division of VR and found no statistically significant differences in vocational outcomes.

Gender. Gender was also one of the most studied variables for consumers with TBI who had participated in a state-federal VR agency. Cardoso et al. (2007) reported gender to be a statistically significant predictor of successful vocational outcomes. Specifically, they reported that men had a 1.2 times ($OR = 1.16$; 95% CI: 1.04-1.30) greater odds of reaching a Status 26 in comparison to women. Bounds, Schopp, Johnstone, Unger, and Goldman (2003) examined vocational outcomes and gender in a group of 78 consumers with TBI (55 male, 23 female) who had received services through a Missouri Vocational Rehabilitation Division agency. They found that 24% ($n = 13$) of men had reached a successful employment outcome compared to 4% of women ($n = 1$). Given that only one female consumer had reached a successful outcome, it is

nearly impossible to draw any substantial conclusions from this result. They also reported that that 74% of the female consumers' cases had closed prior to the initiation of any services compared to 56% of men. Finally, they also found that 73% of women had their cases closed due to refusal of services compared to 45% of men. These findings, however, were not statistically significant (Bounds et al., 2003). In contrast, Lustig et al. (2003) reported finding no statistically significant differences based on gender between those who became successfully employed at case closure and those who did not.

Education. The variable representing consumers' educational levels at application was also reviewed in a few studies of outcomes for consumers with TBI following participation in a state-federal VR agency. Catalano et al. (2006) found that consumers with TBI who had a Bachelor's degree or higher at the time of application demonstrated the greatest employment outcomes at a rate of 60% compared to those with an Associate's degree (52%), Special Education (52%), a high school diploma or equivalent (50%), and less than a high school diploma (45%). Similarly, Cardoso et al. (2007) also found educational levels at application of VR services to be a statistically significant predictor for consumers with TBI. Specifically, they found that consumers who had a high school education and equivalent (17% reduction in odds; $OR = 0.83$; 95% CI: 0.69-0.99) or below were less likely to reach a Status 26 compared to consumers who had a Bachelor's degree or higher. Particularly for high school dropouts, Cardoso et al. (2007) reported a 38% reduction in odds ($OR = 0.62$; 95% CI: 0.51-0.76), which was also statistically significant. Conversely, Lustig et al. (2003) found no statistically significant associations between educational levels at application and competitive employment outcomes among their sample of consumers with TBI.

Public support at application. This variable represents those who were receiving public support assistance (e.g., Supplemental Security Insurance [SSI], Social Security Disability Insurance [SSDI], Temporary Assistance for Needy Families [TANF], Workers' Compensation, veterans' disability benefits, medical insurance not through employment, general assistance) at the time of application. Many studies that examined this variable did so in terms of it being a work disincentive to reaching a successful employment outcome. Hence, this is often considered a risk factor to experiencing a successful vocational rehabilitation outcome.

Catalano et al. (2006) found from their sample of consumers with TBI that only 45% of those who had reported having any type of work disincentive reached a successful employment outcome compared to 58% of those who reported not having any type of work disincentive, which was statistically significant. Secondly, they also found work disincentives to be a third statistically significant predictor of reaching a successful outcome among clients with TBI whose cases had low average to below average expenditures (< \$1,918). Particularly, consumers who reported having any type of work disincentive had a statistically significant lower rate of successful outcome (52%) compared to consumer with low average to below average expenditures and no work disincentive (70%).

Rahimi et al. (2009) reported similar results from their sample of consumers with TBI. More specifically, they found consumers with TBI who had work disincentives had a 44% reduction in odds ($OR = 0.56$; 95% CI: .50-.62) of closing as a Status 26 in comparison to consumers with TBI who did not have work disincentives, which was statistically significant. Cardoso et al. (2007) also examined work disincentives as interacted by race and other VR services. After controlling for demographic factors and VR service variables, they reported that Latinos with TBI who received a comprehensive assessment to determine service needs, physical

or mental rehabilitative services, and reported having work disincentives at application had statistically significant lower odds of achieving a successful employment outcome in comparison to White consumers who received these same services as well as Latinos and Whites who did not receive these services. In contrast, Wrona (2010) investigated the relationship between VR services and employment outcomes among consumers with TBI who had participated in VR services from 1998-2002 in Washington state ($n = 797$) and were receiving worker's compensation. It was reported that at least 518 cases (65%) were closed successfully compared to only 48 cases that were closed unsuccessfully.

Job search assistance, job placement, and on-the-job supports. From the study conducted by Catalano et al. (2006), job placement was determined to be the most statistically significant predictor of achieving a successful employment outcome. They found that consumers who were allotted job placement assistance as part of their IPE services showed a rate of 68% for successful closures while those who did not receive this service had a lower successful closure rate of 41%.

Using a logistic regression analysis, Cardoso et al. (2007) found job placement assistance, on-the-job supports (i.e., support services provided to employed consumers while on the job to strengthen retention), and job search assistance to be statistically significant with reaching a Status 26 after controlling for demographic variables among their sample of consumers with TBI ($OR = 1.95$; 95% CI: 1.71-2.23; $OR = 2.18$; 95% CI: 1.89-2.50, respectively). Particularly, consumers who had received job placement assistance and on-the-job supports were twice as likely to reach a Status 26 compared to those who did not receive these services. Consumers who had received job search assistance were 1.25 times more likely to obtain a successful employment outcome ($OR = 1.25$; 95% CI: 1.08-1.44). When considering

these services between Latinos and Whites with TBI, Cardoso et al. (2007) found that there were no statistically significant differences between these two groups for receiving job placement assistance or job search assistance; however, Latinos demonstrated a 20% reduction in odds of receiving on-the-job supports in comparison to Whites, which was statistically significant ($OR = 0.71$; 95% CI: 0.55-0.91). Further, it was noted that on-the-job supports was the most statistically significant predictor of obtaining competitive employment (Cardoso et al., 2007).

Rahimi et al. (2009) also examined job placement assistance and on-the-job supports after controlling for demographic variables. Most notably, they found that consumers who had received these services had twice the greater odds of reaching a Status 26 compared to consumers who did not receive these services ($OR = 1.92$; 95% CI: 1.64-2.25; $OR = 2.07$; 95% CI: 1.75-2.44) with both being statistically significant. When evaluating job placement service by race, they reported that Blacks (non-Latino) who required job placement services had statistically significant lower odds of a successful employment closure compared to Whites with TBI in their sample ($OR = 0.63$; 95% CI: 0.42-0.93). Yet, there were no statistically significant differences in this service being provided to Whites and Blacks (non-Latino) with TBI (Rahimi et al., 2009).

Schonbrun, Sales, and Kampfe (2007) analyzed associations between VR services and successful employment outcomes among a sample of consumers with TBI from the FY 2002 RSA-911 dataset. Similar to the previous studies, job placement assistance was found to be statistically significant with obtaining competitive employment in addition to job search assistance ($p < 0.001$). Rates of competitive employment stood at 37% and 34%, respectively.

College or university training. This service represents any college or university training that was approved and funded after the initiation of an IPE. Rahimi et al. (2009) found

university training to be a statistically significant predictor of obtaining competitive employment after controlling for demographic variables in a logistic regression analysis. In particular, consumers who participated in university training after IPE were almost twice as likely to have a successful outcome compared to consumers who did not receive this service ($OR = 1.95$; 95% CI: 1.60-2.38). Further, they noted White consumers were 1.6 times more likely to be approved for university training as part of their IPE compared to Blacks (non-Latino) with TBI ($OR = 1.59$; 95% CI: 1.26-2.01). Cardoso et al. (2007) also found university training to be a statistically significant, positive predictor of employment ($OR = 1.31$; 95% CI: 1.12-1.54).

Catalano et al. (2006) investigated college training as influenced by case expenditures. They found that consumers whose cases fell in the high expenditure group (\$1,918-\$4,824) had a statistically significant increase in reaching a successful employment outcome (rate of 70%) in comparison to those in the high expenditure group who did not receive any college training (57%) post-IPE.

Occupational/Vocational training. In their sample of Latinos and Whites with TBI, Cardoso et al. (2007) found that Latinos had a 1.5 times greater odds of receiving vocational training than Whites, which was statistically significant ($OR = 1.53$; 95% CI: 1.19-1.97). They also found this service to be a statistically significant, positive predictor of successful employment ($OR = 1.29$; 95% CI: 1.08-1.51). On the other hand, Rahimi et al. (2009) reported no statistically significant differences with this service being provided to Whites and Blacks with TBI. Yet, they also found that those who were provided with vocational training had 1.4 greater odds ($OR = 1.42$; 95% CI: 1.17-1.72) of closing in a Status 26 compared to consumers who were not provided this service after controlling for demographic factors. This finding was statistically significant.

Counseling and guidance. From a logistic regression analysis, Rahimi et al. (2009) reported counseling and guidance (i.e., in-depth counseling that is provided in addition to the routine guidance given throughout the VR process) to be statistically significant to obtaining competitive employment with consumers having a 1.3 greater odds of having a successful outcome when provided this service compared to those who did not receive this service ($OR = 1.34$; 95% CI: 1.14-1.57) after controlling for demographic factors. Also, they did not find any statistically significant differences in this service being provided to Whites and Blacks (non-Latinos) with TBI from their sample. Cardoso et al. (2007) found no statistically significant differences in the sample of Latinos and Whites with TBI who had received substantial counseling and guidance during the VR process, but also found this service to be a statistically significant, positive predictor of employment ($OR = 1.24$; 95% CI: 1.10-1.40). Opposite of the Rahimi et al. (2009) and Cardoso et al. (2007) studies, Schronbrun et al. (2007) did not find counseling and guidance to be a statistically significant predictor of competitive employment outcomes ($OR = .883$; 95% CI: .448-1.74).

Assistive technology. The variable representing assistive technology can include any devices, equipment, or products (e.g., computers with synthesized speech capability, walkers, wheelchairs) that are provided to consumers with the intent to assist in reaching successful outcomes. Gamble and Satcher (2002) evaluated differences between VR outcomes and the use of assistive technology among a sample ($n = 1,145$) of consumers with TBI who had participated in state-federal VR services from 1992-2000 in a southeastern state. They reported that of the 2.6% ($n = 30$) consumers who received an assistive technological related service and the 97% ($n = 1,115$) who were not provided this service, 73% ($n = 22$) of those provided with assistive technology reached a successful employment outcome compared to 49% ($n = 545$) of those who

were not provided with this service, which was statistically significant ($p < .05$). Cardoso et al. (2007) reported no statistically significant differences between Whites and Latinos with TBI in their sample who had received assistive technology as part of their VR service plan, but did find it to be a statistically significant, positive predictor of successful employment ($OR = 1.27$; 95% CI: 1.04-1.56). Rahimi et al. (2009) also found this variable to be a statistically significant, positive predictor of successful employment ($OR = 1.38$; 95% CI: 1.10-1.73).

Assessment. Assessment services are used to help determine whether a consumer is eligible for VR services and/or to help identify needed VR services to reduce impediments to employment. Schronbrun et al. (2007) examined assessment services in relation to VR outcomes. From their findings, assessment-related services increased the odds of reaching a VR outcome, but it was not statistically significant ($OR = 1.27$; 95% CI: .877-1.83). Also, Rahimi et al. (2009) found that Whites with TBI had a 1.2 higher odds of receiving assessment services than Blacks (non-Latino), which was statistically significant ($OR = 1.21$; 95% CI: 1.04-1.44).

Maintenance. In their sample of consumers with TBI, Bounds et al. (2003) reported a statistically significant difference between gender and allocation of maintenance services. Particularly, men were much more likely to be provided with this service compared to women (44% compared to 22%, respectively; $p < 0.05$). Cardoso et al. (2007) reported that the Latinos in their sample had a 1.5 times greater odds of receiving maintenance as part of their VR cases in comparison to the White consumers, which was also statistically significant ($OR = 1.62$; 95% CI: 1.27-2.08). They also found this service to be a statistically significant, positive predictor of employment following a logistic regression analysis ($OR = 1.42$; 95% CI: 1.20-1.68). On the other hand, Rahimi et al. (2009) reported finding no statistically significant differences between Black (non-Latino) consumers and White consumers with TBI who received this service, but did

find this service to be a statistically significant, positive predictor of successful employment outcomes ($OR = 1.39$; 95% CI: 1.15-1.69).

Transportation. In their sample, Johnstone et al. (2003) found that Blacks (non-Latino) with TBI were more likely to receive transportation services as part of the VR process in comparison to Whites, which was statistically significant (62% compared to 21%, respectively; $p < 0.01$). Cardoso et al. (2007) found Latinos in their sample had a 1.6 times greater odds of receiving transportation services than Whites ($OR = 1.64$; 95% CI: 1.34-1.20). They also concluded this service to be a statistically significant risk factor to obtaining competitive employment after controlling for demographic factors with a 22% reduction in odds ($OR = .78$; 95% CI: 0.69-0.89). Specifically, consumers who had received transportation demonstrated a 22% reduction in odds of reaching a Status 26 in comparison to consumers who did not receive this service. Rahimi et al. (2009) also found transportation to be a statistically significant risk factor to obtaining competitive employment. Particularly, results from a logistic regression analysis showed that consumers who required transportation services demonstrated a 25% reduction in odds of closing in a Status 26 ($OR = 0.75$; 95% CI: .64-.88).

Case expenditures. In this regard, case expenditures refer to the amount of funding VR counselors spend on each case. Catalano et al. (2006) reported that in relation to outcomes, a higher amount of expenditures was spent on cases that reached a successful rehabilitated outcome ($M = \$4,809$) compared to cases that were closed unsuccessfully ($M = \$3,656$). They also examined case expenditures among consumers who had received job placement services and found it to be the second most statistically significant factor to closing a case in a Status 26. Particularly, consumers whose cases had low average to below average expenditures ($< \$1,918$) displayed the lowest successful outcomes (60%) when compared to the cases with high average

(\$1,918-\$4,824; 70%) and above average ($> \$4,824$; 77%) expenditures. Third, they also examined case expenditures and its relation to job search assistance. Consumers' cases with high expenditures who received assistance with job searching as part of the VR process demonstrated a greater rate of obtaining competitive employment (74%) compared to those with high case expenditures but did not receive job search assistance (64%; Catalano et al., 2006). Fourth, case expenditures were also examined with on-the-job supports. For those in the low case expenditures group, successful employment rates proved to be higher (62%) in comparison to those who did not receive on-the-job supports (42%).

Gamble and Satcher (2002) reported from their sample of participants with TBI who had received assistive technology and closed successfully had higher case expenditures (\$15K) than for those who did not receive assistive technology (\$6K) and closed successfully, which was statistically significant ($p < .05$). From Whitfield and Lloyd's (2008) study, it was determined that those in the AI/AN with TBI group received a reduction in case expenditures compared to non-AI/AN at more than \$1,700, which was statistically significant ($p < .001$).

Weekly earnings after case closure. Schronbrun et al. (2007) investigated weekly earnings at case closure using ANOVA and reported that those who closed successfully had an average weekly wage of \$314 compared to \$35 per week for consumers who were not closed successfully. Additionally, when examining weekly earnings as interacted by assessment services, there was an increase to \$272 per week compared to \$253 per week for those who did not receive an assessment related service ($p = .07$). Third, Schronbrun et al. (2007) also examined weekly earnings by counseling and guidance. They found that for consumers who were provided with counseling and guidance, their weekly wages averaged to \$263 per week compared to \$267 for consumers who were not provided this service ($p = .499$). Fourth, they

also examined weekly earnings by job placement services and reported that consumers had an average weekly wage of \$247 compared to \$276 for those who were not provided with this service, which was statistically significant ($p = .001$). Next, Schronbrun et al. (2007) investigated weekly earnings by job search assistance. It was reported that consumers who participated in this service had an average weekly income of \$267 compared to \$274 for those who did not receive job search assistance, which was also statistically significant ($p = .001$). Finally, they also examined weekly earnings by diagnosis and treatment services and found that those who required this service averaged \$289 per week compared to \$249 for those who did not need this service, which was also statistically significant ($p = .001$; Schronbrun et al., 2007).

From Gamble and Satcher's (2002) study, they found that those who had received assistive technology as part of the VR process reported an average weekly earnings of \$270 after obtaining competitive employment compared to \$233 for those who also reached a successful employment outcome but were not provided with assistive technology. This finding, however, was not statistically significant ($p > .05$). Lastly, Whitfield and Lloyd (2008) also examined weekly earnings and hours worked at closure between AI/AN and non AI/AN with TBI and reported finding no statistically significant differences.

Summary of TBI and VR System

The preceding literature provides evidence that successful rehabilitated outcomes, type of services, and case expenditures in a state-federal VR agency can be affected by client race and ethnicity. Particularly, Whites with TBI were shown to have the highest levels of obtaining competitive employment in comparison to all other racial and ethnic groups (Cardoso et al., 2007; Catalano et al., 2006; Rahimi et al., 2009). Rosenthal et al. (1996) proposes that a possibility of lower rates of return to work outcomes for people of color with TBI is that they

may have lower rates of pre-injury employment and less pre-injury educational levels in comparison to Whites. Also, Rahimi et al. (2009) suggests that VR counselors may be minimizing the potential of consumers of color with TBI to obtain competitive employment. It remains unclear, however, how other racial or ethnic groups compare with each other as one study found Latinos with TBI to have the lowest rates of closing in Status 26 (Catalano et al., 2006) while another found Blacks (non-Latino) to have the lowest (Rahimi et al., 2009).

A few of the studies also reported age as being a statistically significant predictor of consumers closing in a Status 26. Moreover, consumers who were considered “younger” were more likely to become successfully rehabilitated than those who were considered to be “older” (Cardoso et al., 2007; Lustig et al., 2003), however, the standard range of age affiliated with being “younger” or “older” was inconsistent. For gender, there is still much to be discovered on how this variable may affect successful rehabilitative outcomes for people with TBI. The findings regarding education was mostly consistent in that consumers with TBI who applied for VR services with a Bachelor’s degree or higher were more likely to close in a Status 26 compared to those with lower educational levels (Cardoso et al., 2007, Catalano et al., 2006). Although the general consensus regarding consumers with TBI having some type of public support at application was a risk factor to closing as successfully rehabilitated, one study found a higher level of Status 26 (successful closure) over Status 28 (unsuccessful closure) in a sample of consumers with TBI and worker’s compensation (Wrona, 2010).

Findings on VR service related variables were also mixed. Many of the studies found job placement, on-the-job supports, and job search assistance to be statistically significant predictors of Status 26 for consumers with TBI (Cardoso et al., 2007; Catalano et al., 2006; Rahimi et al., 2009; Schronbrun et al., 2007). In general, no statistically significant differences were reported

between Blacks (non-Latino), Latinos, and Whites with TBI receiving job placement assistance or job search assistance, however, Latinos were reported to be less likely to receive on-the-job supports (Cardoso et al., 2007). Also, one study found lower rates of successful rehabilitative outcomes among Blacks who were provided with job placement (Rahimi et al., 2009).

There were also disparities reported in who received college or university training and vocational training. Overall, Whites with TBI were more likely to be approved and funded for college/university training while Latinos were more likely to receive vocational training (Cardoso et al., 2007; Rahimi et al., 2009). Yet, no statistically significant differences were reported between Blacks (non-Latino) and Whites with TBI who received vocational training (Rahimi et al., 2009). College/university training was also found to be a statistically significant, positive predictor of successful employment (Catalano et al., 2006; Cardoso et al., 2007; Rahimi et al., 2009).

Likewise, no statistically significant differences were found between Whites, Blacks (non-Latino), and Latinos with TBI in receiving substantial counseling and guidance (Cardoso et al., 2007; Rahimi et al., 2009), however, there were mixed findings on whether this service is a statistically significant predictor of obtaining competitive employment. Schronbrun et al., (2007) did not find this service to be a statistically significant predictor of successful employment while Cardoso et al. (2007) and Rahimi et al. (2009) did. One explanation for Schronbrun et al.'s (2007) finding is that consumers who are in need of more intensive counseling in addition to the general guidance provided during the VR process may have a higher level of impairment, thus a higher level of need than consumers who obtain competitive employment without this service.

Also, no statistically significant differences were found between Whites and Latinos with TBI in receiving assistive technology as an IPE services (Cardoso et al., 2007). Therefore, it is

unknown if disparities exist among other racial or ethnic groups in receiving this service.

Assistive technology was also found to be a statistically significant, positive predictor of successful employment in two studies (Cardoso et al., 2007; Rahimi et al., 2009).

There were inconsistent findings on the deliverance of maintenance services among racial and ethnic groups. While one study found Latinos with TBI were more likely to receive maintenance in comparison to Whites (Cardoso et al., 2007), another study did not find any statistically significant differences with who received this service among Whites and Blacks (non-Latino; Rahimi et al., 2009). Also, three studies found maintenance to be a statistically significant, positive predictor of obtaining a successful employment outcome (Bounds et al., 2003; Cardoso et al., 2007; Rahimi et al., 2009).

For transportation, which was considered to be a statistically significant risk factor in closing successfully (Cardoso et al., 2007; Rahimi et al., 2009), differences were found among those who received this service. Moreover, Blacks (non-Latino) and Latinos with TBI were more likely to receive transportation assistance than Whites (Cardoso et al., 2007; Johnstone et al., 2003). A possible explanation for these findings is that Blacks (non-Latino) and Latinos may have a higher need for VR services that reduce environmentally related barriers such as maintenance and transportation in comparison to Whites (Johnstone et al., 2003).

Although a few of the studies examined case expenditures in terms of race or ethnicity, one study reported lower amounts of VR funding being spent on cases of consumers who identified as AI/AN with TBI in comparison to those who identified as non-AI/AN (Whitfield & Lloyd, 2008). One possible explanation could be that members of the AI/AN group may have refused various VR services due to a lack of understanding of their benefit (Whitfield & Lloyd, 2008). Also, findings showed a consistency in cases with higher case expenditures closing

successfully compared to cases with lower case expenditures (Catalano et al., 2006; Gamble & Satcher, 2002).

Finally, an examination of VR services and its influence on weekly earnings after closure for consumers with TBI was also conducted. Overall, consumers with TBI who received assessment or diagnosis and treatment services, and assistive technology showed increases in weekly earnings while those who received counseling and guidance, job placement, and job search assistance showed a decrease in weekly earnings (Schronbrun et al., 2007).

Outcomes and Acceptance Rates of General Disabilities within the VR System

Atkins and Wright (1980) produced a well-known study of disparities between Blacks (non-Latino) and Whites in the state-federal VR system using RSA data from FY 1976. Essentially, they concluded that Black applicants experienced unequal treatment in all steps of the VR process in comparison to White applicants. In particular, they found that acceptance rates for Black applicants were disproportionately lower (5.5%) compared to White applicants. Moreover, 12% of Black applicants were determined ineligible, cited mostly for failure to cooperate, compared to slightly over 8.5% for White applicants. Additionally, higher rates of Black applicants (7%) were determined ineligible for not having a severe disability compared to 4% of White applicants. When examining case closures, a higher percentage of Blacks (42%) were closed after IPE without reaching a successful outcome compared to Whites (35%). Thus, more Whites were found to be successfully rehabilitated than Blacks. Yet, it is unknown if this finding was statistically significant or not as an inferential statistical test was not conducted (Atkins & Wright, 1980).

Following the Atkins and Wright study, Ross and Biggi (1986) analyzed VR outcomes (Statuses 08, 26, 28, and 30) in a sample of Whites, Blacks (non-Latino), AI/AN, and

Asians/Pacific Islanders. They, too, found that Whites were more likely to be closed in Status 26, or successfully employed, compared to the other groups. They also found higher rates of closures in Statuses 08, 28, and 30 among the non-White consumers. Also, Whites were most likely determined ineligible for reasons of refusal of services (Ross & Biggi, 1986). A few years later, Herbert and Martinez (1992) explored if a relationship existed between ethnicity and employment outcomes in the state-federal VR process (including statuses 08, 26, 28, and 30), and were the first to include Latinos in this type of comparison. Similar to the findings reported in the studies that preceded this one, they found that Whites were more likely to be determined eligible for VR services. Additionally, Herbert and Martinez reported that Latinos and Blacks (non-Latino) in particular were more likely to be determined ineligible for state-federal VR services in comparison to Whites, thus, also being less likely to becoming successfully rehabilitated. Likewise, unlike the previous studies, they found no significant differences in Statuses 28 and 30 between Blacks and Whites. One year later, Dziekan and Okocha (1993) also examined state-federal VR eligibility rates by race and ethnicity for consumers served from 1985-1989. Their findings were also comparable to Atkins and Wright's (1980), Ross and Biggi's (1986), and Herbert and Martinez's (1992) studies with Whites with disabilities most likely determined eligible for VR services than Blacks (non-Latino) or Latinos with disabilities. In 1995, Feist-Price revealed comparable findings in her study of Black and White consumers who applied for VR services in a southeastern state. Differences were found between these groups in that Blacks (non-Latino) were more likely to be closed in Statuses 08 and 28 compared to Whites. Thus, this study also validated the findings in the previous studies.

Wheaton (1995) also investigated acceptance rates between Black (non-Latino) and White applicants in the state-federal VR system (Latinos were excluded due to small sample

sizes). Although no statistical differences were reported between the two groups in terms of eligibility, differences in rates were found. Whites had an acceptance rate of 53% while Blacks had an acceptance rate of 47%. Following this study, Peterson (1996) also reported finding no statistical differences in acceptance rates between Blacks (non-Latino), Whites, Native Americans, Asians/Pacific Islanders, or Latinos. In 1999, Wilson, too, found no statistically significant differences in acceptance rates between Blacks (non-Latino) and Whites from the FY 1996 RSA-911 database who were served in a large Midwestern state-federal VR agency.

That same year, Wilson, Jackson II, and Doughty (1999) found in their study of Black (non-Latino) and White consumers who were served in a large Midwestern state-federal VR agency also from the FY 1996 RSA-911 dataset that Blacks were more likely to be closed prior to successful rehabilitation specifically for failure to cooperate or unable to locate. Contrarily, Whites who closed before becoming successfully rehabilitated were more likely to do so due to having a too severe disability, having no disability, or other circumstances. In the following paragraphs, various client variables and service variables will be reviewed regarding their associations with VR outcomes and VR acceptance rates in a population of people with diverse disabilities among literature conducted from the year 2000 to the present.

Outcomes and the VR System

Race/ethnicity. Patterson, Allen, Parnell, Crawford, and Beardall (2000) considered the influence of race and ethnicity in their analysis of VR outcomes among a sample of VR consumers with a range of disabilities who participated in VR services in a southeastern state. The data was taken from the FY 1996 RSA-911 database. Statistically significant differences ($p < .01$) were found between Black (non-Latino; $n = 3,102$) consumers with disabilities and White ($n = 10,928$) consumers with disabilities. Moreover, the rate of successful employment

outcomes was 60% for Whites; however, only 55% of Blacks were able to reach the same outcome.

Using a sample of Black (non-Latino) and White ($n = 17,466$) consumers with disabilities from the FY 1996 RSA-911 database who were served in large Midwestern state VR agency, Jackson II and Wilson (2001) reported a statistically significant association between race and VR outcomes. Specifically, Blacks were more likely to be closed in Statuses 08, 28, and 30 while Whites were more likely to be closed in Status 26.

Wilson (2005) analyzed differences in closure statuses with race/ethnicity, including identifying as Latino, as an independent variable using FY 2001 RSA-911 data. He found that consumers who identified as non-Latino (Black; $n = 4,000$) and were between the ages of 51-60 years were more likely to be closed unsuccessfully in comparison to non-Latino Whites from the same age group. Further, consumers who identified as White Latino/a were more likely to be successfully rehabilitated than Black Latino/a. Both of these findings were statistically significant.

Dutta, Gervey, Chan, Chou, and Ditchman (2008) investigated several factors of VR outcomes, including race and ethnicity, among a stratified sample of VR ($n = 15,000$) consumers with a sensory/communicative, physical, or mental disability from FY 2005 RSA-911 database. The variable of race and ethnicity was found to be statistically significant of VR outcomes. In particular, Blacks (non-Latino) with a sensory or communicative disability were found to have a 20% lower odd ($OR = 0.80$; 95% CI: 0.67-0.96) of successfully obtaining competitive employment. Additionally, Native Americans with physical impairments and mental disabilities were found to have a 51% and 50%, respectively, lower odd of gaining employment ($OR = .49$;

95% CI: 0.31-0.78; $OR = .50$; 95% CI: 0.31-0.82) in comparison to Whites, which was also statistically significant.

Age. Age was also a statistically significant predictor of VR outcomes, but for only one of the groups in the Dutta et al. (2008) study. Consumers between the ages of 35-54 years with a sensory/communicative disability were 1.4 times more likely to be successfully rehabilitated ($OR = 1.39$; 95% CI: 1.19-1.63) compared to consumers between the ages of 16-34 years. Likewise, those between the ages of 55-64 years had a 1.9 times greater ($OR = 1.88$; 95% CI: 1.47-2.39) odds of becoming successfully employed; those who were 65 years and older were over three times more likely ($OR = 3.30$; 95% CI: 2.40-4.54) to obtain competitive employment when compared to the 16-34 age group. Additionally, it was noted that age was not a statistically significant predictor of employment outcomes for those with physically or mentally related disabilities.

Education. In the study conducted by Jackson II and Wilson (2001), educational status at application was also statistically significant. Hence, Whites with disabilities were more likely to have a high school diploma or higher when applying for VR services while Blacks (non-Latino) with disabilities were more likely to apply with less than a high school diploma.

Dutta et al. (2008) also reported education to be a statistically significant predictor of successful VR outcomes for two of their sample groups. Consumers with a sensory/communicative related disability who participated in a special education program demonstrated a 58% ($OR = 0.42$; 95% CI: .27-.67) decreased chance of becoming successfully employed when compared to consumers with a college degree and the same disability category. High school dropouts with a sensory/communicative impairment showed a 35% lesser chance ($OR = 0.62$; 95% CI: .48-.82) of reaching a Status 26 while those with a high school diploma had

a 26% lower odds ($OR = 0.74$; 95% CI: .58-.96) of obtaining competitive employment.

Likewise, consumers with physical impairments who had less than a high school education had a 50% lower odds ratio ($OR = 0.50$; 95% CI: .39-.65) of being successfully employed compared to consumers with a college degree. Consumers with physical disabilities who had a high school education demonstrated a 36% lesser chance ($OR = 0.64$; 95% CI: .51-.81) while consumers with some postsecondary education or an Associate's degree had a 32% decreased odds ($OR = 0.68$; 95% CI: .53-.87) of closing in Status 26 compared to consumers with college degrees. Finally, Dutta et al. (2008) noted that education was not a statistically significant predictor of successful rehabilitation for consumers with mental disabilities.

Job search assistance, job placement, on-the-job supports. Results from a logistic regression analysis found all three of these services to be statistically significant predictors of reaching a Status 26 in the Dutta et al. (2008) study. Among the three groups of participants, job placement was the most predictive for people with a physical impairment in which they had a 2.2 greater chance ($OR = 2.23$; 95% CI: 1.91-2.61) of becoming successfully employed when provided with this service. Those with a mental impairment showed a 2.1 higher odds ($OR = 2.12$; 95% CI: 1.83-2.44) of closing in a Status 26 when job placement was received followed by those with a sensory/communicative impairment who had a 1.7 greater odds ($OR = 1.66$; 95% CI: 1.34-2.06) of being successfully employed after this service was provided. Regarding on-the-job supports, people with mentally related disabilities benefited the most from this service with a 2.4 greater chance ($OR = 2.40$; 95% CI: 2.05-2.81) of being successfully employed. For the other two groups, consumers with sensory/communicative disabilities were 2.2 times more likely ($OR = 2.23$; 95% CI: 1.68-2.96) to be successfully employed and those with physical disabilities were almost two times ($OR = 1.97$; 95% CI: 1.59-2.44) as likely to close in Status 26

when provided with on-the-job supports. Finally, those provided with job search assistance also showed an increased chance of being successfully employed for those with physical disabilities ($OR = 1.29$; 95% CI: 1.10-1.52) and mental disabilities ($OR = 1.28$; 95% CI: 1.09-1.49; Dutta et al., 2008).

Mwachofi (2009) examined differences in job search assistance, job placement, and on-the-job supports by gender as taken from the FY 2004 RSA-911 data. It was reported that women with disabilities were more likely to receive these services in comparison to men with disabilities.

College/university training. Dutta et al. (2008) found university training to have a statistically significant correlation with successful employment outcomes for only one of the three groups analyzed in their study. Consumers with physical impairments who received university training as part of their VR services had a 1.2 greater odds ($OR = 1.22$; 95% CI: 1.04-1.43) of obtaining competitive employment than those who did not receive this service. Robinson and Klein (2008) also explored college/university training in a sample of 54,937 consumers diagnosed with mental illness and substance abuse. They found a strong association (.80) between race and this service. Consumers of color were less likely to receive college/university training as part of their IPE services in comparison to White consumers, which was statistically significant ($p < .000$). Mwachofi (2009) examined differences in receiving college/university training during the VR process by gender and reported that men with disabilities were more likely to receive this service compared to women with disabilities, which was also statistically significant ($p < 0.01$).

Occupational/Vocational training. In the study conducted by Dutta et al. (2008), vocational training was found to have a statistically significant association with obtaining a

successful employment outcome for those with mental disabilities only. In particular, those in this group who received this service had a 1.7 greater odds ratio ($OR = 1.71$; 95% CI: 1.43-2.04) of becoming successfully employed compared to those who did not receive this service.

Mwachofi (2009) reported that men with disabilities were more likely to receive vocational training as part of their IPE services in comparison to women with disabilities, which was statistically significant ($p < 0.01$).

Counseling and guidance. Substantial counseling and guidance was reported to be statistically significantly with successful employment outcomes for persons with physical and mental impairments only in the study by Dutta et al. (2008). Moreover, persons with physical impairments who received substantial counseling and guidance had a 1.2 greater chance ($OR = 1.16$; 95% CI: 1.02-1.32) of being successfully employed while those with mental impairments who also received this service had a slightly greater odds of becoming competitively employed ($OR = 1.18$; 95% CI: 1.03-1.35). No statistically significant associations were reported with receiving this service and reaching a Status 26 for those in the sensory/communicative disability group.

Assessment. In their study of consumers with a dual diagnosis of a mental health impairment and substance abuse, Robinson and Klein (2008) found a difference in consumers of color with a disability who had received assessment services and White consumers. Of the total sample, 25% ($n = 13,874$) of consumers of color received assessment services compared to 29% ($n = 15,967$) of White consumers. This difference, however, was not statistically significant.

Maintenance. Subsequent to a logistic regression analysis, maintenance services were found to influence an increase in chances of becoming successfully employed for the three participant groups in the Dutta et al. (2008) study. Those with a sensory/communicative

disability had a 1.5 higher chance ($OR = 1.49$; 95% CI: 1.17-1.89) of closing in a Status 26 compared to 1.4 chance ($OR = 1.37$; 95% CI: 1.15-1.63) for consumers with a mental disability and a 1.3 chance ($OR = 1.27$; 95% CI: 1.06-1.52) for consumers with a physical disability. Thus, these findings were statistically significant.

Transportation. Dutta et al. (2008) found transportation services to have a negative association with reaching a Status 26, particularly for people with sensory/communicative disabilities. Moreover, a 31% decreased odds of becoming successfully employed was reported for those needing this service.

Case expenditures. Patterson et al. (2000) investigated case expenditures with employment outcomes and found that more funding was spent on White consumers with disabilities (\$2,479) than Black (non-Latino) consumers (\$2,096). Case expenditures were also reviewed by Dutta et al. (2008) among their three groups of participants (e.g., sensory/communicative impairments, physical impairments, mental impairments). The highest case expenditures were spent on those in the sensory/communicative disability group ($M = \$5,462$), followed by those in the physical disability group ($M = \$4,816$), and finally those in the mental disability group ($M = \$3,006$).

Robinson and Klein (2008) explored case expenditures for successful and unsuccessful closures in their sample of consumers diagnosed with mental illness and substance abuse ($n = 54,937$). They discovered in the group of successful closures that White consumers' cases averaged \$2,381 in expenditures compared to \$2,338 spent on cases for consumers of color. For those with unsuccessful closures, the opposite was reported. Case expenditures for White consumers averaged to \$812 compared to \$847 for consumers of color. In a study conducted by Mwachofi, Broyles, and Khaliq (2009) using FY 2006 RSA-911 data ($n = 617,149$) in which

various VR related services were examined for their association with successful outcomes, it was found that lower case expenditures were spent on people of color with disabilities (an average of \$550 less per person) compared to White consumers, which was statistically significant.

Weekly earnings and hours worked after case closure. In the study conducted by Mwachofi et al. (2009) investigated weekly earnings before and after VR services after controlling for age and educational levels. They found that before VR interventions, consumers of color displayed a weekly average earning of \$34 compared to \$62 for White consumers. After the allocation of VR interventions, consumers of color had an increase in average weekly earnings to \$303 compared to \$344 for White consumers. Although both groups had a growth in average weekly earnings, White consumers had the greatest increase. Mwachofi et al. (2009) also reviewed hours worked before and after VR interventions. Consumers of color worked an average of two less hours per week in comparison to Whites (3.68 and 5.94, respectively) before the start of VR services. After the completion of VR services, consumers of color showed a .48 increase in hours worked over White consumers (32.12 and 31.64, respectively). Mwachofi et al. note, though, that despite the increase in average hours worked for consumers of color after VR interventions, a gap continues to exist in wages earned between this group and White consumers.

Robinson and Klein (2008) found a statistically significant difference in earnings per hour between consumers of color and White consumers. White consumers showed earnings of \$9.79 per hour compared to \$8.82 per hour for consumers of color. Regarding hours worked, no statistically significant differences were found (Robinson & Klein, 2008).

Mwachofi (2009) examined week earnings and hours worked by gender. It was reported that weekly earnings for men with disabilities increased from \$52.40 at application to \$334.70 at

closure while weekly earnings for women increased from \$51.34 at application to \$284.25 at closure. Mwachofi noted that although VR services increased weekly earnings for both genders; it also widened the gap in earnings from \$1.09 at application to \$50.61 at closure. This finding was statistically significant ($p < 0.01$).

Types of employment. According to RSA (2010), there are seven types of successful employment categories. These include employment without supports in an integrated setting, employment with supports in an integrated setting, extended employment, state agency-managed Business Enterprise Program (BEP), self-employment (except BEP), homemaker, and unpaid family worker. Few studies have analyzed the impact of types of employment on employment related factors (e.g., earnings, hours worked, benefits) or whether disparities exist based on types of employment. Cavanaugh (1999) examined differences in employment types among a sample of 18,000 consumers who were blind as extracted from FY 1995 RSA-911 data. She reported that 25% the sample were employed competitively with supports in an integrated setting, self-employment, or BEP compared to 44% who closed in the categories of extended employment, homemaker, and unpaid family worker (Cavanaugh, 1999).

In 2000, Schroeder analyzed hourly earnings and rates of health insurance by types of employment among a sample of consumers with blindness and other visual disabilities. He reported that those who were placed with supports in an integrated setting had an increase in hourly earnings over a three year period from \$7.56 to \$13.24 an hour, which was over a 78% increase. Regarding access to health insurance from the employer, Schroeder (2000) reported an increase from 38.2% to 58.8% over a three year period.

Summary of Outcomes and the VR System

Similar to the literature reviewed regarding TBI and VR outcomes, the literature reviewed in this section of VR outcomes among consumers with disabilities also reveals evidence that race and ethnicity can have an influence on VR outcomes and the types of services received as part of the IPE. Generally, more Whites with disabilities were reported to reach successfully rehabilitated outcomes in comparison to people of color (Dutta et al., 2008; Jackson II & Wilson, 2001; Patterson et al., 2000; Wilson 2005). In addition, one study reported that White Latinos also showed a greater rate of closing in a Status 26 compared to Black Latinos (Wilson 2005). A possible explanation for this finding is that White Latinos may have similar experiences as White non-Latinos based on their phenotype when compared to Black Latinos (Wilson & Senices, 2005). Age was only primarily reviewed in one study in which the findings were opposite of that which was reported in the literature among consumers with TBI. Hence, this study found that consumers between the ages of 16-34 years had the lowest rates of competitive employment while those between the ages of 35-54 years had the highest (Dutta et al., 2008). Education was also similar to the literature reviewed in the previous section; consumers with a high school or more educational level, especially those with a college degree, had a greater chance of closing successfully than those with less than a high school diploma (Dutta et al., 2008; Jackson II & Wilson, 2001).

Comparable to the studies reviewed on consumers with TBI and the VR system, job search assistance, job placement, and on-the-job supports were found to significant predictors in one study (Dutta et al., 2008), however, this was not reviewed on the basis of race. For college/university training and vocational training, it was reported from two studies that consumers of color and women were less likely to receive college/university training as part of

their IPE services (Mwachofi, 2009; Robinson & Klein, 2008). Likewise, another study found that people with physical disabilities were more likely to receive college/university training while those with mental disabilities were more likely to receive vocational training (Dutta et al., 2008). Also, receiving substantial counseling and guidance was found to be significantly correlated with closing in a Status 26 for consumers with a physical or mental disability (Dutta et al., 2008). For assessment services, only one study found this service to be provided at a higher rate to White consumers than consumers of color, however, this finding was not statistically significant (Robinson & Klein, 2008). In comparison to the studies reviewed for consumers with TBI, transportation was also found to have negative correlation for reaching a Status 26 among consumers with other types of disabilities (Dutta et al., 2008).

Similar to the literature reviewed in the first section, the literature reviewed in this section found that White consumers with disabilities were also more likely to have a higher amount of funding allocated to their cases in comparison to consumers of color (Mwachofi et al., 2009; Patterson et al., 2000; Robinson & Klein, 2008). Comparable to the explanation given for consumers of color with TBI who also had lower case expenditures, Mwachofi et al. (2009) implicate that a possible reason for their finding is that consumers of color are requesting and/or provided with lower quality VR services (i.e., transportation, maintenance). One study, however, found that more funding was spent on cases for consumers of color who closed unsuccessfully, but not for those who closed successfully (Robinson & Klein, 2008). Likewise, the studies reviewed here found that White consumers were more likely to spend more time in the VR system than consumers of color (Mwachofi et al., 2009; Robinson & Klein, 2008). Additionally, two studies reported that White consumers had higher earnings after the completion of VR services (Mwachofi et al., 2009; Robinson & Klein, 2008) while another study

reported that men had a greater increase in weekly earnings following the completion of VR services (Mwachofi, 2009). For hours worked, though, only one study found that consumers of color showed a slightly higher increase than White consumers (Mwachofi et al., 2009). Also, two studies examined differences in employment and employment factors (i.e., earnings, hours worked) based on employment types among people who are blind (Cavanaugh, 1999; Schroeder, 2000). One study found that a higher percentage of consumers were placed into non-competitive types of employment (i.e., extended employment, homemaker, unpaid family worker; Cavanaugh, 1999) while the other found that consumers who were placed in competitive employment within integrated settings earned higher wages and had a higher access to health insurance through their employer (Schroeder, 2000).

Acceptance Rates and the VR System

Race/ethnicity. Race and ethnicity continues to be a widely studied variable for its association with state-federal VR acceptance rates. Wilson (2002) explored whether significant differences existed in state-federal VR acceptance rates between Blacks (non-Latino; $n = 58,658$), AI/AN ($n = 3,191$), Asians/Pacific Islanders ($n = 3,653$), and Whites ($n = 194,250$) using FY 1998 RSA-911 data. Findings revealed that Black applicants were less likely to be accepted for VR services in comparison to White applicants, which was statistically significant. Further, the only groups that did not show any statistically significant differences were among applicants who identified as AI/AN and Asian/Pacific Islander. Therefore, the findings from this study contrasted the Wilson (1999) study and Wheaton (1995) studies.

Also in 2002, Wilson, Alston, Harley, and Mitchell investigated the effects of several variables on VR eligibility determination using FY 1998 RSA-911 data and a binary logistic regression analysis. Participants included Blacks (non-Latino; $n = 46,816$), Whites ($n =$

164,183), Asian/Pacific Islander ($n = 3,098$), and AI/AN ($n = 2,476$). In contrast to previous findings, they found that Black applicants were over two times more likely to be determined eligible for VR services compared to White applicants. Likewise, they also found a positive correlation among AI/AN applicants and acceptance rates; however, this finding was not statistically significant. Also, it was noted that Asians/Pacific Islanders had a negative correlation with VR eligibility determinations (Wilson et al., 2002).

Chan et al. (2005) also investigated several factors related to acceptance rates using the FY 2001 RSA-911 data and found race to be the second most important predictor of acceptance rates (behind severe disability status). They reported that Whites and Asians with severe disabilities displayed higher acceptance rates (94% and 96%, respectively) when compared to Blacks (non-Latino; 91%), Latinos (91%), and AI/AN (93%) with severe disabilities, which is somewhat incongruent with the previous literature reporting no statistical significance or a negative correlation for individuals who identify as Asian or Pacific Islander. Distinctly, they found a difference of six percent in acceptance rates between Blacks and Whites, which fundamentally validates Capella's (2002) finding of a five percent difference in acceptance rates between Blacks and Whites (Chan et al., 2005).

Wilson and Senices (2005) also explored public VR acceptance rates by race, particularly between consumers who identify as Latino ($n = 34,563$) and all other non-Latinos ($n = 157,131$), as taken from the FY 1998 RSA-911 database. They found that identifying as Latino or non-Latino accounted for 32% of the variance (ϕ coefficient = $-.568^2$) in state-federal VR eligibility determination. Further, consumers who identified as Latino/a were more likely to be accepted for VR services in comparison to consumers who were non-Latino/a (e.g., White, Black, AI/AN, and Asian/Pacific Islander). Thus, the findings of this study were inconsistent with previous

findings (e.g., Herbert and Martinez, 1992; Dziekan and Okocha, 1993) that Latinos were one of the least likely groups to be determined eligible for VR services.

Kolakowsky-Hayner (2010) also evaluated factors related to state-federal VR acceptance rates from the FY 2001 RSA-911 database. When examining this outcome with race and ethnicity, it was also reported that Whites ($n = 3,852$) and Asians or Pacific Islander had the highest acceptance rates (86% and 85% respectively) followed by AI/AN (82%) and Blacks (non-Latinos; 82.3%). Further, the lowest acceptance rates were found among Latinos (81.6%). The findings for Asians and Pacific Islanders are compatible with Chan et al.'s (2005) findings, but contradict findings in earlier studies.

Gender. From the 2001 RSA-911 data, Chan et al. (2005) reported finding no statistically significant differences in acceptance rates by gender (56% male; 44% female). Kolakowsky-Hayner (2010) also did not find any statistically significant differences in VR acceptances when comparing males ($n = 12,151$; 66%) and females ($n = 6,153$; 34%). Similarly, Mwachofi's (2009) study also did not reveal any differences in acceptance rates by gender using FY 2004 RSA-911 data.

Education. In 2001, Wilson, Harley, and Alston revisited the interaction of race and acceptance rates as a means to validate the earlier findings of Wilson (1999). This study, however, included education as a control variable. Participants for this study (Black, non-Latinos [$n = 1,453$] and Whites [$n = 3,122$]) were taken from the FY 1998 RSA-911 database and focused on participants who were served a public VR agency in Michigan. They concluded that VR acceptance rates were dependent on race. With regards to education, they found that Blacks (non-Latino) with disabilities having a high school diploma or less were least likely to be found eligible for VR services when compared to Whites with an equal level of education

(Wilson et al., 2001). Wilson et al. (2002) also explored educational levels with eligibility determinations and reported that after controlling for educational levels, consumers with greater than a high school diploma had lower chances of being accepted for VR services (i.e., as education increased, VR acceptance rates decreased).

In a study conducted by Wilson and Gines (2009), education was found to be the third statistically significant predictor in their study of VR applicants ($n = 12,000$) acquired from the FY 1998 RSA-911 database. Applicants who had a high school diploma or higher were more likely to be determined eligible for VR services regardless of other factors such as race or significance of disability.

Kolakowsky-Hayner (2010) found education to be the most statistically significant predictor of acceptance rates. Particularly, she reported that consumers who had participated in special education services had higher acceptance rates (89%) compared to those who had received their education in a public education system (85%). Moreover, those who had a received special education services had a better rate of acceptance than those with more than a high school diploma (86%), a high school diploma or equivalent (85%), and less than a high school education (84%).

Significant disability. Chan et al. (2005) found severity of disability to be the most statistically significant predictor of acceptance rates from the 2001 RSA-911 data. Moreover, people with severe disabilities were more likely to be accepted for VR services (93%) when compared to people who had no severe disability (45%). Chan et al. also found that Asians who had a severe disability showed the highest rate of acceptance (96%) while Blacks (non-Latino) and Latinos with severe disabilities continued to have the lowest VR acceptance rates (91%). When considering applicants who did not have a severe disability, both Asians and Latinos had

the highest acceptance rates at 50% followed by Whites (45%). Those who identified as Black and had no severe disability still had the lowest rates of VR acceptance (37%). Hence, the difference in VR acceptance rates between Blacks and Whites without severe disabilities increased to 8%.

Wilson and Gines (2009) also analyzed VR eligibility determinations among a stratified sample of Blacks (non-Latinos; $n = 3,000$), Whites ($n = 3,000$), AI/AN ($n = 3,000$), and Asians/Pacific Islanders ($n = 3,000$) as obtained from the FY 1998 RSA-911 database. They found that having a severe disability was a statistically significant predictor of VR eligibility determination. Of the consumers who had a significant disability, 99.5% were certified as eligible for VR services while 96.5% of those without a significant disability were also accepted. When considering the influence of race and significant disability on acceptance rates, those who identified as Black or AI/AN and had a significant disability showed a somewhat greater rate of VR acceptance than all other racial/ethnic groups at 99.8%. For those without a significant disability, being White, Black, or AI/AN was associated with higher rates of acceptance at 97%. Further, Asians/Pacific Islanders showed the lowest rate of acceptance (93%) among those with no severe disability.

Source of support. Wilson (2000) explored the differences of acceptance rates by source of support at application. Overall, it was found that source of support was a statistically significant predictor of acceptance rates. In particular, as personal earnings increased or the more resources a consumer had at application, rates of VR acceptance somewhat decreased. Wilson et al. (2002) also explored source of support with acceptance rates and found that consumers who specifically received social support through family and friends had lower rates of becoming eligible for VR services.

Unsuccessful closure reasons. Chan et al. (2005) reviewed race and its interaction with unsuccessful closures from the FY 2001 RSA-911 data ($n = 628,248$). They found that Blacks (non-Latinos) showed the highest rates of closing for failure to cooperate (25%) while Asians had the lowest rates for this reason (12%). On the other hand, Asians displayed the highest percentages (24%) of closing for unable to locate or contact. While Whites had the highest rates of closing for refusal of services (26%), Latinos showed the lowest (15%) for this closure reason. In contrast, Latinos had the highest percentages for closing as having no disabling condition.

In 2010, Kolakowsky-Hayner also evaluated factors related to unsuccessful closure statuses among participants with varying types of brain injury who used state-federal VR services as collected from the FY 2001 RSA-911 database. The sample included Whites ($n = 15,101$; 83%), Blacks (non-Latinos; $n = 2,607$; 14%), Latinos ($n = 1,432$; 8%), AI/AN ($n = 305$; 2%), and Asian/Pacific Islanders ($n = 280$; 2%). When comparing Whites to non-Whites, she found that Whites were more likely to be closed for refusing services (32%), unable to locate/contact or moved (21%), and failure to cooperate (16%) while non-Whites were more likely to be closed for refusing services (25%), unable to locate/contact or moved (25%), and failure to cooperate (21%).

Summary of Acceptance Rates and the VR System

As found in the literature reviewed in this section, race and ethnicity also appears to have a significant influence on VR acceptance rates for consumers with disabilities. The findings, though, seem to reveal less consistency than that which was found for consumers with TBI. For example, while one study found Black (non-Latino) applicants were less likely to be accepted for VR services than White applicants (Wilson, 2002); another reported they were more likely to be accepted than Whites (Wilson et al., 2002). Wilson (2002) speculates that negative views of

particular ethnic groups may be a possible explanation for lower acceptance rates in comparison to Whites, however, Wilson et al. (2002) note that because rates of disability are higher among Blacks (non-Latino), this might explain why they found a higher acceptance rate among this population in their study. One study found Latinos to have the highest acceptance rates over non-Latinos (Wilson & Senices, 2005) while another study found Latinos to have the lowest rates of VR acceptance in comparison to Whites, Asians, AI/AN, and Blacks (non-Latino; Kolakowsky-Hayner, 2010). Moreover, Wilson and Senices (2005) point out that although their findings appear to contradict the Dziekan and Okocha (1993) study, one possible explanation could be that the participants used in the Dziekan and Okocha study were categorized as Latino only with no option to choose a race (e.g., White, Black) as participants did in the Wilson and Senices study. In addition, one study found Asians/Pacific Islanders to have one of the highest acceptance rates (Chan et al., 2005) while another found a negative correlation with identifying as Asian/Pacific Islander and VR acceptance rates (Wilson et al., 2002). For gender, three studies reported finding no statistically significant differences between males and females and acceptance into VR services (Chan et al., 2005; Kolakowsky-Hayner, 2010; Mwachofi, 2009). The findings on education were somewhat inconsistent in that those with a high school diploma or less were least likely to be accepted for VR services, especially for Black (non-Latino) applicants (Wilson et al., 2002; Wilson et al., 2001), while another found consumers with high school diplomas to have the highest rates of acceptance (Wilson & Gines, 2009). Also, another study found that consumers who had received Special Education services were more likely to be determined eligible for VR services over those with more than a high school diploma, high school diploma, or less than a high school diploma from a regular education system (Kolakowsky-Hayner, 2010).

A few of the studies also found having a severe disability to be statistically significant with acceptance into VR services compared to not having a severe disability (Chan et al., 2005; Wilson & Gines, 2009). Chan et al. notes this to be consistent with the Rehabilitation Act of 1973 in which consumers with the most severe disabilities have the highest priority in being served in state VR agencies. Also, when analyzed by race, one study reported Asians with a significant disability had the highest rate of VR acceptance while Blacks (non-Latinos) and Latinos had the lowest rates of acceptance (Chan et al., 2005). One possible explanation mentioned in the Chan et al. study regarding this finding is that consumers who present with stereotypes held by White professionals may provoke negative judgments on that particular group. Another study found that Blacks (non-Latinos) and AI/AN with significant disabilities had the highest rates of acceptance into VR services compared to all other racial or ethnic groups (Wilson & Gines, 2009). Lastly, two of the studies reviewed sources of support and its relationship with acceptance into the VR system. It was determined that higher personal earnings and receiving support from family and friends decreased a consumer's chances into being determined eligible for VR services (Wilson, 2000; Wilson et al., 2002). Finally, two of the studies also found that for Black (non-Latino) consumers who closed unsuccessfully, the reason cited was most likely failure to cooperate (Chan et al., 2005; Kolakowsky-Hayner, 2010), which validated the findings of the Atkins and Wright (1980) case.

Chapter 3: Methodology

This study investigates VR outcomes of consumers of color with TBI who were served in a state-federal VR agency across the nation during FY 2010. More specifically, this study examines predictors of successful competitive employment outcomes based on consumer demographic information, types of services, and case expenditures. This study seeks to analyze and better understand differences in VR experiences between Blacks (non-Latinos), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

Hypotheses

H₁: Among individuals with TBI who received vocational rehabilitation (VR) services, there are differences among Blacks (non-Latino), White Latinos, Black Latinos, American Indians/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders in exiting the system with a successful employment outcome.

H₂: Among individuals with TBI who achieved employment outcomes, there are differences in the types of employment (i.e., employment without supports in integrated setting, self-employment [except BEP], state-agency managed Business Enterprise Program [BEP], and employment with supports in integrated settings) achieved among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders.

H₃: There are differences in hours worked and weekly earnings among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI who achieved employment outcomes.

H₄: There are differences in acceptance rates for VR services (i.e., Status 10) among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

H₅: There are differences in amount of time counselors take to determine eligibility (i.e., Statuses 04, 06, 10) among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

H₆: There are differences in case expenditures among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

H₇: There are differences in reasons for unsuccessful closures (i.e., Statuses 08, 28, 30) among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islander with TBI.

H₈: Consumer demographic information (e.g., race/ethnicity, age, gender, level of education, significant disability), types of services, and delivery of services predicts employment outcomes among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

Research Design

This study is an ex post facto design since it explores relationships with non-manipulative independent variables. Groups and conditions have previously been formed and applied prior to the start of this study. Hypotheses are derived from the reviewed literature and tested after relationships between variables have been established. In other words, ex post facto research designs uses information that already exists among intact groups and attempts to look backward to explain how a given set of independent variables affect a dependent variable. Thus, the name

“ex post facto” literally translates to “after the fact” (Heppner, Wampold, & Kivlighan Jr., 2008). One issue with utilizing an ex post facto design is the likelihood of chance influencing the findings. Heppner et al. (2008) imply that particularly with a large set of variables, results are likely to be impacted by chance which may lead to erroneous conclusions.

Additionally, this study uses a secondary data analysis in which the data was not collected by the researcher. The data comes from the RSA-911 national database for FY 2010. This database was developed by RSA and based on data collected from all state-federal VR agencies throughout the U.S. and its territories (RSA, 2010).

Sampling

The population for this study is defined as consumers who (a) have a traumatic brain injury, (b) identify her/his race/ethnicity as either Black, White Latino/a, Black Latino/a, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders, and (c) have applied for and/or have been accepted for VR services at a state-federal VR program. Thus, the sample contains 2,505 consumers who fit these conditions.

The participant pool for this study is identified as VR consumers with documented cases in the FY 2010 RSA-911 database. This study utilizes a nonprobability sample design because not all consumers will have the same probability for participation (McCready, 2006). In this case, consumers matching the above three conditions were eligible for the participant pool. Therefore, all other consumers matching this description (e.g., consumers receiving private VR services) who are not receiving state-federal VR services would be found ineligible for participation.

The sampling method used for this study is convenience sampling. This method of sampling is a nonprobability sampling technique in which participants are selected based on

convenience. A concern with using a convenient sample is the possibility of sampling variance; specifically, the differences that may exist between members (McCready, 2006). Thus, establishing validity of the results as well as generalizing to the larger population may be difficult due to this sampling method. It would be ideal to include consumers of color with TBI who are receiving VR services through alternative agencies (e.g., Veterans Administration) as a means to increase validity, however, because a secondary database is being used, this is not possible and extends beyond the scope of this study.

Power is defined as the probability that a statistical test will yield statistically significant results to reject the null hypothesis when the null hypothesis is false (Cohen, 1988). In order to determine the power in a study, three factors must be considered including the alpha level, sample size, and effect size (Cohen, 1988). A power analysis is usually conducted at the beginning of a study to calculate the minimum sample size needed to detect a given effect size (Grimm, 1993).

Many studies conducted in the social sciences field set the alpha level (i.e., significance level; α) at .05 to indicate the probability of making a Type I (i.e., rejecting the null hypothesis when the null hypothesis is in fact true; Cohen, 1988). In other words, a .05 alpha level represents a 5% chance that a Type I error will be committed. Likewise, Type II error (i.e., β) is committed when the null hypothesis is accepted when it is actually false (Cohen, 1988). Additionally, Cohen suggests that by increasing the sample size, variance can be decreased. Effect size measures the relationship between two variables and as it increases, so does the magnitude that this relationship would exist in the larger population (Cohen, 1988). An effect size can be categorized as small, medium, or large. The effect sizes reported in the reviewed

studies ranged from .16 (small) to .28 (medium) to .53 (large) for a multiple logistic regression analysis, however, the average effect size was .16 (small).

A power analysis for this study was conducted using G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007). By setting the power to .95 with an alpha level at .05 and a small effect size, it was determined that the needed sample size was 988. This sample size is large enough for a nonprobability sampling design since changes in the dependent variable can be detected. The size of this sample, therefore, is comparable to the mean of sample sizes found in similar studies during the literature review (McCready, 2006).

Instrument

This study uses data extracted from the FY 2010 RSA-911 database. The archival data recorded in the RSA-911 is that which was provided by VR counselors for each case that was opened and closed. Subsequently, VR counselors followed federally regulated coding procedures as established by RSA (2010) to record the information.

Data Collection Procedures

All information found in consumer records is classified according to RSA's coding system, which is primarily binary and allows for easily translating responses from consumers into a computer two-digit format (Neubauer, Freudenberger, & Kuhn, 2007). The *Reporting Manual for the RSA 911 Case Services Report* is the codebook which describes reporting formats and translation for codes used in the RSA-911 database. Also, the RSA-911 database is both mutually exclusive and exhaustive. Specifically, the database is mutually exclusive since data from consumers are classified into one category (e.g., received job coaching, did not receive job coaching) and is also exhaustive because all data from consumers is placed into some type of category (Frankfort-Nachmias & Nachmias, 1996 as cited in Boutin, 2006).

It is acknowledged that some coding error may exist within the data since it is being collected from an archived database. It should be noted, though, that this database was monitored by two parties. The first party was the VR agency itself in which it is a requirement to regularly review all consumer records of each staff member involved with a caseload before the information is officially passed on to RSA. Thus, it is assumed that each VR agency systematically checks for errors in data recording. The second party that checks for errors in the RSA-911 data is the central office assigned to each agency. Agencies are given a set amount of time to correct any inconsistencies or errors (i.e., anomalies) found within the data that may have been overlooked by each individual unit (RSA, 2010).

Dependent Variables

Employment outcome is the primary dependent variable that will be examined in this study. It is a categorical variable with two levels: employed (Status 26) and not employed (Status 28 or Status 30). According to RSA (2010), the variable successful, competitive employment is described as full or part time employment in an integrated setting, becoming self employed, or employed in a state-managed Business Enterprise Program (BEP) with earnings either at or above Federal or State minimum wage. On the other hand, unsuccessful employment is characterized as consumers who were not employed upon completion of VR services.

Eligibility status (i.e., acceptance for VR services) is the secondary dependent variable that will be examined in this study. This is a categorical variable with two levels-Status 08 (closed before eligibility in which a consumer may be ineligible or withdraw from eligibility) and Status 10 (acceptance in which a consumer is certified by a VR Counselor for having a disability that results in a substantial impediment to employment, and that the consumer can benefit from VR services in terms of an employment outcome).

Independent Variables

Definitions outlined for each independent variable are based on information found in the RSA-911 Case Service Report Manual (RSA, 2010).

Race/ethnicity status. According to RSA (2010), race and ethnicity information should be recorded for all consumers who applied and/or received services through any state VR agency across the U.S. Furthermore, RSA (2010) assumes that many consumers should willingly self-identify with the given racial/ethnic categories, however, it is explicitly stated, “If a customer truly refuses to identify his/her race or Hispanic ethnicity status, the counselor should, at a minimum notify respondents that if they fail to self-identify that observer-identification may be used” (p.13). Likewise, those who identify as Latino/a must also identify with at least one of the racial categories, however, if the consumer only chooses to identify as Latino and does not identify with any of the racial categories, the same procedure outlined above must be followed by the VR counselor. The options listed for this category include Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, and Hispanic or Latino.

Age. This is a continuous variable that represents the age of the consumer and is based on the date of birth provided at application.

Gender. This is a nominal variable for either male or female. It should be noted, though, that a consumer is not required to provide a response for this variable.

Level of education attained at application. This is a nominal variable with eight categories: no formal schooling; elementary education (grades 1-8); secondary education, no high school diploma (grades 9-12); special education certificate of completion/diploma or in attendance; high school graduate or equivalency certificate (regular education students); post-

secondary education, no degree; Associate degree or Vocational/Technical certificate; Bachelor's degree; and Master's degree or higher.

Significant disability. This is also a nominal variable, which represents whether the consumer had a significant disability at any time during the VR process (i.e., significant disability, no significant disability). An individual is considered to have a significant disability when s/he had a physical or mental impairment that seriously limits one or more functional capacities towards successful employment (e.g., mobility, communication, self-care, interpersonal skills, self-direction, work tolerance, work skills), when multiple VR services can be expected over an extended period of time, and when s/he has one or more physical or mental disabilities resulting from an 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, musculoskeletal disorders, neurological disorders (i.e., stroke, epilepsy), spinal cord conditions (i.e., paraplegia, quadriplegia), sickle cell anemia, specific learning disability, end-stage renal disease, or another disability or combination of disabilities that is diagnosed following an assessment used for eligibility determination and specific VR needs.

Primary source of support at application. This is a nominal variable that represents the consumer's largest single source of financial support at the time of application. It includes personal income (e.g., earnings, interest, dividends, rent); family and friends; public support (e.g., SSI, SSDI, TANF); and all other sources (e.g., private disability insurance, private charities).

Vocational rehabilitation counseling and guidance. This is also a nominal variable which contains two levels (i.e., those who received this service and those who did receive this

service). Essentially, this service represents the rehabilitation counseling that was provided to a consumer as needed to achieve and maintain a successful employment outcome, which may relate to vocational, personal adjustment, medical, family, and social issues.

College or university training. This is a nominal variable that provides funding for post-secondary academic training with the expectations of leading to either an associate, baccalaureate, graduate, or professional degree.

Occupational/vocational training. This is also a nominal variable that supports occupational, vocational, or job skill training through a community college, vocational/trade, or technical institution.

On-the-job training. This is a nominal variable, which refers to training for job skills for a specific position.

Job readiness training. This is also a nominal variable that represents the training a consumer needs to prepare for work (e.g., appropriate work behaviors, punctuality, dressing and grooming appropriately).

Job search assistance. This is a nominal variable, which includes job search activities such as resume preparation, job interview skills, and identifying appropriate job opportunities.

Job placement. This is also a nominal variable that includes a referral to a specific job.

On-the-job supports. This is a nominal variable, which represents specialized employment supports for consumers who are working which may include job coaching and job retention services.

Transportation services. This is a nominal variable associated with travel and related expenses necessary for consumers to participate in VR services and/or employment. It may also include training to learn a public transportation system.

Maintenance services. This is also a nominal variable related to monetary support for various expenses such as food, shelter, and clothing (e.g., uniforms, professional work attire) that are necessary for a consumer's participation in VR services and employment, but exceed the cost of normal expenses.

Rehabilitation technology. This is a nominal variable, which refers to the application of technology as needed to eliminate barriers to employment, education, and independent living. This may include rehabilitation engineering services, assistive technology devices and services, personal assistance services, reader services, interpreter services, personal attendant services, and technical assistance services.

Data Analysis

For H_1 , a Chi-square test of independence will be used. This will be a 2 (type of closure) x 6 (race/ethnicity) design. Type of closure will consist of two categories; a) exited with an employment outcome and b) exited without an employment outcome, after receiving services.

For H_2 , the Chi-square test of independence will be used. This will be a 4 (employment status at closure) x 6 (race/ethnicity) design. Employment status at closure will consist of; a) employment without supports in integrated setting, b) self-employment (except BEP), c) state-agency managed Business Enterprise Program (BEP), and d) employment with supports in integrated settings.

H_3 will be examined with a one-way MANOVA. The independent variable will be consumer race/ethnicity and the dependent variables will be earnings at closure and hours worked at closure.

H_4 will be examined with a 2 (acceptance) x 6 (race/ethnicity) Chi-square test of independence. Acceptance will be a derivative variable calculated by summing cases 2-7 in

Type of Closure, which will be consumers accepted for services. Individuals who exited the VR program as applicants (#1) will be labeled as “not accepted.”

H₅ will be examined with a one-way ANOVA. Participant race/ethnicity will be the independent variable. The amount of time counselors take to determine eligibility will be the dependent variable. The amount of time counselors take to determine eligibility will be a derivative variable calculated by subtracting the date of application from the date eligibility was determined and returning the time in days or months as warranted. If a significant difference is observed, post hoc analyses will be performed to determine where specific group differences exist. Data will be analyzed on the participants accepted for services.

H₆ will be examined with a one-way ANOVA. The independent variable will be participant race/ethnicity. The dependent variable will be case expenditures. Cases in this analysis will include participants who exited the VR program with employment and those who exited without employment, after receiving services.

H₇ will be investigated with a 10 (reason for closure) x 6 (race/ethnicity) Chi-square test for independence. Reason for closure will consist of unable to locate or contact, disability too significant to benefit from VR services, refused services or further services, death, individual in institution, transferred to another agency, failure to cooperate, transportation not feasible or available, extended services not available, and all other reasons. Cases in this analysis will include participants who exited the VR program without employment, after receiving services.

H₈ will be examined with a hierarchical binary logistic regression analysis. This is considered an appropriate model given that it provides a systematic framework to test hypotheses with some set of predictor independent variables to better identify predictors with a particular dependent variable after accounting for the relationship with some set of control independent

variables and the dependent variable. Therefore, the control independent variables (i.e., age, race/ethnicity, gender, level of education attained at closure, significant disability) will be entered into Block 1, followed by the predictor independent variables (i.e., types of services, case expenditures) in Block 2. The dependent variable will be employment status at closure; closed with employment or closed without employment, after receiving services.

Data in this study will be analyzed using SPSS version 21.0 (SPSS, 2012). Descriptive statistics will be used to describe the demographic characteristics of the sample and the states in which VR services were received. To test the hypotheses, four types of analyses will be used. First, a Chi-square test of independence will be used to test VR closure by race/ethnicity, employment status at closure by race/ethnicity, acceptance rates by race/ethnicity, and reason for closures by race/ethnicity. Next, a one-way MANOVA will be used to test race/ethnicity with earnings at closure and hours worked at closure. Third, a one way ANOVA will be used to test race/ethnicity and the amount of time to make an eligibility determination; and race/ethnicity and case expenditures. Finally, a hierarchical binary logistic regression analysis will be used to test consumer demographic variables, VR service variables, and employment status at case closure. Table 1 provides an overview of the statistical tests that will be used for each hypothesis.

Table 1

Statistical Tests, Dependent, and Independent Variables

<i>Hypothesis</i>	<i>Statistical Test</i>	<i>Dependent Variable</i>	<i>Independent Variable</i>
H ₁	Chi-square	Type of closure	Race/ethnicity
H ₂	Chi-square	Employment status at closure	Race/ethnicity
H ₃	One-Way MANOVA	Earnings at closure, hours worked at closure	Race/ethnicity
H ₄	Chi-square	Acceptance	Race/ethnicity
H ₅	One-Way ANOVA	Length of time for eligibility determination	Race/ethnicity
H ₆	One-Way ANOVA	Case expenditures	Race/ethnicity
H ₇	Chi-square	Reason for closure	Race/ethnicity
H ₈	Hierarchical Binary Logistic regression	Employment status at closure	Block 1: Control independent variables (race/ethnicity, age, gender, level of education attained at closure, significant disability); Block 2: Predictor independent variables (types of services, case expenditures, amount of time it takes counselors to determine eligibility)

Chapter 4: Results

Introduction

The primary purpose of this study was to examine potential disparities within the state-federal VR system as it applied to rehabilitation outcomes and service provision among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with traumatic brain injury (TBI). In particular, employment outcomes, types of employment achieved, types of services, acceptance rates, case expenditures, hourly wages, and number of hours worked were analyzed among people of color with TBI. A secondary purpose of this study was to analyze the relationship between a set of predictor independent variables with the dependent variable (i.e., employment outcome). Past literature regarding racial and ethnic differences among people with TBI served in a state-federal VR agency has only been explored between Whites and people of color with TBI and not specifically examining people of color with TBI (Arango-Lasprilla et al., 2007; Rosenthal, Wilson, Ferrin, & Frain, 2005; Wehman, Targett, Yasuda, McManus, & Briel, 2007; Wilson, 2002).

This chapter is organized in sections including a discussion of the sample demographics, descriptive statistics for key study variables, results from the research questions including hypothesis testing results, and a final summary of the results.

Sample Demographics

There were 2,505 people of color with TBI who closed from the state-federal VR program nationwide in FY 2010; 54.9% ($n = 1,374$) were Black (non-Latino); 28.7% ($n = 720$) were White Latino; 8.2% ($n = 206$) were American Indian/Alaska Native; 5.2% ($n = 130$) were Asian; 1.7% ($n = 42$) were Black Latino; and 1.3% ($n = 33$) were Native Hawaiian/Pacific Islander (Table 2).

Table 2

Race/Ethnicity

Race/Ethnicity	<i>n</i>	%
White Latino	720	28.7
Black Latino	42	1.7
Black, Non-Latino	1,374	54.9
American Indian/Alaska Native	206	8.2
Asian	130	5.2
Native Hawaiian/Pacific Islander	33	1.3
Total	2,505	100.0

Regarding gender and age, 70% ($n = 1,757$) were males and 30% ($n = 748$) were females ranging from 15 to 72 years of age ($M = 33.51$, $SD = 12.67$). Concerning highest level of education at application, 37.4% ($n = 935$) were high school graduates or had equivalency certificates; 24.8% ($n = 620$) were high school drop-outs; and 16.1% ($n = 402$) had post-secondary education but no college degrees. A full descriptive table of all educational levels at application is presented in Table 3.

Table 3

Highest Education Level at Application

	Highest Education	<i>n</i>	%	<i>Valid %</i>	<i>Cumulative %</i>
	No formal schooling	4	.2	.2	.2
	Elementary education (grades 1-8)	75	3.0	3.0	3.2
	Secondary education (no high school diploma (grades 9-12)	620	24.8	24.8	28.0
	Special education certificate of completion/diploma or in attendance)	143	5.7	5.7	33.7
	High school graduate or equivalency certificate (regular education students)	935	37.3	37.4	71.1
	Post-secondary education, no degree	402	16.0	16.1	87.2
	Associate degree or Vocational/Technical Certificate	177	7.1	7.1	94.2
	Bachelor's degree	99	4.0	4.0	98.2
	Master's degree or higher	45	1.8	1.8	100.0
	Total	2,500	99.8	100.0	
Missing	Not Answered	5	.2		
Total		2,505	100.0		

With regard to the states in which this sample of consumers were served, close to half (48.9%) of the applicants who applied for VR services were from 10 states (Table 4), which included California (9.3%, $n = 234$), Texas (8.3%, $n = 207$), New York (5.7%, $n = 144$), Florida (4.5%, $n = 113$), North Carolina (4.4%, $n = 111$), Tennessee (3.9%, $n = 97$), Pennsylvania (3.6%, $n = 90$), Missouri (3.2%, $n = 80$), Illinois (3%, $n = 75$), and New Jersey (3%, $n = 75$).

Appendix B provides a descriptive table for all states and territories.

Table 4

Top 10 States of Application for Services

State	<i>n</i>	%
California	234	9.3
Texas	207	8.3
New York	144	5.7
Florida	113	4.5
North Carolina	111	4.4
Tennessee	97	3.9
Pennsylvania	90	3.6
Missouri	80	3.2
Illinois	75	3.0
New Jersey	75	3.0
Total	1,226	

Descriptive Statistics for Key Variables

Regarding type of closure, 10.4% ($n = 260$) exited as an applicant, before eligibility; 2.7% ($n = 67$) exited during or after extended evaluation, before eligibility; 20% ($n = 502$) exited with employment; 30.4% ($n = 762$) exited without employment, after receiving services; 2.2% ($n = 55$) exited after eligibility but before receiving services; 0.6% ($n = 14$) exited from an order of selection waiting list; and 33.7% ($n = 845$) exited after eligibility, but before an individualized plan for employment (IPE) was developed. Thus, 86.9% ($n = 2,178$) were accepted for services and 13.1% ($n = 327$) were not accepted. A rehabilitation acceptance rate of 39.72% was found for this sample. A summary of types of closure is presented in Table 5.

Table 5

Type of Closure

Type of Closure	<i>n</i>	%
Exited as an applicant, before eligibility	260	10.4
Exited during/after a trial work experience/extended evaluation, before eligibility	67	2.7
Exited with an employment outcome	502	20.0
Exited after services, without an employment outcome	762	30.4
Exited without employment, after a signed IPE, but before receiving services	55	2.2
Exited from an order of selection waiting list	14	.6
Exited without an employment outcome, after eligibility, before an IPE	845	33.7
Total	2,505	100.0

Among applicants accepted for services, it took counselors an average of 46 days to determine eligibility ($SD = 67.20$). Applicants who were employed at closure earned a mean of \$309.19 in weekly wages ($SD = \234.07), and worked a mean of 27.90 hours per week ($SD = 11.07$). Among applicants who received services, a mean of \$5,181.34 was spent on services ($SD = \$9,310.36$). Descriptive statistics reflecting central tendency and variation are presented in Table 6. Because of the large standard deviation values, the low and high values are included.

Table 6

Descriptive Statistics for Key Variables

Variable	<i>n</i>	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Amount of Time for Eligibility Determination (in days)	1,264	.00	824.00	46.00	67.20
Weekly Earnings at closure	502	\$0	\$1,923	\$309.19	\$234.07
Hours worked per week at closure	502	0	60	27.90	11.07
Cost of purchased services	1,264	\$0	\$110,829	\$5,181.34	\$9,310.36

Hypotheses

Eight research hypotheses were formulated for investigation. They were as follows:

H₁: Among individuals with TBI who received vocational rehabilitation (VR) services, there are differences among Blacks (non-Latino), White Latinos, Black Latinos, American Indians/Alaska Natives, Asians, and Native Hawaiians/Other Pacific Islanders in exiting the VR program with an employment outcome.

H₂: Among individuals with TBI who achieved employment outcomes, there are differences in the types of employment achieved among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders.

H₃: There are differences in hours worked and weekly earnings among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI who achieved employment outcomes.

H₄: There are differences in acceptance rates among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

H₅: There are differences in the amount of time counselors take to determine eligibility among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

H₆: There are differences in case expenditures among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

H₇: There are differences in reasons for closures (other than Status 26) among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

H₈: Consumer demographic information (race/ethnicity, age, gender, educational level, significant disability, public support), VR services (job search assistance, job placement assistance, on-the-job supports, maintenance, transportation, college/university training, vocational training, counseling and guidance, assistive technology), and case expenditures do predict employment outcomes among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI.

Hypothesis One – Employment Outcome by Race/Ethnicity

H₁ stated that among individuals with TBI who received vocational rehabilitation (VR) services, there are differences (dependence) among Blacks (non-Latino), White Latinos, Black Latinos, American Indians/Alaska Natives, Asians, and Native Hawaiians/Other Pacific Islanders in exiting the VR program with an employment outcome. This question was investigated with a 6 x 2 Chi-square test of independence. The findings revealed no statistically significant difference (dependence) among Blacks, White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI in exiting the system with a Status 26 (successfully closed), $X^2(n = 1,264) = 7.43, p = .191$. Successful closure rates ranged from 35% to 43.2% with an overall rehabilitation rate of 39.7%. Therefore, the null hypothesis is not rejected. A cross-tabulation of race/ethnicity by type of closure is presented in Table 7.

Table 7

Cross-tabulation of Race/Ethnicity by Type of Closure

Type of Closure	<i>Not Employed</i>	<i>Employed</i>	<i>Total</i>
White Latino	218	166	384
<i>% within race/ethnicity</i>	56.8%	43.2%	100%
<i>% of total</i>	17.2%	13.1%	30.4%
Black Latino	13	7	20
<i>% within race/ethnicity</i>	65%	35%	100%
<i>% of total</i>	1%	.6%	1.6%
Black, non-Latino	422	245	667
<i>% within race/ethnicity</i>	63.3%	36.7%	100%
<i>% of total</i>	33.4%	19.4%	52.8%
AI/AN	55	50	105
<i>% within race/ethnicity</i>	52.4%	47.6%	100%
<i>% of total</i>	4.4%	4%	8.3%
Asian	43	27	70
<i>% within race/ethnicity</i>	61.4%	38.6%	100%
<i>% of total</i>	3.4%	2.1%	5.5%
NH/PI	11	7	18
<i>% within race/ethnicity</i>	61.1%	38.9%	100%
<i>% of total</i>	.9%	.6%	1.4%
Total	762	502	1,264
<i>% within race/ethnicity</i>	60.3%	39.7%	100%
<i>% of total</i>	60.3%	39.7%	100%

Hypothesis Two – Type of Employment by Race/Ethnicity

H₂ stated that among individuals with TBI who achieved employment outcomes, there are differences in the types of employment (i.e., employment without supports in integrated setting, self-employment [except BEP], state-agency managed Business Enterprise Program [BEP], and employment with supports in integrated settings) achieved among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders. This question was initially examined with a 6 x 5 square Chi-square test of independence for each type of employment achieved. A cross-tabulation of race/ethnicity by all types of employment is presented in Table 8.

For a valid Chi-square analysis, the percentage of cells with an expected frequency (*ef*) of < 5 can be no more than 20% (Preacher, 2001). It is observed in Table 8 that the criterion was not met. Specifically, 63.3% of the cells had an *ef* < 5, primarily in the categories of Self-Employment (except BEP), Homemaker, and Unpaid Family Worker. Therefore, it was decided by the researcher to eliminate these three categories from the analysis for H₂ and only examine differences (dependence) in the employment without supports in an integrated setting and employment with supports in an integrated setting categories among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI who reach a Status 26 using a 6 x 2 Chi-square test of independence. Eighty-six percent (*n* = 138) of White Latinos were closed with employment without supports in integrated settings, compared to 72% (*n* = 176) of Black Latinos, 76% (*n* = 38) of Blacks (non-Latino), 83% (*n* = 19) of American Indian/Alaska Natives, 73% (*n* = 7) of Asians, and 100% of Native Hawaiian/Pacific Islanders. On the other hand, it was found that 14% (*n* = 22) of White Latinos, 25% (*n* = 8) of Black (non-Latino), 18% (*n* = 7) of American Indian/Alaska Natives, and 27% of Asians were employed with supports within an integrated setting. The findings of

this revised Chi-square test showed no statistically significant differences (dependence) among people of color with TBI employed with support in an integrated setting and those who were employment without supports, $X^2(n = 479) = 9.84, p = .080$. The cross-tabulation of this finding can be found in Table 9.

Table 8

Cross-tabulation of Race/Ethnicity by All Types of Employment

Types of Employment	<i>White Latino</i>	<i>Black Latino</i>	<i>Black, non-Latino</i>	<i>AI/AN</i>	<i>Asian</i>	<i>NH/PI</i>	<i>Total</i>
Employment without supports	138	5	176	38	19	7	383
<i>% within race/ethnicity</i>	83.1%	71.4%	71.8%	76%	70.4%	100%	76.3%
<i>% of total</i>	27.5%	35.1%	35.1%	7.6%	3.8%	1.4%	76.3%
Self-employment (except BEP)	4	0	5	3	0	0	12
<i>% within race/ethnicity</i>	2.4%	.0%	2%	6%	.0%	.0%	2.4%
<i>% of total</i>	.8%	.0%	1%	.6%	.0%	.0%	2.4%
Homemaker	2	0	7	0	1	0	10
<i>% within race/ethnicity</i>	1.2%	.0%	2.9%	.0%	3.7%	.0%	2%
<i>% of total</i>	.4%	.0%	1.4%	.0%	.2%	.0%	2%
Unpaid Family Worker	0	0	0	1	0	0	1
<i>% within race/ethnicity</i>	.0%	.0%	.0%	2%	.0%	.0%	.2%
<i>% of total</i>	.0%	.0%	.0%	.2%	.0%	.0%	.2%
Employment with Supports	22	2	57	8	7	0	96
<i>% within race/ethnicity</i>	13.3%	28.6%	23.3%	16%	25.9%	.0%	19.1%
<i>% of total</i>	4.4%	.4%	11.4%	1.6%	1.4%	.0%	19.1%
Total	166	7	245	50	27	7	502
<i>% within race/ethnicity</i>	100%	100%	100%	100%	100%	100%	100%
<i>% of total</i>	33.1%	1.4%	48.8%	10%	5.4%	1.4%	100%

Table 9

Cross-tabulation of Race/Ethnicity by Employment with and without Supports

Employed with and without Supports	<i>Employed without Supports</i>	<i>Employed with Supports</i>
White Latino	138	22
<i>% within race/ethnicity</i>	86.3%	32.1%
<i>% of total</i>	28.8%	4.6%
Black Latino	5	<5
<i>% within race/ethnicity</i>	71.4%	<5
<i>% of total</i>	1%	<5
Black, non-Latino	176	57
<i>% within race/ethnicity</i>	75.5%	24.5%
<i>% of total</i>	36.7%	1%
AI/AN	38	8
<i>% within race/ethnicity</i>	82.6%	17.4%
<i>% of total</i>	7.9%	1.7%
Asian	19	7
<i>% within race/ethnicity</i>	73.1%	26.9%
<i>% of total</i>	4%	1.5%
NH/PI	7	<5
<i>% within race/ethnicity</i>	100%	<5
<i>% of total</i>	1.5%	<5
Total	383	96
<i>% within race/ethnicity</i>	80%	20%
<i>% of total</i>	80%	20%

Hypothesis Three – Differences in Hours Worked and Weekly Earnings by Race/Ethnicity

H₃ stated that there are differences in hours worked and weekly earnings among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI who achieved employment outcomes.

Descriptive statistics for hours worked and weekly earnings by race/ethnicity are presented in Table 10.

Table 10

Descriptive Statistics of Race/Ethnicity and Hours Worked and Weekly Earnings

Hours Worked	<i>White Latino</i>	<i>Black Latino</i>	<i>Black, non-Latino</i>	<i>AI/AN</i>	<i>Asian</i>	<i>NA/PI</i>
<i>n</i>	166	7	245	50	27	7
<i>Mean</i>	29.03	29.43	27.36	25.66	29.33	28.86
<i>Median</i>	30.00	30.00	26.00	21.00	35.00	30.00
<i>SD</i>	10.997	9.519	11.043	11.60	11.482	9.082
<i>Minimum</i>	0	16	0	0	0	20
<i>Maximum</i>	60	40	52	40	40	40
Weekly Earnings						
<i>n</i>	166	7	245	50	27	7
<i>Mean</i>	\$342.72	\$292.00	\$283.29	\$314.74	\$325.41	\$335.71
<i>Median</i>	\$290.00	\$290.00	\$232.00	\$213.50	\$315.00	\$240.00
<i>SD</i>	\$291.08	\$184.39	\$182.06	\$267.15	\$183.08	\$271.28
<i>Minimum</i>	\$0	\$116	\$0	\$0	\$0	\$147
<i>Maximum</i>	\$1,923	\$674	\$1,144	\$1,200	\$702	\$920

Because there was not a normal distribution for these variables within this sample as shown in Figures 1 and 2, it was determined that analyzing findings using a Kruskal-Wallis H test would be an appropriate alternative to using a one-way MANOVA (Siegel & Castellan Jr., 1988). The Kruskal-Wallis H test, an extension of the Mann-Whitney U test, is considered the non-parametric equivalent to the one-way ANOVA and is used for making comparisons between two or more independent samples (Siegel & Castellan Jr., 1988). Kruskal-Wallis uses the median values in making comparisons, whereas MANOVA uses mean values and has a statistical assumption that the distribution for the dependent variable(s) is fairly normal.

The outcome of the Kruskal-Wallis H test revealed no statistically significant differences (dependence) in the median hours worked and median weekly earnings among Blacks, White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI (hours worked: $H = 4.753$ [4, $n = 502$], $p = .314$; weekly earnings: $H = 4.708$ [4, $n = 502$], $p = .319$). Therefore, the null hypothesis is not rejected. The results of the Kruskal-Wallis H tests are presented in Table 11.

Figure 1

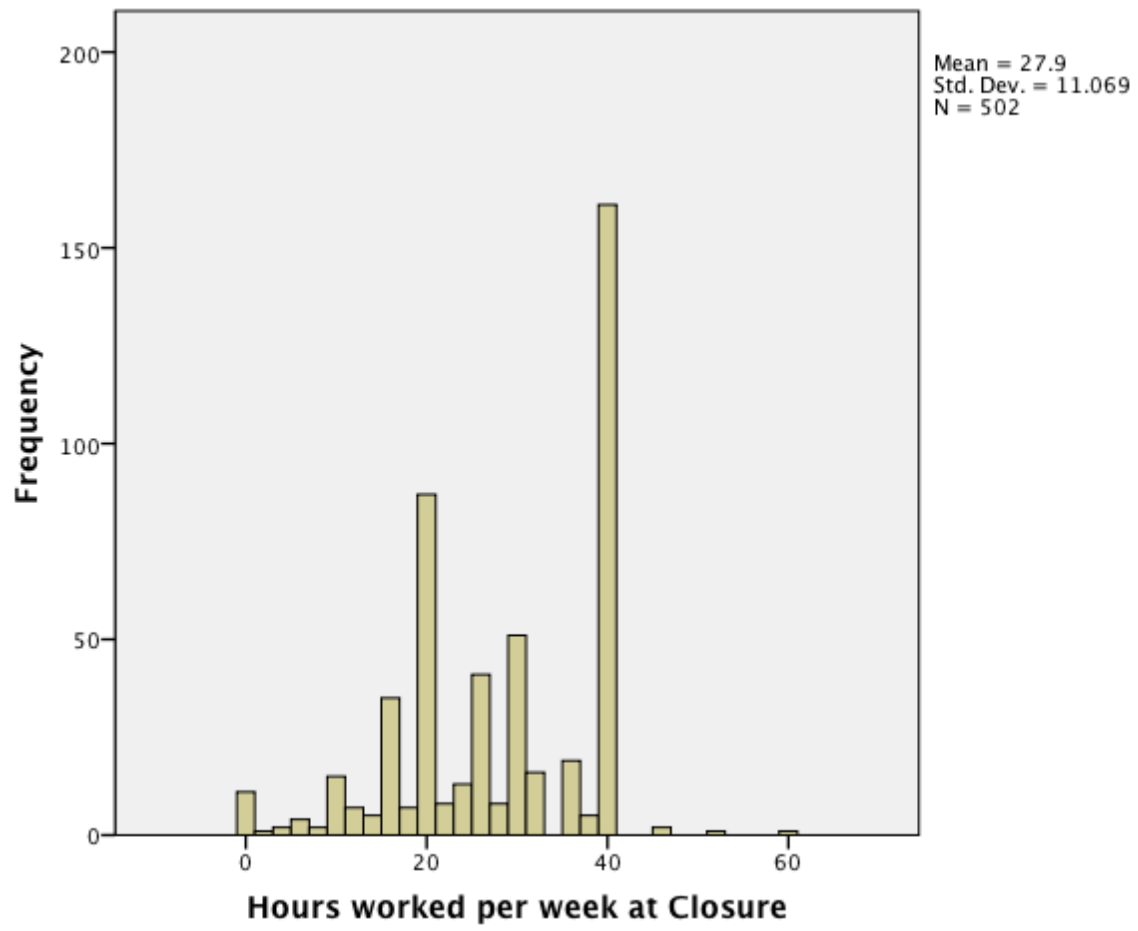


Figure 2

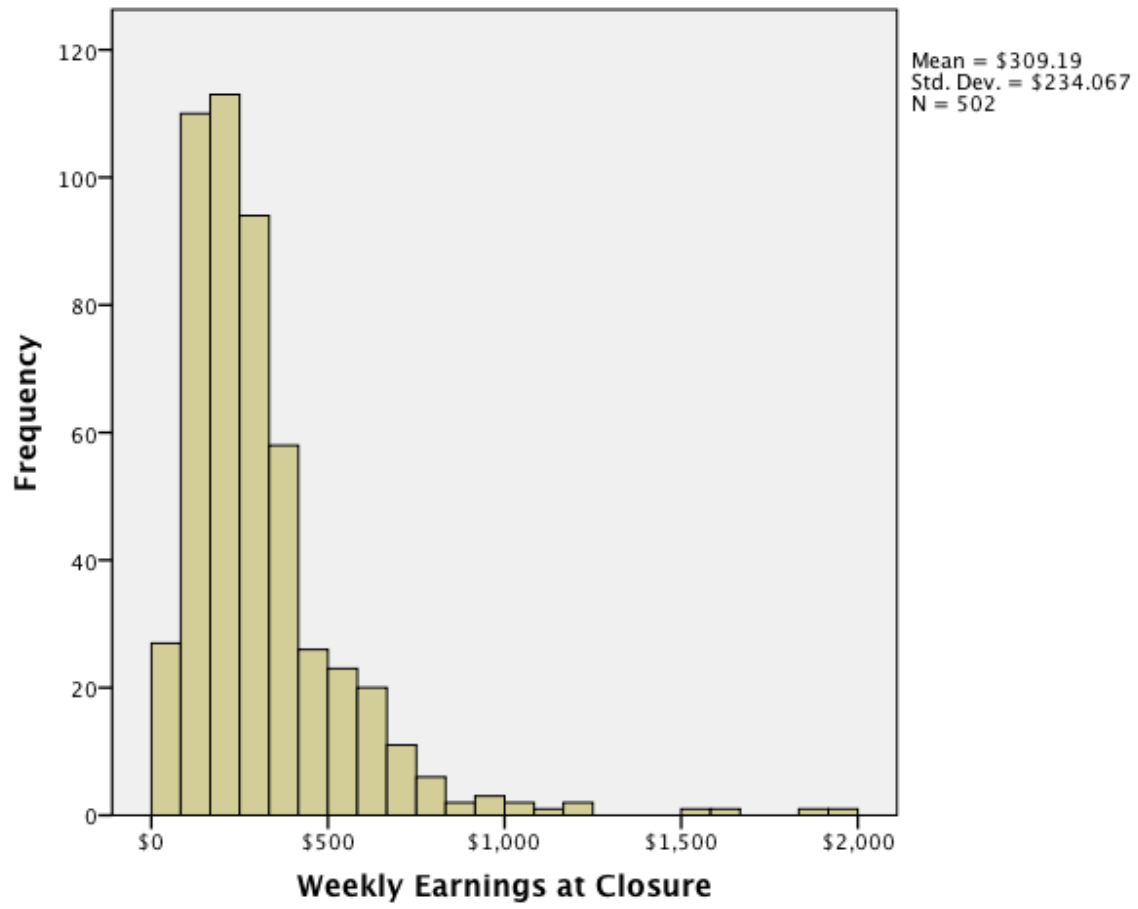


Table 11

Kruskal-Wallis Analysis of Race/Ethnicity and Hours Worked and Weekly Earnings

Test Statistics	<i>Hours worked per week at closure</i>	<i>Weekly earnings at closure</i>
<i>Chi-Square</i>	4.753	4.708
<i>Df</i>	4	4
<i>Asymp. Sig.</i>	.314	.319

Hypothesis Four – Acceptance Rates by Race/Ethnicity

H₄ stated there are differences in acceptance rates among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. This research question was examined with a 2 x 6 Chi-square test of independence. From the results, there was no statistically significant difference (dependence) in acceptance rates for VR services (i.e., Status 10) among Blacks, White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI, $X^2(n = 2,505) = 8.31, p = .140$. Acceptance rates ranged from 81% to 91.5% with an overall acceptance rate of 86.9%. Therefore, the null hypothesis was not rejected. A cross-tabulation of race/ethnicity by acceptance is presented in Table 12.

Table 12

Cross-tabulation of Race/Ethnicity by Acceptance

Acceptance Rates	<i>Not Accepted</i>	<i>Accepted</i>	<i>Total</i>
White Latino	89	631	720
<i>% within race/ethnicity</i>	12.4%	87.6%	100%
<i>% of total</i>	3.6%	25.2%	28.7%
Black Latino	8	34	42
<i>% within race/ethnicity</i>	19%	81%	100%
<i>% of total</i>	.3%	1.4%	1.7%
Black, non-Latino	196	1,178	1,374
<i>% within race/ethnicity</i>	14.3%	85.7%	100%
<i>% of total</i>	7.8%	47%	54.9%
AI/AN	20	186	206
<i>% within race/ethnicity</i>	9.7%	90.3%	100%
<i>% of total</i>	.8%	7.4%	8.2%
Asian	11	119	130
<i>% within race/ethnicity</i>	8.5%	91.5%	100%
<i>% of total</i>	.4%	4.8%	5.2%
NH/PI	3	30	33
<i>% within race/ethnicity</i>	9.1%	90.9%	100%
<i>% of total</i>	.1%	1.2%	1.3%
Total	327	2,178	2,505
<i>% within race/ethnicity</i>	13.1%	86.9%	100%
<i>% of total</i>	13.1%	86.9%	100%

Hypothesis Five – Amount of Time for Eligibility Determination by Race/Ethnicity

H₅ stated that there are differences in the amount of time counselors take to determine eligibility among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. Given that the distribution for this research hypothesis did not approximate a normal distribution (Figure 3), this hypothesis was examined with a Kruskal-Wallis H test. Results indicated no statistically significant differences (dependence) in the amount of time it took VR counselors to make an eligibility determination for VR services as a function of client ethnicity, $H = 7.42$ (4, $n = 2,178$), $p = .115$. Therefore, the null hypothesis cannot be rejected. The results of this Kruskal-Wallis H test are shown in Table 13.

Figure 3

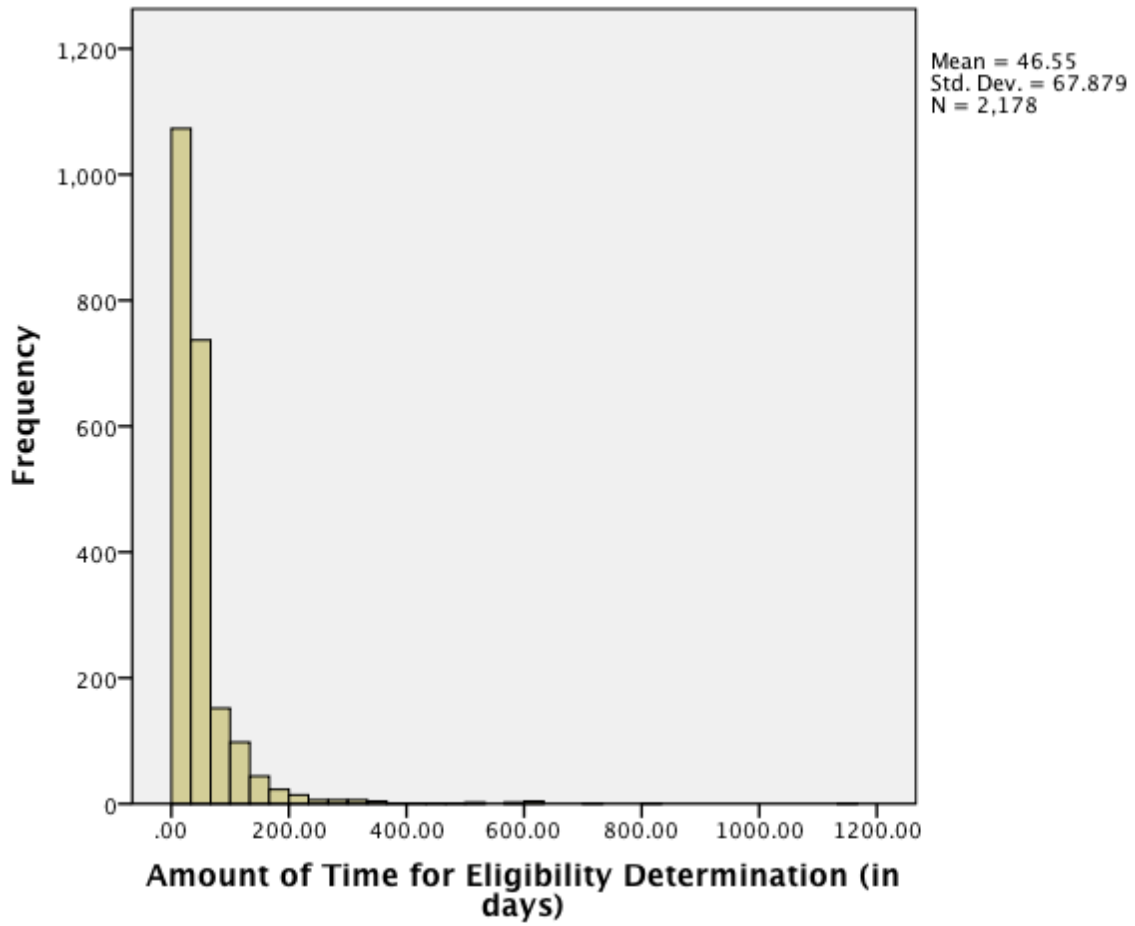


Table 13

Kruskal-Wallis Analysis of Race/Ethnicity and Amount of Time for Eligibility Determination

Eligibility Determination (Days)	<i>White Latino</i>	<i>Black Latino</i>	<i>Black, non-Latino</i>	<i>AI/AN</i>	<i>Asian</i>	<i>NA/PI</i>
<i>n</i>	631	34	1,178	186	119	30
<i>Mean</i>	48.54	80.09	47.18	36.32	39.50	33.63
<i>Median</i>	41.00	51.00	31.50	26.50	35.00	36.50
<i>SD</i>	74.69	115.52	68.67	37.88	35.05	39.37
<i>Minimum</i>	.00	.00	.00	.00	.00	.00
<i>Maximum</i>	1,163	571	824	215	224	186

Test Statistics:	<i>Amount of Time for Eligibility Determination (in days)</i>
<i>All Groups</i>	
<i>Chi-Square</i>	7.419
<i>Df</i>	4
<i>Asymp. Sig.</i>	.115

Hypothesis Six

H_6 stated that there are differences in case expenditures among Blacks (non-Latinos), White Latinos, Black Latinos, American Indian/Alaska Native, Asian Americans, and Native Hawaiian/Other Pacific Islander with TBI. To test for differences, an omnibus test using a Kruskal-Wallis H test was conducted due to the skewness of the variable (Figure 4). Cases in this analysis included participants who exited the VR program as successfully employed and those who exited unemployed after receiving services. Outcomes of this analysis revealed a statistically significant difference in case expenditures among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI, $H = 12.19 (4, n = 2,505), p = .016$. Therefore, the null hypothesis is rejected. Findings of the Kruskal-Wallis H test for race/ethnicity by case expenditures are presented in Table 14.

Figure 4

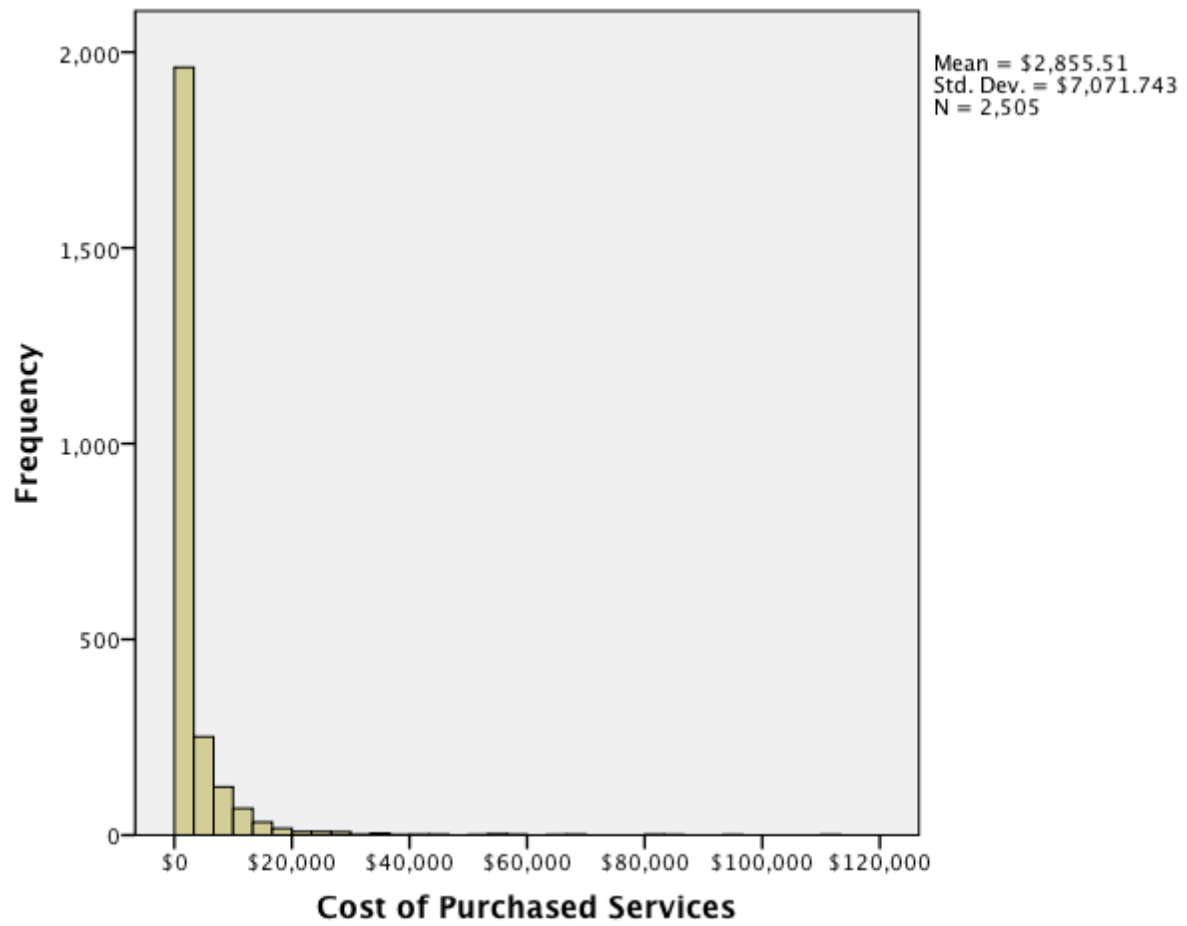


Table 14

Kruskal-Wallis Analysis of Race/Ethnicity and Case Expenditures

Test Statistics	Case Expenditures
<i>Chi-Square</i>	12.190
<i>Df</i>	4
<i>Asymp. Sig.</i>	.016

To further examine how many case dollars were spent on each particular group, a frequency using a split file for each of the six groups was computed. Black Latinos with TBI had the highest amount of case expenditures (*MDN* = \$4,306) followed by Asians (*MDN* = \$3,538), and American Indian/Alaska Natives (*MDN* = \$3,300). Descriptive findings of this variable for all groups are displayed in Table 15.

Table 15

Descriptive Statistics of Race/Ethnicity and Case Expenditures by Group

Case Expenditures	<i>White Latino</i>	<i>Black Latino</i>	<i>Black, non-Latino</i>	<i>AI/AN</i>	<i>Asian</i>	<i>NA/PI</i>
<i>n</i>	720	42	1,374	206	130	33
<i>Mean</i>	\$3,188	\$4,306	\$2,575	\$3,003	\$3,538	\$1,812
<i>Median</i>	\$831	\$1,262	\$466	\$905	\$940	\$613
<i>SD</i>	\$7,573	\$11,347	\$6,743	\$5,456	\$8,582	\$3,025
<i>Minimum</i>	\$0	\$0	\$0	\$0	\$0	\$0
<i>Maximum</i>	\$83,261	\$68,032	\$110,829	\$36,579	\$85,416	\$11,934

VR services provided to each group were also examined. The services provided the most to this sample were assessment services followed by counseling/guidance. The least provided services were reader services, interpreter services, and personal attendant assistance. The services provided the most and least is shown in Table 16. A descriptive table of all services provided to this sample is presented in Appendix C.

Table 16

Most and Least VR Services Provided by Race/Ethnicity

VR Service	<i>White Latino</i>	<i>Black Latino</i>	<i>Black, non- Latino</i>	<i>AI/AN</i>	<i>Asian</i>	<i>NH/PI</i>	<i>Total</i>
Assessment	479	26	781	142	89	22	1,539
<i>% within service</i>	31.1%	1.7%	50.7%	9.2%	5.8%	1.4%	100%
<i>% within race/ethnicity</i>	66.5%	61.9%	56.8%	68.9%	68.5%	66.7%	61.4%
<i>% of total</i>	19.1%	1%	31.2%	5.7%	3.6%	.9%	61.4%
Counseling/Guidance	421	16	666	122	74	18	1,317
<i>% within service</i>	32%	1.2%	50.6%	9.3%	5.6%	1.4%	100%
<i>% within race/ethnicity</i>	58.5%	38.1%	48.5%	59.2%	56.9%	54.5%	52.6%
<i>% of total</i>	16.8%	.6%	26.6%	4.9%	3%	.7%	52.6%
Reader Services	1	0	3	0	0	0	4
<i>% within service</i>	25%	0%	75%	0%	0%	0%	.2%
<i>% within race/ethnicity</i>	.1%	0%	.2%	0%	0%	0%	.2%
<i>% of total</i>	0%	0%	.1%	0%	0%	0%	.2%
Interpreter Services	2	0	3	1	1	0	7
<i>% within service</i>	28.6%	0%	42.9%	14.3%	14.3%	0%	100%
<i>% within race/ethnicity</i>	.3%	0%	.2%	.5%	.8%	0%	.3%
<i>% of total</i>	.1%	0%	.1%	0%	0%	0%	.3%
Personal Attendant	4	0	2	1	1	0	8
<i>% within service</i>	50%	0%	25%	12.5%	12.5%	0%	100%
<i>% within race/ethnicity</i>	.6%	0%	.1%	.5%	.8%	0%	.3%
<i>% of total</i>	.2%	0%	.1%	0%	0%	0%	.3%

Since statistical differences were found between case expenditures and race/ethnicity, a post hoc analysis was conducted due to the potential of an inflated Type I error. Post hoc means “after the fact” and is useful for investigating additional statistically significant differences through further analyses after an overall statistically significant difference is detected (Urda, 2010). For this study, a series of 15 pairwise comparisons were conducted using the Bonferroni correction method. A Bonferroni correction is “an adjustment made to P values when several dependent or independent statistical tests are being performed simultaneously on a single data set” (Napierala, 2012; p. 40). This type of test is also used to reduce the likelihood of obtaining false positive results, or Type I errors, by using multiple pairwise comparisons on a single set of data (Napierala, 2012). After using the Bonferroni correction for this hypothesis (Table 17), it was revealed that none of the 15 pairs reached a p -value of .003 or less (as calculated by dividing 15 by the initial p -value of .05), which indicates that no statistically significant differences exist between case expenditures and race/ethnicity.

Table 17

Bonferroni Correction of Case Expenditures and Race/Ethnicity

Sample 1-Sample 2	<i>Test Statistic</i>	<i>Sig.</i>	<i>Adj. Sig.</i>
Black (non-Latino), NH/PI	.284	.594	1.000
Black (non-Latino), White Latino	.4877	.027	.408
Black (non-Latino), AI/AN	.3774	.052	.781
Black (non-Latino), Asian	3.368	.066	.997
Black (non-Latino), Black Latino	.883	.347	1.000
NH/PI, White Latino	.778	.378	1.000
NH/PI, AI/AN	.288	.592	1.000
NH/PI, Asian	1.756	.185	1.000
NH/PI, Black Latino	1.125	.289	1.000
White Latino, AI/AN	.025	.874	1.000
White Latino, Asian	.327	.567	1.000
White Latino, Black Latino	.403	.525	1.000
AI/AN, Asian	.050	.823	1.000
AI/AN, Black Latino	.459	.498	1.000
Asian, Black Latino	.504	.478	1.000

Hypothesis Seven

H₇ stated that there are differences (dependence) in reasons for closures (other than Status 26) among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders. Reason for closure included unable to locate or contact, disability too significant to benefit from VR services, refused services, death, individual in institution, transferred to another agency, failure to cooperate, transportation not feasible or available, extended services not available, and all other reasons. Cases in this analysis included participants who exited the VR program without employment, after receiving services. This research question was initially investigated with a 10 (reason for closure) x 6 (race/ethnicity) Chi-square test of independence. A cross-tabulation of race/ethnicity and square results by all reasons for closure is presented in Appendix D.

Since over 20% of the cells did not meet the five or more expected frequency requirement for a valid Chi-square result (Preacher, 2001), the researcher decided to collapse this variable into four categories (unable to locate, refused services, failure to cooperate, and all other closure reasons) using results from previous literature and re-analyze using the same statistical procedure. Subsequent re-analysis indicated that no statistically significant differences in the closure reasons were found among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI, $X^2(n = 1,420) = 7.45, p = .679$. Therefore, the null hypothesis cannot be rejected. Results of this cross-tabulation and Chi-square test are shown in Table 18.

Table 18

Cross-tabulation of Race/Ethnicity by Reason for Closure (Unable to Locate, Refused Services, Failure to Cooperate, All Other Reasons)

Revised Reason for Closure	<i>White Latino</i>	<i>Black Latino</i>	<i>Black, non-Latino</i>	<i>AI/AN</i>	<i>Asian</i>	<i>NH/PI</i>	<i>Total</i>
Unable to Locate	151	15	296	38	22	7	529
<i>% within race/ethnicity</i>	21%	35.7%	21.5%	18.4%	16.9%	21.2%	21.1%
<i>% within closure reason</i>	28.5%	2.8%	56%	7.2%	4.2%	1.3%	100%
<i>% within total</i>	6%	.6%	11.8%	1.5%	.9%	.3%	21.1%
Refused Services	138	7	267	44	22	6	484
<i>% within race/ethnicity</i>	19.2%	16.7%	19.4%	21.4%	16.9%	18.2%	19.3%
<i>% within closure reason</i>	28.5%	1.4%	55.2%	9.1%	4.5%	1.2%	100%
<i>% of total</i>	5.5%	.3%	10.7%	1.8%	.9%	.2%	19.3%
Failure to Cooperate	107	8	245	32	12	3	407
<i>% within race/ethnicity</i>	14.9%	19%	17.8%	15.5%	9.2%	9.1%	16.2%
<i>% within closure reason</i>	26.3%	2.0%	60.2%	7.9%	2.9%	.7%	100%
<i>% of total</i>	4.3%	.3%	9.8%	1.3%	.5%	.1%	16.2%
All Other Reasons	324	12	566	92	74	17	1,085
<i>% within race/ethnicity</i>	45%	28.6%	41.2%	44.7%	56.9%	51.5%	43.3%
<i>% within closure reason</i>	29.9%	1.1%	52.2%	8.5%	6.8%	1.6%	100%
<i>% of total</i>	12.9%	.5%	22.6%	3.7%	3.0%	.7%	43.3%
Total	720	42	1,374	206	130	33	2,505
<i>% within race/ethnicity</i>	100%	100%	100%	100%	100%	100%	100%
<i>% within closure reason</i>	28.7%	1.7%	54.9%	8.2%	5.2%	1.3%	100%
<i>% of total</i>	28.7%	1.7%	54.9%	8.2%	5.2%	1.3%	100%

Hypothesis Eight

H₈ stated that consumer demographic information (race/ethnicity, age, gender, educational level, significant disability, public support), types of services (job search assistance, job placement assistance, on-the-job supports, maintenance, transportation, college/university training, vocational training, counseling and guidance, assistive technology), and case expenditures predict employment outcomes among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. This hypothesis was examined with a hierarchical binary logistic regression. Employment outcome was the dichotomous, dependent variable (employed, not employed). Demographic variables were entered in Block One as control variables, and case service variables were entered in Block Two. The square omnibus test for Block One of the model was statistically significant, $X^2(n = 1,246) = 58.78, p < .001$. The Nagelkerke R-square = .063, which means that 6.3% of the variance in employment outcomes can be explained by demographic variables. After the inclusion of Block Two, this model was statistically significant, $X^2(n = 1,246) = 213.85, p < .001$. The Nagelkerke R-square = .368, which indicated that 36.8% of the variance in employment outcomes can be explained by demographic and case service variables. Among the significant demographic variables, education at application was a significant, positive predictor of employment, the odds ratio (*OR*) value was equal to 1.15 with a *p*-value of .001. (*OR* = 1.15; 95% CI: 1.058-1.247). Each unit increase in education was associated with an increase in the odds of employment by a factor of 1.12. The receipt of supplemental security income (SSI) was a significant, negative predictor of employment, *OR* = .370; 95% CI: .275-.498, *p* < .000. If applicants received SSI at application, their odds of obtaining employment at closure were decreased by a factor of .370. The receipt of social security disability insurance

(SSDI) was a significant, negative predictor of employment, $OR = .695$; 95% CI: .520-.928), $p = .014$. If applicants received SSDI at application, their odds of obtaining employment at closure were decreased by a factor of .695.

Among the significant case service variables, job placement was a significant, positive predictor of employment, $OR = 3.99$; 95% CI: 3.015-5.305, $p < .000$. If applicants received job placement, they were almost four times as likely to obtain competitive employment compared to those who did not receive this service. On-the-job supports were also a significant, positive predictor of employment, $OR = 3.95$; 95% CI: 2.848-5.467, $p < .000$. Similar to job placement, consumers who received on-the-job supports were almost four times as likely to close successfully compared to those who did not receive this service. Next, the provision of maintenance was a significant, positive predictor of employment, $OR = 2.214$; 95% CI: 1.550-3.161, $p < .000$. If applicants received maintenance, their odds of obtaining employment increased over two times. Also, occupational/vocational training was a statistically significant, positive predictor of successful employment, $OR = 1.70$; 95% CI: 1.139-2.514, $p = .009$. Consumers who received occupational/vocational training were almost two times as likely to close successfully compared to those who did not receive this service. Also, counseling/guidance was found to be a statistically significant, positive predictor of employment, $OR = 1.89$; 95% CI: 1.433-2.487, $p < .000$. This indicates that consumers who received counseling and guidance were almost two times as likely to obtain competitive employment. Case expenditures were a significant, positive predictor of employment, $OR = 1.00$; 95% CI: 1.000-1.000, $p < .000$. For each unit increase in case expenditures, the odds of participants obtaining employment increased by a factor of 1.26. Based on these findings, the null hypothesis is rejected. These results are presented in Table 19.

Table 19

Hierarchical Logistic Regression Results

Block One	B.	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Sex (1=Male, 2=Female)	-.008	.134	.004	1	.952	.992	.763	1.289
Race_Ethnicity (R/E)			3.243	5	.663			
R/E (Black Latino)	-.391	.508	.591	1	.442	.677	.250	1.832
R/E (Black non-Latino)	-.177	.138	1.641	1	.200	.838	.639	1.098
R/E (AI/AN)	.091	.229	.156	1	.693	1.095	.699	1.716
R/E (Asian)	-.235	.291	.650	1	.420	.791	.447	1.399
R/E (NH/PI)	-.262	.532	.243	1	.622	.769	.271	2.183
Age	-.008	.006	2.072	1	.150	.992	.981	1.003
Education at App	.139	.042	10.880	1	.001	1.149	1.058	1.247
*Sig. Disability	.379	.371	1.042	1	.307	1.460	.706	3.020
*SSI	-.995	.152	42.910	1	.000	.370	.275	.498
*TANF	-.926	.578	2.568	1	.109	.396	.128	1.229
*General Asst (Govt.)	-.179	.341	.274	1	.600	.836	.428	1.633
*SSDI	-.365	.148	6.070	1	.014	.695	.520	.928
*Veterans' Benefits	-1.315	1.117	1.386	1	.239	.268	.030	2.396
*Workers' Comp	-.439	.667	.432	1	.511	.645	.174	2.385
*Other Public Support	-.160	.257	.387	1	.534	.852	.515	1.411
Block Two								
*Job Search	.206	.160	1.658	1	.198	1.229	.898	1.681
*Job Placement	1.386	.144	92.455	1	.000	3.999	3.015	5.305
*On the Job Supports	1.373	.166	68.130	1	.000	3.946	2.848	5.467
*Maintenance	.795	.182	19.094	1	.000	2.214	1.550	3.161
*Transportation	.178	.140	1.614	1	.204	1.194	.908	1.571
*College/University	.361	.200	3.251	1	.071	1.435	.969	2.126
*Occ/Voc Training	.526	.202	6.779	1	.009	1.692	1.139	2.514
*Counseling	.635	.141	20.379	1	.000	1.887	1.433	2.487
*Rehab Technology	-.085	.259	.108	1	.742	.918	.552	1.526
Expenditures	.000	.000	22.352	1	.000	1.000	1.000	1.000
Constant	-2.945	.451	42.576	1	.000	.053		

a. Variable(s) entered on step 1: Job_Search, Job_Placement, On_the_Job_Supports, Maintenance, Transportation, College_University, Occupational_Vocational_Training, Counseling, Rehab_Technology, case_expend.

b. All variables with (*) were coded as 0=Not Provided, 1=Provided.

Because the receipt of SSI and SSDI were the only variables found to be negative predictors of employment outcomes, a post hoc analysis using a Chi-square test of independence was conducted to further analyze if differences existed between SSI and SSDI, and type of closure. Results revealed a statistically significant difference for recipients of SSI ($X^2 [n = 2,454] = 60.86, p < .000$) and SSDI ($X^2 [n = 2,454] = 15.91, p = .014$). A cross-tabulation of the full results is presented in Appendix E.

Summary of Findings

Eight research questions and associated hypotheses were tested. No significant disparities were observed in type of closure, employment status at closure, earnings at closure, hours worked at closure, acceptance rates, length of time for eligibility determinations, case expenditures, and reasons for closure among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. The rehabilitation rate for this population was 39.72%.

Hierarchical logistic binary regression investigated the predictors of employment. The square omnibus test for Block One of the model was statistically significant, $X^2(n = 1,246) = 58.78, p < .001$. The Nagelkerke R-square for demographic variables was .063. The model after the inclusion of Block Two of the model was statistically significant, $X^2(n = 1,246) = 213.85, p < .001$. The Nagelkerke R-square = .368, which indicated that 36.8% of the variance in employment outcomes can be explained by demographic and case service variables. Among the significant demographic variables, education at application was a statistically significant, positive predictor of employment. Each unit increase in education was associated with an increase in the odds of employment by a factor of 1.15. The receipt of SSI and SSDI were

statistically significant, negative predictors of employment with .370 and .695 decreased odds of obtaining competitive employment, respectively.

Among the significant case service variables, job placement and on-the-job supports were statistically significant, positive predictors of employment. If consumers received job placement or on-the-job supports, their odds of obtaining employment at closure were increased by a factor of 3.999 and 3.946, respectively. The provision of maintenance was a statistically significant, positive predictor of employment with an increase of 2.21 odds of obtaining competitive employment. Occupational/vocational training was also a statistically significant, positive predictor of employment with increased odds of 1.70. Counseling/guidance was also a statistically, positive predictor of employment with a 1.89 increased odds of obtaining competitive employment. Case expenditures were a statistically significant, positive predictor of successful employment. For each unit increase in case expenditures, the odds of participants obtaining employment increased by a factor of 1.00. A summary of the findings for each hypothesis can be found on Table 20. Implications of these findings will be discussed in Chapter Five.

Table 20

Hypotheses, Statistical Tests, and Outcomes

Hypothesis	Statistical Test	Significance	Supported/Not Supported
H ₁ : Among individuals who VR services, there are differences among Blacks (non-Latinos), White Latinos, Black Latinos, AI/AN, Asians, and NH/PI in exiting with an employment outcome.	Chi-square	$p = .191$	Not Supported
H ₂ : Among individuals who achieved employment outcomes, there are differences in the types of employment achieved among Blacks (non-Latinos), White Latinos, Black Latinos, AI/AN, Asians, and NH/PI with TBI.	Chi-square	$p = .080$	Not Supported
H ₃ : There are differences in hours worked and hourly wages among Blacks (non-Latinos), White Latinos, Black Latinos, AI/AN, Asians, and NH/PI who achieved employment outcomes.	Kruskal-Wallis H	$p = .314$; $p = .319$	Not Supported
H ₄ : There are differences in acceptance rates among Blacks (non-Latinos), White Latinos, Black Latinos, AI/AN, Asians, and NH/PI.	Chi-square	$p = .140$	Not Supported
H ₅ : There are differences in amount of time counselors take to determine eligibility among Blacks (non-Latinos), White Latinos, Black Latinos, AI/AN, Asians, and NH/PI.	Kruskal-Wallis H	$p = .115$	Not Supported
H ₆ : There are differences in case expenditures among Blacks (non-Latinos), White Latinos, Black Latinos, AI/AN, Asians, and NH/PI.	Bonferroni Correction test	$p > .003$	Not Supported
H ₇ : There are differences in reasons for closures (other than achieving employment outcomes) among Blacks (non-Latinos), White Latinos, Black Latinos, AI/AN, Asians, and NH/PI.	Chi-square	$p = .679$	Not Supported
H ₈ : Consumer demographic information and delivery of services predict employment outcomes among Blacks (non-Latinos), White Latinos, Black Latinos, AI/AN, Asians, and NH/PI.	Hierarchical Binary Logistic Regression	$p < .001$ for model, but not all variables were significant predictors of employment	Partially Supported

Chapter 5: Discussion

This study examined disparities in VR outcomes and services among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. This chapter summarizes findings regarding consumer characteristics and results for each hypothesis. A discussion of the study's limitations will follow as well as implications for practice and future research.

Summary of Descriptive Statistics

Almost 40% of this sample was accepted for state-federal VR services during FY 2010. Twenty percent of this sample closed in a Status 26 (successful employment outcome) while 30% closed in a Status 28 (unsuccessful employment outcome after IPE services). Specifically, 19% of Blacks (non-Latino), 14% of Latinos (both Black and White), 4% of American Indian/Native Alaskans, 2% of Asians, and less than 1% of Native Hawaiian/Pacific Islanders with TBI closed in a Status 26.

Although direct comparisons cannot be made with previous studies that examined VR outcomes for people with TBI since this is the first study to do so only among people of color, it is worth noting that these findings do not show any similarities with the earlier studies as the percentages for people of color who were employed at case closure from this study was much lower. Particularly, Cardoso et al. (2007) reported a 49% successful rehabilitated rate among Latinos with TBI while Rahimi et al. (2009) reported a rate of 46% for Blacks, non-Latinos. Further, Catalano et al. (2006) found American Indian/Native Alaskans with TBI to have the highest employment rate at 50%, followed by Asians at 44%, Blacks (non-Latino) at 42%, and Latinos at 41%. Consequently, it could be that the rates of successful employment could

increase if Whites with TBI who were served in a state-federal VR agency during FY 2010 were included in this study.

In terms of Status 28 rates, 60% of this sample did not achieve successful vocational rehabilitation closure rates. As one would expect on the basis of 26 closure rates, the unsuccessful outcome rate reported in this study was also lower than Status 28 rates reported in previous studies. Cardoso et al. (2007) reported a rate of 51% for Latinos with TBI while Rahimi et al. (2009) reported a 54% Status 28 rate for Blacks (non-Latino).

When compared to the employment rates of people with disabilities in the larger population, at least 15% were unemployed in 2010 compared to only 9% for persons without a disability (Bureau of Labor Statistics [BLS], 2012), a rate much lower than that found in this study and previous studies. Among the larger population, Blacks (non-Latino) with disabilities had the highest unemployment rate at 23.5% followed by Latinos (20%), while Asians (11%) had the lowest. On the other hand, almost 19% of persons with disabilities were employed compared to 64% among persons with no disability in the larger population. Specifically, 18% were Asian (a similar rate found among Whites), 16% were Latino/a, and 13% were Black (non-Latino). Thus, the rates for people of color with disabilities in the national population were higher than the rates found in this study. This could be a reflection of the implication a disability type may have on the ability to obtain and maintain employment.

Among those who were employed at closure, the average weekly earnings were \$309.19 and the average working hours per week was 28 hours. The acceptance rate for VR services in FY 2010 among this sample was 87%. For those who were accepted for VR services, it took counselors an average of 46 days to make an eligibility determination. With regards to case expenditures, counselors spent an average of \$9,310 on VR services for people of color with TBI

during FY 2010. This finding was over \$4,500 higher than that reported in the Catalano et al. (\$4,809; 2006) study.

Hypothesis One

Hypothesis one stated statistically significant differences with achieving a Status 26 would occur among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. Contrary to the hypothesis, the results showed that there were no statistically significant differences with reaching a successful employment outcome among this sample in FY 2010. This result is similar to findings reported by Johnstone et al. (2003) and Lustig et al. (2003) who also found no statistically significant differences in VR outcomes based on race and ethnicity among consumers with TBI. On the other hand, this study differs from the findings of Catalano et al. (2006), Cardoso et al. (2007), and Rahimi et al. (2009) who each found that race and ethnicity contributed to statistically significant differences with VR outcomes (Status 26 and Status 28) among consumers with TBI.

The expectation that differences in achieving successful VR outcomes as a function of a consumer's race or ethnicity is something that has been well documented in the literature (i.e., Atkins & Wright, 1980; Dziekan & Okacha, 1993; Herbert & Martinez, 1992; Jackson II & Wilson, 2001; Patterson et al., 2000; & Wilson, 2005). In accounting for why current findings are not consistent with prior studies, there are several considerations worth noting. First, the current study focused on comparisons of people of color as opposed to comparisons between White and non-White groups. Although no statistical differences existed among this sample, it is unknown if differences would have been detected if Whites with TBI were included in the analyses. Second, the current study focused exclusively on vocational rehabilitation of persons

with TBI as opposed to an examination of all client disabilities. It may be that statistical differences exist by disability.

Hypothesis Two

Hypothesis two indicated there would be statistically significant differences in the types of employment (i.e., employment without supports in integrated setting and employment with supports in integrated settings) among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI who achieved a Status 26. After eliminating the categories of self-employment (except BEP), homemaker, and unpaid family worker because of insufficient numbers to conduct the statistical analysis needed, results of the Chi-square test revealed no statistically significant differences between those who were employed with supports in an integrated setting or those who were employed without supports in an integrated setting. Specifically, this study found that 80% of the sample were employed without supports (37% Black [non-Latino], 29% White Latino, 8% American Indian/Alaska Native, 4% Asian, 2% Native Hawaiian/Pacific Islander, and 1% Black Latino) while 20% were employed with supports in an integrated setting (4.6% White Latino, 2% American Indian/Alaska Native, 2% Asian, and 1% Black [non-Latino]).

These findings are slightly different than the results presented in Cavanaugh's (1999) study who found differences between those employed with and without integrated supports among people who were blind. The lower percentage of employment with supports in an integrated setting in this study may be reflective of the trending controversy surrounding sheltered workshops and supported employment. Sheltered workshops have often been denounced for its low wages and benefits, segregation from employment with people with no disabilities (Murphy & Rogan, 1995), and limited opportunities for career advancement

(Schuster, 1990). In the same manner, supported employment has been criticized for its high costs, increased dependency, and higher risk of termination (Rusch, 1990). Therefore, it is possible that VR counselors were opposed to considering employment with supports for their consumers and did not discuss these options further.

Hypothesis Three

Hypothesis three stated statistically significant differences existed in hours worked and weekly earnings among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI who achieved successful employment outcomes. Results of the Kruskal-Wallis H test did not support the hypothesis that significant differences existed. The wages per week for this sample was \$309 and the average hours worked per week was 28. Compared to Mwachofi's (2009) study, the average earnings was slightly higher, while the average hours worked was slightly lower. Specifically, Mwachofi (2009) found average weekly earnings of \$303 and average weekly hours worked of 32 among people of color with disabilities who received public VR services during FY 2004.

The findings of this study differed from Robinson and Klein's (2008) study in which statistically significant differences were found between consumers of color with a dual diagnosis and White consumers. Particularly, White consumers earned a \$1.00 more an hour than consumers of color. Robinson and Klein note that the possible difference in earnings per hour found in their study could be related to educational attainment, workplace discrimination, or level of multicultural competencies of the VR counselors. A possible explanation for the contrasting findings of this study and Robinson and Klein's (2008) study is that White consumers were included in the sample. Although no statistically significant differences were

detected in this study for weekly earnings and hours worked, it is unknown if this finding would still exist had Whites with TBI been included in the sample.

Hypothesis Four

Hypothesis four indicated statistically significant differences in acceptance rates would be present among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. Results of the Chi-square test of independence did not reveal any statistically significant differences in acceptance rates among this sample. This finding differed from earlier studies that found statistically significant differences in acceptance rates by race/ethnicity among VR consumers with TBI. Specifically, Chan et al. (2005) found Asians to have the highest acceptance rates at 85% while Blacks (non-Latino) had the lowest rate at 77%. Kolakowsky-Hayner (2010) found Blacks with TBI to have the largest acceptance rate at 11.7% (after Whites) and Asians to have the lowest (1%).

Regarding those who were not accepted for VR services, this study found Blacks (non-Latino) to have the highest rate of non-acceptance at 8% while Native Hawaiians/Pacific Islanders has the lowest rate of non-acceptance at .1%. The findings of this study are much lower than the rates found in Chan et al.'s (2005) study. In their study, Blacks (non-Latino) were found to have the highest rate of non-VR acceptance at 23% while Asians had the lowest rate of non-acceptance at 16%. The results of Kolakowsky-Hayner (2010) also showed Blacks (non-Latino) to have the highest ineligibility rate (following Whites) and Asians with the lowest at .2%. A plausible explanation for the difference between this study and earlier studies (i.e., Chan et al, 2005; Kolakowsky-Hayner, 2010) in terms of acceptance rates is that this study excluded Whites with TBI. Therefore, it is unknown if statistically significant differences would have

existed with acceptance rates had Whites with TBI been included in the sample. Another possible explanation for the contrasting results between studies is the difference in the statistical tests used to analyze this question. In particular, Chan et al. (2005) and Kolakowsky-Hayner (2010) analyzed differences with acceptance rates used an Exhaustive Chi-squared automatic interaction detector (CHAID) while this study used a Chi-square test of independence. CHAID differs from other types of analyses in that it can perform multiple splits on a single variable (Nisbet, Elder, & Miner, 2009).

Results from this study also differed from earlier studies that examined acceptance rates by race/ethnicity among a general VR population (Wilson, 2002; Wilson et al., 2002; Wilson & Senices, 2005) in which statistically significant differences were found. Similarly, this study differed from the historical findings of Atkins and Wright (1980), Herbert and Martinez (1992), Dziekan and Okocha (1993), and Feist-Price (1995) who also found statistically significant differences in acceptance rates based on race/ethnicity. The findings of this study, however, were similar to the results reported in studies conducted by Wheaton (1995), Peterson (1996), and Wilson (1999) in which no statistically significant differences with acceptance rates were found. As noted by Wheaton (1995), a possible explanation for the conflicting results may relate to the varying degrees of how the dependent variable (i.e., acceptance rates) is analyzed. For example, a study that included Statuses 10 (eligible, before IPE), 12 (IPE complete), 26 (successfully rehabilitated), 28 (unsuccessfully rehabilitated), and 30 (closed after eligibility and before the start of IPE services) would likely have very different results than a study that only investigated consumers who were in a Status 10 or 8 (ineligible). Also, as noted earlier with Chan et al. (2005) and Kolakowsky-Hayner (2010), these historical studies also included Whites with disabilities in their comparisons with other groups; specifically, while one may have looked

at all ethnic groups (e.g., Dziekan & Okocha, 1993; Herbert & Martinez, 1992; Peterson, 1996; Ross & Biggi, 1986; Wilson, 2002; Wilson et al., 2002; Wilson & Senices, 2005), others only considered one particular ethnic group (e.g., Atkins & Wright, 1980; Feist-Price, 1995; Wheaton, 1995; Wilson, 1999; Wilson et al., 1999) in their comparisons to Whites.

Hypothesis Five

Hypothesis five stated statistically significant differences exist in the amount of time counselors took to make an eligibility determination for VR services among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. Results of the Kruskal-Wallis H test revealed, however, that there are no statistically significant differences in the amount of time VR counselors took to reach an eligibility determination. The lack of statistically significant differences may be influenced by the skewness of the distribution, which indicated VR counselors are taking only a few days to make an eligibility determination for their consumers. More importantly, the positive skewness of this distribution could be an indication of a higher proportion of consumers in this sample receiving public support through SSI or SSDI at application. According to Title I of the Rehabilitation Act of 1973, consumers who have SSI or SSDI are presumed eligible for VR services; therefore, VR counselors would likely take less than a day to determine these cases eligible. Furthermore, the skewness of this variable is considered favorable since it demonstrates VR counselors are remaining within the 60 day requirement, which is also outlined under Title I of the Rehabilitation Act of 1973.

Hypothesis Six

Hypothesis six stated significant differences exist in case expenditures among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Native, Asians, and Native

Hawaiian/Other Pacific Islander with TBI. An omnibus test of differences using a p -value of .05 initially found a statistically significant difference. A post hoc analysis using a more conservative approach (i.e., Bonferroni correction method) was conducted to reduce the possibility of Type I error. This resulted in a more stringent p -value of .003 (.05 divided by 15 [# of comparisons]). Subsequent to the Bonferroni correction test, no statistically significant differences between case expenditures and race/ethnicity existed.

Further, it was also noted that assessment and counseling/guidance were the most frequent services provided to this sample. A possible explanation for the high amount of assessments given to this sample is that this service is predominantly used to assist with making an eligibility determination (RSA, 2010). It could be that the varying levels of severity associated with TBI have warranted additional evaluations to determine a consumer's ability to obtain and maintain employment. Similarly, counseling and guidance is a service that is mostly provided directly from the VR counselor, and usually requires no case funds (RSA, 2010). Because a role of the VR counselor is to guide consumers through the VR process, it is standard practice to list counseling and guidance as a service. In some situations, a case can be closed in a Status 26 with counseling and guidance listed as the only substantial service on an IPE.

These findings contrasted with the results reported in Whitfield and Lloyd's (2008) study in which differences were found among American Indian/Alaska Natives compared to other groups. Specifically, lower case expenditures were spent on consumers who identified as American Indian/Alaska Native with TBI compared to other racial/ethnic groups. These results also differed from the findings reported by Patterson et al. (2000), Robinson and Klein (2008), and Mwachofi et al. (2009) in which differences based on race/ethnicity were found within case expenditures. The skewness of the distribution for case expenditures may be related to the

findings of this study. In particular, the distribution revealed that at least 50% of this sample received \$150 to \$0 in case expenditures. It could be that a great deal of this sample had comparable benefits (e.g., Medicare, Medicaid, private insurance) through other sources. Considering that VR case funds are the payor of last resort (i.e., after using all sources of comparable benefits; RSA, 2010), it would appear logical that the more comparable benefits this group had, the lower amounts of case expenditures, including \$0, would be expected.

Hypothesis Seven

Hypothesis seven indicated there would be statistically significant differences in unsuccessful closure reasons among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. Subsequent to collapsing this variable into four categories (unable to locate, refuse services, failure to cooperate, and all other reasons [i.e., disability too significant, death, individual in institution, transfer to different agency, transportation not available, extended services not available, other reasons]), there were no statistically significant differences among client ethnicities as indicated in the Chi-square test results.

These findings differed from Chan et al.'s (2005) study in which statistically significant differences were found for unsuccessful closure reasons based on race/ethnicity among a sample of VR consumers with TBI. In their study, Asians were found to have the highest rates of closing as unable to locate (24%) and refused services (after Whites, 23%). Further, they reported that Blacks (non-Latino) had the highest rate of closing for failure to cooperate (25%). Kolakowsky-Hayner (2010) also found statistically significant differences for unsuccessful closures based on race/ethnicity. Particularly, her study showed that non-Whites with TBI had a higher closure rate for unable to locate (25%) and failure to cooperate (21%), but had the lowest

rates closing for refusing services (25%) compared to Whites. Wilson et al. (1999) also found statistically significant differences with reasons for unsuccessful closures, specifically with Blacks (non-Latino) showing the highest rates of closing as unable to locate and failure to cooperate, in comparison to Whites. Although further analysis would be needed to investigate the lack of statistically significant differences with reasons for unsuccessful closures in this study, a noticeable difference with this study and the studies conducted by Chan et al., (2005), Kolakowsky-Hayner (2010), and Wilson et al. (1999) is that they included Whites within their analysis. Because this study did not include Whites with TBI in the sample, it is unknown if statistically significant differences would appear otherwise.

Hypothesis Eight

Hypothesis eight stated consumer demographic characteristics, types of services, and case expenditures would predict employment outcomes among Blacks (non-Latino), White Latinos, Black Latinos, American Indian/Alaska Natives, Asians, and Native Hawaiian/Other Pacific Islanders with TBI. Results of the hierarchical binary regression analysis revealed that among consumer demographic variables, education at application was a statistically significant, positive predictor of employment indicating that higher levels of education at application increased odds of reaching a successful employment outcome by 1.15 times. This finding was comparable to the result reported in Cardoso et al.'s (2007) study in which education was also found to be a statistically significant predictor of successful employment from a sample of consumers with TBI. Similarly, this outcome compares to Jackson II and Wilson's (2001) study among a sample of VR consumers with disabilities, which also found educational level at application to be a statistically significant, positive predictor of employment. In contrast, the result from this study differs from Lustig et al.'s (2003) study in which no statistically significant associations were

found between education and employment outcomes among consumers with TBI. The differences in significant associations with educational attainment and employment outcomes between this study and Lustig et al.'s study might be related to the specific geographical location in which Lustig et al.'s study was taken. Moreover, Lustig et al.'s study included consumers who were served in a Tennessee Division of Rehabilitation Services while this study, as well as Cardoso et al. (2007) and Jackson II and Wilson (2001), included a nationwide sample of VR consumers.

Public support was a statistically significant, negative predictor of employment outcomes. In particular, consumers who were being supported through SSI or SSDI at application showed decreased odds of obtaining successful employment by .37 and .70, respectively. This result was similar to that found by Rahimi et al. (2009) who found consumers with TBI who were also receiving SSI or SSDI had a 44% reduction in odds of obtaining competitive employment. Furthermore, the post hoc Chi-square analysis showed that there were statistically significant differences among types of closures and recipients of SSI or SSDI. Particularly for those receiving SSI at application, over 26% closed without a successful employment outcome (i.e., Statuses 08, 06, 28, 30, 38, 10) compared to less than 4% who closed in Status 26 (successfully employed). Among recipients of SSDI, a little over 21% closed without successful employment, while 5% closed with an employment outcome. These findings support the assertion made by Matrone and Leahy (2005) in which consumers who report receiving SSI or SSDI are less likely to become successfully employed. Specifically, from the FY 2002 RSA-911 database, they found that receiving public support through SSI or SSDI had a statistically significant negative effect on successful employment outcomes. Further, they suggest this finding could be related to apprehension about losing a source of income and health coverage.

For VR service variables, job placement, on-the-job supports, maintenance, occupational/vocational training, and counseling/guidance were found to be statistically significant, positive predictors of successful employment, meaning that an increase in these services improved the odds of closing successfully with competitive employment. Results of this study are similar to earlier studies of successful VR outcomes among consumers with TBI and other disabilities. Cardoso et al. (2007), Dutta et al. (2008), and Rahimi et al. (2009) all found job placement and on-the job supports to be statistically significant, positive predictors of closing in a Status 26. In particular, Cardoso et al. found on-the-job supports to be the most statistically significant predictor of successful employment outcomes followed by job placement. Schronburn et al. (2007) also found job placement to be a statistically significant, positive predictor of successful employment outcomes among a sample of consumers with TBI, however, on-the-job supports was not found to be statistically significant in their study.

Maintenance was also found to be a statistically significant, positive predictor of successful employment. This result supports the findings reported in Bounds et al. (2003), Cardoso et al. (2007), and Rahimi et al.'s (2009) studies in which consumers with TBI who received maintenance showed a greater likelihood of closing in Status 26. The finding also supports the Dutta et al. (2008) study of consumers with sensory, physical, and mental disabilities in which recipients of maintenance services had an increased chance of becoming successfully employed.

Occupational/vocational training was also found to be a statistically significant, positive predictor of employment. Past studies have also found this variable to be a statistically significant, positive predictor of successful employment outcomes. For instance, Cardoso et al. (2007) found that consumers with TBI who received this service were 1.3 times more likely to

close successfully, while Rahimi et al. (2009) found that consumers with TBI were 1.4 times more likely to close successfully. Dutta et al. (2008) also found occupational/vocational training to be a statistically significant predictor of successful employment outcomes by almost 1.7 times among consumers with mental disabilities.

Counseling/guidance was also found to be a statistically significant, positive predictor of employment outcomes. This finding compared to the study conducted by Cardoso et al. (2007) reported that consumers with TBI who received this service were 1.2 times more likely to close successfully compared to those who did not receive this service. The finding of this study also supported Rahimi et al.'s (2009) study in which consumers with TBI were 1.3 times more likely to close successfully. In contrast, the result of this study differed by Schronbrun et al. (2007) who did not find counseling/guidance to be a statistically significant predictor of successful employment outcomes.

Case expenditures were also found to be a positive, statistically significant predictor of successful employment outcomes. Particularly, the more funds that were spent on a client, the greater the likelihood of obtaining successful employment. This result is comparable to those reported by Catalano et al. (2006) in which it was found that more case expenditures were spent on cases that closed successfully compared to unsuccessful case closures among a sample of consumers with TBI.

Most surprisingly, this study did not find race/ethnicity or age to be statistically significant predictors of employment. Past studies that examined race/ethnicity and employment outcomes among consumers with TBI found this variable to be a statistically significant predictor of employment (Cardoso et al., 2007; Catalano et al., 2006; Rahimi et al., 2009). This study, however, supported Johnstone et al.'s (2003) and Lustig et al.'s (2003) findings in which

race/ethnicity was not found to be a statistically significant predictor of employment. Likewise, based on the studies of Lustig et al. (2002), Cardoso et al. (2007), and Rahimi et al. (2009), age was expected to be a statistically significant predictor of employment. Although this study did not support results of these studies, it did support Skeel et al.'s (2003) study in which age was not a statistically significant predictor of employment among consumers with TBI.

Because this study included a nationwide sample, it was unexpected that results for race/ethnicity and age, and its lack of a significant association with employment outcomes would compare to the studies conducted by Johnstone et al. (2003), Lustig et al. (2002) and Skeel et al. (2003), which only analyzed statewide data. Also, as mentioned throughout this chapter, Cardoso et al. (2007) and Rahimi et al. (2009) included Whites with TBI in their analyses, which may have influenced their findings of a statistically significant relationship between race/ethnicity, age, and VR outcomes.

Limitations

Sample sizes. A limitation of this study is the small sample sizes in three groups, which resulted in comparison disparities. Specifically, out of the 2,505 consumers, only 130 were Asian, 42 were Black Latinos, and 33 were Native Hawaiian/Pacific Islanders. Given that the primary purpose of this study was to compare employment outcomes among each non-White group with TBI without eliminating any groups or lumping groups together into one as done in previous studies (Arango-Lasprilla et al., 2007; Rosenthal, Wilson, Ferrin, & Frain, 2005; Wehman, Targett, Yasuda, McManus, & Briel, 2007; Wilson, 2002), each group in the sample was kept separate. Therefore, any statistically significant differences reported for Asians, Black Latinos, and Native Hawaiian/Pacific Islanders throughout this study should be interpreted with caution as it is not certain if these differences would exist in larger sample sizes.

Generalizability. This study used archival data from the FY 2010 RSA-911 database and used an ex-post facto design. Causality, therefore, cannot be inferred from these results. Generalizability is also limited given that nearly half (48.9%) of the data were represented from 10 states. In fact, the majority of states and U.S. territories ($n = 36$) had only 1% or less of clients with TBI. Results are also restricted to one disability type, TBI, and may not be appropriate to persons with other disabilities who sought VR services.

Coding errors. As previously mentioned, data used in this study was extracted from the FY 2010 RSA-911 national database. The information found in this database is entered directly by VR counselors at each state-federal VR agency across the U.S. and its territories for each case that is open and/or closed. Therefore, data is susceptible to human error. These errors can include data input errors as well as errors with properly identifying a consumer's race/ethnicity, particularly for those who did not wish to provide this type of information (RSA, 2010). For instance, it is possible that a Latino/a who presented with a light phenotype may have been misrepresented as White, non-Latino instead of White Latino by the VR counselor if s/he opted to not disclose this information. Also, an error could be made with categorizing the primary disability of TBI. For example, a VR counselor may have incorrectly classified a primary disability of an acquired, non-traumatic brain injury (e.g., stroke) as a TBI.

Implications for Rehabilitation Counselors

Several recommendations for state-federal VR counselors can be made based on the results from this study. First, services that were found to be the most statistically significant predictors of successful employment were job placement, on-the-job supports, maintenance, occupational/vocational training, and counseling/guidance. Although the RSA-911 data does not provide details about job placement procedures that VR counselors use as part of service

delivery, an earlier paper by Fawber and Wachter (1987) provides five suggestions to improve employment outcomes. Their suggestions include selecting placements that are consistent with consumers' abilities, strengths, interests, and limitations; conducting a job analysis (i.e., identifying attributes and tasks needed to perform a particular job); educating employers and co-workers of consumers' strengths and limitations (if consumers choose to disclose this information) to prevent any misunderstandings of consumers' behaviors; acting as the liaison between employers and the agency on behalf of consumers' best interests and abilities; and encouraging the support from consumers' families to become an essential part of the VR process.

Maintenance, a short term service that is provided as financial support for basic needs such as shelter, food, and clothing, was also a statistically significant, positive predictor of successful employment outcomes. This finding may be indicative of societal barriers that may exist for people of color with TBI. Therefore, it is recommended that VR counselors thoroughly assess for additional impediments to employment external to limitations related to a consumer's disability by asking clear and direct questions relative to how consumers' are meeting their basic needs.

Client educational levels at the time of service application were also a statistically significant predictor of successful employment outcomes in this study. It stands to reason that consumers who gain more education or training from services received during the VR process may have greater odds of obtaining successful employment (Cardoso et al., 2007; Rahimi et al., 2009). As observed in this study, recipients of occupational/vocational training had a greater outcome of obtaining competitive employment. Thus, VR counselors are recommended to engage in a greater exploration of this option with consumers if it is believed this service could not only lead to competitive employment, but higher earnings as well.

Receiving public support was found to be a statistically significant, negative predictor of successful employment outcomes. A plausible explanation for this finding is that consumers with public support (e.g., Social Security Administration [SSA] beneficiaries) may become fearful of losing their benefits (i.e., medical insurance, income); thereby closing unsuccessfully from the VR process after applying for services (Matrone & Leahy, 2005). A recommendation for VR counselors is to become more knowledgeable of SSA's policy regarding substantial gainful activity (SGA), which sets a predetermined work activity level and earnings according to a person's disability (SSA, 2013), and better educate consumers with information regarding the benefits and value of obtaining competitive employment that could provide a higher income and a higher quality health insurance. To alleviate fears of having medical benefits relinquished and encourage a successful return to work, U.S. Congress developed the Medicaid Buy-In Program, which allows consumers with disabilities who are working and earn above the SGA amount to keep Medicaid benefits by paying premiums based on income (Kiernan, Halliday, & Boeltzig, 2004). VR counselors could inform consumers of the Medicaid Buy-In Program and provide a referral to a local Social Security office.

Implications for Future Research

One of the difficulties in making assumptions about the impact of a given disability and VR outcomes is that there is no differentiation in terms of severity of disability, and in particular, functional impairment. Thus, regardless of severity of disability, the RSA data collection system does not take into account for severity. Although many state VR agencies use an "order of selection" of seven general functional categories (i.e., physical mobility, dexterity and coordination, physical tolerance, personal behaviors, capacity to learn, communication and direction), they do not capture nuances in a more detailed clinical scale such as that provided by

the Functional Assessment Measure (FAM), which combines aspects of the Functional Independence Measure (FIM) with additional items to strengthen measurements of cognitive, psychosocial, and communicative functioning specifically for people with TBI (Alcott, Dixon, & Swann, 1997; Hall, Hamilton, Gordon, & Zasler, 1993; Hobart et al., 2001) . A first recommendation for future research is to make a proposal to RSA to create a variable in their case management system that includes questions from the FIN/FAM that focus on speech, emotional status, orientation, reading/writing, attention, adjustment to limitations, self-care, and mobility. The RSA-911 database should also include a variable that reflects the causes of TBI (e.g., fall, motor vehicle accident). The Centers for Disease Control and Prevention (2010) suggest that Blacks (non-Latino) are more likely to obtain a TBI following a gunshot wound. Therefore, having this information could expand upon established trends of racial/ethnic disparities among state-federal VR consumers (Cardoso et al., 2007; Rosenthal et al., 2005).

Another recommendation for future research is to analyze employment outcomes of TBI populations outside of the VR system. For example, the Traumatic Brain Injury Model Systems (TBIMS) has conducted longitudinal research regarding various outcomes of the recovery process, including employment, from 1 year post-injury and up to 20 years post injury (TBIMS, 2010). Combining the knowledge gained from outcomes of studies that have focused on RSA-911 data and TBIMS data, as well as recommendations, could further advance the field with a better understanding of factors that contribute to successful and unsuccessful employment, and ultimately a better quality of life, among people with TBI. Finally, future research may also benefit from analyzing the findings of this study with other disabilities among people of color. Findings among other disability populations of color may be able to shed more light on the significant and non-significant results of this study.

Although findings from this study were generally consistent with the results of previous studies in terms of statistically significant predictors of employment outcomes among state-federal VR consumers with TBI and other disabilities, results of the logistic regression showed that demographic and case service variables only accounted for 37% of the variance. In comparison to previous studies that used logistic regression analyses to predict employment outcomes among all consumers (i.e., Whites, people of color) with TBI, the Nagelkerke R^2 computed in this model was almost double (e.g., 16%, Cardoso et al., 2007; 17%, Rahimi et al., 2009). A primary difference in the logistic regression computed in this study versus previous studies (i.e., Cardoso et al., 2007; Rahimi et al. 2009) is that not all service variables were included in the model as they were in the earlier studies. Specifically, only the service variables which were found to have a statistically significant influence on outcomes in other studies were considered for this model. Likewise, the logistic regression model computed in this study also included case expenditures, while the other studies did not. Appendix F provides an overview of the variables analyzed in previous studies and this study, as well as identifies those which were found to have a statistically significant influence on employment outcomes and acceptance rates among people with TBI.

In essence, the statistically significant predictors found to influence employment outcomes in this study as well as previous studies should come as no surprise. It seems logical that predictors such as educational level at application, receipt of job related services (e.g., job placement, on-the-job supports), and having public support would have a significant relationship with employment outcomes. As seen in past studies and this study, over half of the variance (63%) remains unexplained. Perhaps more variance could be explained through demographics and characteristics of VR counselors. For instance, Syzmanski and Parker (1989) found that VR

counselors who have a master's degree in rehabilitation counseling had higher successful employment closures and were more cost-efficient to the agency (e.g., spent fewer expenditures on unsuccessful closures) than VR counselors with bachelor's degrees or an unrelated degree. Another consideration would be to investigate the relationships consumers have with their VR counselors. Baldwin, Wampold, and Imel (2007) found the working alliance between counselors and clients to be a significant predictor of client outcomes. Specifically, they found that client outcomes were influenced by VR counselors' counseling technique skills, monitoring the strength of the alliance, and skills with rebuilding broken alliances. Therefore, the final recommendation is for RSA to begin collecting information about VR counselors, including demographical information and certification status, as well as a measure for consumers' perceptions of their working alliance with their counselors (e.g., Working Alliance Inventory [WAI], Horvath & Greenberg, 1989). Combined with the information that has been established through the RSA-911 database, including ways to measure for characteristics of the VR counselor may further contribute to the advancement of the field and provide a greater insight to the variance that remains unaccounted.

References

- Abrams, D., Barker, L. T., Haffey, W., & Nelson, H. (1993). The economics of return to work for survivors of traumatic brain injury: Vocational services are worth the investment. *Journal of Head Trauma Rehabilitation, 8*(4), 59-76.
- Alcott, D., Dixon, K., & Swann, R. (1997). The reliability of the items of the Functional Assessment Measure (FAM): Difference in abstractness between FAM items. *Disability and Rehabilitation, 19*(9), 355-358.
- Arango-Lasprilla, J. C., Ketchum, J. M., Gary, K. W., Kreutzer, J. S., O'Neil-Pirozzi, T. M., Wehman, P., Marquez de la Plata, C., & Jha, A. (2009). The influence of minority status on job stability after traumatic brain injury. *Journal of Injury, Function, and Rehabilitation, 1*(1), 41-49. Doi: 10.1016/j.pmrj.2008.07.001
- Arango-Lasprilla, J. C., Ketchum, J. M., Lewis, A. N., Krch, D., Gary, K. W., & Dodd Jr., B. A. (2011). Racial and ethnic disparities in employment outcomes for persons with traumatic brain injury: A longitudinal investigation 1-5 years after injury. *Journal of Injury, Function, and Rehabilitation, 3*, 1083-1091. Doi: 10.1016/j.pmrj.2011.05.023
- Arango-Lasprilla, J. C., Ketchum, J. M., Williams, K., Kreutzer, J. S., Marquez de la Plata, C. D., O'Neil-Pirozzi, T. M., & Wehman, P. (2008). Racial differences in employment outcomes after traumatic brain injury. *Archives of Physical Medicine and Rehabilitation, 89*, 988-995. Doi: 10.1016/j.apmr.2008.2008.02.012
- Arango-Lasprilla, J. C., Rosenthal, M., Deluca, J., Komaroff, E., Sherer, M., Cifu, D., & Hanks, R. (2007). Traumatic brain injury and functional outcomes: Does minority status matter? *Brain Injury, 21*, 701-708.

- Atkins, B. J., & Wright, G. N. (1980). Three views: Vocational rehabilitation of Blacks: The statement. *Journal of Rehabilitation, 46*(2), 42-46.
- Baldwin, S. A., Wampold, B. E., & Imel, Z. E. (2007). Untangling the alliance-outcome correlation: Exploring the relative importance of therapist and patient variability in the alliance. *Journal of Counseling and Clinical Psychology, 75*, 842-852. Doi: 10.1037/0022-0006X.75.6842
- Bazarian, J. J., Hartman, M., & Delahunta, E. (2000). Minor head injury: Predicting follow-up after discharge from the emergency department. *Brain Injury, 14*(3), 285-294.
- Bazarian, J. J., Pope, C., McClung, J., Cheng, Y. T., & Flesher, W. (2003). Ethnic and racial disparities in emergency department care for mild traumatic brain injury. *Academic Emergency Medicine, 10*(11), 1209-1217.
- Bounds, T. A., Schopp, L., Johnstone, B., Unger, C., & Goldman, H. (2003). Gender differences in a sample of vocational rehabilitation clients with TBI. *NeuroRehabilitation, 18*, 189-196.
- Boutin, D. L. (2006). *Effectiveness of the state vocational rehabilitation program for consumers with hearing impairments* (Doctoral dissertation). The Pennsylvania State University, University Park, PA.
- Bowman, S. M., Martin, D. P., Sharar, S. R., & Zimmerman, F. J. (2007). Racial disparities in outcomes of persons with moderate to severe traumatic brain injury. *Med Care, 45*(7), 686-690.
- Brain Injury Association of America. (2009). Living with brain injury. Retrieved from <http://www.biausa.org/living-with-brain-injury.htm>

- Brault, M. W. (2008). *Americans with disabilities: 2005*. Retrieved from <https://www.census.gov/prod/2008pubs/p70-117.pdf>
- Capella, M. E. (2002). Inequities in the VR system: Do they still exist? *Rehabilitation Counseling Bulletin, 45*, 143-153.
- Cardoso, E., Romero, M. G., Chan, F., Dutta, A., & Rahimi, M. (2007). Disparities in vocational rehabilitation services and outcomes for Hispanic clients with traumatic brain injury: Do they exist? *Journal of Head Trauma Rehabilitation, 22*(2), 85-94.
- Catalano, D., Pereira, A. P., Wu, M. Y., Ho, H., & Chan, F. (2006). Service patterns related to successful employment outcomes of persons with traumatic brain injury in vocational rehabilitation. *NeuroRehabilitation, 21*, 279-293.
- Cavanaugh, B. S. (1999). *Relationship of agency structure and client characteristics to rehabilitation services and outcomes for consumers who are blind*. Washington, DC: National Institute on Disability and Rehabilitation Research. Retrieved from the ERIC database. (ED471947)
- Centers for Disease Control and Prevention. (2002). Traumatic brain injury among American Indians/Alaska Natives-United States, 1992-1996. *MMWR Weekly, 51*(14), 303-305.
- Centers for Disease Control and Prevention (2010). Traumatic brain injury in the United States: A report to Congress. Retrieved from http://www.cdc.gov/traumaticbraininjury/tbi_report_to_congress.html
- Chan, F., Wong, D. W., Rosenthal, D. A., Kundu, M. M., & Dutta, A. (2005). Eligibility rates of traditionally underserved individuals with disabilities revisited: A data mining approach. *Journal of Applied Rehabilitation Counseling, 36*(3), 3-10.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Disability awareness: A brief history of legislation. (n.d.). Retrieved from Colorado State University website: <http://rds.colostate.edu/history-of-legislation>

Dutta, A., Gervery, R., Chan, F., Chou, C. C., & Ditchman, N. (2008). Vocational rehabilitation services and employment outcomes for people with disabilities: A United States study. *Journal of Occupational Rehabilitation, 18*, 326-334. Doi: 10.1007/s10926-008-9154-z

Dzielen, K. I., & Okocha, A. G. (1993). Accessibility of rehabilitation services; comparison by race-ethnic status. *Rehabilitation Counseling Bulletin, 36*, 183-189.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149-1160.

Faul, M., Xu, L., Wald, M. M., & Coronado, V. G., Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. (2010). *Traumatic brain injury in the United States: Emergency department visits, hospitalizations and deaths 2002–2006*. Retrieved from http://www.cdc.gov/traumaticbraininjury/pdf/blue_book.pdf

Fawber, H. L., & Wachter Jr., J. F. (1987). Job placement as a treatment component of the vocational rehabilitation process. *Journal of Head Trauma Rehabilitation, 2*(1), 27-33.

Feist-Price, S. (1995). African Americans with disabilities and equity in vocational rehabilitation services: One state's review. *Rehabilitation Counseling Bulletin, 39*, 119-129.

Frankfort-Nachmias, C., & Nachmias, D. (1996). *Research methods in the social sciences* (5th ed.). New York, NY: St. Martin's Press.

- Gamble, D., & Satcher, J. (2002). Rehabilitation outcomes, expenditures, and the provision of assistive technology for persons with traumatic brain injury. *Journal of Applied Rehabilitation Counseling, 33*(3), 41-44.
- Gary, K. W., Ketchum, J. M., Arango-Lasprilla, J. C., Kreutzer, J. S., Novack, T., Copolillo, A., & Deng, X. (2010). Differences in employment outcomes 10 years after traumatic brain injury among racial and ethnic minority groups. *Journal of Vocational Rehabilitation, 33*, 65-75. Doi: 10.3233/JVR-2010-0516
- Giesen, J. M., Cavanaugh, B. S., & Sansing, W. K. (2004). Access to vocational rehabilitation: The impact of race and ethnicity. *Journal of Visual Impairment & Blindness, 98*(7), 410-419.
- Grieco, E. M., & Cassidy, R. C. (2001). Overview of race and Hispanic origin: 2000. Retrieved from <http://www.census.gov/prod/2001pubs/c2kbr01-1.pdf>
- Grimm, L. G. (1993). *Statistical applications for the behavioral sciences*. New York, NY: John Wiley & Sons.
- Hall, K. M., Hamilton, B. B., Gordon, W. A., & Zasler, D. (1993). Characteristics and comparisons of functional assessment indices: Disability Rating Scale, Functional Independence Measure, and Functional Assessment Measure. *Journal of Head Trauma Rehabilitation, 8*(2), 60-74.
- Hepner, P. P., Wampold, B. E., & Kivlighan Jr., D. M. (2008). *Research design in counseling* (3rd ed.). Belmont, CA: Thomson Brooks/Cole.
- Herbert, J. T., & Martinez, M. Y. (1992). Client ethnicity and vocational rehabilitation case service outcome. *Journal of Job Placement, 8*(1), 10-16.

- Hobart, J. C., Lamping, D. L., Freeman, J. A., Langdon, D. W., McLellan, D. L., Greenwood, R. J., & Thompson, A. J. (2001). Evidence based measurement: Which disability scale for neurologic rehabilitation? *Neurology*, *57*(4), 639-644. Doi: 10.1212/WNL.57.4.639
- Horvath, A. O., & Greenberg, L. S. (1989). Development and validation of the Working Alliance Inventory. *Journal of Counseling Psychology*, *36*(2), 223-233.
- Howden, L. M., & Meyer, J. A. (2011). Age and sex composition: 2010. Retrieved from <http://www.census.gov/prod/cen2010/briefs/c2010br-03.pdf>
- Humes, K. R., Jones, N. A., & Ramirez, R. R. (2011). Overview of race and Hispanic origin: 2010. Retrieved from <http://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf>
- Jackson II, R. L., & Wilson, K. B. (2001). The dynamics of race and identity in vocational rehabilitation settings: A systematic comparison of closure rates among Blacks and Whites. *The Journal of Intergroup Relations*, *27*(4), 28-39.
- Jager, T. E., Weiss, H. B., Coben, J. H., & Pepe, P. E. (2000). Traumatic brain injuries evaluated in U.S. emergency departments, 1992-1994. *Academic Emergency Medicine*, *7*(2), 134-140.
- Jenkins, W., Patterson, J., Szymanski, E. M. (1998). Philosophical, historical, and legislative aspects of the rehabilitation counseling profession. In R. Parker & E. Szymanski (Eds.), *Rehabilitation counseling: Basics and beyond* (3rd ed., pp. 1-40). Austin (TX): Pro-Ed.
- Johnstone, B., Mount, D., Gaines, T., Goldfaders, P., Bounds, T., & Pitts, Jr., O. (2003). Race differences in a sample of vocational rehabilitation clients with traumatic brain injury. *Brain Injury*, *17*(2), 95-104.
- Johnstone, B., Schopp, L. A., Harper, J., & Koscuilek, J. (1999). Neuropsychological impairments, vocational outcomes, and financial costs for individuals with traumatic

- brain injury receiving state vocational rehabilitation services. *Journal of Head Trauma Rehabilitation*, 14, 220-232.
- Kiernan, W., Halliday, J., & Boeltzig, H. (2004). *Economic engagement: An avenue to employment for individuals with disabilities*. Retrieved from http://scholarworks.umb.edu/cgi/viewcontent.cgi?article=1002&context=ici_pubs
- Kolakowsky-Hayner, S. A. (2010). Acceptance rates in state-federal vocational rehabilitation of clients with brain injury: Is racial disparity an issue? *Brain Injury*, 24(12), 1428-1447. Doi: 10.3109/02699052.2010.523039
- Krankowski, T. (1993). Pre and post-injury skill analysis: Determining existing vocational potential for individuals with traumatic brain injury. *Vocational Evaluation and Work Adjustment Bulletin*, 26, 85-88.
- Kundu, M., & Schiro-Geist, C. (2006). Legislative aspects of rehabilitation. In P. Leung, C. Flowers, W. Talley, & P. Sanderson, (Eds.), *Multicultural issues in rehabilitation and allied health* (pp.17-43). Osage Beach, MO: Aspen Professional Services.
- Langlois, J. A., Rutland-Brown, W., & Thomas, K. E. (2006). *Traumatic brain injury in the United States: Emergency department visits, hospitalizations, and deaths*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury.
- Lustig, D. C., Strauser, D. R., Weems, G. H., Donnell, C. M., & Smith, L. D. (2003). Traumatic brain injury and rehabilitation outcomes: Does the working alliance make a difference? *Journal of Applied Rehabilitation Counseling*, 34(4), 30-37.
- Martin, F. H. (2010). Racial variation in vocational rehabilitation outcomes: A structural equation modeling approach. *Rehabilitation Counseling Bulletin*, 54(1), 26-35. Doi: 10.1177/0034355209360420

- Matrone, K. F., & Leahy, M. J. (2005). The relationship between vocational rehabilitation client outcomes and rehabilitation counselor multicultural counseling competencies. *Rehabilitation Counseling Bulletin, 48*(4), 233-244.
- McCready, W. C. (2006). Applying sampling procedures. In F. T. L. Leong, & J. T. Austin (Eds.), *The psychology research handbook: A guide for graduate students and research assistants* (pp. 147-160). Thousand Oaks, CA: Sage.
- Murphy, S. T., & Rogan, P. M. (1995). *Closing the shop: Conversation from sheltered to integrated work*. Baltimore, MD: Paul H. Brookes.
- Mwachofi, A. K. (2008). African Americans' access to vocational rehabilitation services after antidiscrimination legislation. *Journal of Negro Education, 77*(1), 39-59.
- Mwachofi, A. K., Broyles, R., & Khaliq, A. (2009). Factors affecting vocational rehabilitation intervention outcomes: The case for minorities with disabilities. *Journal of Disability Policy Studies, 20*(3), 170-177. Doi: 10.1177/1044207309338670
- Napierala, M. W. (2012). What is the Bonferroni correction? *American Academy of Orthopedic Surgeons, 6*(4), 40-42.
- Nelson, L. A., Rhoades, D. A., Noonan, C., Manson, S. M., & AI-SUPERPPF Team. (2007). Traumatic brain injury and mental health among two American Indian populations. *Journal of Head Trauma Rehabilitation, 22*(2), 105-112. Doi: 10.1097/01.HTR.0000265098.52306.a9
- Neubauer, A., Freudenberger, J., & Kuhn, V. (2007). *Coding theory: Algorithms, architectures, and applications*. West Sussex, England: John Wiley & Sons Ltd.

- Niemeier, J., & Arango-Lasprilla, J. C. (2007). Toward improved rehabilitation services for ethnically diverse survivors of traumatic brain injury. *Journal of Head Trauma Rehabilitation, 22*, 75-84.
- Nisbet, R., Elder IV, J., & Miner, G. (2009). *Handbook of statistical analysis and data mining applications*. Oxford, UK: Academic Press.
- North Carolina Department of Health and Human Services. (2008). *Case status codes and rehabilitation process diagram*. Retrieved from <http://info.dhhs.state.nc.us/olm/manuals/dsb/vr/man/Case%20Status%20Codes%20and%20Rehabilitation%20Process%20Diagram.htm>
- O'Neill, J., Hibbard, M. R., Brown, M., Jaffe, M., Sliwinski, M., Vandergoot, D., & Weiss, M. J. (1998). The effect of employment on quality of life and community integration after traumatic brain injury. *Journal of Head Trauma Rehabilitation, 13*(4), 68-79.
- Parker, R. S. (1987). Recognizing employees who have suffered brain damage. *EAP Digest, 7*, 55-60.
- Patterson, J. B., Allen, T. B., Parnell, L., Crawford, R., & Beardall, R. L. (2000). Equitable treatment in the rehabilitation process: Implications for future investigations related to ethnicity. *Journal of Rehabilitation, 66*(2), 14-18.
- Peterson, G. E. (1996). *An analysis of participation, progress, and outcome of individuals from diverse racial and ethnic backgrounds in the public vocational rehabilitation program in Nevada* (Doctoral dissertation). University of Northern Colorado, Greeley, CO.
- Possl, J., Jurgensmeyer, S., Karlbauer, F., Wenz, C., & Goldenberg, G. (2001). Stability of employment after brain injury: A 7-year follow-up study. *Brain Injury, 15*, 15-27.

- Preacher, K. J. (2001). Calculation for the chi-square test: An interactive calculation tool for chi-square tests of goodness of fit and independence [Computer software]. Retrieved from <http://quantpsy.org>
- Quiñones-Mayo, Y., Wilson, K. B., & McGuire, M. V. (2000). Vocational rehabilitation and cultural competency for Latino populations: Considerations for rehabilitation counselors. *Journal of Applied Rehabilitation Counseling, 31*(1), 19-26.
- Rahimi, M., Blalock, K. M., Dutta, A., Chan, J. Y., Dalton, J., Chan, F., & Rosenthal, D. (2009). Disparities in vocational rehabilitation services and outcomes for African American clients with traumatic brain injury. *Rehabilitation Counselors and Educators Journal, 3*(2), 5-16.
- Rehabilitation Act Amendments of 1992. 29 U.S.C. § 701 et seq.
- Rehabilitation Act of 1973, 29 U.S.C. § 701 et seq.
- Rehabilitation Services Administration. (1993). *Rehabilitation Act of 1973 as amended by the Rehabilitation Act of 1992*. Washington, DC: U.S. Department of Education.
- Robinson, M., & Klein, M. (2008). Dual diagnosis: Does race affect vocational rehabilitation outcomes? *Journal of Applied Rehabilitation Counseling, 39*(3), 19-24.
- Rosenthal, D. A. (2004). Effects of client race on clinical judgment of practicing European American vocational rehabilitation counselors. *Rehabilitation Counseling Bulletin, 47*(3), 131-141. Doi: 10.1177/00343552040470030201
- Rosenthal, D. A., Dijkers, M., Harrison-Felix, C., Nabors, N., Witol, A. D., Young, M. E., & Englander, J. S. (1996). Impact of minority status on functional outcomes and community integration following traumatic brain injury. *Journal of Head Trauma Rehabilitation, 11*(5), 40-57.

- Rosenthal, D. A., Wilson, K. B., Ferrin, J. M., & Frain, M. (2005). Acceptance rates of African-American versus White consumers of vocational rehabilitation services: A meta-analysis. *Journal of Rehabilitation, 71*, 36-44.
- Ross, M. G., & Biggi, I. M. (1986). Critical vocational rehabilitation service delivery issues at referral (02) and closure (08, 26, 28, 30) in serving select disabled persons. In S. Walker, F. Z. Belgrave, A. M. Banner, & R. W. Nicholls (Eds.), *Equal to the challenge: Perspective, problems, and strategies in the rehabilitation of the nonwhite disabled* (pp.39-50). Washington, DC: The Bureau of Educational Research, School of Education, Howard University. (ERIC Document Reproduction Service No. ED 276196).
- Rubin, S., & Roessler, R. (2007). *Foundations of the vocational rehabilitation process*. Austin TX: Pro-Ed.
- Rusch, F. R. (1990). *Supported employment: models, methods, and issues*. Sycamore, IL: Sycamore Publishing Company.
- Schonbrun, S. L., Sales, A. P., & Kampfe, C. M. (2007). RSA services and employment outcome in consumers with traumatic brain injury. *Journal of Rehabilitation, 73*(2), 26-31.
- Schroeder, F. K. (2000). Changing patterns in the rehabilitation system: Meeting the needs of the blind and otherwise disabled. *Braille Monitor, 43*(8), 1-3.
- Schuster, J. W. (1990). Sheltered workshops: Financial and philosophical liabilities. *Mental Retardation, 28*, 233-239.
- Shafi, S., & Gentilello, L. M. (2008). Ethnic disparities in initial management of trauma patients in a nationwide sample of emergency department visits. *Archives of Surgery, 143*(11), 1057-1061. Doi: 10.1001/archsurg.143.11.1057.

- Shafi, S., Marquez de la Plata, C., Diaz-Arrastia, R., Shipman, K., Carlile, M., Frankel, H., Parks, J., & Gentilello, L. M. (2007). Racial disparities in long-term functional outcome after traumatic brain injury. *The Journal of Trauma, Injury, Infection, and Critical Care*, 63(6), 1263-1270. Doi: 10.1097/TA.0b013e31815b8f00
- Siegel, S., & Castellan Jr., N. J. (1988). *Nonparametric statistics for the behavioral sciences* (2nd ed.). New York: McGraw-Hill.
- Smart, J., & Smart, D. (1996). Hispanic Americans: Topics of interest to rehabilitation counselors. *Rehabilitation Education*, 10(3), 171-184.
- Social Security Administration. (2013). *Substantial gainful activity*. Retrieved from <http://www.ssa.gov/oact/cola/sga.html>
- Staudenmayer, K. L., Diaz-Arrastia, R., de Oliveira, A., Gentilello, L. M., & Shafi, S. (2007). Ethnic disparities in long-term functional outcomes after traumatic brain injury. *The Journal of Trauma, Injury, Infection, and Critical Care*, 63(6), 1364-1369. Doi: 10.1097/TA.0b013e31815b897b
- Szymanski, E. M., & Parker, R. M. (1989). Relationship of rehabilitation client outcome to level of rehabilitation counselor education. *Journal of Rehabilitation*, 55, 32-36.
- Szymanski, E. M., & Parker, R. M. (2003). *Work and disability: Issues and strategies in career development and job placement*. Austin, TX: Pro-Ed.
- Taranto, J. (2012, February 6). Off the treadmill; "African-American" never completely caught on: That's a sign of progress. *Wall Street Journal*. Retrieved from <http://online.wsj.com/article/SB10001424052970204369404577207252177326914.html>
- Teasdale, G., & Jennett, B. (1974). Assessment of coma and impaired consciousness: A practical scale. *The Lancet*, 2(7872), 81-84.

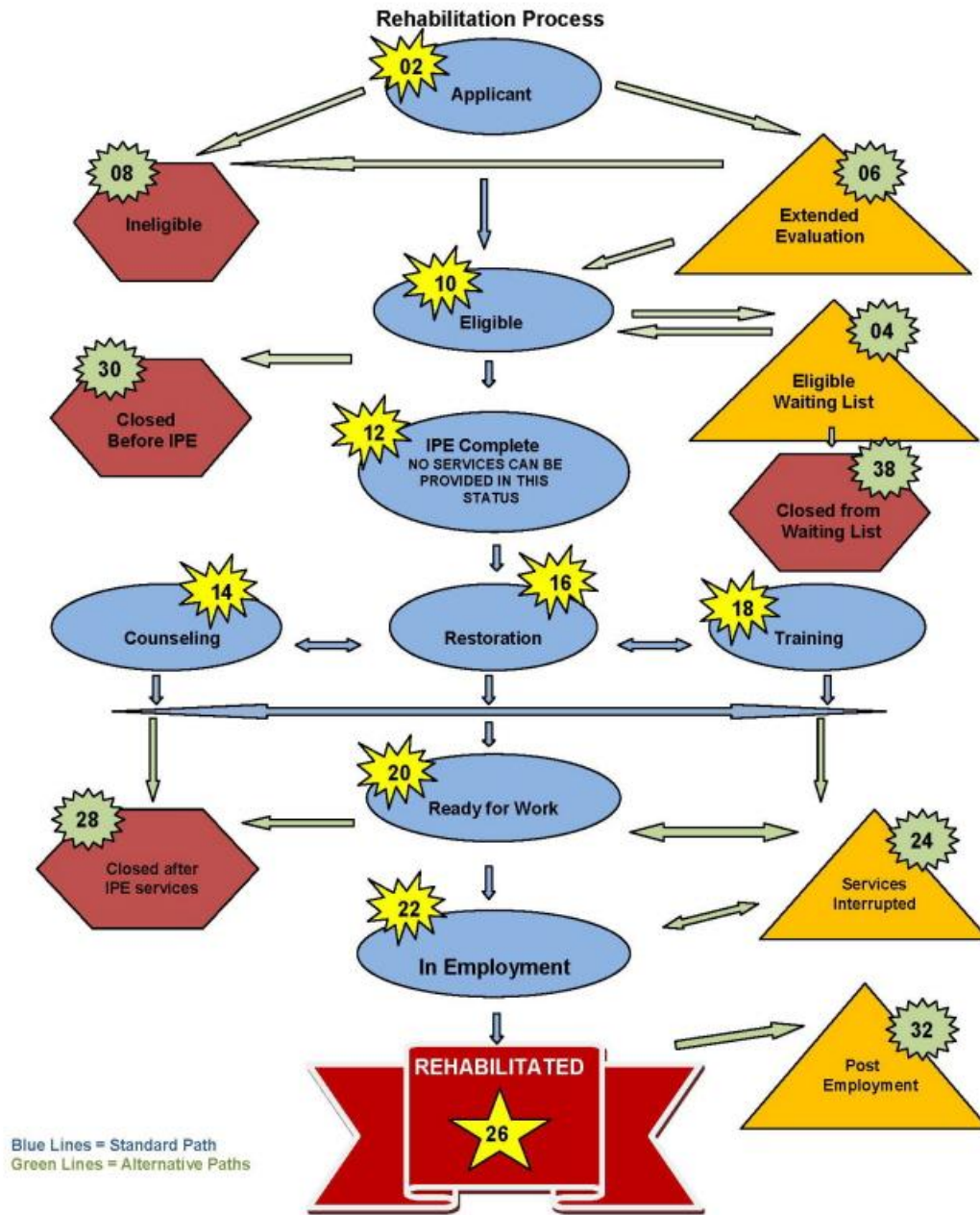
- Traumatic Brain Injury Model Systems. (2010). *The traumatic brain injury model systems of care*. Retrieved from <https://www.tbindsc.org/Documents/TBIModel%20SystemsBrochure2010.pdf>
- Traumatic Brain Injury National Data Center. (2005). *Traumatic brain injury: Facts and figures*. Retrieved from http://www.tbinc.org/registry/pdf/ff_winter2005.pdf
- U.S. Census Bureau. (2010). 20th Anniversary of Americans with Disabilities Act: July 26. Retrieved from <https://www.census.gov/newsroom/releases/archives.html>
- U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality. (2011). *National healthcare disparities report* (AHRQ Publication No. 12-0006). Retrieved from <http://www.ahrq.gov/qual/qrd10.htm>
- U.S. Department of Labor, Bureau of Labor Statistics. (2012). *Persons with a disability: Labor force characteristics 201* (USDL Publication No. 12.1125). Retrieved from <http://www.bls.gov/news.release/pdf/disabl.pdf>
- Urdan, T. C. (2010). *Statistics in plain English* (3rd ed.). New York, NY: Routledge, Taylor, & Francis Group.
- Washington, J. (2012, February 3). Some Blacks insist: 'Don't call me African-American' [Web log comment]. Retrieved from <http://www.jessewashington.com/black-or-african-american.html>
- Wehman, P., Targett, P., West, M., & Kregel, J. (2005). Productive work and employment for persons with traumatic brain injury: What have we learned after 20 years? *Journal of Head Trauma Rehabilitation*, 20(2), 115-127.

- Wehman, P., Targett, P., Yasuda, S., McManus, S., & Briel, L. (2007). Helping persons with traumatic brain injury of minority origin: Improve career and employment outcomes. *Journal of Head Trauma Rehabilitation, 22*, 95-104.
- Wheaton, J. E. (1995). Vocational rehabilitation acceptance rates for European Americans and African Americans: Another look. *Rehabilitation Counseling Bulletin, 38*, 224-231.
- Whitfield, H. W., & Lloyd, R. (2008). American Indians/Native Alaskans with traumatic brain injury: Examining the impairments of traumatic brain injury disparities in service provision, and employment outcomes. *Rehabilitation Counseling Bulletin, 51*(3), 190-192. Doi: 10.1177/0034355207311316
- Wilkerson, D. A., & Penn, L. A. (1938). The participation of Negroes in the federally-aided program of civilian vocational rehabilitation. *Journal of Negro Education, 7*(3), 319-330.
- Williams, P. D. E. (2008). *Differences in the vocational rehabilitation process between African Americans and European Americans with specific learning disabilities on acceptance, services, and reasons for closure* (Doctoral dissertation). Retrieved from <http://search.proquest.com.ezaccess.libraries.psu.edu/docview/304483452>
- Wilson, K. B. (1999). Vocational rehabilitation acceptance: A tale of two races in a large Midwestern state. *Journal of Applied Rehabilitation Counseling, 30*(2), 25-31.
- Wilson, K. B. (2000). Predicting vocational rehabilitation acceptance based on race, education, work status, and source of support at application. *Rehabilitation Counseling Bulletin, 43*(2), 97-105.
- Wilson, K. B. (2002). Exploration of VR acceptance and ethnicity: A national investigation. *Rehabilitation Counseling Bulletin, 45*(3), 168-176. Doi: 10.1177/003435520204500306
- Wilson, K. B. (2005). Vocational rehabilitation closure statuses in the United States: Generalizing to the Hispanic/Latino ethnicity. *Journal of Applied Rehabilitation Counseling, 36*(2), 4-11.

- Wilson, K. B., Alston, R. J., Harley, D. A., & Mitchell, N. A. (2002). Predicting VR acceptance based on race, gender, education, work status at application, and primary source of support at application. *Rehabilitation Counseling Bulletin, 45*(3), 132-142. Doi: 10.1177/003435520204500302
- Wilson, K. B., & Gines, J. E. (2009). A national reassessment: Exploring variables that predispose people with disabilities to vocational rehabilitation acceptance. *Rehabilitation Education, 23*(2), 159-170.
- Wilson K. B., Harley, D. A., & Alston, R. J. (2001). Race as a correlate of vocational rehabilitation acceptance: Revisited. *Journal of Rehabilitation, 67*(3), 35-41.
- Wilson, K. B., Jackson II, R. L., & Doughty, J. D. (1999). What a difference a race makes: Reasons for ineligibility within the vocational rehabilitation system. *American Rehabilitation, 25*(2), 16-24.
- Wilson, K. B., & Senices, J. (2005). Exploring the vocational rehabilitation acceptance rates for Hispanics versus non-Hispanics in the United States. *Journal of Counseling and Development, 83*, 86-96.
- Wright, G. N. (1980). *Total rehabilitation*. Boston: Little Brown.
- Wrona, R. M. (2010). Disability and return to work outcomes after traumatic brain injury: Results from the Washington State Industrial Insurance Fund. *Disability and Rehabilitation, 32*(8), 650-655. Doi: 10.3109/09638280903186327
- Zasler, N. D. (1997). The role of medical rehabilitation in vocational reentry. *Journal of Head Trauma Rehabilitation, 12*, 42-56.

Appendix A

Vocational Rehabilitation Process Diagram



Source: North Carolina Health and Human Services, 2008

Appendix B

State of Application for Services

State	<i>n</i>	%	<i>Cumulative %</i>
California	234	9.3	9.3
Texas	207	8.3	17.6
New York	144	5.7	23.4
Florida	113	4.5	27.9
North Carolina	111	4.4	32.3
Tennessee	97	3.9	36.2
Pennsylvania	90	3.6	39.8
Missouri	80	3.2	43.0
Illinois	75	3.0	45.9
New Jersey	75	3.0	48.9
Maryland	72	2.9	51.8
New Mexico	72	2.9	54.7
Washington	72	2.9	57.6
Virginia	71	2.8	60.4
Alabama	69	2.8	63.2
Ohio	62	2.5	65.6
Minnesota	60	2.4	68.0
Michigan	55	2.2	70.2
Georgia	48	1.9	72.1
Colorado	46	1.8	74.0
Wisconsin	46	1.8	75.8
South Carolina	44	1.8	77.6
Arizona	43	1.7	79.3
Massachusetts	41	1.6	80.9
Kansas	38	1.5	82.4
Indiana	34	1.4	83.8
Nevada	34	1.4	85.1
Puerto Rico	33	1.3	86.5
Louisiana	28	1.1	87.6
Montana	25	1.0	88.6
Oregon	25	1.0	89.6
Kentucky	23	.9	90.5
Arkansas	22	.9	91.4

Oklahoma	21	.8	92.2
Connecticut	20	.8	93.0
Utah	19	.8	93.8
Nebraska	14	.6	94.3
South Dakota	12	.5	94.8
Wyoming	12	.5	95.3
Rhode Island	11	.4	95.7
Idaho	10	.4	96.1
Iowa	10	.4	96.5
Mississippi	10	.4	96.9
Alaska	9	.4	97.3
Delaware	9	.4	97.6
North Dakota	9	.4	98.0
New York	7	.3	98.3
District of Columbia	6	.2	98.5
Hawaii	5	.2	98.7
Florida	5	.2	98.9
Minnesota	4	.2	99.1
West Virginia	3	.1	99.2
South Carolina	3	.1	99.3
Maine	2	.1	99.4
Massachusetts	2	.1	99.5
New Jersey	2	.1	99.6
New Mexico	2	.1	99.6
Washington	2	.1	99.7
Vermont	1	.0	99.8
Virgin Islands	1	.0	99.8
Connecticut	1	.0	99.8
Nebraska	1	.0	99.9
North Carolina	1	.0	99.9
Oregon	1	.0	100.0
Virginia	1	.0	100.0
Total	2,505	100.0	

Appendix C

Amount of VR Services Provided by Race/Ethnicity

VR Service	<i>White Latino</i>	<i>Black Latino</i>	<i>Black, non- Latino</i>	<i>AI/AN</i>	<i>Asian</i>	<i>NH/PI</i>	<i>Total</i>
Assessment	479	26	781	142	89	22	1,539
<i>% within service</i>	31.1%	1.7%	50.7%	9.2%	5.8%	1.4%	100%
<i>% within race/ethnicity</i>	66.5%	61.9%	56.8%	68.9%	68.5%	66.7%	61.4%
<i>% of total</i>	19.1%	1%	31.2%	5.7%	3.6%	.9%	61.4%
Diagnosis & Treatment	233	13	329	40	34	8	657
<i>% within service</i>	35.5%	2%	50.1%	6.1%	5.2%	1.2%	100%
<i>% within race/ethnicity</i>	32.4%	31%	23.9%	19.4%	26.2%	24.2%	26.2%
<i>% of total</i>	9.3%	.5%	13.1%	1.6%	1.4%	.3%	26.2%
Counseling/Guidance	421	16	666	122	74	18	1,317
<i>% within service</i>	32%	1.2%	50.6%	9.3%	5.6%	1.4%	100%
<i>% within race/ethnicity</i>	58.5%	38.1%	48.5%	59.2%	56.9%	54.5%	52.6%
<i>% of total</i>	16.8%	.6%	26.6%	4.9%	3%	.7%	52.6%
College/University Training	78	3	74	20	10	2	187
<i>% within service</i>	41.7%	1.6%	39.6%	10.7%	5.3%	1.1%	100%
<i>% within race/ethnicity</i>	10.8%	7.1%	5.4%	9.7%	7.7%	6.1%	7.5%
<i>% of total</i>	3.1%	.1%	3%	.8%	.4%	.1%	7.5%
Occupational/Voc Training	56	3	94	11	6	2	172
<i>% within service</i>	32.6%	1.7%	54.7%	6.4%	3.5%	1.2%	100%
<i>% within race/ethnicity</i>	7.8%	7.1%	6.8%	5.3%	4.6%	6.1%	6.9%
<i>% of total</i>	2.2%	.1%	3.8%	.4%	.2%	.1%	6.9%
On-the-Job Training	21	0	26	3	3	1	54
<i>% within service</i>	38.9%	0%	48.1%	5.6%	5.6%	1.9%	100%
<i>% within race/ethnicity</i>	2.9%	0%	1.9%	1.5%	2.3%	3%	2.2%
<i>% of total</i>	.8%	0%	1%	.1%	.1%	0%	2.2%
Remedial Education	12	1	14	2	0	1	30
<i>% within service</i>	40%	3.3%	46.7%	6.7%	0%	3.3%	100%
<i>% within race/ethnicity</i>	1.7%	2.4%	1%	1%	0%	3%	1.2%
<i>% of total</i>	.5%	0%	.6%	.1%	0%	0%	1.2%

Job Readiness	76	7	162	21	14	3	283
<i>% within service</i>	26.9%	2.5%	57.2%	7.4%	4.9%	1.1%	100%
<i>% within race/ethnicity</i>	10.6%	16.7%	11.8%	10.2%	10.8%	9.1%	11.3%
<i>% of total</i>	3%	.3%	6.5%	.8%	.6%	.1%	11.3%
Disability Related							
Augmented Skills	27	1	27	4	6	0	65
<i>% within service</i>	41.5%	1.5%	41.5%	6.2%	9.2%	0%	100%
<i>% within race/ethnicity</i>	3.8%	2.4%	2%	1.9%	4.6%	0%	2.6%
<i>% of total</i>	1.1%	0%	1.1%	.2%	.2%	0%	2.6%
Miscellaneous							
Training	42	4	99	16	10	0	171
<i>% within service</i>	24.6%	2.3%	57.9%	9.4%	5.8%	0%	100%
<i>% within race/ethnicity</i>	5.8%	9.5%	7.2%	7.8%	7.7%	0%	6.8%
<i>% of total</i>	1.7%	.2%	4%	.6%	.4%	0%	6.8%
Job Search							
Assistance	142	6	209	34	24	9	424
<i>% within service</i>	33.5%	1.4%	49.3%	8%	5.7%	2.1%	100%
<i>% within race/ethnicity</i>	19.7%	14.3%	15.2%	16.5%	18.5%	27.3%	16.9%
<i>% of total</i>	5.7%	.2%	8.3%	1.4%	1%	.4%	16.9%
Job Placement							
Job Placement	157	8	280	48	30	10	533
<i>% within service</i>	29.5%	1.5%	52.5%	9%	5.6%	1.9%	100%
<i>% within race/ethnicity</i>	21.8%	19%	20.4%	23.3%	23.1%	30.3%	21.3%
<i>% of total</i>	6.3%	.3%	11.2%	1.9%	1.2%	.4%	21.3%
On-the-Job Supports							
On-the-Job Supports	80	3	143	28	10	4	268
<i>% within service</i>	29.9%	1.1%	53.4%	10.4%	3.7%	1.5%	100%
<i>% within race/ethnicity</i>	11.1%	7.1%	10.4%	13.6%	7.7%	12.1%	10.7%
<i>% of total</i>	3.2%	.1%	5.7%	1.1%	.4%	.2%	10.7%
Transportation							
Transportation	178	14	305	48	34	8	587
<i>% within service</i>	30.3%	2.4%	52%	8.2%	5.8%	1.4%	100%
<i>% within race/ethnicity</i>	24.7%	33.3%	22.2%	23.3%	26.2%	24.2%	23.4%
<i>% of total</i>	7.1%	.6%	12.2%	1.9%	1.4%	.3%	23.4%
Maintenance							
Maintenance	64	5	113	30	10	2	224
<i>% within service</i>	28.6%	2.2%	50.4%	13.4%	4.5%	.9%	100%
<i>% within race/ethnicity</i>	8.9%	11.9%	8.2%	14.6%	7.7%	6.1%	8.9%
<i>% of total</i>	2.6%	.2%	4.5%	1.2%	.4%	.1%	8.9%

Rehabilitation							
Technology	30	2	60	10	10	1	113
<i>% within service</i>	26.5%	1.8%	53.1%	8.8%	8.8%	.9%	100%
<i>% within race/ethnicity</i>	4.2%	4.8%	4.4%	4.9%	7.7%	3%	4.5%
<i>% of total</i>	1.2%	.1%	2.4%	.4%	.4%	0%	4.5%
Reader Services							
	1	0	3	0	0	0	4
<i>% within service</i>	25%	0%	75%	0%	0%	0%	.2%
<i>% within race/ethnicity</i>	.1%	0%	.2%	0%	0%	0%	.2%
<i>% of total</i>	0%	0%	.1%	0%	0%	0%	.2%
Interpreter Services							
	2	0	3	1	1	0	7
<i>% within service</i>	28.6%	0%	42.9%	14.3%	14.3%	0%	100%
<i>% within race/ethnicity</i>	.3%	0%	.2%	.5%	.8%	0%	.3%
<i>% of total</i>	.1%	0%	.1%	0%	0%	0%	.3%
Personal Attendant							
	4	0	2	1	1	0	8
<i>% within service</i>	50%	0%	25%	12.5%	12.5%	0%	100%
<i>% within race/ethnicity</i>	.6%	0%	.1%	.5%	.8%	0%	.3%
<i>% of total</i>	.2%	0%	.1%	0%	0%	0%	.3%
Technical Assistance							
	8	1	15	2	2	0	28
<i>% within service</i>	28.6%	3.6%	53.6%	7.1%	7.1%	0%	100%
<i>% within race/ethnicity</i>	1.1%	2.4%	1.1%	1%	1.5%	0%	1.1%
<i>% of total</i>	.3%	0%	.6%	.1%	.1%	0%	1.1%

All Other Reasons	40	1	66	10	13	3	133
<i>% within closure reason</i>	28.6%	1.7%	55.4%	7.2%	5.6%	1.4%	100%
<i>% of total</i>	5.2%	.1%	8.7%	1.3%	1.7%	.4%	17.5%
Total	218	13	422	55	43	11	762
<i>% within closure reason</i>	28.6%	1.7%	55.4%	7.2%	5.6%	1.4%	100%
<i>% of total</i>	28.6%	1.7%	55.4%	7.2%	5.6%	1.4%	100%

Appendix E

Cross-tabulation of SSI/SSDI by Type of Closure

SSI		<i>Did Not Receive</i>	<i>Did Receive</i>	<i>Total</i>
Status 08-Applicant before eligibility	Count	176	51	227
	<i>% within closure</i>	77.5%	22.5%	100%
	<i>% within SSI</i>	10.2%	7.0%	9.3%
	<i>% within total</i>	7.2%	2.1%	9.3%
Status 06-Extended Evaluation	Count	37	30	67
	<i>% within closure</i>	55.2%	44.8%	100%
	<i>% within SSI</i>	2.1%	4.1%	2.7%
	<i>% within total</i>	1.5%	1.2%	2.7%
Status 26-Employed	Count	406	93	499
	<i>% within closure</i>	81.4%	18.6%	100%
	<i>% within SSI</i>	23.5%	12.8%	20.3%
	<i>% within total</i>	16.5%	3.8%	20.3%
Status 28-Not employed	Count	476	273	749
	<i>% within closure</i>	63.6%	36.4%	100%
	<i>% within SSI</i>	27.5%	37.7%	30.5%
	<i>% within total</i>	19.4%	11.1%	30.5%
Status 30-After IPE, before services	Count	39	16	55
	<i>% within closure</i>	70.9%	29.1%	100%
	<i>% within SSI</i>	2.3%	2.2%	2.2%
	<i>% within total</i>	19.4%	.7%	2.2%
Status 38-After eligibility, from Order of Selection	Count	12	2	14
	<i>% within closure</i>	85.7%	14.3%	100%
	<i>% within SSI</i>	.7%	.3%	.6%
	<i>% within total</i>	.5%	.1%	.6%
Status 10-After eligibility, before IPE	Count	583	260	843
	<i>% within closure</i>	69.2%	30.8%	100%
	<i>% within SSI</i>	33.7%	35.9%	34.4%
	<i>% within total</i>	23.8%	10.6%	34.4%
Total	Count	1,729	725	2,454
	<i>% within closure</i>	70.5%	29.5%	100%
	<i>% within SSI</i>	100%	100%	100%
	<i>% within total</i>	70.5%	29.5%	100%
SSDI				
Status 08-Applicant before eligibility	Count	187	41	228
	<i>% within closure</i>	82.0%	18.0%	100%
	<i>% within SSI</i>	10.3%	6.4%	9.3%
	<i>% within total</i>	7.6%	1.7%	9.3%

Status 06-Extended Evaluation	Count	43	23	66
	<i>% within closure</i>	65.2%	34.8%	100%
	<i>% within SSI</i>	2.4%	3.6%	2.7%
	<i>% within total</i>	1.8%	.9%	2.7%
Status 26-Employed	Count	372	126	498
	<i>% within closure</i>	74.7%	25.3%	100%
	<i>% within SSI</i>	20.6%	19.6%	20.3%
	<i>% within total</i>	15.2%	5.1%	20.3%
Status 28-Not employed	Count	546	204	750
	<i>% within closure</i>	72.8%	27.2%	100%
	<i>% within SSI</i>	30.2%	31.7%	30.6%
	<i>% within total</i>	22.2%	8.3%	30.6%
Status 30-After IPE, before services	Count	46	9	55
	<i>% within closure</i>	83.6%	16.4%	100%
	<i>% within SSI</i>	2.5%	1.4%	2.2%
	<i>% within total</i>	1.9%	.4%	2.2%
Status 38-After eligibility, from Order of Selection	Count	9	5	14
	<i>% within closure</i>	64.3%	35.7%	100%
	<i>% within SSI</i>	.5%	.8%	.6%
	<i>% within total</i>	.4%	.2%	.6%
Status 10-After eligibility, before IPE	Count	607	236	843
	<i>% within closure</i>	72.0%	28.0%	100%
	<i>% within SSI</i>	33.5%	36.6%	34.4%
	<i>% within total</i>	24.7%	9.6%	34.4%
Total	Count	1,810	644	2,454
	<i>% within closure</i>	73.8%	26.2%	100%
	<i>% within SSI</i>	100%	100%	100%
	<i>% within total</i>	73.8%	26.2%	100%

Appendix F

TBI and VR Outcomes Literature Overview

	Bounds et al., 2003	Cardoso et al., 2007	Catalano et al., 2006	Chan et al., 2005	Gamble & Satcher, 2002	Johnstone et al., 2003	Kolakowsky -Hayner, 2010	Lustig et al., 2002	Rahimi et al., 2009	Schonbrun et al., 2007	Skeel et al., 2003	Whitfield & Lloyd, 2008	Tamez, 2013
Race/ethnicity		X*	X*	X*		X	X*	X	X*				X
Age		X*						X*	X*		X		X
Gender	X*	X*		X			X	X					X
Education		X*	X*				X*	X					X*
Sig. Disability				X*									X
Public Support		X*	X*						X*			X	X*
Job Search		X*											X
Job Placement		X*	X*						X*	X*			X*
On Job Support		X*							X*				X*
College/Uni		X*	X*						X*				X
Occ/Voc Trng			X*						X*				X*
Counseling		X*							X*	X			X*
Asst. Tech.		X*			X*				X*				X
Assessment									X*	X			
Maintenance	X*	X*							X*				X*
Transportation		X*				X*			X*				X
Case Expend.			X*		X*								X*
Weekly Earn.					X					X*		X	

X = independent variables analyzed

* = statistically significant differences detected based on variable

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