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FACTORS CONTRIBUTING TO SUCCESSFUL EMPLOYMENT OUTCOMES
FOR HISPANIC WOMEN WHO ARE DEAF: UTILIZATION OF
CHI-SQUARED AUTOMATIC INTERACTION DETECTOR
AND LOGISTIC REGRESSION ANALYSIS

A Dissertation

by

AMBER M. FEIST

Submitted to the Graduate School of the
University of Texas-Pan American
In partial fulfillment of the requirements for the degree of

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July 2013

Major Subject: Rehabilitation Counseling

FACTORS CONTRIBUTING TO SUCCESSFUL EMPLOYMENT OUTCOMES
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July 2013

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ABSTRACT

Feist, Amber M., Factors Contributing to Successful Employment Outcomes for Hispanic Women Who are Deaf: Utilization of Chi-Squared Automatic Interaction Detector and Logistic Regression Analysis. Doctor of Philosophy (Ph.D.), July, 2013, 140 pp., 19 tables, 1 figure, 93 references.

Hispanic women who are deaf constitute a heterogeneous group of individuals with varying vocational needs. To understand the unique needs of this population, it is important to analyze how consumer characteristics, presence of public supports, and type of services provided influence employment outcomes for Hispanic women who are deaf. The purpose of this study was to examine predictive factors of consumer characteristics, public supports, and patterns of service delivery related to employment among Hispanic women who are deaf utilizing the Rehabilitation Services Administration (RSA) case service report (RSA-911) for fiscal year 2009 (FY 2009). Exhaustive chi-squared automatic interaction detector (CHAID) analysis and binary logistic regression analysis were used to analyze the RSA-911 dataset. CHAID analysis allowed the extrapolation of four homogeneous subgroups (i.e., end groups) with similar characteristics influential in predicting successful versus unsuccessful employment outcomes. Results from the CHAID analysis revealed public support is the most salient factor in predicting employment outcomes for Hispanic women who are deaf. Resulting end groups from the CHAID analysis were used to inform the logistic regression analysis. The logistic regression analysis highlighted on-the-job supports, diagnosis and treatment of impairment, job placement services,

rehabilitation technology, and assessment services rehabilitation services as the most influential services enhancing the probability of achieving a successful outcome.

DEDICATION

I dedicate this dissertation in loving memory to my brother, Cody Feist (1976-2000), who led by example to teach me that one person can impact the lives of many. Also, I dedicate this dissertation in loving memory to Anthony Lalum, Rita Feist, O.R. Miller, and Stephanie Pederson. The valuable lessons you all taught me along the way have not been forgotten. I love and miss you all. As well, I dedicate this dissertation to my mother, Mary Feist and my father, P.A. Feist for never giving up on me and believing I can accomplish anything. Your ongoing support and love during the difficult times throughout the dissertation process has made this all possible. Additionally, I dedicate this dissertation to my husband, Jaime Tamez, who has provided endless hours of support and understanding. Last, I dedicate this dissertation to all of the people with disabilities I have had the opportunity to work with throughout the years. Each of you has inspired me in a special way. Thank you from the bottom of my heart.

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CHAPTER I

INTRODUCTION

The field of vocational rehabilitation (VR) counseling is largely associated with its evolutionary roots grounded in federal legislation to provide employment services to people with disabilities. From the early mandates, which include the Smith-Hughes Act of 1917 and the Smith-Fess Act of 1920, VR services were limited to vocational education and services focusing on individuals with physical disabilities (Jenkins, Patterson, & Szymanski, 1998). Such limitations acted as a means to exclude many individuals with disabilities from the workplace. However, the progression of VR legislation has refined and expanded upon the type of services to be provided and the type of disabilities to be included in service provision. For example, the passage of the Rehabilitation Act of 1973 and amendments recognized the need to provide statewide comprehensive VR services to promote consumer choice and advocacy throughout the VR process, acknowledge the ability of people with various disabilities to engage in gainful employment activities, emphasize the importance of serving people with severe disabilities, and include coverage of individuals with mental disabilities (Jenkins, et al., 1998). The Americans with Disability Act (ADA) of 1990 (P.L. 101-336) has also been influential by expanding the civil rights and protection of people with disabilities in areas of employment, transportation, public accommodations and services, and telecommunications (Jenkins, et al., 1998). Such laws

have recognized the ability of people with disabilities to engage in gainful employment activities with the assistance of VR programs to provide services that increase employability.

Demographic changes have also led to the further expansion of VR laws to include guidelines in working with diverse groups. The Rehabilitation Act Amendments of 1992 (29 U.S.C. §701-744) address the increasing need for VR programs to become more effective in working with individuals with disabilities from various backgrounds to minimize discrepancies in employment outcomes. In reaction to the 1992 Amendments, the Council on Rehabilitation Education (CORE) includes in their standards the need to address “Implications of cultural and individual diversity including cultural, disability, gender, sexual orientation, and aging issues” (CORE, 2012, p. 26). Conversely, much attention has been given to strengthening counselor competency in working with diverse populations. Currently overseen by the Rehabilitation Services Administration (RSA), VR includes services to maximize gainful employment outcomes provided to individuals with sensory/communication, physical, and/or mental disabilities from a multitude of backgrounds (Rehabilitation Services Administration [RSA], 2008), including Hispanic women who are deaf.

Hispanics in the United States

The following sections provide information about the Hispanic population in the U.S. Information regarding the Hispanic population as a whole, Hispanic women and deafness, and the utilization of VR services will be discussed.

Hispanic Population

One minority group served by the state/federal VR system is Hispanics. This group warrants attention because they are the fastest growing minority population, accounting for 16.3% of the total U.S. population (Ennis, Rios-Vargas, & Albert, 2011; Hunes, Jones, &

Ramirez, 2011), and may contribute to the overall success of the VR program in terms of employment outcomes. In 2010, the age-adjusted disability rate for Hispanics was approximately 18% (Brault, 2012). Adjusting for age controls for the impact of age differences on health and disability rates. Also noteworthy among the Hispanic population is the higher prevalence of unemployment. The unemployment rate for Hispanics in the U.S. is 11.3%, compared to 8.8% of the total population (Bureau of Labor Statistics, 2011), indicating a greater need for supports in securing competitive employment. This is especially true for Hispanics women with disabilities, as they tend to experience even lower rates of employment (31.7%) than their non-disabled counterparts (Bureau of the Census, 2006; Equal Employment Opportunity Commission, 2009). Since Hispanic women constitute 48% of the overall Hispanic growth (Hunes, et al., 2011), VR counselors should be prepared to explore factors contributing to successful and unsuccessful employment outcomes for this population. As the Hispanic population continues to grow, VR counselors need to be aware of employment discrepancies that may exist for this population to ensure quality services. Wilson, Garraway, and Bennett (2006) indicated successful service delivery to minority people with disabilities begins with counselors and supervisors understanding the different experiences minority groups encounter through the VR process. By exploring predictive factors contributing to successful employment outcomes of minorities with disabilities, policy makers and professionals are able to address unique characteristics and needs of these diverse populations. One such population includes Hispanic women who are deaf.

Hispanic Women and Deafness

In 2010, women made up approximately 47% of the workforce (U.S. Department of Labor, 2010). However, Cheung and Halpern (2010) indicated women continue to be

underrepresented in employment, especially in upper management positions. Hispanic women often experience even greater disparities in the workforce despite societal efforts, including the civil rights movement and the development of the Equal Employment Opportunity Commission, to enhance minority equality. In 2005, approximately 14% of Hispanic women had a disability (Brault, 2008). The presence of a disability often adds to disparities faced by women in the workplace. For example, Hispanic women with disabilities were employed at a rate of 31.7%, compared to 61.2% of Hispanic women without disabilities, and 34.8% of White women with disabilities (Bureau of the Census, 2006). Possible explanations for such disparities in employment for Hispanic women with disabilities include the decreased likelihood of graduating from high school (61.7% of Hispanics versus 84.6% of Whites) or holding a bachelor's degree (13.1% of Hispanics versus 26.2% of Whites), attaining professional jobs (22.5% of Hispanics versus 37.3% of Whites), and earning comparable pay when compared to their White counterparts (\$24,738 for Hispanics versus \$32,649 for Whites; Bureau of the Census, 2006). Greater identification with Western or Hispanic cultural values, proficiency in English, and access to vocational rehabilitation services, may also contribute to disparities in the workplace (Velcoff, Hernandez, & Keys, 2010). While it is evident disparities exist for Hispanic women and Hispanic women with disabilities with regard to education and employment opportunities, little is known about the impact hearing loss may have on this population. However, an exploration of challenges faced by individuals who are deaf can assist in revealing trends that may exist among Hispanic women who are deaf.

Decreased educational opportunities among Hispanic women are likely exasperated when coupled with the presence of hearing loss. Much like Hispanic women, individuals with hearing loss face unique challenges in education. For example, among students with severe to profound

hearing loss in the U.S., 44.4% did not graduate from high school, compared to 18.7% of the general population (Blanchfield, Feldman, Dumbar, & Gardner, 2001) and the average student who is deaf graduates from high school with approximately a fourth grade reading level (Shirmer & McGougough, 2005). Graduation from college is also lower for students who are deaf or hard of hearing, with a graduation rate of 5.1% versus 12.8% of the hearing population (Blanchfield, et al., 2001). The gaps in educational opportunities among individuals who are deaf or hard of hearing have a substantial impact on vocational and earning potential. Individuals who are deaf or hard of hearing experience higher rates of unemployment (McNeil, 2000) and earn less money (Blanchfield, et al., 2001) than their hearing counterparts. Although the aforementioned does not directly speak of Hispanic women who are deaf, it is apparent that Hispanic women and individuals who are deaf experience challenges in education and employment. These challenges are likely to be more prevalent given the multiple minority status of Hispanic women who are deaf.

Utilization of Vocational Rehabilitation Services

Unique characteristics are evident among Hispanic women when compared to non-Hispanic women with regard to age, level of education, earning potential, and socioeconomic status (SES). According to Gonzales and the Pew Hispanic Center (2008), 42% of Hispanic women in the U.S. are between the ages of 18 and 34, compared to 28% of non-Hispanic women. Such differences in age patterns will likely impact the type of VR services required, as younger women may have different education and vocational needs than older women. Thirty-six percent of Hispanic women have less than a high school education, in contrast to 10% of their non-Hispanic counterparts. Hispanic women employed full-time earn \$460 per week compared to \$615 per week for non-Hispanics, and Hispanic women are almost twice as likely to live in

poverty than their non-Hispanic counterparts. Such disparities among Hispanic women are often intensified with the presence of a disability. Because Hispanic women living in the U.S. tend to be younger, less educated, earn less money, and are more likely to live in poverty, it is important to explore factors contributing to employment outcomes to increase employability among this group. One way to explore factors influencing employment outcomes for various subgroups of individuals with disabilities is by analyzing VR service patterns for different populations.

The state/federal VR program, administered by the RSA, is the largest employment program for individuals with disabilities in the nation. Available in all 50 states, VR includes services to maximize gainful employment outcomes provided to individuals with sensory/communication, physical, and/or mental disabilities from a variety of backgrounds (RSA, 2008), including Hispanic women who are deaf. For VR purposes, the RSA defines deafness as either (a) deafness, primary communication visual or (b) deafness, primary communication auditory. The 2010 U.S. Census Bureau uses the terms *Hispanic* and *Latino* interchangeably to include individuals of “Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture regardless of race” (Hunes, et al., 2011, p. 2). The RSA utilizes the aforementioned governmental definition of Hispanics to classify ethnicity among consumers participating in state/federal VR programs. To be eligible for services, an individual must meet the following criteria: (a) the presence of a disability, (b) resulting in a substantial impediment to employment, (c) who can benefit from available services, and (d) require VR services. Once an individual is found eligible for services, an individualized plan for employment (IPE) is developed by the VR counselor and consumer of services that best suite the needs of the person with a disability. A multitude of services may be provided to increase the likelihood of successful employment outcomes including, but not limited to, diagnosis and

treatment, VR counseling and guidance, training, job search assistance, transportation services, interpreter services, and job placement assistance (RSA, 2008). Upon receiving VR services, individual cases may be closed in status 26 (competitively employed) or status 28 (not competitively employed). Status 26 refers to those individuals who have been working for at least 90 days in either part-time or full-time employment in an integrated setting with or without supports. Status 26 refers to those individuals whose case was closed without an employment outcome following service provision. Closure information collected by each VR agency is reported to the RSA each fiscal year for compilation and program analysis, referred to as the Case Service Report (RSA-911) dataset. This information is made available to researchers to explore patterns contributing to employment outcomes for people with disabilities. One way to analyze the RSA-911 dataset is to explore factors impacting employment outcomes for Hispanic women who are deaf.

In a study by Capella (2003) comparing VR consumers with hearing loss with other types of disabilities and the general labor force, consumers with disabilities were found to hold lower skilled jobs than people from the general labor force. Additionally, individuals with hearing loss were more likely to be represented in clerical occupations, as homemakers, in unpaid family work, as vending stand clerks or operators, in extended employment, or in self-employment. Overall, only slight differences were found between consumers with hearing loss and individuals with other types of disabilities. However, deaf and hard of hearing consumers were grouped together for the study. There is evidence that individuals who are deaf do not fare as well as those who are hard of hearing in VR (Boutin & Wilson, 2009; Dutta, Gervey, Chan, Chou, & Ditchman, 2008; Moore, 2002).

Research indicates that individuals who are deaf and utilize VR services are less likely than those who are hard of hearing to have successful employment outcomes (Boutin & Wilson, 2009). The types of services provided also impacts the successful employment outcome of persons who are deaf. According to Moore (2002), consumers who are deaf were more likely to work when they were provided counseling and guidance and job placement services as opposed to consumers who did not receive such services. Age has also been identified as a predictive factor in employment outcomes among individuals who are deaf, with younger individuals experiencing less success (Dutta, et al., 2008). Despite a growing body of research on VR services for individuals who are deaf, studies specific to the VR experiences of Hispanic women who are deaf are limited.

VR counselor knowledge and preparation in working with individuals who are deaf or hard of hearing may also impact successful employment outcomes for this population. Capella (2003) stated individuals who are deaf or hard of hearing have low participation rates in VR services and have experienced a decline in successful employment rates. He hypothesized one reason may be due to inadequate counselor preparation that is specialized in hearing loss. A study by Bet-Chava, Deignan, and Martin (2002) with 172 participants (sample chosen based upon membership in American Deafness and Rehabilitation Association or National Rehabilitation Association) supported this hypothesis, demonstrating VR counselors receiving more pre-service training and in-service training on hearing loss and assistive technology were more knowledgeable about these issues and reported greater feelings of competency in working with this population. Not surprisingly, the authors found VR counselors coming from deaf and hard of hearing specialty programs to possess greater understanding and knowledge about the needs of consumers with hearing loss. Such increased knowledge and understanding may benefit

consumers who are deaf if the counselor uses their knowledge to provide services geared toward eliminating or minimizing the impediment to employment. For example, counselors with extensive knowledge on the assistive technology devices used by people who are deaf and hard of hearing are likely to discuss the provision of such service, whereas counselors who are not familiar with assistive technology devices may not be as likely to discuss this service option with consumers. Despite increased understanding and knowledge among VR counselors who have participated in specialty hearing loss programs, a significant number of general VR counselors in the study reported to work with individuals with hearing loss, denoting a need for increased educational opportunities for VR counselors managing a general caseload. Training in working with individuals from multiple minority backgrounds may also be used during the VR process when the individual with hearing loss also fits into other minority categories, such as Hispanic women who are deaf.

The VR process leading to services can become more complex for VR counselors when working with individuals with hearing loss who also identify with membership in other minority groups, including Hispanic women who are deaf. Foster and Kinuthia (2003) conducted a study with 33 minority college students who were deaf and found varying degrees of identification as a person who is deaf. For some participants, being deaf was the most important identity characteristic, while others reported racial or ethnic background, language, or gender. Students also expressed difficulty when their personal sense of self interacted with the external world, resulting in conflict between societal expectations, desires to fit in, and personal identity. Counselors working with individuals who are deaf with diverse backgrounds should assess individual identity within each person, and not assume deafness is the most salient characteristic. Additionally, because Hispanics who are deaf account for one of the largest and fastest growing

minority groups within the deaf population and English may be their second language; it is imperative that trilingual counselors be trained to work in the field of rehabilitation.

Statement of the Problem

The measurement of the relationship between consumer demographic characteristics, public supports, and services provided in predicting employment outcomes for persons with disabilities has gained increased attention in the vocational rehabilitation (VR) process. One way to measure predictive factors leading to employment outcomes is through the analysis of the Rehabilitation Services Administration National Case Service Report (RSA-911) database, which includes information regarding every consumer with a disability who has participated in the VR process (RSA, 2008). This national database can be used to examine predictive factors related to employment outcomes for a particular group of individuals with disabilities. One such group is Hispanic women who are deaf.

Approximately 16% of the U.S. female population has a disability, and 13% of non-institutionalized working age females between the ages of 21 and 64 have a disability (Cornell University, 2007). While the exact numbers of Hispanic females who are deaf in the U.S. is unknown, approximately 2% of Hispanic females reported a hearing loss in 2009 (Cornell University, 2010). Race and ethnicity have a significant impact on employment with regard to gender and disability. For example, Hispanic, Native American, and African American women between the ages of 21 and 64 were less likely to work than individuals from other racial and ethnic groups (O'Day & Foley, 2008). In contrast, Hispanic males with disabilities in the same age group were found to have high rates of employment (45.1%), second only to Asian men (46.9%). O'Day and Foley (2008) stated, "To uncover the racial and ethnic implications of employment outcomes of women with disabilities researchers should include race, ethnicity, and

gender as factors in determining the relationship between disability and employment rates” (p. 5).

Previous research exploring factors related to consumer success throughout the state/federal VR process for people with disabilities has emphasized the importance of focusing on a combination of variables that may account for differences in employment outcomes, including race and ethnicity, educational attainment, gender, family and public supports, level of acculturation as it pertains to employment opportunities, type of disability, and VR acceptance rates, (Alon & Tienda, 2005; Arango-Lasprilla et al., 2011; Gonzalez, Rosenthal, & Kim, 2011; Velcoff, et al., 2010; Wilson, 2005; & Zanskas, Lustig, & Ishitani, 2011). These researchers maintain that a multitude of factors contribute to employment outcomes, and the identification of relationships between and among variables is essential in determining the most salient factors contributing to successful employment outcomes for different groups participating in VR. However, despite a growing body of research on factors instrumental in successful employment outcomes for people with disabilities, studies specific to Hispanic women who are deaf are sparse. Further research that explores the interaction among demographic variables, public supports, and service patterns related to successful employment outcomes for Hispanic women who are deaf is instrumental in developing a better understanding of this population.

Statement of the Purpose

The purpose of this study was to examine predictive factors of consumer characteristics, public supports, and patterns of service delivery related to employment outcomes for Hispanic women who are deaf, as defined by the U.S. Census Bureau and Rehabilitation Services Administration (RSA). The 2010 U.S. Census Bureau uses the terms *Hispanic* and *Latino* interchangeably to include individuals of “Cuban, Mexican, Puerto Rican, South or Central

American, or other Spanish culture regardless of race” (Hunes, et al., 2011, p. 2). The RSA utilizes the aforementioned governmental definition of Hispanics to classify ethnicity among consumers participating in state/federal VR programs. In accordance with RSA (2008), deafness will be identified as either (a) deafness, primary communication visual or (b) deafness, primary communication auditory.

Data Analyses

Exhaustive chi-squared automatic interaction detector (CHAID) analysis was used to determine associations between the predictor variables (consumer demographics and public supports) and the criterion variable (employment outcome). CHAID is a method of clustering, which groups “...patterns into distinct segments or clusters based on a suitable notion of closeness or similarity among these patterns. Good clusters show high similarity within a group and low similarity between patterns belonging to two different groups” (Ghosh, 2003, p. 248). Specifically, CHAID splits a sample into smaller groups with similar characteristics that account for the likelihood, or probability, of predicting the criterion variable through the employment of a systematic algorithm. These homogenous end groups, or nodes, represent consumer characteristics and disincentive patterns that interact to significantly contribute to varying probabilities of employment outcomes. The alpha level was set at .05. A Bonferroni correction was used to correct for the number of statistical tests performed within each predictor variable to reduce the risk of Type 1 error. CHAID is an appropriate decision tree model when the criterion variable (employment outcome) is dichotomous and categorical.

The homogenous end groups identified in the exhaustive CHAID analysis were used to inform the logistic regression analysis. In other words, consumer characteristics and public supports that were found significant in predicting employment outcomes identified during the

CHAID analysis were further analyzed in the logistic regression analysis. The number of service variables entered into the logistic regression analysis was reduced through stepwise linear regression analysis, eliminating variables that were nonsignificant. Binary logistic regression is utilized when the outcome variable (employment outcome) is dichotomous and categorical and the predictor variables are categorical (Pallant, 2010). Predictor variables may be either continuous or noncontinuous in logistic regression analysis. Logistic regression analysis was selected for its ability to predict patterns by identifying how a set of predictor variables are related to the criterion variable (Leary, 2008). In logistic regression analysis, "...all predictor variables are tested in one block to assess their predictive ability while controlling for the effects of other predictors in the model" (Pallant, 2010, p. 168). Results from the analysis detect how statistically significant predictor variables impacted the criterion variable (competitive employment outcomes) and the amount of variance explained for by each predictor variable. An odds ratio is provided in logistic regression analysis to indicate how much more likely individuals with certain consumer characteristics, public supports, and vocational rehabilitation services were to be employed than persons who did not exhibit certain consumer characteristics, receive public supports, or receive specific vocational rehabilitation services.

Research Questions

The current study utilized exhaustive chi-squared automatic interaction detector (CHAID) and binary logistic regression analyses to determine predictive factors among consumer characteristics, public supports, and service patterns related to employment outcomes for Hispanic women who are deaf. The following research questions were addressed:

CHAID Analysis

1. What interactive patterns of consumer demographic characteristics and public supports predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

Binary Logistic Regression Analysis

2. Within the identified homogenous end groups, how do service delivery patterns interact to predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

Null Hypotheses

The null hypothesis in research represents the notion that an observable outcome is random, or due to chance (Lehman, 1995). Researchers have two decisions to make upon analyzing data; fail to reject the null hypothesis or reject the null hypothesis. When researchers fail to reject the null hypothesis they are indicating there is no significant difference between or among variables and the outcome is due to chance. If the researcher rejects the null hypothesis they are indicating there is a significant difference between one or more of the variables and the difference is not due to chance. The null hypotheses for this study is as follows:

Null Hypothesis: CHAID

1. Patterns of consumer demographic characteristic and public supports do not predict the likelihood of successful employment outcomes for Hispanic women who are deaf.

Null Hypothesis: Binary Logistic Regression Analysis

2. Within the identified homogenous end groups, service delivery patterns do not interact to predict the likelihood of successful employment outcomes for Hispanic women who are deaf.

Significance of the Research

Identifying predictive patterns among demographic characteristics, public supports, and service delivery regarding employment outcomes for Hispanic women who are deaf are critical to explore and address unique employment needs of this population. Results from the study may increase knowledge about employment needs of Hispanic women who are deaf and allow for improvements in the prediction of successful employment outcomes for this population. Furthermore, findings can assist in guiding vocational rehabilitation policy and practice to increase employability among Hispanic women who are deaf. Identifying patterns that increase competitive employment outcomes for Hispanic women who are deaf will likely result in more positive success rates among this population.

Summary of Introduction

Although the Hispanic population constitutes the fastest growing minority group in the U.S. (Ennis, et al., 2011), they continue to face occupational barriers. Such barriers include poverty and educational deficits (Sue & Sue, 2003), reduced level of acculturation, and difficulty trusting counselors (Velcoff, et al., 2010). Disparities that exist for minorities often result in less education, decreased presence in professional jobs, and earned wages that are less than their White counterparts (Bureau of the Census, 2006). Individuals who are deaf also face unique challenges to attaining employment, including lower rates of high school and college graduation, less earnings (Blanchfield, et al., 20010), higher unemployment rates (McNeil, 2000) and decreased visibility in professional occupations (Boutin, 2010; Boutin & Wilson, 2009). Type of services provided also impacts employment outcomes for individuals who are deaf, with counseling and guidance and job placement services contributing to successful outcomes (Moore, 2002). While it is apparent that disparities in educational attainment and employment

opportunities exist for Hispanics, women, and individuals who are deaf exist, little is known about factors influencing successful employment outcomes among Hispanic women who are deaf. An exploration of how patterns of consumer characteristics, public supports, and services provided interact with employment outcomes can assist in identifying factors instrumental in predicting successful employment outcomes for Hispanic women who are deaf and utilize VR services. Results may also be instrumental in formulating future policy in working with Hispanic women who are deaf.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The purpose of this study was to examine predictive factors of consumer characteristics, public supports, and patterns of service delivery related to employment outcomes for Hispanic women who are deaf. This chapter provides a literature review as it relates to the purpose of the study. Discussion in this chapter includes characteristics of individuals who are deaf, employment among individuals who are deaf, employment among Hispanic women with deafness, employment challenges, prediction studies in research, prediction studies in vocational rehabilitation, logistic regression analysis in vocational rehabilitation, CHAID analysis in vocational rehabilitation, CHAID and logistic regression analyses in vocational rehabilitation, and contribution of the study.

Deafness¹

While recent data is not available regarding the current number of individuals who are deaf in the U.S., data from the 1990-1991 National Center for Health Statistics indicated approximately 1.5 million people over the age of two were deaf (Ries, 1994). Individuals with different degrees of hearing loss make up a heterogeneous group, with varying racial and ethnic,

¹ When referring to deaf or deafness, a lowercase “d” is utilized by the author to signify audiological conditions and a capital “D” is utilized to signify a cultural identity.

gender, educational, socioeconomic, and employment backgrounds. Level of hearing loss is typically measured by determining the lowest decibel (dB) an individual is able to hear, with a larger dB resulting in more severe level of hearing loss and deleterious impact on an individual's ability to communicate. Hearing specialists classify individuals as deaf when they do not rely on auditory stimulation as their primary means of communication (Scheetz, 2004). Speech audiometry measurements are often utilized to determine severity of loss, loudness tolerance, and speech recognition (Martin & Clark, 2003). Individuals who are born deaf or lose their hearing before the age of three are considered prelingually deaf and people who lose their hearing after the onset of speech and language are referred to as postlingually deaf. Among individuals who are deaf or hard of hearing in the U.S. and English-speaking areas of Canada, approximately 100,000 to 300,000 people use American Sign Language (ASL) as their primary language (Padden & Humphries, 2005). Many of these individuals identify with being a member of Deaf culture based on a shared cultural history and language within the larger society.

Employment Among Individuals who are Deaf and VR Implications

The VR system is dedicated to providing services to people with disabilities to increase employability (RSA, 2008). However, there is evidence that individuals who are deaf are underrepresented in employment. Individuals with deafness who utilize VR services may be less likely than those who are hard of hearing to have successful employment outcomes. In a study by Boutin and Wilson (2009), individuals who were hard of hearing experienced an employment rate of 69% versus only 31% of people who were deaf. The types of services provided also impacts the successful employment outcome of persons who are deaf. According to Moore (2002), consumers who are deaf were more likely to work when they were provided counseling and guidance and job placement services as opposed to consumers who did not receive such

services. Also, Boutin and Wilson (2009) examined the degree of hearing loss and type of occupation attained following participation in state/federal VR programs in fiscal year 2004. They found that consumers who were hard of hearing had an increased likelihood of obtaining competitive employment outcomes compared to individuals who were deaf. Individuals who were deaf were employed in non-professional jobs, whereas individuals who were hard of hearing were more likely to hold professional jobs. In a similar study by Boutin (2010) to investigate employment outcomes for VR consumers with hearing loss, consumers who were hard of hearing were found to be more prevalent in professional occupations than those who were deaf. Consumers who are deaf were more likely to be placed in food preparation and janitorial positions. Common themes throughout the literature suggest there is opportunity for improvement within VR programs to better assist individuals who are deaf. Additionally, literature concerning hearing loss often does not differentiate among level of hearing loss, gender, and race/ethnicity when examining predictive factors related to VR access and employment outcomes (e.g., Boutin & Wilson, 2009; Dutta, et al., 2008; Moore, 2002; Moore, Giesen, & Cavanaugh, 2005). While such studies provide a better understanding of challenges surrounding deafness and hard of hearing, few studies focus on specific populations who are deaf, such as Hispanic women who are deaf. Despite a growing body of research on VR services for individuals who are deaf, studies specific to the VR experiences of Hispanic women who are deaf are limited.

Employment Among Hispanic Women with Deafness

Because the Bureau of the Census considers Hispanic an ethnic minority, many studies in rehabilitation conducted on race have often overlooked Hispanic issues (Hunes, et al., 2011; Wilson & Senices, 2005). However, there is evidence that Hispanics, as an ethnic minority, are

underrepresented in employment and leadership roles (Eagly & Chin, 2010), with Hispanic women often experiencing even greater disparities. In 2011, Hispanics, including Hispanic women, experienced an overall unemployment rate of 11.3%, the highest of any racial or ethnic group in the U.S. (U.S. Bureau of Labor Statistics, 2011). During the same time, the general unemployment rate was 8.8%. When Hispanic women are employed, they are most often reported to work in service, labor, clerical, and sales positions (Equal Employment Opportunity Commission, 2008). Hispanics, including Hispanic women, are also underrepresented in federal employment, especially when considering higher paying positions. For example, approximately 8% of Hispanics (3.23% of Hispanic women) hold permanent federal jobs in the U.S. and 3.62% of Hispanics (1.14% of Hispanic women) are employed in senior pay level positions (including managerial, supervisory, and policy-making jobs) in the federal government (U.S. Equal Employment Opportunity Commission, 2009).

In addition to disparities in the workplace for Hispanic women, disability also has a negative impact on one's ability to become employed (Estrada-Hernandez, Wadsworth, Nietupski, Warth, & Winslow, 2008), and this general finding extends to Hispanic women who are deaf. Similar to employment trends reported for Hispanic women, individuals who are deaf are employed in more nonprofessional than professional jobs (Boutin, 2010; Boutin & Wilson, 2009). Additionally, gender discrepancies have been identified in employment outcomes for individuals with hearing loss, with men earning approximately 20% more than women, experiencing more frequent promotions, are more likely to be employed full-time, and receiving benefits more often (Schroedel & Geyer, 2000; Schroedel, Geyer, & McGee, 1996). Coupled together, it appears that being deaf, Hispanic, and female presents a multitude of challenges with regard to employment. Efforts to increase employability among this population may assist in

decreasing disparities in employment outcomes. One way to increase employment opportunities among Hispanic women who are deaf includes identifying factors impacting successful employment outcomes among this population.

Employment Challenges

Studies that have been conducted with the Hispanic population indicate barriers to employment exist for all Hispanics, including women with disabilities. For example, Riggart, Eckert, and Crimando (1993) reported communication barriers among individuals from different cultural backgrounds, noting how culturally bound verbal phrases and nonverbal gestures may be misunderstood. Communication barriers are often magnified among women who are deaf and adjusting to where they fit within hearing and Deaf cultures (Aguayo, & Coady, 2001). Sue and Sue (2003) identified additional communication and employment barriers including race, gender, or ethnicity of staff that is predominately White and male; language barriers; failure to understand others' worldviews; cultural stereotyping; poverty and educational deficits; and decreased opportunities for leadership roles. Such disparities for minority women and women with disabilities place them at a disadvantage and challenge VR professionals to find ways to better serve minority populations, including Hispanic women who are deaf.

Velcoff, et al. (2010) identified level of acculturation as a predictor in success of employment outcomes of Hispanics with disabilities, with higher levels of acculturation correlating with better employment outcomes. In this study, acculturation was measured utilizing the Disability and Employment Survey, which assesses, "...concerns experienced by individuals with disabilities when seeking employment, with attention paid to the concerns of racial and ethnic minorities" (Velcoff, et al., 2010, p. 54). The investigators identified additional barriers to include difficulty understanding the counselor, mistrust of counselors of a differing

cultural background, and lower educational attainment among Hispanics. They also found Hispanics with greater family supports reported more successful employment outcomes among individuals with higher levels of acculturation. Such unique experience of Hispanic women with disabilities, including Hispanic women who are deaf, makes it imperative for VR counselors to address potential barriers to increase the chances of successful employment outcomes.

Vaughn and Boston (2010) addressed issues related to employment outcomes among minority women with psychiatric disabilities who receive Temporary Assistance for Needy Families (TANF). Participants included minority women (defined as Latina, African American, Native American/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, or Multiracial) who participated in VR services for fiscal year (FY) 2007. Prior to restricting their research to individuals who received TANF, the authors examined factors related to employment outcomes for minority women and noted:

The variables which predicted a positive employment outcome were having a high school diploma, having a bachelor's degree or higher, diagnosis/treatment, VR counseling/guidance, college/university training, occupational/vocational training, job search assistance, job placement, on-the-job supports, transportation services, maintenance, information and referral, and miscellaneous training (p. 32).

This study indicated that minority women with psychiatric disabilities who received TANF were most likely to be employed when they had at least a high school diploma and when certain VR services were provided. However, it is uncertain if similar employment patterns are present among women with disabilities other than psychiatric disorders that receive some type of public supports. Consumer characteristics, impact of public supports, and services provided to Hispanic

women who are deaf should also be examined to determine how such factors impact employment outcomes.

With the passing of the Rehabilitation Act Amendments of 1992 (29 U.S.C. § 701–744), which address the issue of multicultural counseling among rehabilitation professionals, counselor competency in working with minority populations has been a growing issue of interest (Bellini, 2002; Chao, Wei, Good, & Flores 2011; Mpofu & Conyers, 2004). The Council on Rehabilitation Education (CORE), the accreditation organization responsible for overseeing the academic preparation of rehabilitation counseling professionals, includes in their standards the need to address “Implications of cultural and individual diversity including cultural, disability, gender, sexual orientation, and aging issues” (CORE, 2012, p. 26). According to Mpofu and Conyers (2004), minority or disability status alone does not equate to inequality. Rather, it is the limited access to resources and opportunities that place individuals at a disadvantage. A study by Bellini (2002) revealed that rehabilitation counselors who were female, members of an ethnic minority group, enrolled in graduate courses and/or workshops related to multicultural counseling were more likely to self-identify as competent in working with minority populations.

Prediction Studies

Prediction studies are utilized in a variety of research settings to identify underlying patterns of behavior or descriptive characteristics. Once identified, these patterns may be instrumental in directing research, policy, and practice endeavors. Data mining is a commonly used method of extrapolating information from large datasets to make predictions regarding a given population. For example, data mining has occurred in academia to explore the interaction between student characteristics and academic outcomes (Martinez, Acosta, Uribe, & Rambo, 2012; Sujitparapitaya, 2006); in business and marketing to predict consumer demand

patterns (Cheung & Li, 2012; Kyun, Sohn, & Kim, 2009; Ramesh, Prasad, Bhuravarjula, & Krishna, 2010); in the healthcare field to increase understanding of patient health behaviors (Ramachandran, Girija, & Bhuvanewari, 2012; Yoo, et al., 2012); and in politics to predict voting patterns (Murray & Scime, 2010). More recently, prediction studies have been used to predict patterns within the vocational rehabilitation system to explore factors related to successful employment outcomes for individuals with a variety of disabilities (e.g., Arango-Lasprilla et al., 2011; Lydell, Grahn, Månsson, Baigi, & Marklund, 2009; Rogers, Bishop, & Crystal, 2005; Vaughn & Boston, 2010).

Prediction Studies in Vocational Rehabilitation

Vocational rehabilitation (VR) is a state and federal program designated to assist people with disabilities gainfully obtain and maintain employment outcomes “...consistent with their strengths, resources, priorities, concerns, abilities, capabilities, interests, and informed choice” (U.S. Department of Education, 2010, p.1). Mandated by the Rehabilitation Act of 1973, VR services are based upon eligibility criteria including, (a) the presence of a disability, (b) resulting in a substantial impediment to employment, (c) who can benefit from available services, and (d) require VR services. A multitude of services may be provided to individuals with disabilities to increase the likelihood of successful employment outcomes. Services include, but are not limited to, diagnosis and treatment, VR counseling and guidance, training, job search assistance, transportation services, interpreter services, and job placement assistance (RSA, 2008).

Because VR is instrumental in increasing employment opportunities for people with disabilities, several studies examine the predictive factors on employment outcomes. Variables of interest include consumer characteristics (e.g., age, race and ethnicity, type of disability, and

gender), public supports (e.g., SSI, SSDI, and TANF), and services provided (e.g., diagnosis and treatment, job placement assistance, and training).

CHAID Analysis in Vocational Rehabilitation

Often in research it is necessary to extrapolate information regarding smaller groups from a larger set of data. CHAID analysis is a data mining approach that fits this need (Gehrke, 2003). Once the target population is identified, homogeneous end groups are displayed in a tree-shaped diagram to depict patterns of interaction among predictor variables contributing to the probability of predicting the criterion variable. This analysis is useful in vocational rehabilitation to detect the strong associations between predictor variables (e.g., consumer characteristics, public supports, race/ethnicity) and the criterion variable (e.g., employment outcome). Below is a discussion of how CHAID analysis has been used in the field of vocational rehabilitation to predict consumer employment outcomes.

Gonzalez, et al. (2011) explored the predictive relationship between consumer demographic characteristics and employment outcomes for individuals with specific learning disabilities between the ages of 16 and 24 utilizing CHAID analysis. Participants included 30,265 individuals with a specific learning disability as their primary disability participating in VR services for FY 2007. The criterion variable included employment outcome and the predictor variables included gender, race, type of disability, age, level of education, and public supports. Results of the study indicated a successful employment rate of 62.45% and an unsuccessful employment rate of 37.55% for the target population. Men with specific learning disabilities experienced more positive employment outcomes (62%) than women (38%). Differences also existed in overall employment outcomes when taking into account race/ethnicity, with European Americans experiencing the highest success (64%), followed by

African Americans (20%), Hispanics (13%), Asian Americans (1.5%), and Native Americans (1.2%). For the overall sample, the most predictive factor of successful employment outcomes was public supports; individuals who did not receive public supports were more likely to be employed (64.98%) than those who did receive such supports (55.09%). Hispanic women who did not receive public supports were employed at a rate of 59.43%, indicating they were less likely to be employed compared to the overall population when public supports were not present. The authors also found that for European American and Hispanic women who received public supports and had a level of education at the associate's degree, the rate of successful employment outcomes increased (71.83%). As suggested in the study, it is important to explore how multiple characteristics of an individual interact with services provided to predict employment outcomes for people with disabilities, subsequently increasing the ability of research professionals to predict employment outcomes for people with various disabilities.

Another study by Chronister, et al. (2008) utilizing CHAID analysis to explore factors related to employment outcomes for individuals with substance abuse disorders who utilized VR services. RSA-911 data for FY 2001 was analyzed in the study. Participants included 24,505 men (71%) and 10,269 women (29%) whose cases had been closed successfully. The criterion variable was employment outcome and three sets of predictor variables including demographic variables, public supports, and service variables. The success rate for the target population was 55%. The authors found that race/ethnicity significantly impacted employment outcomes in their study, with European Americans (55%), African Americans (56%), and Hispanics (55%) showing the highest rates of success. Consumers with an education level of at least a high school degree and some college who were married were also found to have increased successful employment outcomes. The authors identified job placement as the most significant service for

people with substance abuse disorders. Individuals receiving job placement services were employed at a rate of 68% while people who did not receive this service were employed at a rate of 50%. For individuals receiving job placement services, the second most significant predictor variable was other services (e.g., occupational tools and equipment and initial stocks and licenses). For people who did not receive job placement services but received substantial counseling services and physical or mental restoration services, the employment rate was 58%. While disincentives were shown to have a negative impact on employment outcomes for some of the homogenous end groups, the authors noted this impact was smaller for individuals with substance abuse disorders than has been found in previous research with other disability groups, indicating disincentives may impact certain groups of individuals with disabilities more than others.

Focusing on people with orthopedic disabilities, Chan, Cheing, Chan, Rosenthal, and Chronister (2006) investigated predictive factors in employment outcomes among consumers using exhaustive CHAID analysis. RSA-911 data for FY 2001 was analyzed in the study. The sample consisted of 74,861 people with orthopedic disabilities whose case was closed as successful or unsuccessful after receiving services. The criterion variable was employment outcome and the predictor variables included demographic characteristics, cash and medical benefits, and services provided. The overall competitive employment rate for the population was 57%. Job placement was found to be the most salient predictor of successful employment among the target population, with an employment rate of 75%. However, the authors stated only 25% of consumers received this service. Receipt of public supports was the second most important factor, with individuals receiving supports experiencing an employment rate of 45% compared to 60% of people who did not receive supports. The authors also found 10 homogeneous end

groups with significantly higher competitive employment rates than the overall sample. The group with the highest competitive employment rate included 157 women with orthopedic disabilities between the ages of 16 and 34 or age 65 and older who did not receive public supports and did receive counseling and guidance, university training, and job placement services. The researchers also noted this group did not receive transportation services or restoration services.

The use of CHAID analysis to extrapolate homogeneous end groups from a large set of data allows rehabilitation researchers to identify consumer patterns instrumental in predicting employment outcomes for target populations. Logistic regression analysis has also been beneficial in studies with people with disabilities to describe the strength and magnitude of the relationship between predictor variables and employment outcomes. The combined use of the aforementioned analyses in rehabilitation research can provide different levels of robustness of information under examination.

Logistic Regression Analysis in Vocational Rehabilitation

Logistic regression analysis is an appropriate statistical tool to predict or explain relationships among variables when the criterion variable is dichotomous and categorical and the predictor variables are categorical or continuous (Huck, 2008; Pallant, 2010). An odds ratio is provided to indicate how much more likely an outcome is to occur given the presence or absence of each of the predictor variables. The ability of researchers to estimate the likelihood of a particular outcome occurring makes logistic regression analysis desirable in vocational rehabilitation studies.

Rogers, et al. (2005) explored the predictive relationship between services provided and employment outcomes among VR consumers receiving SSI or SSDI. The authors also examined

the impact of gender, education, race, and age on employment. The criterion variable in the study included VR service outcomes and the predictor variables included service variables, number of services, cost of services, and demographic variables. The predictive relationship was examined utilizing binary logistic regression analysis of 6,264 consumers receiving SSI or SSDI at application whose case was either closed rehabilitated or closed not rehabilitated following the development of an individualized plan for employment. Of the 13 service categories examined, six variables were found to significantly predict employment outcomes in the study. The Exp (B) represents an odds ratio with larger numbers indicating greater likelihood of successful employment outcomes when provided a specific service. Services significantly related to successful employment included job placement services (Exp (B) = 3.187), on-the-job training (Exp (B) = 1.628), other services (Exp (B) = 1.403), restoration services (Exp (B) = 1.293), and miscellaneous services (Exp (B) = 1.289). For example, individuals who received job placement services were over three times more likely to be employed than people who did not receive the service. Race and education were the only demographic variables significantly related to employment outcomes in the study. Whites were over 1.5 times more likely to be employed than their non-White counterparts. Education at application was also associated with more positive employment outcomes.

Logistic regression analysis has been used to predict employment outcomes for minority women (Latina, African American, Native American or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, and Multiracial) with psychiatric disabilities utilizing VR services (Vaughn & Boston, 2010). The sample was comprised of 10,238 minority women between the ages of 18 and 64 diagnosed with a psychiatric disability. Predictor variables in the study included age, race, type of psychiatric disability, TANF receipt, level of education, and

employment status. Results suggested that when compared to the “other mental illness” category, women whose primary disability included schizophrenia or depression were less likely to be employed. Secondary disability type did not appear to have an impact on employment outcomes for this population. Receiving TANF benefits were negatively related to employment outcomes, indicating receipt of TANF benefits might hinder successful employment outcomes. Education also appeared to have an impact on employment outcomes, with consumers receiving a bachelor’s degree or higher experiencing more positive outcomes than people who did not receive a bachelor’s degree or higher. The three services accounting for the most positive predictive ability for minority women with a psychiatric disability in the study included job placement assistance (Exp (B) = 3.687), on-the-job supports (Exp (B) = 3.093), and maintenance (Exp (B) = 2.203). Additional services significant in predicting employment outcomes included diagnosis/treatment, VR counseling and guidance, college/university training, occupational/vocational training, job search assistance, transportation services, miscellaneous training, and other services. Assessment services, job readiness training, and information/referral services did not significantly impact employment outcomes for minority women in this study.

Dutta, et al. (2008) examined the impact of VR services among individuals with sensory/communicative, physical, and mental impairments utilizing logistic regression analysis. Participants included a total of 15,000 people with disabilities (5,000 persons included in each of the three disability categories) participating in VR services in FY 2005. Included in the sensory/communicative impairment category were individuals with visual impairments, blindness, hearing loss, and deafness. Of this group, approximately half (51%) were women. The criterion variable was employment outcome. Predictor variables included demographic

variables (i.e., age, gender, race/ethnicity, education, cash or medical supports, and employment at time of application) and type of service provided (e.g., information and referral services, job search assistance, and transportation services). Age was found to be a significant factor only for individuals with sensory/communicative disorders, with older individuals experiencing significantly greater employment outcomes than younger individuals. Education was significantly related to employment outcomes for individuals with sensory/communicative disorders and physical disabilities, with higher levels of education associated with more positive outcomes. Employment status at application was significant for all three disability groups, but the impact for people with sensory/communicative disorders was the most prominent.

Individuals with sensory/communicative disorders who were employed at the time of application were 4.05 times more likely to be employed at closure, people with physical disabilities were 2.79 times more likely to be employed at closure, and people with mental impairments were 1.53 times more likely to be employed at closure. Although job placement, on-the-job supports, maintenance, and other services predicted employment outcomes for each of the disability groups targeted in the study, the impact of the services varied among the groups. For example, individuals with physical disabilities were 2.23 times more likely to be employed at closure when they received job placement services, while individuals with sensory/communicative disabilities were 1.66 times more likely to be employed at closure when job placement services were provided. People with sensory/communicative disorders receiving on-the-job supports were 2.23 times more likely to be employed at closure, while individuals with physical impairments were 1.97 times more likely to be employed at closure when they received on-the-job supports. Additional services significantly related to employment outcomes for individuals with sensory/communicative disorders included diagnostic and treatment services and

rehabilitation technology services, with greater employment outcomes when these services were provided. Transportation services were negatively related to employment outcomes for people with sensory/communicative disorders. This research suggests that individuals with sensory/communication, physical, mental disabilities exhibit different patterns of consumer characteristics and service needs. As such, it is important for VR professionals to further explore how the VR process impacts subgroups within each of these different groups. One such subgroup is Hispanic women who are deaf.

The Use of CHAID and Regression Analyses in Research

Studies utilizing both CHAID and regression analyses, although sparse, can complement one another to provide a more comprehensive description of variable interactions. CHAID analysis detects interactive patterns accounting for varying degrees of probability in predicting the criterion variable. Regression analysis provides information regarding the strength and nature of the interactive relationship among predictor variables and the criterion variable.

Horner, Fireman, and Wang (2010) explored the relationship among student behavior, peer status, race, and gender to decisions about school discipline utilizing CHAID and regression analyses. The researchers first utilized exploratory exhaustive CHAID analysis to identify relationships among variables most strongly associated with decisions regarding disciplinary action. Follow-up confirmatory analysis was conducted using regression analysis with those predictor variables identified in the CHAID analysis. The researchers yielded similar results with the CHAID and regression analyses, including the identification of overt aggression alone as a significant predictor of disciplinary action and a significant relationship between overt aggression and prosocial behavior to disciplinary action. However, the CHAID analysis revealed a significant relationship between race and aggression in predicting disciplinary action, while the

regression analysis did not find a significant relationship between race and aggression in the prediction of disciplinary action. Rather, race was found to impact disciplinary action independent of aggression in the regression analysis. In this study, CHAID analysis allowed researchers to examine how predictor variables interact to account for the likelihood of the presence or absence of disciplinary action among homogeneous end groups while regression analysis provided information about the strength and nature of the relationship of predictor variables to the criterion variable.

Thomas and Galambos (2004) used regression and CHAID analyses to identify how demographic characteristics, experiences, and perceptions impact overall student satisfaction with their college experience. In comparing results from the two analyses, the researchers found similarities and differences. Both analyses identified intellectual growth, satisfaction with their academic experience, and instruction quality as significant in predicting student satisfaction with their college experience. However, the regression analysis recognized significant variables that contributed independently to increased predictions of overall student satisfaction not present in the CHAID analysis. Conversely, the CHAID analysis identified variable combinations (homogeneous end groups) contributing to increased predictions of overall satisfaction not present in the regression analysis.

The combined use of CHAID and regression analyses to examine the same data can provide a more extensive explanation of factors significant in predicting the criterion variable compared to the use of one analyses. While the regression analysis provides information regarding significant predictors of an entire target population, CHAID analysis allows the researcher to examine the likelihood of variable combinations significant in predicting target

outcomes. The use of both has been beneficial among vocational rehabilitation researchers to provide a more in-depth understanding of people with disabilities.

Contribution of the Study

The current research will have an impact on the field of rehabilitation by adding to the body of knowledge, providing preliminary findings for future research to build upon, and allowing for implementation of findings. There is limited information regarding Hispanic women who are deaf and utilize VR services. Additional information pertaining to this unique population can help identify services to improve employment outcomes. Follow-up studies that compare Hispanic males and females or Hispanics who are deaf with those that are hard of hearing to identify differences in employment outcomes may also be beneficial. Once potential factors impacting employment outcomes for Hispanic females who are deaf that utilize VR services are identified, counselors can use this information to better serve their consumers.

Furthermore, findings may be incorporated into policy changes to increase successful employment outcomes for Hispanic women who are deaf. VR counselors providing services to Hispanic women who are deaf may utilize significant results to ensure best practices in service delivery. Identifying patterns of service delivery significant in increasing positive employment outcomes may also act to minimize work disparities among Hispanic women who are deaf and utilize VR services. Results may also be instrumental in developing and implementing a model for working with Hispanic women who are deaf to increase successful employment outcomes in state VR agencies.

CHAPTER III

METHODOLOGY

Introduction

The current study incorporated exhaustive chi-squared automatic interaction detector (CHAID) and binary logistic regression analyses. In the CHAID analysis, consumer characteristics and public supports were analyzed to determine their interactive ability to predict employment outcomes among Hispanic women who are deaf. Significant homogeneous end groups identified in the CHAID analysis were further examined in the logistic regression analysis. The sections in this chapter address sampling and population, criterion and predictor variables, data analysis, research questions, null hypotheses, reliability and validity, limitations and delimitations, and the chapter summary.

Sampling and Population

The Rehabilitation Service Administration Report (RSA-911) fiscal year (FY) 2009 national database was used to extract information regarding employment outcomes for Hispanic women who are deaf. Of the 588,970 people with a disability participating in VR services with a closed case in FY 2009, 57,738 (10%) were Hispanic and 24,835 (4%) were Hispanic women. All consumers who are deaf included 11,688 (2%) individuals. Hispanics included 1,609 of the deaf population with a primary disability code of 3 (deafness, primary communication visual) or 4 (deafness, primary communication auditory), 756 being Hispanic women who are deaf. When

taking into consideration closure type (26 = successful employment outcome, 28 = unsuccessful employment outcome), the target population of Hispanic women who are deaf was reduced to 570. Consumer age in the sample ranged from 16 to 76 years ($M = 32.91$, $SD = 13.290$). Approximately 24% ($n = 135$) of the target sample was between the ages of 16 and 20, 25% ($n = 141$) between the ages of 21 and 29, 20% ($n = 116$) between the ages of 30 and 39, 18% ($n = 104$) between the ages of 40 and 49, and 13% ($n = 73$) between the ages of 50 and 76. Level of education for the sample included 7% ($n = 40$) special education, 31% ($n = 175$) less than high school, 38% ($n = 215$) high school graduate, 21% ($n = 119$) associate degree, and 4% ($n = 21$) bachelor degree or higher. Approximately 54% of the sample received public supports (e.g., SSI, SSDI, TANF). Among those receiving public supports, 44.2% ($n = 252$) received one support, 8.2% ($n = 47$) received two public supports, and 1.1% ($n = 6$) received three public supports. Of the 570 participants, 26.1% ($n = 149$) were employed at application. Table 1 presents the demographic characteristics of the sample population.

Table 1 Demographic Characteristics (*N* = 570)

Variable	Frequency	%
Age at application		
21-29	141	24.7
16-20	135	23.7
30-39	116	20.4
40-49	104	18.2
50-76	73	12.8
Level of education		
HS graduate	215	37.7
Less than HS	175	30.7
Associate degree	119	20.9
Special education	40	7.0
Bachelor degree or higher	21	3.7
Receipt of public supports		
Zero supports	260	45.6
One support	252	44.6
Two supports	47	8.2
Three supports	6	1.1
Severity of Disability		
Severe	535	93.9
Non-severe	35	6.1

Variables

This section provides a detailed description of the variables examined in the study. The predictor variables for the CHAID analysis included consumer characteristics and public supports. The criterion variable included employment outcomes. The predictor variables for the logistic regression analysis were the four homogenous end groups identified in the CHAID analysis and VR services provided. The criterion variable was employment outcomes. In this quantitative study, all variables were considered qualitative variables as a result of their categorical nature (Huck, 2008). Variables, values, and descriptions are displayed in Table 2.

Criterion/Dependent Variables

The criterion variable in this study was vocational rehabilitation employment outcome, defined by RSA (2008) as “closed and rehabilitated” (at least one service was received and consumer worked for at least 90 consecutive days in competitive employment) or “closed and not rehabilitated” (case was closed after rehabilitation plan was initiated, but no employment was secured). Competitive employment was defined by the RSA (2008) as employment in an integrated setting, self-employment, or employment in a state-managed Business Enterprise Program (BEP) performed on a full-time or part-time basis and the person receives payment at or above minimum wage. Employment outcome was coded ‘closetype’, with a code of 0 corresponding to no successful employment outcome (closed and not rehabilitated) and a code of 1 corresponding to successful employment outcome (closed and rehabilitated).

Predictor/Independent Variables

The predictor variables included demographic characteristics, public supports, and services provided. Demographic characteristics were age and level of education. Public supports included SSI, TANF, general assistance, SSDI, Veterans’ disability benefits, WC and

other public supports. Type of services included a) assessment, b) diagnosis and treatment of impairment, c) VR counseling and guidance, d) college or university training, e) occupational/vocational training, f) on-the-job training, g) basic academic remedial or literacy training, h) job readiness training, i) disability related augmentative skills training, j) miscellaneous training, k) job search assistance, l) job placement assistance, m) on-the-job supports, n) transportation services, o) maintenance, p) rehabilitation technology, q) reader services, r) interpreter services, s) personal attendant services, t) technical assistance services, u) information and referral services, and v) other services. Service predictor variables were either provided or not provided.

Age. Age was categorized into five groups. Group 1 included consumers between the ages of 16 and 20 and was coded as 1. Group 2 included consumers between the ages of 21 and 29 and was coded as 2. Group 3 included consumers between the ages of 30 and 39 and was coded as 3. Group 4 included consumers between the ages of 40 and 49 and was coded as 4. Group 5 included consumers between the ages of 50 and 76 and was coded as 5. Missing values were accounted for and coded 0.

Level of Education. Level of education was categorized into 5 groups. Group 1 included special education as was coded as 1. Group 2 included individuals with less than high school education and was coded as 2. Group 3 included individuals who were high school graduates and was coded as 3. Group 4 consisted of individuals with an associate degree and was coded as 4. Group 5 included individuals with a bachelor degree or higher and was coded as 5.

Public Supports. Public supports included the receipt of public support (e.g., SSDI, SSI, TANF). Consumers either received or did not receive public supports (value code 0 = no

supports, value code 1 = supports). Also, public supports were analyzed according to the number of supports received by consumers (value code 0 = no supports, value code 1 = 1 support, value code 2 = 2 supports, value code 3 = 3 supports). The RSA-911 dataset identifies public support as the cash payments made by federal, state, and/or local governments for any reason, including an individual's disability, age, economic, retirement, and survivor status. Supports include (a) Supplemental Security Income (SSI) for the aged, blind, or disabled, (b) temporary assistance for needy families (TANF), (c) general assistance (state or local government), (d) Social Security Disability Insurance (SSDI), (e) veterans' disability benefits, (f) workers' compensation, and (g) other public support.

Assessment. Assessment services were services provided to an individual to determine program eligibility for VR services, to assign individuals to a priority category of a VR agency that operates under an order of selection, and/or to determine the nature and scope of VR services to be included in the individualized plan for employment (IPE). These services were either not provided (value code = 0) or provided (value code = 1).

Diagnostic and Treatment of Impairment. Diagnostic and treatment services included:

1. Corrective surgery or therapeutic treatment that is likely, within a reasonable period of time, to correct or modify substantially a physical or mental impairment that constitutes a substantial impediment to employment;
2. Diagnosis and treatment for mental and emotional disorders by qualified personnel who meet State licensure laws;
3. Dentistry;
4. Nursing services;

5. Necessary hospitalization (either inpatient or outpatient care) in connection with surgery or treatment;
6. Drugs and supplies;
7. Prosthetic, orthotic, or other assistive devices, including hearing aids;
8. Eyeglasses and visual services, including visual training, and the examination and services necessary for the prescription and provision of eyeglasses, contact lenses, microscopic lenses, telescopic lenses, and other visual aids prescribed by personnel who meet State licensure laws and are selected by the individual;
9. Podiatry;
10. Physical therapy;
11. Occupational therapy;
12. Speech or hearing therapy;
13. Mental health services;
14. Treatment of either acute or chronic medical complications and emergencies that are associated with or arise out of the provision of physical and mental restoration services or that are inherent in the condition under treatment;
15. Special services for treatment of individuals with end-stage renal disease, including transplantation, dialysis, artificial kidneys, and supplies; and
16. Other medical or medically related rehabilitation services.

These services were either not provided (value code = 0) or provided (value code = 1).

Vocational Rehabilitation Counseling and Guidance. The RSA-911 dataset defined counseling and guidance as discrete therapeutic counseling and guidance services that are necessary for an individual to achieve an employment outcomes, including personal adjustment

counseling; counseling that addresses medical, family, or social issues; vocational counseling; and any other form of counseling and guidance that is necessary for an individual with a disability to achieve an employment outcome. This service is distinct from the general counseling and guidance relationship that exists between the counselor and the individual during the entire rehabilitation process. These services were either not provided (value code = 0) or provided (value code = 1).

College or University Training. College or university training included full-time or part-time academic training above the high school level leading to a degree (associate, baccalaureate, graduate, or professional), a certificate or other recognized educational credential. A four-year college or university, a community college, a junior college, or a technical college may provide such training. These services were either not provided (value code = 0) or provided (value code = 1).

Occupational/Vocational Training. These services entailed occupational, vocational, or job skill training provided by a community college and/or business, vocational/trade school to prepare students for gainful employment in a recognized occupation, not leading to an academic degree or certification. These services were either not provided (value code = 0) or provided (value code = 1).

On-the-Job Training. Services included training in specific job skills by a prospective employer. Generally the individual is paid during this training and will remain in the same or a similar job upon successful completion. On-the-job training also included apprenticeship-training programs conducted or sponsored by an employer, a group of employers, or a joint apprenticeship committee representing both employers and a union. These services were either not provided (value code = 0) or provided (value code = 1).

Basic Academic Remedial or Literacy Training. Training was geared toward literacy training or training provided to remediate basic academic skills that are needed to function on the job in the competitive labor market. These services were either not provided (value code = 0) or provided (value code = 1).

Job Readiness Training. This service included training to prepare an individual for the world of work (e.g., appropriate work behaviors, getting to work on time, appropriate dress and grooming, increasing productivity). These services were either not provided (value code = 0) or provided (value code = 1).

Disability Related Augmentative Skills Training. Training was geared toward disability related augmentative skills training includes but is not limited to: (a) orientation and mobility, (b) rehabilitation teaching, (c) training in the use of low vision aids, (d) Braille, (e) speech reading, (f) sign language, and (g) cognitive training/retraining. These services were either not provided (value code = 0) or provided (value code = 1).

Miscellaneous Training. Any training not recorded in one of the other categories listed, including GED or high school training leading to a diploma was included in miscellaneous training. These services were either not provided (value code = 0) or provided (value code = 1).

Job Search Assistance. Job search activities support and assist a consumer in searching for an appropriate job. Job search assistance may include help in resume preparation, identifying appropriate job opportunities, developing interview skills, and making contacts with companies on the behalf of the consumer. These services were either not provided (value code = 0) or provided (value code = 1).

Job Placement Assistance. Job placement assistance was a referral to a specific job resulting in an interview, whether or not the individual obtained the job. These services were either not provided (value code = 0) or provided (value code = 1).

On-the-Job Supports. This service was provided to consumers who have been placed in employment and require additional assistance in order to stabilize the placement and enhance job retention. Such services include job coaching, follow-up and follow-along, and job retention services. These services were either not provided (value code = 0) or provided (value code = 1).

Transportation Services. Transportation, including adequate training in the use of public transportation vehicles and systems, entailed travel and related expenses necessary to enable an applicant or eligible individual to participate in VR services. Examples of transportation services/expenses include, but are not limited to:

1. Travel and related expenses for a personal care attendant or aide if the services of that person are necessary to enable the individual to travel to participate in any VR service;
2. Relocation expenses incurred by the individual in connection with a job placement that is a significant distance from the individual's current residence;
3. The purchase and repair of vehicles, including vans, but not the modification of these vehicles; and
4. Training in the use of public transportation vehicles and services.

These services were either not provided (value code = 0) or provided (value code = 1).

Maintenance. Maintenance included monetary support provided for those expenses such as food, shelter and clothing that are in excess of the normal expenses of the individual, and that are necessitated by the individual's participation in an assessment for determining eligibility of

VR needs or while receiving services under an IPE. Examples of maintenance expenses include, but are not limited to:

1. Cost of uniforms or other suitable clothing required for an individual's job placement or job seeking activities;
2. Cost of short-term expenses, such as food and shelter, that are required in order for an individual to participate in assessment or vocational training at a site that is not within commuting distance of an individual's home;
3. Initial one-time costs, such as security deposits or charges for the initiation of utilities, that are required in order for an individual to relocate for a job placement; and
4. Costs of an individual's participation in enrichment activities related to that individual's training program.

These services were either not provided (value code = 0) or provided (value code = 1).

Rehabilitation Technology. Rehabilitation technology was the systematic application of technologies, engineering methodologies, or scientific principles to meet the needs of, and address the barriers confronted by, individuals with disabilities in areas that include education, rehabilitation, employment, transportation, independent living, and recreation. The service included rehabilitation engineering services, assistive technology devices, assistive technology services, and personal assistance services. These services were either not provided (value code = 0) or provided (value code = 1).

Reader Services. Reader services included, in addition to reading aloud, transcription of printed information into Braille or sound recordings if the individual requests such transcription. Reader services are generally utilized among individuals who are blind or deaf-blind, but may also include individuals unable to read because of serious neurological disorders, specific

learning disabilities, or other physical or mental impairments. These services were either not provided (value code = 0) or provided (value code = 1).

Interpreter Services. Interpreter services were sign language or oral interpretation services for individuals who are deaf or hard of hearing and tactile interpretation services for individuals who are deaf-blind. Specially trained individuals perform sign language or oral interpretation. Also included in this service were real-time captioning services for persons who are deaf or hard of hearing. Language interpretation services were not included in this category (included with “other services”). These services were either not provided (value code = 0) or provided (value code = 1).

Personal Attendant Services. Personal attendant services were those personal services that an attendant performs for an individual with a disability such as bathing, feeding, dressing, providing mobility and transportation, etc. These services were either not provided (value code = 0) or provided (value code = 1).

Technical Assistance Services. Services included technical assistance and other consultation services provided to conduct market analyses, to develop business plans, and to provide resources to individuals in the pursuit of self-employment, telecommuting and small business operation outcomes. These services were either not provided (value code = 0) or provided (value code = 1).

Information and Referral Services. Information and referral services were provided to individuals who require services from other agencies (through cooperative agreement) not available through the VR program. These services were either not provided (value code = 0) or provided (value code = 1).

Other Services. The RSA-911 dataset used this category for all other VR services that cannot be recorded elsewhere. Included here were occupational licenses, tools and equipment, initial stocks and supplies. Medical care for acute conditions arising during rehabilitation and constituting a barrier to the achievement of an employment outcome was also included in this category. These services were either not provided (value code = 0) or provided (value code = 1).

Data Collection and Analysis

Institutional Review Board (IRB) approval was obtained through The University of Texas-Pan American. The existing RSA-911 database, which is collected annually by the RSA and includes information about every individual with a disability whose case was closed in a given FY, was retrieved for FY 2009 along with *The Reporting Manual for the Case Service Report* for FY 2009. The manual provides an explanation of the specifications for reporting RSA-911 data. Demographic information, public supports, and services provided were examined to explore their impact on consumer employment outcomes. Statistical Product and Service Solutions (SPSS) 20.0 Decision Trees add-on module was used to conduct the exhaustive CHAID and binary logistic regression analyses (IBM Corp., 2011). SPSS is appropriate for this type of research since it allows for the analysis of a large number of predictor variables with relation to the criterion variable (Pallant, 2010). SPSS has been widely used in social sciences since it was first developed in 1968 to analyze data from raw datasets (Nie, Bent, & Hull, 1970).

The research design included a quantitative data mining design using ex post facto data from the U.S. Department of Education, Rehabilitation Service Administration (RSA), Case Service Report (RSA-911) national data set for individuals with disabilities who participated in state/federal vocational rehabilitation (VR) services in fiscal year (FY) 2009. The RSA-911

database includes information about consumer demographic characteristics, type and severity of disability, type of financial and medical supports, and services provided to people with disabilities. Data can be extracted from this larger dataset to examine predictive factors instrumental in employment outcomes for specific subsets of the larger population. In the current study, data was extracted for Hispanic women who are deaf with a case closed either successfully or unsuccessfully following the development of an individualized plan for employment (IPE) to examine the predictive interactive relationship between consumer demographic characteristics, public supports, and services delivery patterns. Exhaustive chi-squared automatic interaction detector (CHAID) and binary logistic regression analyses were conducted.

Exhaustive CHAID analysis was used to determine associations between the predictor variables (consumer demographics and public supports) and the criterion variable (employment outcome). CHAID is a method of clustering, which groups "...patterns into distinct segments or clusters based on a suitable notion of closeness or similarity among these patterns. Good clusters show high similarity within a group and low similarity between patterns belonging to two different groups" (Ghosh, 2003, p. 248). Specifically, CHAID splits a sample into smaller groups with similar characteristics that account for the likelihood, or probability, of predicting the criterion variable through the employment of a systematic algorithm. These homogenous end groups, or nodes, represent consumer characteristics and public supports that interact to significantly contribute to varying probabilities of employment outcomes. The alpha level was set at .05. A Bonferroni correction was used to correct for the number of statistical tests performed within each predictor variable to reduce the risk of Type 1 error. CHAID is an

appropriate decision tree model when the criterion variable (employment outcome) is dichotomous and categorical.

The homogenous end groups identified in the exhaustive CHAID analysis were used to inform the logistic regression analysis. In other words, consumer characteristics and public supports that were found significant in predicting employment outcomes identified during the CHAID analysis were further analyzed in the logistic regression analysis. The number of service variables entered into the logistic regression analysis was reduced through stepwise linear regression analysis, eliminating variables that were not significant. Binary logistic regression is utilized when the outcome variable (employment outcome) is dichotomous and categorical and the predictor variables are categorical (Pallant, 2010). Predictor variables may be either continuous or noncontinuous in logistic regression analysis. Logistic regression analysis was selected for its ability to predict patterns by identifying how a set of predictor variables are related to the criterion variable (Leary, 2008). In logistic regression analysis, "...all predictor variables are tested in one block to assess their predictive ability while controlling for the effects of other predictors in the model" (Pallant, 2010, p. 168). Results from the analysis detect how statistically significant predictor variables impacted the criterion variable (competitive employment outcomes) and the amount of variance explained for by each predictor variable. An odds ratio is provided in logistic regression analysis to indicate how much more likely individuals with certain consumer characteristics, public supports, and vocational rehabilitation services were to be employed than persons who did not exhibit certain consumer characteristics, receive public supports, or receive specific vocational rehabilitation services.

Research Questions

The following research questions were addressed in this investigation:

CHAID Analysis

1. What interactive patterns of consumer demographic characteristics and public supports predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

Binary Logistic Regression Analysis

2. Within the identified homogenous end groups, how do service delivery patterns interact to predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

Null Hypotheses

The null hypothesis in research represents the notion that an observable outcome is random, or due to chance (Lehman, 1995). Researchers have two decisions to make upon analyzing data; fail to reject the null hypothesis or reject the null hypothesis. When researchers fail to reject the null hypothesis they are indicating there is no significant difference between or among variables and the outcome is due to chance. If the researcher rejects the null hypothesis they are indicating there is a significant difference between one or more of the variables and the difference is not due to chance. The null hypotheses for this study is as follows:

Null Hypothesis: CHAID

1. Patterns of consumer demographic characteristic and public supports do not predict the likelihood of successful employment outcomes for Hispanic women who are deaf.

Null Hypothesis: Binary Logistic Regression Analysis

2. Within the identified homogenous end groups, service delivery patterns do not interact to predict the likelihood of successful employment outcomes for Hispanic women who are deaf.

Summary of Methodology

The RSA-911 data set for FY 2009 is utilized in the study to identify patterns among consumer characteristics and public supports related to employment outcomes for Hispanic women who are deaf. Exhaustive CHAID analysis was conducted to examine employment outcomes based on consumer characteristics and public supports among Hispanic women who are deaf. The number of service variables entered into the logistic regression analysis was reduced through stepwise linear regression analysis, eliminating variables that were not significant. Binary logistic regression analysis was used to further examine significant end nodes from the CHAID analysis, with the addition of service patterns, to determine their impact on employment outcomes for the target population.

Table 2 Variables, Values, Definitions

Variable Name	Variable Label	Coded Value	Variable Description
closetype	Employment outcome	0	Status 28: No successful employment outcome (no)
		1	Status 26: Successful employment outcome (yes)
ageappnew	Age	1	16-20
		2	21-29
		3	30-39
		4	40-49
		5	50-76
educ5	Level of education	1	Special education
		2	Less than high school
		3	High school graduate
		4	Associate degree
		5	Bachelor degree or higher
workdis	Public support	1	Yes
		2	No

Continued

Table 2 Variables, Values, Definitions Continued

Variable Name	Variable Label	Coded Value	Variable Description
disinccen	Number of public supports	0	No public supports
		1	1 public support
		2	2 public supports
		3	3 public supports
assesst	Assessment	0	Not provided
		1	Provided
treatmt	Diagnostic and treatment of impairment	0	Not provided
		1	Provided
counsel	Counseling and guidance	0	Not provided
		1	Provided
tuniver	College or university training	0	Not provided
		1	Provided
tvoctrai	Occupational/vocational training	0	Not provided
		1	Provided
tojt	On-the-job training	0	Not provided
		1	Provided
remedial	Basic academic remedial or literacy training	0	Not provided
		1	Provided

Continued

Table 2 Variables, Values, Definitions Continued

Variable	Variable	Coded	Variable
Name	Label	Value	Description
jready	Job readiness training	0	Not provided
		1	Provided
augment	Disability related augmentative skills training	0	Not provided
		1	Provided
tmisc	Miscellaneous training	0	Not provided
		1	Provided
jobsear	Job search assistance	0	Not provided
		1	Provided
jobplace	Job placement assistance	0	Not provided
		1	Provided
jobsupp	On-the-job supports	0	Not provided
		1	Provided
transpor	Transportation services	0	Not provided
		1	Provided
mainten	Maintenance	0	Not provided
		1	Provided
rehabtec	Rehabilitation technology	0	Not provided
		1	Provided

Continued

Table 2 Variables, Values, Definitions Continued

Variable	Variable	Coded	Variable
Name	Label	Value	Description
reader	Reader services	0	Not provided
		1	Provided
interpre	Interpreter services	0	Not provided
		1	Provided
attendnt	Personal attendant services	0	Not provided
		1	Provided
techassi	Technical assistance services	0	Not provided
		1	Provided
irefer	Information and referral services	0	Not provided
		1	Provided
othrserv	Other services	0	Not provided
		1	Provided

CHAPTER IV

RESULTS

The present chapter discusses the results derived through data analyses. The purpose of the study was to examine predictive factors of consumer characteristics, public supports, and patterns of service delivery related to employment outcomes for Hispanic women who are deaf. Exhaustive chi-squared automatic interaction detector (CHAID) analysis and binary logistic regression analysis were used to examine interactions among consumer characteristics, public supports, and service delivery patterns on employment outcomes. The sample of Hispanic women who are deaf was extracted from the Rehabilitation Services Administration National Case Service Report Dataset (RSA-911) for fiscal year (FY) 2009. Discussion will include the process and results of the CHAID and logistic regression analyses.

Exhaustive CHAID Analysis

Exhaustive CHAID analysis was conducted to address the following research question:

1. What interactive patterns of consumer demographic characteristics and public supports predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

Process of the Exhaustive CHAID Analysis

All Hispanic women who are deaf and closed either status 26 (successful employment outcome) or status 28 (unsuccessful employment outcome) were included in the parent node. A

systematic algorithm was employed utilizing SPSS 20.0 Decision Tree add-on module to conduct the exhaustive CHAID analysis (IBM Corp., 2011) to explore interactions between the predictor variables and criterion variable. The sample was then split sequentially into smaller groups with similar characteristics that account for the likelihood, or probability, of predicting the criterion variable. Each split level is considered a child node. These homogeneous end groups, or nodes, represent consumer characteristics and public support patterns that interact to significantly contribute to varying probabilities of employment outcomes. A decision tree diagram is constructed to represent optimal split predictors until all predictors are exhausted. Predictor variables in the current study included age, level of education, and public supports. The criterion variable was employment outcome (successful versus unsuccessful outcomes). Continuous variables were transformed into categories to fit model requirements.

The alpha level was set at .05. A Bonferroni correction was used to correct for the number of statistical tests performed within each predictor variable to reduce the risk of committing a Type I error.

Review of Exhaustive CHAID Analysis Segmentation

Results from the exhaustive CHAID analysis exploring the impact of predictor variables age, education, and public supports on the criterion variable employment outcomes were examined. The resulting tree included seven nodes with two levels and segmented the sample into four terminal nodes. Results of the analysis indicate a risk of false classification of 34% and a risk of 38% for cross-classification. The overall correct classification accuracy of 66% is a significant improvement over the base rate of 55%. Overall, the predictor variables were better at predicting vocational rehabilitation consumers with a competitive employment outcome (74%

accuracy) than for predicting consumers without a competitive employment outcome (55% accuracy). Results of the misclassification matrix can be found in Table 3.

Table 3 Misclassification Matrix – Employment Outcome

Misclassification Matrix – Employment Outcomes				
		<u>Actual Category</u>		
		Unsuccessful	Successful	Total
Predicted Category	Unsuccessful	134	86	220
	Successful	109	241	350
	Total	243	327	570
		<u>Resubstitution</u>	<u>Cross-Validation</u>	
Risk Estimate		.342	.377	
SE of Risk Estimate		.020	.020	

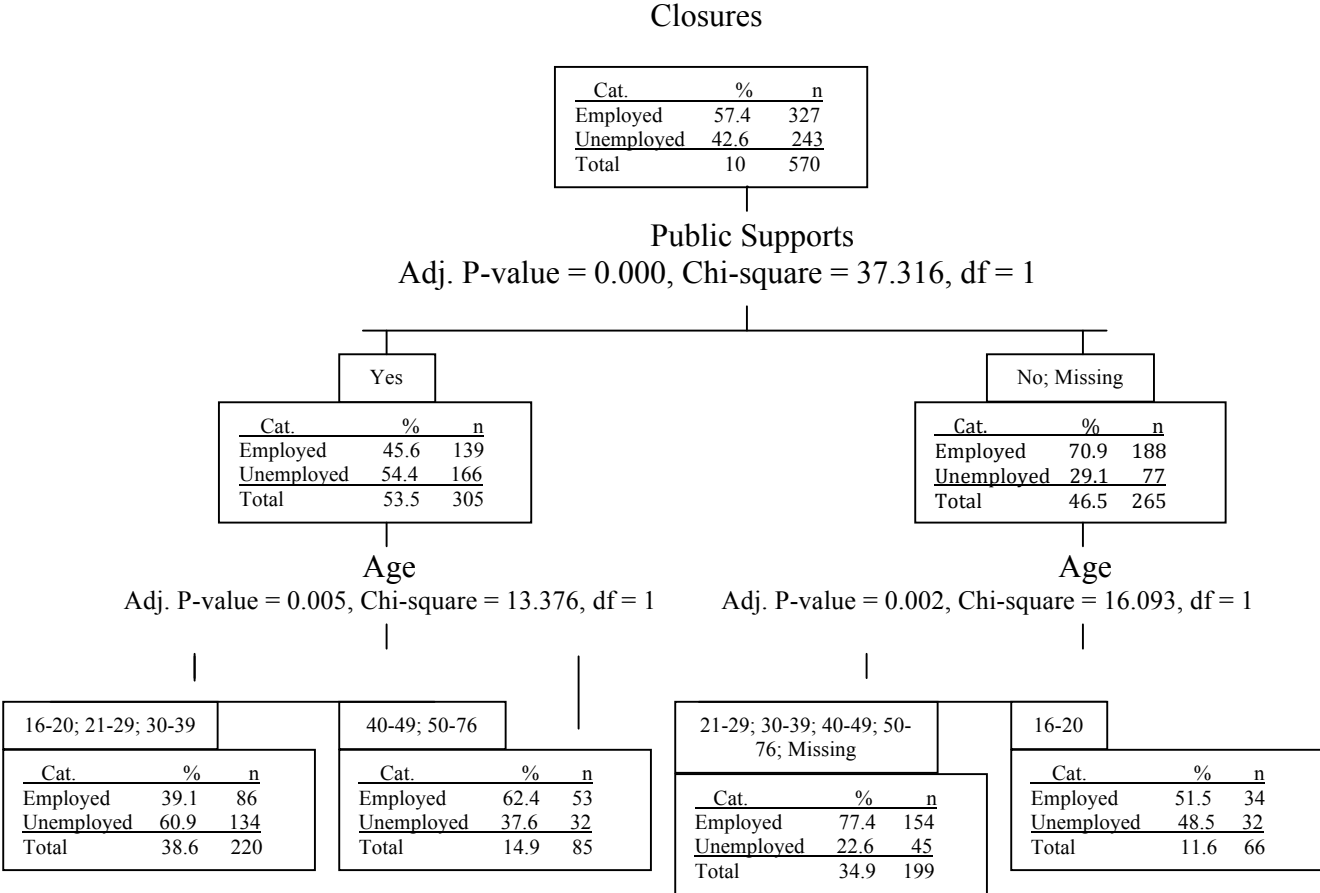
Review of Exhaustive CHAID Analysis Results

After the CHAID analysis was performed and peer checked for correction, the results were reviewed. This section discusses the findings of the CHAID analysis. One CHAID analysis was performed to address the following research question:

1. What interactive patterns of consumer demographic characteristics and public supports predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

A classification tree diagram depicting results of the CHAID analysis is presented in Figure 1. Competitive employment rate (successful outcome) for the overall sample was 57.4% ($n = 327$), with 42.6% ($n = 243$) of the target population not competitively employed (unsuccessful outcome). Receiving public supports was the most salient predictor of successful employment outcomes in the sample. Individuals who received public supports ($n = 305$) were employed at a rate of 45.6%, compared to individuals who did not receive public supports ($n = 265$) who experienced an employment rate of 70.9%. In other words, Hispanic women who are deaf were more likely to be successfully employed if they did not receive public supports. Consumer age was also a significant factor in predicting employment outcomes. Figure 1 displays the decision tree depicting the competitive employment rates of the sample of consumers. Successful and unsuccessful employment rates are reported at each level of the model.

Figure 1 CHAID Decision Tree



Homogeneous End Groups

Four homogeneous end groups were identified in the exhaustive CHAID analysis. The following is a description of the four groups from highest to lowest likelihood for successful employment.

Group 1

This group included 199 individuals in the age categories of 21-29, 30-39, 40-49, and 50-76 and did not receive public supports. Group 1 represented 34.9% of the overall sample and 47% of all employed consumers in the sample. People in this group were 1.35% times more likely to attain successful employment outcomes than other consumers in the sample. The success rate for group 1 was 77.4%.

Group 2

Eighty-five consumers in the age categories of 40-49 and 50-76 and received public supports were included in this group. Group 2 represented 14.9% of the overall sample and 16% of all employed people in the sample. Consumers in this group were 1.09% more likely to attain successful employment outcomes than others in the sample. The success rate for group 2 was 62.4%.

Group 3

This group consisted of 66 individuals between the ages of 16 and 20 years who did not receive public supports. This group represented 11.6% of the overall sample and 10% of all employed individuals in the sample. Individuals in this group were .90% more likely to attain successful employment outcomes than others in the sample. The success rate for group 3 was 51.5%.

Group 4

This group included 220 individuals within the age categories of 16-20, 21-29, and 30-39 and received public supports. This group represented 38.6% of the overall sample and 26% of all employed individuals in the sample. People in this group were .68% more likely to attain successful employment outcomes than other individuals in the sample. The success rate for group 4 was 39.1%.

Non Significant Variables

Level of education was not a significant predictor of employment outcomes among the overall sample in this study. In previous studies with individuals with disabilities, level of education has been found to have a positive impact on employment outcomes. For example, Dutta, et al. (2008) found that individuals with sensory/communicative disorders with higher levels of education experienced more positive employment outcomes. Similar results were found among women with psychiatric disabilities who received a bachelor's degree or higher (Vaughn & Boston, 2010), individuals with specific learning disabilities who were European American or Hispanic women and did not receive public supports with an associate's degree or higher (Gonzalez, et al., 2011), and among people with substance abuse disorders who were married and had an education level of at least high school and some college (Chronister, et al., 2008).

Individuals with severe to profound hearing loss, including Hispanic women, experience higher dropout rates (44.4%) when compared to the general populations (Blanchfield, et al., 2001). Among deaf students who do graduate from high school, the average reading level is at approximately a fourth grade level (Shirmer & McGougough, 2005). In addition, Hispanic women with disabilities experience a decreased likelihood of graduating from high school than

Hispanic women without disabilities and White women with disabilities (Bureau of the Census, 2006). Findings in the current study were consistent with previous literature regarding high dropout rates for Hispanic women and individuals who are deaf, with 30.7% of the sample experiencing a level of education less than high school at application. However, this number decreased to 21.4% at the time of closure, indicating 9.3% of the sample experienced an increase in education to at least high school graduate or equivalency certificate. Additional increases in services to support basic remedial or literacy training and GED attainment from application to closure would allow more Hispanic women who are deaf to compete for jobs requiring at least a high school diploma or equivalency certificate, making them more marketable. Because higher levels of education have been found to correlate with more positive employment outcomes among people with disabilities, VR counselors may consider utilizing services to enhance educational opportunities for Hispanic women who are deaf more frequently. For example, increasing counseling and guidance services geared toward the exploration of long-term employment benefits as a result of higher educational attainment, applying extensive comprehensive assessments to identify areas of strength, and increasing educational opportunities for Hispanic women who are deaf may have positive effects on employment outcomes.

Although the receipt of public support was the most salient factor for the overall target population, the number of public supports received was not significant in predicting employment outcomes for Hispanic women who are deaf. The presence of public supports and the impact on vocational rehabilitation outcomes is well documented (Arango-Lasprilla, et al., 2011; Dutta, et al., 2008; Gonzalez, et al., 2011; Marini, et al., 2008). However, when consideration is made regarding the number of public supports received by Hispanic women who are deaf, results

indicate the mere presence of public support significantly impacts employment outcome regardless of the number of supports provided.

Table 4 highlights the gain scores (employment rates) and index scores of the four homogeneous end groups' successful employment rates as compared to the overall sample.

Table 4 Gains Chart – Four Homogeneous End Groups

Gains Summary					
Target Variable: Successful Employment at Closure					
<u>Group-by-Group</u>					
Group	N (cases)	% Total	% Success	Gain (%)	Index (%)
		Sample	Sample		
1.	199	34.9	47.1	77.4	134.9
2.	85	14.9	16.2	62.4	108.7
3.	66	11.6	10.4	51.5	89.8
4.	220	38.6	26.3	39.1	68.1

Note. The gain percent represents competitive employment rate.

Binary Logistic Regression Analysis

Binary logistic regression analysis was used to address the second research question:

2. Within the identified homogenous end groups, how do service delivery patterns interact to predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

Process of Binary Logistic Regression Analysis

Syntax was created in SPSS for each of the four significant terminal nodes (homogeneous end groups) identified in the exhaustive CHAID analysis. Descriptive statistics were incorporated for each group. Pearson product-moment correlation coefficient was used to explore the bivariate relationship between each independent predictor variable and the criterion variable (employment outcome) to test for high intercorrelations (i.e., several variables with a correlation of .7 or greater or variables with a correlation of .9 or greater; (Pallant, 2010). Correlation analysis was also used to examine the bivariate relationship between predictor, or service variables: (a) assessment, (b) diagnostic and treatment, (c) counseling and guidance, (d) college or university training, (e) occupational/vocational training, (f) on-the-job training, (g) basic academic remedial or literacy training, (h) job readiness training, (i) disability related augmentative skills training, (j) miscellaneous training, (k) job search assistance, (l) job placement assistance, (m) on-the-job supports, (n) transportation services, (o) maintenance, (p) rehabilitation technology, (q) reader services, (r) interpreter services, (s) personal attendant services, (t) technical assistance services, (u) information and referral services, and (v) other services. Due to the small sample size and large number of predictor variables, a stepwise linear regression analysis was conducted with each of the four groups prior to conducting the binary logistic regression analysis to reduce the number of predictor variables. Of the 22 possible

service variables, only those that were statistically significant for each of the homogeneous end groups in the stepwise linear regression analyses were entered into the binary logistic regression analysis. Stepwise logistic regression analysis is appropriate to use when the researcher is interested in screening data to "...develop a subset of IVs that is useful in predicting the DV, and to eliminate those IVs that do not provide additional prediction to the IVs already in the equation" (Tabachnick & Fidell, 2007, p. 140). Four separate binary logistic regression analyses were conducted, using only the significant service variables identified in the stepwise regression analysis, one for each of the homogenous end groups. Variables were entered into the logistic regression model using the Enter method, with all significant predictor variables entered into the equation simultaneously.

Effect size. An analysis of effect size, or strength of the association, was conducted for each of the four homogeneous end groups utilizing a variety of methods. Directional relationships were assessed through an examination of the standardized regression coefficient for each of the predictor variables. An odds ratio, or $\text{Exp}(B)$, is calculated for each of the predictor variables in the model, with larger numbers (positive or negative) indicating greater likelihood of a particular outcome (successful employment outcome) when certain services are present (Pallant, 2010). An odds ratio greater than one indicates a greater likelihood of successful employment outcome, while an odds ratio less than one indicates a decreased likelihood of attaining successful employment. An odds ratio equal to 1 indicates that individuals are equally likely to be in one of the two groups (i.e., employed or not employed).

Multicollinearity. Ideally, predictor variables exhibit strong associations with the criterion variable (employment outcome) and weak or non-significant associations with each other. However, issues of multicollinearity can occur when predictor variables are strongly

related to one another. To address potential issues of multicollinearity, variables were analyzed by examining the correlation matrix. A correlation between predictor variables of .9 or above indicates a presence of multicollinearity. When several variables exhibit a correlation of .7 or greater, the researcher should consider removing highly intercorrelated variables (Pallant, 2010). In the current study, no issues of multicollinearity were found in the correlation matrix.

Additionally, the variance inflation factor (VIF) and tolerance values were examined for the 22 services for each of the four end groups to address potential issues of multicollinearity. A tolerance value of less than .1 for a given predictor variable suggests possible issues of multicollinearity, indicating "...the multiple correlation with other variables is high..." (Pallant, 2010, p. 158). Individual variables with a VIF greater than 2.0 are eliminated from the binary logistic regression analysis to minimize issues of multicollinearity. It was anticipated that some of the service variables would be related to one another, therefore reducing the number of services variables through either elimination of variables exhibiting high correlations or combining variables that were highly correlated. However, in the current study there were no issues of multicollinearity were discovered. As a result, stepwise linear regression analysis was performed for each of the four homogeneous end groups to reduce the number of service variables. Stepwise linear regression analysis is often incorporated to screen variables to eliminate non significant variables for further analysis (Tabachnick & Fidell, 2007). However, the VIF and tolerance values for all of the service variables were included for each of the four homogeneous end groups for a full review of tests for multicollinearity. Tables 5 through 8 provide an overview of the VIF and tolerance levels for each of the four homogeneous end groups.

Table 5 Tolerance, VIF, Coefficient B, and Beta (β) Group 1

Variable	B	Beta (β)	Tolerance	VIF
Assest	.021	.024	.802	1.247
Treatmt	.208	.228	.781	1.280
Counsel	.052	.053	.803	1.246
Tuniver	.196	.131	.572	1.748
Tvoctrai	.236	.140	.770	1.298
Tojt	.415	.121	.769	1.300
Remedial	-.297	-.100	.821	1.217
Jready	.141	.089	.791	1.264
Augment	-.075	-.022	.757	1.322
Tmisc	-.282	-.154	.788	1.269
Jobsear	-.191	-.193	.545	1.833
Jobplace	.249	.271	.600	1.665
Jobsupp	.209	.150	.806	1.241
Transpor	-.152	-.144	.564	1.774
Mainten	-.122	-.081	.558	1.793
Rehabtec	.128	.150	.874	1.145
Interpre	-.086	-.088	.790	1.265
Attendnt	.049	.008	.786	1.273
Techassi	.061	.023	.925	1.081
Irefer	.026	.027	.843	1.186
Otherserv	-.100	-.108	.868	1.152

Table 6 Tolerance, VIF, coefficient B, and Beta (β) Group 2

Variable	B	Beta (β)	Tolerance	VIF
Assest	.210	.213	.743	1.346
Treatmt	.257	.264	.556	1.798
Counsel	.008	.008	.567	1.762
Tuniver	.169	.088	.564	1.774
Tvoctrai	-.340	-.162	.621	1.611
Tojt	-.103	-.044	.766	1.306
Remedial	-.469	-.144	.675	1.482
Jready	.377	.224	.409	2.443
Tmisc	.521	.195	.610	1.640
Jobsear	-.059	-.054	.453	2.208
Jobplace	.156	.156	.519	1.928
Jobsupp	.264	.199	.716	1.396
Transpor	.153	.147	.547	1.828
Mainten	-.130	-.092	.342	2.920
Rehabtec	.157	.162	.655	1.527
Interpre	.055	.055	.750	1.333
Techassi	.066	.025	.383	2.609
Irefer	-.352	-.258	.548	1.825
Otherserv	.013	.012	.657	1.522

Table 7 Tolerance, VIF, coefficient B, and Beta (β) Group 3

Variable	B	Beta (β)	Tolerance	VIF
Assest	.256	.214	.677	1.476
Treatmt	.021	.021	.654	1.530
Counsel	.120	.112	.375	2.669
Tuniver	-.137	-.137	.711	1.406
Tvoctrai	-.008	-.006	.469	2.133
Tojt	.576	.196	.404	2.475
Remedial	-.084	-.029	.636	1.572
Jready	-.238	-.183	.471	2.121
Augment	-.640	-.265	.599	1.668
Tmisc	-.176	-.092	.422	2.369
Jobsear	.090	.064	.520	1.924
Jobplace	-.077	-.067	.431	2.321
Jobsupp	.511	.292	.456	2.194
Transpor	-.090	-.088	.405	2.469
Mainten	.262	.237	.456	2.195
Rehabtec	.568	.568	.538	1.858
Interpre	.192	.192	.611	1.636
Techassi	-.291	-.071	.309	3.231
Irefer	.041	.036	.433	2.309
Otherserv	-.073	-.071	.508	1.969
Reader	.059	.014	.827	1.209

Table 8 Tolerance, VIF, coefficient B, and Beta (β) Group 4

Variable	B	Beta (β)	Tolerance	VIF
Assest	.069	.063	.836	1.196
Treatmt	.003	.003	.869	1.151
Counsel	.026	.022	.704	1.420
Tuniver	.005	.004	.805	1.243
Tvoctrai	-.003	-.002	.833	1.201
Tojt	.127	.056	.858	1.166
Remedial	-.309	-.143	.886	1.129
Jready	.009	.007	.736	1.359
Augment	-.296	-.081	.651	1.537
Tmisc	.032	.018	.782	1.279
Jobsear	.011	.010	.624	1.602
Jobplace	.181	.179	.688	1.453
Jobsupp	.260	.191	.837	1.195
Transpor	.100	.096	.718	1.393
Mainten	.103	.069	.909	1.100
Rehabtec	.187	.178	.888	1.126
Interpre	.009	.009	.818	1.223
Techassi	-.118	-.016	.639	1.564
Irefer	-.169	-.148	.788	1.269
Otherserv	-.080	-.077	.889	1.125
Reader	.083	.011	.869	1.150

Review of Binary Logistic Regression Analysis Results

Due to the small sample size and large number of predictor variables, a stepwise linear regression analysis was conducted with each of the four groups prior to conducting the binary logistic regression analysis to reduce the number of predictor variables. Of the 22 possible service variables, only those that were statistically significant for each of the homogeneous end groups in the stepwise linear regression analyses were entered into the binary logistic regression analysis. Stepwise logistic regression analysis is appropriate to use when the researcher is interested in screening data to "...develop a subset of IVs that is useful in predicting the DV, and to eliminate those IVs that do not provide additional prediction to the IVs already in the equation" (Tabachnick & Fidell, 2007, p. 140). After significant variables were identified, four separate binary logistic regression analyses were conducted, using only the significant service variables identified in the stepwise regression analysis, one for each of the homogeneous end groups. Variables were entered into the logistic regression model using the Enter method, with all significant predictor variables entered into the equation simultaneously.

An analysis of effect size, or strength of the association, was conducted for each of the four homogeneous end groups utilizing a variety of methods. Directional relationships were assessed through an examination of the standardized regression coefficient for each of the predictor variables. An odds ratio, or $\text{Exp}(B)$, is calculated for each of the predictor variables in the model, with larger numbers (positive or negative) indicating greater likelihood of a particular outcome (successful employment outcome) when certain services are present (Pallant, 2010). An odds ratio greater than one indicates a greater likelihood of successful employment outcome, while an odds ratio less than one indicates a decreased likelihood of attaining successful

employment. An odds ratio equal to 1 indicates that individuals are equally likely to be in one of the two groups (i.e., employed or not employed).

Omnibus tests were reviewed for each binary logistic regression analysis to test for adequate fit of the data to the model, where at least one predictor variable is significantly related to the outcome variable. The omnibus tests for the four groups were statistically significant. The Hosmer-Lemeshow Goodness of Fit Test indicates a good fit when model produces a nonsignificant χ^2 ($p > .05$). This test is the recommended for overall fit of a binary logistic regression model (Pallant, 2010). A goodness of fit was obtained for Groups 1, 2, and 4, indicating the data adequately fits the model. Goodness of fit was not obtained for Group 3. Cox & Snell R^2 and Nagelkerke R^2 were examined to determine the amount of variance in the dependent variable explained by the model. Significance tests for the four binary logistic regression analyses can be found in Tables 9 through 11.

Table 9 Omnibus Test: Binary Logistic Regression Analyses (Groups 1-4)

Group	Chi-squared analyses format
1	$\chi^2 (2, N = 199) = 14.922, p < .05$
2	$\chi^2 (2, N = 88) = 9.962, p < .05$
3	$\chi^2 (4, N = 67) = 25.663, p < .05$
4	$\chi^2 (4, N = 222) = 34.935, p < .05$

Table 10 Hosmer-Lemeshow Goodness of Fit Test: Binary Logistic Regression Analysis

(Groups 1-4)

Group	Chi-squared analysis format
1	$\chi^2 (1, N = 199) = .006, p = .937$
2	$\chi^2 (1, N = 88) = .108, p = .742$
3	$\chi^2 (3, N = 67) = 8.389, p = .039$
4	$\chi^2 (4, N = 222) = .553, p = .968$

Table 11 Cox & Snell R^2 and Nagelkerke R^2 : Binary Logistic Regression Analysis (Groups 1-4)

Group	Cox & Snell R^2	Nagelkerke R^2
1	.072	.110
2	.107	.146
3	.318	.425
4	.146	.197

Group 1. Group 1 included 199 individuals in the age categories of 21-29, 30-39, 40-49, and 50-76 and did not receive public supports. This group represented 34.9% of the overall sample and 47% of all employed consumers in the sample. People in this group were 1.35% times more likely to attain successful employment outcomes than other consumers in the sample. The success rate for group 1 was 77.4%.

The VR service variables most frequently received by Group 1 included counseling and guidance (76.4%), diagnostic and treatment of impairment (69.8%), and assessment services (68.8%). Variable frequencies and percentages for Group 1 are presented in Table 12.

Table 12 Frequencies and Percentages: Variables (Group 1)

Variables	Frequency	Percentage
Employed at application	115	57.8
Significant disability	174	87.4
Successful outcomes	154	77.4
Unsuccessful outcomes	45	22.6
Age		
21-29	57	28.6
40-49	54	27.1
30-39	49	24.6
50-76	38	19.1
Missing	1	.5
Public supports		
No	194	97.5
Missing	5	2.5
Services (Yes)		
Counsel	152	76.4
Treatmt	139	69.8
Assest	137	68.8
Rehabtec	82	41.2
Jobplace	58	29.1
Othrserv	56	28.1

Continued

Table 12 Frequencies and Percentages: Variables (Group 1) Continued

Variables	Frequency	Percentage
Interpre	48	24.1
Irefer	48	24.1
Jobsear	46	23.1
Transpor	39	19.6
Jobsupp	20	10.1
Mainten	17	8.5
Tuniver	17	8.5
Jready	15	7.5
Tvoctrai	13	6.5
Tmisc	11	5.5
Techassi	5	2.5
Remedial	4	2.0
Augment	3	1.5
Tojt	3	1.5
Attendnt	1	.5
Reader	0	0.0
Level of education		
HS graduate/ equivalency	77	38.7
Less than HS	49	24.6

Continued

Table 12 Frequencies and Percentages: Variables (Group 1) Continued

Variables	Frequencies	Percentage
Associates degree	46	23.1
Bachelor degree/ Higher	17	8.5
Special education	10	5.0

Due to the large number of service variables and small population for Group 1, which can lead to discrepancies in variance in binary logistic regression analysis, stepwise linear regression analysis was first utilized. Stepwise linear regression analysis was conducted to identify significant service variables for further analysis in order to reduce the number of predictor variables in Group 1. In this analysis, predictor variables were entered into the equation based upon their unique contribution in predicting the criterion variable (employment outcome) in a step-by-step manner with one variable entered at a time (Leary, 2008). Results of the stepwise linear regression analysis demonstrated that employment outcome was best predicted by diagnostic and treatment of impairment, which was entered into the equation in step one. On-the-job supports were entered into the equation in step two because, with diagnosis and treatment of impairment in the equation, it made the greatest unique contribution of the remaining predictor in the prediction of employment outcomes. Reader services were not evaluated, as no consumers in Group 1 received this service. After the second step, the analysis stopped and entered no more predictor variables. The remaining variables did not enter the equation because, with the first two variables already in the equation, none of the others predicted unique variance in predicting employment outcomes.

Binary logistic regression was performed next to assess the predictive impact of diagnosis and treatment of impairment and on-the-job supports on the criterion variable (employment outcomes) for Group 1. The full model containing the two significant predictor variables for Group 1 was statistically significant $\chi^2(2, N = 199) = 14.922, p < .05$, indicating the model was able to distinguish between respondents who experienced successful and unsuccessful employment outcomes. The model as a whole explained between 7.2% (Cox & Snell R^2) and 11.0% (Nagelkerke R^2) of the variance in employment outcomes for Group 1 and correctly

classified 77.4% of cases. Table 13 presents the findings of the binary logistic regression analysis for Group 1. The strongest predictor of employment outcome was diagnostic and treatment of impairment, recording an odds ratio of 3.136, with a 95% CI between 1.536 and 6.405. This indicated that consumers who received diagnostic and treatment services were over three times more likely to experience successful employment outcomes than individuals who did not receive this service for Group 1, controlling for all other factors in the model. Individuals who received on-the-job supports experienced an odds ratio of 9.141, with a 95% CI between 1.151 and 72.613.

Table 13 Binary Logistic Regression (Group 1)

Variable	<i>B</i>	<i>S.E.</i>	Wald	<i>df</i>	<i>Sig</i>	Exp(B)	95% CI	
							Lower	Upper
Diag/Treat	1.143	.364	9.843	1	.002	3.136	1.536	6.405
Job support	2.213	1.057	4.380	1	.036	9.141	1.151	72.613

Note. CI = confidence interval; diag/treat = diagnosis and treatment of impairment.

Group 2. Group 2 consisted of 88 consumers in the age categories of 40-49 and 50-76 who received public supports. This group represented 14.9% of the overall sample and 16% of all employed people in the sample. Consumers in this group were 1.09% more likely to attain successful employment outcomes than others in the sample. The success rate for group 2 was 62.4%.

The VR service variables most frequently received by Group 2 included counseling and guidance (60.2%), assessment services (59.1%), and diagnostic and treatment of impairment (55.7%). Variable frequencies and percentages for Group 2 are presented in Table 14.

Table 14 Frequencies and Percentages: Variables (Group 2)

Variables	Frequency	Percentage
Employed at application	17	19.3
Significant disability	84	95.5
Successful outcomes	53	62.4
Unsuccessful outcomes	32	37.6
Age		
40-49	52	59.1
50-76	36	40.9
Public supports		
Yes	85	96.6
One support	68	77.3
Two supports	16	18.2
Missing	3	3.4
Three supports	1	1.1
Services (Yes)		
Counsel	53	60.2
Assest	52	59.1
Treatmt	49	55.7
Rehabtec	45	51.1
Interpre	34	38.6
Jobplace	33	37.5

Continued

Table 14 Frequencies and Percentages: Variables (Group 2) Continued

Variables	Frequency	Percentage
Transpor	28	31.8
Othrserv	27	30.7
Jobsear	23	26.1
Jobsupp	14	15.9
Irefer	13	14.8
Mainten	12	13.6
Jready	8	9.1
Tuniver	6	6.8
Tvoctrai	5	5.7
Tojt	4	4.5
Tmisc	3	3.4
Techassi	3	3.4
Remedial	2	2.3
Augment	0	0
Attendnt	0	0
Reader	0	0
Level of education		
Less than HS	24	27.3
Associates degree	19	21.6

Continued

Table 14 Frequencies and Percentages: Variables (Group 2) Continued

Variables	Frequency	Percentage
Special education	5	5.7
Bachelor degree/ higher	0	0

Due to the large number of service variables and small population for Group 2, which can lead to discrepancies in variance in binary logistic regression analysis, stepwise linear regression analysis was first utilized. Stepwise linear regression analysis was conducted to identify significant service variables for further analysis in order to reduce the number of predictor variables in Group 2. In this analysis, predictor variables were entered into the equation based upon their unique contribution in predicting the criterion variable (employment outcome) in a step-by-step manner with one variable entered at a time (Leary, 2008). Results of the stepwise linear regression analysis demonstrated that employment outcome was best predicted by diagnostic and treatment of impairment, which was entered into the equation in step one. On-the-job supports were entered into the equation in step two because, with diagnosis and treatment of impairment in the equation, it made the greatest unique contribution of the remaining predictor in the prediction of employment outcomes. Reader services, disability related augmentative skills training, and attendant services were not evaluated, as no consumers in Group 2 received this service. After the second step, the analysis stopped and entered no more predictor variables. The remaining variables did not enter the equation because, with the first two variables already in the equation, none of the others predicted unique variance in predicting employment outcomes.

Binary logistic regression was performed next to assess the predictive impact of diagnosis and treatment of impairment and on-the-job supports on the criterion variable (employment outcomes) for Group 2. The full model containing the two significant predictor variables for Group 2 was statistically significant $\chi^2(2, N = 88) = 9.962, p < .05$, indicating the model was able to distinguish between respondents who experienced successful and unsuccessful employment outcomes. The model as a whole explained between 10.7% (Cox & Snell R^2) and

14.6% (Nagelkerke R^2) of the variance in employment outcomes for Group 2 and correctly classified 70.5% of cases, an improvement over 62.5% in the block method prior to the predictor variables being entered into the equation. Table 15 presents the findings of the binary logistic regression analysis for Group 2. The strongest predictor of employment outcome was diagnostic and treatment of impairment, recording an odds ratio of 3.805, with a 95% CI between 1.465 and 9.881. This indicated that consumers who diagnostic and treatment services were over three times more likely to experience successful employment outcomes than individuals who did not receive this service for Group 2, controlling for all other factors in the model. On-the-job supports were not found to be significant in the binary logistic regression analysis for Group 2.

Table 15 Binary Logistic Regression (Group 2)

Variable	<i>B</i>	<i>S.E.</i>	Wald	<i>df</i>	<i>Sig</i>	Exp(B)	95% CI	
							Lower	Upper
Diag/Treat	1.336	.487	7.534	1	.006	3.805	1.465	9.881
Job support	1.416	.739	3.669	1	.055	4.122	.968	17.556

Note. CI = confidence interval; diag/treat = diagnosis and treatment of impairment.

Group 3. Group 3 consisted of 67 individuals between the ages of 16 and 20 years who did not receive public supports. This group represented 11.6% of the overall sample and 10% of all employed individuals in the sample. Individuals in this group were .90% more likely to attain successful employment outcomes than others in the sample. The success rate for group 3 was 51.5%.

The VR service variables most frequently received by Group 3 included assessment services (77.6%), counseling and guidance (68.7%), and diagnostic and treatment of impairment (58.2%). Variable frequencies and percentages for Group 3 are presented in Table 16.

Table 16 Frequencies and Percentages: Variables (Group 3)

Variables	Frequency	Percentage
Employed at application	7	10.4
Significant disability	63	94.0
Successful outcomes	34	51.5
Unsuccessful outcomes	32	48.5
Age		
16-20	66	98.5
Missing	1	1.5
Public supports		
No	67	100.0
Missing	0	0.0
Services (Yes)		
Assest	52	77.6
Counsel	46	68.7
Treatmt	39	58.2
Tuniver	36	53.7
Interpre	33	49.3
Rehabtec	32	47.8
Transpor	26	38.8
Othrserv	26	38.8
Mainten	19	28.4

Continued

Table 16 Frequencies and Percentages: Variables (Group 3) Continued

Variables	Frequency	Percentage
Irefer	18	26.9
Jobplace	17	25.4
Jready	12	17.9
Tvoctrai	12	17.9
Jobsear	10	14.9
Jobsupp	6	9.0
Tmisc	5	7.5
Augment	3	4.5
Tojt	2	3.0
Remedial	2	3.0
Techassi	1	1.5
Reader	1	1.5
Attendnt	0	0.0
Level of education		
Less than HS	34	50.7
HS graduate/ Equivalency	22	32.8
Special education	7	10.4
Associates degree	4	6.0
Bachelor degree/ higher	0	0.0

Due to the large number of service variables and small population for Group 3, which can lead to discrepancies in variance in binary logistic regression analysis, stepwise linear regression analysis was first utilized. Stepwise linear regression analysis was conducted to identify significant service variables for further analysis in order to reduce the number of predictor variables in Group 3. In this analysis, predictor variables were entered into the equation based upon their unique contribution in predicting the criterion variable (employment outcome) in a step-by-step manner with one variable entered at a time (Leary, 2008). Results of the stepwise linear regression analysis demonstrated that employment outcome was best predicted by rehabilitation technology, which was entered into the equation in step one. Disability related augmentative skills training was entered into the equation in step two because, with rehabilitation technology in the equation, it made the greatest unique contribution of the remaining predictor in the prediction of employment outcomes. Assessment services were entered into the equation in the third step because, with rehabilitation technology and disability related augmentative skills training in the equation, it made the greatest unique contribution of the remaining predictors in the prediction of employment outcomes. In the fourth step, on-the-job supports were entered into the equation because, with rehabilitation technology, disability related augmentative skills training, and assessment services entered into the equation, it made the greatest unique contribution of the remaining predictors in the prediction of employment outcomes. Attendant services were not evaluated, as no consumers in Group 3 received this service. After the fourth step, the analysis stopped and entered no more predictor variables. The remaining variables did not enter the equation because, with the first four variables already in the equation, none of the others predicted unique variance in predicting employment outcomes.

Binary logistic regression was performed next to assess the predictive impact of rehabilitation technology, disability related augmentative skills training, assessment services, and on-the-job supports on the criterion variable (employment outcomes) for Group 3. The full model containing the four significant predictor variables for Group 3 was statistically significant $\chi^2(4, N = 67) = 25.663, p < .05$, indicating the model was able to distinguish between respondents who experienced successful and unsuccessful employment outcomes. The model as a whole explained between 31.8% (Cox & Snell R^2) and 42.5% (Nagelkerke R^2) of the variance in employment outcomes for Group 3 and correctly classified 73.1% of cases, an improvement over 52.2% in the block method prior to the predictor variables being entered into the equation. Table 17 presents the findings of the binary logistic regression analysis for Group 3. The strongest predictor of employment outcome was rehabilitation technology, recording an odds ratio of 10.983, with a 95% CI between 2.914 and 41.399. This indicated that consumers who received rehabilitation technology services were over ten times more likely to experience successful employment outcomes than individuals who did not receive this service for Group 3, controlling for all other factors in the model. Assessment services were also significant in predicting employment outcomes in Group 3, recording an odds ratio of 5.952, with a 95% CI between 1.331 and 26.616. On-the-job supports and augmentative services were not found to be significant in the binary logistic regression analysis for Group 3.

Table 17 Binary Logistic Regression (Group 3)

Variable	<i>B</i>	<i>S.E.</i>	Wald	<i>df</i>	<i>Sig</i>	Exp(B)	95% CI	
							Lower	Upper
Rehab tech	2.396	.677	12.529	1	.000	10.983	2.914	41.399
Assessment	1.784	.764	5.448	1	.020	5.952	1.331	26.616
Job support	2.306	1.316	3.071	1	.080	10.030	.761	132.193
Augmentative	-22.962	23165.846	.000	1	.999	.000	.000	.

Note. CI = confidence interval; rehab tech = rehabilitation technology

Group 4. Group 4 included 222 individuals within the age categories of 16-20, 21-29, and 30-39 and received public supports. This group represented 38.6% of the overall sample and 26% of all employed individuals in the sample. People in this group were .68% more likely to attain successful employment outcomes than other individuals in the sample. The success rate for group 4 was 39.1%.

The VR service variables most frequently received by Group 4 included counseling and guidance (77.0%), assessment services (72.1%), and diagnostic and treatment of impairment (54.1%). Variable frequencies and percentages for Group 4 are presented in Table 18.

Table 18 Frequencies and Percentages: Variables (Group 4)

Variables	Frequency	Percentage
Employed at application	24	10.8
Significant disability	220	99.1
Successful outcomes	86	39.1
Unsuccessful outcomes	134	60.9
Age		
21-29	85	38.3
16-20	69	31.1
30-39	68	30.6
Public Supports		
Yes	220	99.1
One support	184	82.9
Two supports	31	14.0
Three supports	5	2.3
Missing	2	.9
Services (Yes)		
Counsel	171	77.0
Assest	160	72.1
Treatmt	120	54.1
Interpre	118	53.2
Jobplace	83	37.4

Continued

Table 18 Frequencies and Percentages: Variables (Group 4) Continued

Variables	Frequency	Percentage
Othrserv	74	33.3
Transpor	73	32.9
Rehabtec	71	32.0
Jobsear	70	31.5
Tuniver	55	24.8
Irefer	54	24.3
Jready	41	18.5
Jobsupp	34	15.3
Tvoctrai	29	13.1
Mainten	27	12.2
Tmisc	18	8.1
Remedial	12	5.4
Tojt	11	5.0
Augment	4	1.8
Techassi	1	.5
Reader	1	.5
Attendnt	0	0.0
Level of education		
HS graduate/ Equivalency	79	35.6

Continued

Table 18 Frequencies and Percentages: Variables (Group 4) Continued

Variables	Frequency	Percentage
Less than HS	69	31.1
Associates degree	51	23.0
Special education	19	8.6
Bachelor degree/ higher	4	1.8

Due to the large number of service variables and small population for Group 4, which can lead to discrepancies in variance in binary logistic regression analysis, stepwise linear regression analysis was first utilized. Stepwise linear regression analysis was conducted to identify significant service variables for further analysis in order to reduce the number of predictor variables in Group 4. In this analysis, predictor variables were entered into the equation based upon their unique contribution in predicting the criterion variable (employment outcome) in a step-by-step manner with one variable entered at a time (Leary, 2008). Results of the stepwise linear regression analysis demonstrated that employment outcome was best predicted by on-the-job supports, which was entered into the equation in step one. Rehabilitation technology services were entered into the equation in step two because, with on-the-job supports in the equation, it made the greatest unique contribution of the remaining predictors in the prediction of employment outcomes. Job placement services were entered into the equation in the third step because, with on-the-job supports and rehabilitation technology services in the equation, it made the greatest unique contribution of the remaining predictors in the prediction of employment outcomes. In the fourth step, basic academic remedial or literacy training was entered into the equation because, with on-the-job supports, rehabilitation technology services, and job placement services entered into the equation, it made the greatest unique contribution of the remaining predictors in the prediction of employment outcomes. Attendant services were not evaluated, as no consumers in Group 4 received this service. After the fourth step, the analysis stopped and entered no more predictor variables. The remaining variables did not enter the equation because, with the first four variables already in the equation, none of the others predicted unique variance in predicting employment outcomes.

Binary logistic regression was performed next to assess the predictive impact of on-the-job supports, rehabilitation technology services, job placement services, and basic academic remedial or literacy training on the criterion variable (employment outcomes) for Group 4. The full model containing the four significant predictor variables for Group 4 was statistically significant $\chi^2(4, N = 222) = 34.935, p < .05$, indicating the model was able to distinguish between respondents who experienced successful and unsuccessful employment outcomes. The model as a whole explained between 14.6% (Cox & Snell R^2) and 19.7% (Nagelkerke R^2) of the variance in employment outcomes for Group 4 and correctly classified 68.0% of cases, an improvement over 60.4% in the block method prior to the predictor variables being entered into the equation. Table 19 presents the findings of the binary logistic regression analysis for Group 4. The strongest predictor of employment outcome was on-the-job supports, recording an odds ratio of 3.884, with a 95% CI between 1.653 and 8.940. This indicated that consumers who received on-the-job supports were almost 4 times more likely to experience successful employment outcomes than individuals who did not receive this service for Group 4, controlling for all other factors in the model. Rehabilitation technology services were also significant in predicting employment outcomes in Group 4, recording an odds ratio of 2.654, with a 95% CI between 1.415 and 4.977. Individuals in Group 4 who received job placement services were 2.358 times more likely (95% CI between 1.283 and 4.332) to be employed than individuals who did not receive this service. Basic academic remedial or literacy training was not found to be significant in the binary logistic regression analysis for Group 4.

Table 19 Binary Logistic Regression (Group 4)

Variable	<i>B</i>	<i>S.E.</i>	Wald	<i>df</i>	<i>Sig</i>	Exp(B)	95% CI	
							Lower	Upper
Job Support	1.347	.431	9.779	1	.002	3.844	1.653	8.940
Rehab tech	.976	.321	9.253	1	.002	2.654	1.415	4.977
Job placement	.858	.310	7.638	1	.006	2.358	1.283	4.332
Remedial	-1.978	1.072	3.408	1	.065	.138	.017	1.130

Note. CI = confidence interval; rehab tech = rehabilitation technology.

CHAPTER V

SUMMARY AND CONCLUSIONS

Purpose and Research Questions

The purpose of the study was to examine predictive factors of consumer characteristics, public supports, and patterns of service delivery related to employment outcomes for Hispanic women who are deaf. A conceptual review of available literature supported the need for additional research regarding individuals with multiple minority statuses, including Hispanic women who are deaf.

Exhaustive chi-squared automatic interaction detector (CHAID) analysis and binary logistic regression analysis were used to examine interactions among consumer characteristics, public supports, and service delivery patterns on employment outcomes. The sample of Hispanic women who are deaf was extracted from the Rehabilitation Services Administration National Case Service Report Dataset (RSA-911) for fiscal year (FY) 2009. The aforementioned analyses were used to address the following research questions:

CHAID Analysis

1. What interactive patterns of consumer demographic characteristics and public supports predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

Binary Logistic Regression Analysis

2. Within the identified homogenous end groups, how do service delivery patterns interact to predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

Discussion of Findings

Results of the exhaustive CHAID analysis and binary logistic regression analysis were utilized to examine patterns of interaction among predictor variables and the criterion variable (employment outcomes) for Hispanic women who are deaf utilizing RSA-911 data from FY 2009. A discussion of the findings is provided in the following sections.

Exhaustive CHAID Discussion

Exhaustive CHAID analysis was performed to address the first research question.

Research Question 1: What interactive patterns of consumer demographic characteristics and public supports predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

A systematic algorithm was employed to explore the impact of predictor variables age, education, and public supports on the criterion variable employment outcomes were examined. The resulting tree included seven nodes with two levels and segmented the sample into four terminal nodes. The overall competitive employment rate for Hispanic women who are deaf was 57.4%.

Public supports. The most salient characteristic in predicting employment outcomes for Hispanic women who are deaf was the presence of public supports. Participants who received public supports had lower competitive employment rates (45.6%) than those who did not receive public support (70.9%). These findings are consistent with previous research with people with

disabilities that have found public supports to have a negative impact on competitive employment rates among people with disabilities (Chan, et al., 2006; Chronister, et al., 2008; Gonzalez et al., 2011; Vaughn & Boston, 2010). VR counselors should be aware of how public supports impact competitive employment outcomes and be prepared to discuss potential changes to benefits when consumers begin working. This may be done through effective counseling and guidance to discuss with each consumer how their benefits may be impacted by either part-time or full-time employment.

Although the presence of public supports had a negative impact on employment outcomes for Hispanic women who are deaf, the number of supports received was not significant in determining employment outcomes for the current study. It appears the presence of public supports alone, rather than the number of supports provided, is an important consideration for Hispanic women who are deaf. This finding contradicts previous research by Dalton (2007), where an increase in the number of services provided were associated with lower competitive employment rates among the general population of individuals who are deaf. However, in the current study only a small percentage of the target population received more than one public support (9.3). Current findings support the need for future research to further explore how public supports impact different subpopulation within the deaf community to best serve this population. In line with CORE (2012) standards and the Rehabilitation Act Amendments of 1992 (29 U.S.C. § 701-744), benefits counseling provided by VR counselors and community agencies need to consider multiple minority issues including gender and race/ethnicity when working with people who are deaf. When referring consumers to outside sources for benefits counseling, it may be beneficial for VR counselors to inform outside professionals about the

consumer's background as part of the referral process to enhance competency in working with people from minority backgrounds.

Age. Age was significant in predicting employment outcomes among Hispanic women who are deaf in this study. When public supports were not present, Hispanic women between the ages of 21 and 29, 30 and 39, 40 and 49, and 50 and 76 experienced higher competitive employment rates than Hispanic women between the ages 16 and 20 (77.4% and 51.5%, respectively). When public supports were provided, consumers between the ages of 40 and 49 and 50 and 76 experienced more positive employment outcomes (62.4%) than younger Hispanic women between the ages of 16 and 20, 21 and 29, and 30 and 39.

Previous studies regarding the impact of age among people with varying disabilities has yielded mixed results. In a study by Bishop (2004), age was not a significant factor related to employment outcomes for consumers with epilepsy. Similar results have been documented with people with disabilities receiving SSI or SSDI (Rogers, et al., 2005), women of color with psychiatric disabilities (Vaughn & Boston, 2010), individuals with substance-related disorders (Chronister, et al., 2012), and people with spinal cord injury (Marini, et al., 2008). Among consumers with autism, being older was correlated with increased competitive employment rates (Lawer, Brusilovskiy, Salzer, & Mandell, 2009). Similar results were found by Dutta, et al. (2008) regarding individuals with sensory impairments, but not for individuals with physical or mental impairments. The authors noted individuals 65 and older experienced the highest employment rates among consumers with sensory disabilities. Dalton (2007) also demonstrated similar results among consumers who are deaf or hard of hearing, with people in the 55-65 and 65 and older groups exhibiting the highest successful employment rates. Consumers either receiving public supports or not receiving public supports ages 50 and older were among the

groups with the highest competitive employment rates, supporting previous research. However, among Hispanic women who are deaf in the current study, only women between the ages of 16 and 20 who did not receive public supports experienced more negative employment outcomes than women in the sample over the age of 20. One possible explanation for older Hispanic women experiencing higher levels of employment may be a greater likelihood of being employed at application, regardless of whether they received or did not receive public supports. Excluding homemaker and unpaid family workers, individuals between the ages of 16 and 20 were employed at application at a rate of 5.9%, consumers between the ages of 21 and 29 at a rate of 24.8%, participants between the ages of 30 and 39 at a rate of 29.3%, individuals between the ages of 40 and 49 at a rate of 42.3%, and consumers between the ages of 50 and 76 at a rate of 38.4%.

Education. Level of education was not a significant predictor of employment outcomes among the overall sample in the study. In previous studies with individuals with disabilities, level of education has been found to have a positive impact on employment outcomes. For example, Dutta, et al. (2008) found that individuals with sensory/communicative disorders with higher levels of education experienced more positive employment outcomes. Similar results were found among women with psychiatric disabilities who received a bachelor's degree or higher (Vaughn & Boston, 2010), individuals with specific learning disabilities who were European American or Hispanic women and did not receive public supports with an associate's degree or higher (Gonzalez, et al., 2011), and among people with substance abuse disorders who are married and had an education level of at least high school and some college (Chronister, et al., 2008).

Binary Logistic Regression Discussion

Binary logistic regression analysis was performed to address the second research question.

Research Question 2: Within the identified homogenous end groups, how do service delivery patterns interact to predict the likelihood of successful employment outcomes for Hispanic women who are deaf?

The four homogeneous end groups identified in the exhaustive CHAID analysis were further analyzed to explore how services impact successful employment outcomes for the different groups. Due to the small sample size for each of the end groups in relation to the number of overall predictor variables, stepwise linear regression analysis was conducted prior to the binary logistic regression analysis.

Results of the binary logistic regression analysis showed varying relationships between the homogeneous end groups and service variables. However, results should be interpreted with caution due to the small number of individuals in each of the end groups and the large number of potential service variables analyzed. Also, even among service variables found to be significant, the effect size remained small.

Group 1. Group 1 included 199 Hispanic women who are deaf between the ages of 21 and 76 who did not receive public supports. The competitive employment rate for this was 77.4%, with women in this group being 1.35% times more likely to attain successful employment outcomes than other consumers in the sample. Individuals in this group experienced the highest competitive employment rate among women in the sample. The majority of the women in Group 1 were employed at application (57.8%) and were coded as having a significant disability (87.4%). Level of education for this group was 5% special

education, 24.6% less than high school 38.7% high school graduate or equivalent, 23.1% associate degree, and 8.5% bachelor degree or higher.

The VR service variables most frequently received by Group 1 included counseling and guidance (76.4%), diagnosis and treatment of impairment (69.8%), and assessment services (68.8%). Two services were identified as statistically significant in the stepwise logistic regression analysis, diagnosis and treatment of impairment and on-the-job supports. These services were entered into the binary logistic regression analysis to determine their impact in predicting employment outcomes, with both remaining statistically significant for Group 1. No other services were significantly related to employment outcomes for this group. Hispanic women who are deaf between the ages of 21 and 76 who did not receive public supports and received diagnostic and treatment services were over three times more likely to be competitively employed than women who did not receive this service, controlling all other factors in the model. Individuals who received on-the-job supports were also more likely to be employed than those who did not receive this service.

Group 2. Group 2 included 88 women between the ages of 40 and 76 who received public supports. Of this group, 77.3% received one support, 18.2% received two supports, and 1.1% received three supports. This group experienced the second highest competitive employment rate in the sample (62.4%). The significant disability rate for this group was 95.5%, and 19.5% of the women were employed at application. Level of education for Group 2 was 5.7% special education, 27.3% less than high school, 45.5% high school or equivalent, 21.6% associate degree.

The VR service variables most frequently received by Group 2 included counseling and guidance (60.2%), assessment services (59.1%), and diagnostic and treatment of impairment

(55.7%). Diagnosis and treatment of impairment and on-the-job supports were found to significantly relate to employment outcomes for Group 2 and were further analyzed in the binary logistic regression analysis. No other service variables were entered into the final analysis because, with the first two variables already in the equation, none of the others predicted unique variance in predicting employment outcomes. In this group, individuals who received diagnostic and treatment services were almost 4 times more likely to be employed than women who did not receive this service. On-the-job supports were not found to be significant for Group 2.

Group 3. Group 3 was comprised of 67 Hispanic women who are deaf between the ages of 16 and 20 who did not receive public supports. The overall competitive employment rate for this group was 51.5%. Slightly over 10% of this group was employed at the time of application. The vast majority (94%) of the women in this group had a significant disability. Level of education for this group included 10.4% special education, 50.7% less than high school, 32.8% high school graduate or equivalent, and 6% associate's degree.

The VR services most frequently received by Group 3 included assessment services (77.6%), counseling and guidance (68.7%), and diagnostic and treatment of impairment (58.2%). Stepwise linear regression analysis results demonstrated that employment outcomes were best predicted by rehabilitation technology, disability related augmentative skills training, assessment services, and on-the-job supports. No other services were found to be statistically significant. Binary logistic regression analysis revealed the strongest predictor of employment to be rehabilitation technology, with consumers receiving this service over 10 times more likely to be employed than people who did not receive this service. Assessment services were also found to contribute to employment outcomes for Group 3, with women receiving this service over five

times more likely to be employed than women who did not receive this service. Augmentative services and on-the-job supports were not significant with this group.

Group 4. Group 4 consisted of 222 Hispanic women who are deaf between the ages of 16 and 39 who received public supports. Approximately 83% of the consumers in this group received one support, 14% received two supports, and 2.3% received three supports. This group experienced the lowest overall competitive employment rate (39.1%) in the sample. Approximately 11% of the women in Group 4 were employed at application, with 99.1% having a significant disability. Level of education among this group included 8.6% special education, 31.1% less than high school, 35.6% high school or equivalency, 23% associate degree, and 1.8% bachelor degree.

The VR service variables most frequently received by Group 4 included counseling and guidance (77.0%), assessment services (72.1%), and diagnostic and treatment of impairment (54.1%). Stepwise linear regression analysis revealed on-the-job supports, rehabilitation technology services, job placement services, and basic academic remedial or literacy training. No other services were identified as significant in predicting employment outcomes. The four significant service variables were further analyzed through binary regression analysis. On-the-job supports were found to be the most salient predictor of employment outcomes for Group 4, with women receiving this service almost 4 times as likely to be employed than women who did not receive this service. Individuals in this group were almost three times more likely to be employed when receiving rehabilitation technology services when compared to those who did not receive this service. Job placement services were also instrumental in predicting employment outcomes, with women in this group experiencing an overall competitive employment rate over 2 times more likely than those who did not receive job placement services.

Basic academic remedial or literacy training was not significant in predicting employment outcomes for Group 4.

Diagnostic and treatment of impairment was the most salient predictor of employment outcomes for Hispanic women who are deaf between the ages of 21 and 76 who did not receive public supports. The second most salient predictor was on-the-job supports. While diagnostic and treatment of impairment was the second most common service (received by approximately 70% of this subgroup) provided for this group, only about 10% received on-the-job supports. Efforts by VR counselors to explore this service more in depth with their consumers to determine this is an appropriate service is warranted given the positive impact on employment outcomes for participants in Group 1. The majority of consumers in Group 1 were employed at application (57.8%). This likely had an impact on the high successful competitive employment rate at closure for Group 1. Further investigation regarding different service patterns among individuals who are employed versus not employed at application and closure may show different competitive employment rates.

Group 2, including Hispanic women who are deaf between the ages of 40 and 76 who received public supports, benefited significantly from diagnosis and treatment services alone. Diagnostic and treatment services were provided to almost 56% of people in Group 2. Efforts should be made to increase the use of services significant in increasing employment rates for individuals in this group. However, each case should be considered on an individual basis to ensure best practices for each person served. Members of Group 2 were employed at application at a rate of 19.3%. Benefits counseling with this group should be incorporated in an attempt to increase successful employment outcomes.

Hispanic women who are deaf and between the ages of 16 and 20 who did not receive public supports made up Group 3. Significant services for this group included rehabilitation technology and assessment services. Approximately 48% of this group received rehabilitation technology services and 77% received assessment services. Slightly over 10% of this group was employed at application. Professionals should be especially careful in interpreting results for this group, as the sample size was extremely small with only 67 participants.

Group 4 was comprised of Hispanic women who are deaf between the ages of 16 and 39 who received public supports. This was the least likely of the groups to attain a successful employment outcome. Salient services for this group included on-the-job supports and rehabilitation technology services. On-the-job supports were provided to 15% of the group, with 32% receiving rehabilitation technology services. VR counselors should be aware of the services instrumental in assisting this subgroup become employed and increase the use of these services as appropriate for individual cases.

The current sample experienced a more positive competitive employment outcome rate (57.4%) than the overall employment rate for people with disabilities (30.7%) for FY 2009. This is consistent with previous findings indicating individuals with sensory/communication disabilities (including individuals who are deaf) are more likely to be employed than people with physical or mental disabilities at the time of closure (Dutta, et al., 2008). One possible explanation for this discrepancy may be higher employment rates at application for the target population in the current study (26.1%) than individuals with disabilities in general within the dataset (17.5%). Also, participants in the current study experienced higher employment rates than those in a previous study by Boutin and Wilson (2009), indicating Hispanic women

who are deaf fare better than the general population of individuals who are deaf with regard to employment outcomes.

On-the-job supports, diagnosis and treatment of impairment, rehabilitation technology, and job placement were found to have a significant impact on employment outcomes among Hispanic women who are deaf in at least one of the four homogeneous end groups. These results differ from findings by Moore (2002), who found the presence of job placement is associated with increased employment outcomes among individuals who are deaf. In the current study, job placement services were only significant among Hispanic women who are deaf between the ages of 16 and 39 who received public supports. This is not surprising given the low employment rates at application for Hispanic women who are deaf between the ages of 16 and 20 when compared to women in the sample who were 40 years of age or older, indicating a greater need for supports to secure employment. Increasing services leading to employment outcomes, as well as job placement services may assist in increasing employment opportunities for this age group.

Additionally, the study by Moore (2002) identified counseling and guidance as a salient service in predicting successful employment outcomes among individuals who are deaf. This was not the case in the current study, even though counseling and guidance was the service provided the most frequently among three of the groups and was the second most frequently provided service for the remaining group. Counseling and guidance services may be more significant in leading to employment outcomes if they are geared specifically toward Hispanic women who are deaf and exhibit certain characteristics that contribute to higher or lower success rates in the workplace. Counselor training and educational opportunities to increase knowledge about this diverse population may also lead to greater employment outcomes.

Findings of the current study share some characteristics with minority women with psychiatric disabilities. For example, a study by Vaughn and Boston (2010) found minority women with psychiatric disabilities who received TANF experienced more successful employment outcomes when diagnostic and treatment of impairment, on-the-job supports, and job placement services were present. These services were also significant in predicting successful employment outcomes among Hispanic women who are deaf. However, women with psychiatric disabilities were also found to experience more successful employment outcomes when they had a high school diploma or equivalency certificate, a bachelor's degree or higher, VR counseling and guidance, transportation services, maintenance, information and referral services, and miscellaneous training while Hispanic women who are deaf experienced more successful outcomes with rehabilitation technology services and basic remedial or literacy training. Such findings indicate different patterns of service delivery instrumental in the contribution of successful employment outcomes among different subgroups of people with disabilities. Counselors should be aware of the services provided and their impact on employment outcomes when working with Hispanic women who are deaf.

Limitations

Limitations need to be considered with regard to implementation and future directions of research. This section addresses the limitations of the current study. First, the sample size of the current study was small, especially when broken down into the four homogeneous end groups. According to Tabachnick and Fidell (2007), in studies utilizing regression analysis where the researcher is interested in analyzing individual predictors, the sample size should be equal to or greater than 104 plus the number of predictor variables to achieve a medium effect size when the alpha level is set at .05 and the beta value is equal to or greater than .20. For example, in the

current study using the aforementioned formula, the number of participants should have reached at least 126 for each of the four end groups. However, the current study included every Hispanic woman who is deaf and utilized VR services whose case was closed in either status 26 or 28 for FY 2009 in the nation. A possible solution to the small sample size includes combining several years in a single analysis. In addition to the small sample size, the effect size was small for the homogeneous end groups, which supports the potential for confounding variables that were not explored to impact employment outcomes (e.g., level of acculturation, family supports, race/ethnicity of the counselor).

Second, the study focuses on a very unique population over the period of one year. Current results can only be generalized to similar populations. Additional studies to determine whether similar patterns exist across time and for Hispanic women who are deaf and do not utilize VR services would assist increasing generalizability of the current results. In addition, the sample was not random, as it included only individuals who applied for VR services and whose case was closed in either status 26 or status 28 in FY 2009.

Third, the use of ex post facto data does not allow for manipulation of independent variables or random assignment of participants. Also, potential counselor error in entering data cannot be controlled for using an existing dataset. However, RSA has developed an 18-point crosscheck to minimize the impact of counselor error. Cause and effect cannot be inferred in ex post facto research designs.

Fourth, although logistic regression is more flexible than other techniques that predict a discrete outcome from a set of predictor variables (e.g., discriminant analysis), it is possible for one (or more) of the predictor variables to appear unrelated to the criterion variable when in fact it is. For example, Tabachnick and Fidell (2007) report, "If an area of that correlation is whittled

away by other IVs, the unique contribution of the IV is often very small despite a substantial correlation with the DV” (p. 137).

Despite these limitations, the current study provides a starting point in examining how VR professionals can provide services to Hispanic women who are deaf based upon evidence-based research practices. Future studies that expand upon and support the current findings may be instrumental in guiding VR practice in working with this unique population.

Rehabilitation Counselor Implications

Working with individuals from multiple minority backgrounds, VR counselors require and understanding and competency in working with unique populations to minimize discrepancies in employment outcomes (29 U.S.C. § 701-744; CORE, 2012). Courses and training opportunities that focus on working with individuals from diverse backgrounds can increase feelings of counselor competency (Datti & Conyers, 2010) in addressing how membership in multiple minority statuses may influence their ability to become employed. For example, Hispanics, women, and people with disabilities all experience decreased employment than the general population (Bureau of Labor Statistics, 2011; Bureau of the Census, 2006; Equal Employment Opportunity Commission, 2009; McNeil, 2000). When more than one minority status is present, the opportunity for employment decreases even further. Additionally, counselors should not assume that all individuals who are deaf consider deafness their most salient characteristic. Individuals who associate more with being Hispanic, or being female, or being deaf will likely approach career development and decision making differently. Counselors need to address the unique issues faced by each consumer to provide the most comprehensive services. Specialized training in working with groups identifying with multiple minority backgrounds can assist in heightening counselor awareness and can improve the provision of VR

services to Hispanic women who are deaf. Counselors should also address whether the family will be involved in the VR process, the need for interpreter services, and how environmental factors influence the individual's career goals and decisions. Having a cultural awareness of the experiences of Hispanic women who are deaf can assist counselors in competently providing services to this population.

Because younger Hispanic women who are deaf experience lower rates of employment at application, VR counselors may consider utilizing services to best prepare these individuals to enter the world of work. For example, incorporating personal/social adjustment training, job readiness training, simulated work situations, mock interviews, and assistance with filling out application materials may assist in better preparing younger Hispanic women who are deaf to become employed. Additionally, because younger individuals tend to have less work experience than older individuals, job placement services and supports on the job to assist in maintaining employment once attained could benefit this subgroup. Counseling and guidance services that address potential challenges in the workforce faced by younger Hispanic who are deaf may also assist in increasing employment outcomes.

Counselor orientation to theoretical approaches to career development may also assist in enhancing best practices in serving Hispanic women who are deaf at different stages in their career development. For example, social cognitive career theory recognizes the importance of including the individual in the decision-making process throughout the development of one's career (Lent, Brown, & Hackett, 1994). A unique aspect of this theory is the ability to explore how environmental factors and personal characteristics influence career development among minorities. Previous researchers have applied tenants of social cognitive career theory with various minority groups (Bussey & Bandura, 1999; Gibbons & Shoffner, 2004; Lindley, 2006;

Vaughn, 2009). However, the impact of this theory has not been researched among Hispanic women who are deaf. According to Feist, Saladin, and Hansmann (2013), social cognitive career theory may be instrumental in allowing "...counselors to develop a better understanding of how to best accommodate the individual needs of Hispanic women who are deaf and empower these women to make career choices that are appropriate for them" (p. 455). Further examination of the potential relationship between social cognitive career theory and employment outcomes for Hispanic women who are deaf is warranted.

Higher educational attainment has been linked to more positive employment outcomes among individuals with disabilities (Chronister, et al., 2008; Dutta, et al., 2008; Gonzalez, et al., 2011; Vaughn & Boston, 2010). Individuals with severe to profound hearing loss, including Hispanic women, experience higher high school dropout rates (44.4%) when compared to the general population (Blanchfield, et al., 2001). Among deaf students who do graduate from high school, the average reading level is at approximately a fourth grade level (Shirmer & McGougough, 2005). In addition, Hispanic women with disabilities experience a decreased likelihood of graduating from high school than Hispanic women without disabilities and White women with disabilities (Bureau of the Census, 2006). Findings in the current study were consistent with previous literature regarding lower levels of education among individuals who are deaf, with 30.7% of the sample experiencing a level of education less than high school at application. However, this number decreased to 21.4% at the time of closure, indicating 9.3% of the sample experienced an increase in education to at least high school graduate or equivalency certificate. Additional increases in services to support basic remedial or literacy training and miscellaneous training, which includes GED training and attainment, from application to closure would allow more Hispanic women to compete for jobs requiring at least a high school diploma

or equivalency certificate, making them more marketable. Because higher levels of education have been found to correlate with more positive employment outcomes among people with disabilities, VR counselors may consider utilizing services to enhance educational opportunities for Hispanic women who are deaf more frequently. For example, increasing counseling and guidance services geared toward the exploration of long-term employment benefits as a result of higher educational attainment, applying extensive comprehensive assessments to identify areas of strength, and increasing educational and support services for Hispanic women who are deaf could yield positive effects on employment outcomes.

Among Hispanic women who are deaf and utilize VR services, the most influential characteristic associated with successful employment outcomes was the presence of public supports. VR counselors need to be prepared to discuss in great detail how benefits may influence individuals once they are employed. Additional training opportunities and workshops that address benefits counseling and knowledge of social security experts in the area is essential in assisting Hispanic women how are deaf and receive public supports attain successful employment outcomes.

In the current study, the least likely group to experience positive employment outcomes were between the ages of 16 and 39 who received public supports. The services most influential in predicting employment outcomes for this group included on-the-job supports, rehabilitation technology services, and job placement services. However, the most commonly provided services among this group included counseling and guidance, assessment services, and diagnosis and treatment of impairment. It is imperative for VR counselors to pay close attention to the services that support increases in employment outcomes for this group. Additionally, efforts to increase the success rate among this group through further exploration of the specific types of

services provided within each of the service categories could prove to be beneficial. Benefits counseling may also increase employment rates among these women.

Future Research

Findings of the current study suggest the need for additional research to further enhance knowledge and best practices in working with Hispanic women who are deaf. First, VR services are focused on services that assist individuals with disabilities prepare for, obtain, and maintain employment outcomes (RSA, 2008). Additional influencing factors are instrumental in shaping an individual's career development and choices. For example, challenges to employment that exist for Hispanics, women, and people with disabilities place them at a disadvantage in securing employment. Some of the unique challenges include a decreased rate of completing high school or college than the general population (Blanchfield, et al., 2001; Bureau of the Census, 2006), increased likelihood of experiencing communication barriers (Aguayo & Coady, 2001; Riggan, et al., 1993), increased levels of poverty (Gonzalez & Pew Hispanic Center, 2008), fewer professional jobs (Boutin & Wilson, 2009; Capella, 2003), and lower levels of acculturation (Velcoff, et al., 2010). Unique characteristics may also include bilingual and trilingual skills (Hansmann, et al., 2009), better understanding of multiple minority status issues, and ability to be function in hearing and non-hearing settings. Research that explores the aforementioned issues that may influence employment outcomes should also be explored to determine how they are related to positive or negative employment outcomes for minority women with disabilities.

Second, better counselor preparation in working with diverse minority groups with disabilities, including Hispanic women who are deaf, can assist in more adequate provision of services. Beta-Chava et al. (2002) demonstrated that VR counselors who received more pre-service and in-service training in working with people with hearing loss and assistive technology

needs were more likely to report knowledge about these areas. Additionally, VR counselors specializing in hearing loss are better equipped to understand the service needs of this unique population. In general VR counseling programs, the authors found that only about 2% of the curriculum was dedicated to increasing awareness about individuals with hearing loss.

Qualitative studies that focus on activities of counselors successful in working with minorities with hearing loss and minority groups could further assist in the development of best practices for Hispanic women who are deaf. Also, an increase in curriculum training for general counselors can assist in increasing awareness about the needs of minority groups with varying levels of hearing loss. Assessment of the impact of increased curriculum training geared toward individuals with hearing loss would be warranted.

Third, the use of existing career theories that have been found beneficial in working with minority groups should be explored. One such theory is social cognitive career theory. By working with consumers to identify individual experiences and societal expectations in shaping career development and choices can assist in VR counselors and consumers choose appropriate career paths. Additionally, unique strengths and characteristics that Hispanic women who are deaf exhibit may be utilized to accomplish career goals.

Finally, future research should include consumer perspectives of the VR process, success, and areas for improvement. This can assist in guiding researchers, policy makers, and practitioners in developing more comprehensive best practices models in working with heterogeneous groups of individuals with varying types of abilities. By involving Hispanic women who are deaf in research endeavors, they are empowered to make a difference and contribute to positive changes in service provision.

Conclusions

Hispanic women who are deaf make up a heterogeneous group with differing VR needs. VR counselors should be made aware of the different trends unique to this population. Results of the current study identify four emerging patterns in assisting counselors in determining best practices in working with subgroups within this population. First, counselors need to be aware of the continued negative impact public supports have in achieving successful employment outcomes among individuals with disabilities, including Hispanic women who are deaf. Second, counselors need to be aware of how age can impact employment outcomes for Hispanic women who are deaf. Third, services variables were identified as significant in enhancing employment outcomes for this population should be considered when working with Hispanic women who are deaf. Significant variables in the current study included on-the-job supports, diagnosis and treatment of impairment, job placement services, rehabilitation technology, and assessment services. Although some similar patterns were found for this population when compared to other individuals with disabilities, unique patterns also emerged and should be considered when working with Hispanic women who are deaf to enhance successful employment outcomes. Finally, results of the study also identify a need for additional ways to explore employment trends among unique populations.

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BIOGRAPHICAL SKETCH

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