The Dissertation Committee for Rafelina G. Emuang certifies that this is the approved version of the following dissertation:

The Determinants of Successful Self-Employment Outcomes among Blind and Visually-Impaired Consumers

Committee:

James Schaller, Supervisor

Audrey Sorrells

Timothy Keith

Nina Zuna

James Patton

The Determinants of Successful Self-Employment Outcomes among Blind and Visually-Impaired Consumers

by

Rafelina G. Emuang, B. S., M. Ed.

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

December 2014

Dedication

I dedicate this dissertation to my parents, Raphael Emuang and Victoria Valberg, whose adult onset disabilities in their lives have inspired me to make a difference in the lives of others.

Acknowledgements

Though my name appears on this dissertation, many individuals helped me on my journey through the doctoral program. My former advisor, Dr. Randy Parker, encouraged me to pursue the doctoral program after completing the Masters program in Rehabilitation Counseling. I would like to thank my current advisor, Dr. James Schaller and committee members, Dr. Audrey Sorrells, Dr. James Patton, Dr. Timothy Keith and Dr. Nina Zuna for their guidance and support. A special thanks to Dr. Gene Brooks and Marti Culp for helping me stay focused during difficult times through their friendship, honest feedback, and guidance in navigating the academic arena. No words can express my gratitude to Dr. Kristen Jones and Marc Anderberg for the numerous revisions they read and feedback they provided. Thanks to my friends and family for the love and emotional support through this journey and adjustment to my own disability.

The Determinants of Successful Self-Employment Outcomes among Blind and Visually-Impaired Consumers

Rafelina G. Emuang, Ph.D.
The University of Texas at Austin, 2014
Supervisor: James Schaller

Federal and state vocational rehabilitation (VR) agencies are putting increased emphasis on, and providing more resources for, self-employment for individuals who are blind or visually-impaired since the Rehabilitation Act was amended in 1998. Additional emphasis is being placed on self-employment because VR system consumers – especially those who are blind or visually-impaired – are disproportionately likely to have difficulty obtaining other kinds of competitive employment in the aftermath of the 2007-2009 recession.

The purpose of this quantitative study is to identify variables in the administrative records of the federal Rehabilitation Service Agency that impact self-employment outcomes and earnings among blind or visually-impaired consumers. The file, comprised of 13,998 cases closed in Texas from Fiscal Years 2008 through 2012, spans the national recession and subsequent slow recovery. From the original file, 798 cases closed through self-employment were examined by employment status at application, cost of services and returns on investments (ROI). This study found those who were self-employed at application were 50 times more likely to be self-employed at closure. Those who received

assessments, diagnosis and treatment, technical assistance, and rehabilitation services were more likely to be self-employed at closure. The variables most closely related to weekly earnings at closure for self-employed consumers were: gender (male), being self-employed at application and receiving some form of rehabilitation technology. Disproportionate numbers of those who were self-employed at application were 55 to 65 and self-identified as White only with weekly earnings at application above the mean for the entire population of consumers whose cases were closed through self-employment. They received the fewest services on average over the shortest period of time at the lost average cost. Returns on investments in serving those who were self-employed at application were positive but small. The average cost of services provided to those employed at application was the highest. However, on average, they experienced decreases in the hours worked per week and weekly earnings. Thus, returns on investments were, on average, negative. Limitations of the study, implications for practice, and future research are discussed.

Table of Contents

List of Tables

Chapter 1: Introduction

Background

Employment is critically important to the economic and psychological independence of working-age adults. In addition to providing income, integration into the workforce contributes to an individual's self-esteem and builds social capital. But individuals with vision impairments as their primary disability face challenges in obtaining and maintaining employment. Historically, they have been marginalized in the labor market. The official unemployment rate for persons who are blind or visually-impaired consistently runs three to four percentage points higher than the rate for the general population (Bell, 2010). Their official unemployment rate also tends to be one to two percentage points higher than for persons with other types of disabilities (i.e., other sensory, physical, mental and cognitive impairments). It should be noted that those data may not reflect the full extent of their marginalization because the official unemployment rate does not include persons with vision impairments who: a) have not worked long enough to qualify for Unemployment Insurance (UI) benefits; or b) are "discouraged workers" insofar as they have ceased looking for work after exhausting eligibility for UI benefits (Jones, 2008). In addition, the nominal labor force participation rate masks under-employment among persons who are blind or visually-impaired. That is, controlling for level of educational attainment, these individuals are still likely to have lower average annual earnings than their peers with comparable levels of education in the general population or in other disability groupings (Kirchner & Smith, 2005).

The Rehabilitation Act of 1973 clearly established employment outcomes as the primary objective of publicly funded vocational rehabilitation (VR) services (Arnold & Seekins, 2005;

Bell, 2010). Despite that policy directive, the unemployment rate among working-age individuals who are blind or visually-impaired ran between 70% and 80% (Kirchner & Schmeidler, 1997). Because publicly funded efforts had little impact on unemployment among persons with disabilities, subsequent amendments to the Rehabilitation Act of 1973 – chiefly the Americans with Disabilities Act (Bell, 2010) - and conforming amendments in federal workforce development and welfare reform legislation - the Workforce Investment Act of 1998 (WIA) and the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) respectively - reiterated the emphasis on employment outcomes for VR consumers and persons with disabilities who received other kinds of publicly-funded services. Amendments to the Social Security Act also restructured financial incentives and committed additional resources to encouraging employment outcomes for persons with disabilities.

Despite those additional policy directives and larger investments in employment-oriented case services across VR, workforce, and public assistance entities, studies conducted after passage of the ADA, WIA, and PRWORA found that unemployment among persons with disabilities in general, and especially for blind or visually-impaired persons, persistently was higher than for the general population and for other disability groups (Bell, 2010).

Employment outcomes achieved by VR consumers can be tracked through administrative records called the RSA911. That is, the Rehabilitation Services Administration (RSA) requires all federal and state VR agencies receiving public funds to report, and measures their performance annually based on, successful employment case closures (i.e., “26 closures”). Several types of employment are counted as 26 closures: (a) competitive (unsubsidized) employment in an integrated environment; (b) self-employment; (c) participation in the Randolph-Sheppard Business Enterprise Program (BEP – in Texas, known as Business

Enterprise of Texas or BET); (d) supported employment in an integrated environment; and (e) uncompensated work in a family-owned business or as a homemaker. VR professionals and researchers often refer to 26 closures except sheltered employment and uncompensated work collectively as "successful competitive employment" (Bell, 2010).

Self-Employment

Data show that the recession of 2007-2009 took a disproportionate toll on the competitive employment of persons with disabilities in general and persons who are blind or visually-impaired in particular. And they have not fared well in the "jobless recovery." In addition, as the result of force reductions in Afghanistan and Iraq, there has been a surge in the number of returning veterans with battle-related vision impairments who are eligible for VR case services just as slots in BEP are nearing saturation. Thus, of the competitive employment options, increasing attention is being paid to, and more resources are being made available for, VR services leading to self-employment.

According to the RSA self-employment "refers to work for profit or fees including operating one's own business, farm, shop or office. 'Self-employment' includes sharecroppers, but not wage earners on farms" (RSA, 2008, p. 14).

Amendments to the Rehabilitation Act of 1973 and conforming amendments in the WIA were reiterated and emphasized in an RSA technical advisory circular in 2000 regarding self-employment (Arnold & Seekins, 2005). In addition, during his first term in office, President Obama issued executive orders and promoted legislation to provide financial incentives (e.g., prolonged individual eligibility for disability income benefits from the Social Security Administration and tax credits to firms that hire them), and directives for interagency collaboration between VR entities and both Small Business Development Centers (SBDC) and

the Veterans' Administration (VA) to increase self-employment outcomes for returning veterans – particularly those with battlefield-related disabilities (Obama, 2010).

Although emphasis has increased and more resources are being committed by state and federal VR agencies to self-employment for individuals who are blind or visually-impaired, case management practices are not yet driven by empirical evidence. Because professional ethics and policy guidelines prevent experimental designs using service-eligible individuals, available research does not identify causal relationships between VR services and types of case closures. Studies published in peer reviewed journals since 1990 (when the ADA was passed) identify persistent barriers to employment and under what conditions self-employment might be a viable option for individuals who are blind or visually-impaired. SBDC support is considered essential in cases where consumers lack adequate financial resources and entrepreneurial skills needed to succeed in self-employment. In addition, persons who are blind or visually-impaired need VR services (e.g., O&M, assistive technology training) to perform well in any work setting -- including in small businesses that they might start for themselves. If they are to succeed in helping consumers achieve self-employment, VR professionals need to collaborate with small business development specialists to tailor delivery of an appropriate mix of rehabilitation and entrepreneurial training services to each individual's needs and to leverage financial resources available from several funding streams. But, in the absence of evidence-driven strategies, self-employment case services may be less than optimally effective. Without professional development regarding what works for whom, under what conditions, VR case managers may be unaware of, underutilize, or poorly implement even the best practices for facilitating self-employment outcomes.

Purpose of the Study

The main purpose of this study is to identify determinates of self-employment outcomes among VR consumers who are blind or visually-impaired. Analysis of administrative records in the RSA911 can identify consumer characteristics and VR services which: (a) increase the odds that blind or visually-impaired consumers will have their cases closed through self-employment; and (b) best predict their earnings at case closure.

Significance of the Study

Consumers who are blind or visually-impaired are of special interest. They are less likely than persons in the general population or consumers with other kinds of disabilities to be employed on the payrolls of others. At the same time, they are more likely to be self-employed. Revell et al. (2009) analyzed longitudinal participation and outcomes of self-employment closures from fiscal year 2003 to 2007 for general and combined VR systems. They found that average earnings for self-employment closures exceeded average earnings for all 26 case closures. And individuals with a sensory disability (like impaired hearing and blindness or visual impairments) clearly could be identified as the primary recipients of case services to facilitate self-employment.

Policy-makers support devoting more VR resources to increasing self-employment outcomes. Nevertheless, self-employment closure rates have remained steady – and even declined during the recent recession and subsequent jobless recovery. To carry-out policy-makers' recommendation more effectively and to use available resources more efficiently, case managers and other VR professionals need empirical evidence regarding the consumer characteristics and mix of services which best predict the odds of case closure through self-employment for those who are blind or visually-impaired and their earnings at closure.

Research Questions

This study focuses on the following research questions:

1. What are the determinants of successful self-employment among blind and visually-impaired consumers of the state's VR agency at case closure?

    a. Which personal characteristics are most likely to increase the odds that a consumer's case will be closed successfully through self-employment?

    b. Which case services are most likely to increase the odds of self-employment at closure?

2. For blind and visually-impaired consumers whose cases were closed successfully through self employment:

    a. Which personal characteristics best predict earnings at closure?

    b. Which case service variables best predict earnings at closure?

Chapter 2: Review of Literature

The purpose of this chapter is to review available research done to identify the correlates of successful employment outcomes – especially self-employment – for VR consumers who are blind or visually-impaired. This review focuses on studies conducted after 1989 (i.e., when the ADA was being debated). All of the studies deal with persons who are blind or visually-impaired (either exclusively or as members of a broader disability population). Additionally, all the studies pertain to VR services.

The literature is fragmented in describing: a) overall employment opportunities in the context of changing economic conditions; b) barriers to, and supports for, achieving outcomes labeled "competitive employment" (including self-employment); c) why successful case closures (competitive employment in general and self-employment in particular) vary among VR consumer by disability type. The objective of this review is to form testable hypotheses about what combination of rehabilitation and entrepreneurial services are most effective in helping which consumers achieve self-employment under what conditions. For example, do the odds of successful self-employment outcomes vary with the amount of funding provided by the VR agency or stringent requirements regarding business plan reviews by expert external consultants? Secondarily, the intent is to identify professional development activities that will enable VR counselors to provide more effective services to consumers who want to start their own businesses. Themes and insights derived from the available literature will help shape recommendations for increasing: (a) all types of competitive employment outcomes for all VR consumers regardless of disability type; (b) all types of 26 closures achieved by blind or visually-impaired VR consumers; (c) self-employment outcomes among VR consumers who are blind or

visually-impaired; and (d) earnings among self-employed VR consumers who are blind or visually-impaired at case closure.

Employment Opportunities Under Changing Economic Conditions

Opportunities for all types of employment for all persons, regardless of disability status, vary as national economic conditions fluctuate across peaks and valleys of the business cycle. Opportunities to be employed on the payroll of others (also known as "salaried employment") increase during periods when positive changes in the Gross National Product (GNP) indicate that business and industry are growing. Such opportunities most often are correlated inversely with the official unemployment rate. Conversely, the labor market shrinks during a recession (as indicated by no growth or a decline in GNP and an increase in the official unemployment rate).

But trends in self-employment may be bi-modal. That is, a larger percentage of the civilian labor force responding to tightening job market conditions during a recession are "pushed" to resort to self-employment. Conversely, a larger percentage of the civilian labor force opts for salaried employment during an economic recovery. Case closure rates for VR consumers through competitive employment in general and fluctuations in self-employment closures need to be examined in the context of these trends in the overall economy and in the labor market served by a particular VR agency.

The Bureau of Economic Analysis (BEA) declared that the American economy officially slumped into a recession in June of 2007. It declared that a recovery officially began in November, 2009. Aggregate employment fell and the official unemployment rate rose as expected at the recession's onset. But job growth after this recent recession officially ended has not been as robust as has historically been the case after recessions prior to 2000. (The media uses the phrase "jobless recovery" to describe slower than expected job growth from 2009 to the

present.) Because of the relatively slow resumption of employment demand growth since 2009, the push to self-employment continues.

VR consumers, regardless of disability type and the type of employment they desire, are caught up in the larger economic trends. For example, Bell (2010) found that the number of blind and visually-impaired persons who applied for VR services declined in the ten years preceding the recession's onset. Of those receiving VR services, more than 20 percent in each cohort already held a job at time of application. Nonetheless, the competitive closure rate (CCR) steadily increased from 27 percent in 1997 to 37 percent in 2007 (p. 112).

Labor market economists use exogenous economic variables (e.g., year-to-year change in GNP) and aggregate statistics (e.g., average annual unemployment rate) to describe the context in which VR services are delivered (see Table 1). In part, they may explain the kinds of changes in the data across rows (see Table 2). But explanations of economic changes over time are beyond the scope of this study. Nonetheless, labor market considerations help consumers, VR professionals, policy-makers, and advocacy groups set realistic expectations and benchmark outcomes based on an understanding of how, from one year to the next, exogenous variables (i.e., factors beyond their control) change the context in which consumers make career choices, Individualize Plan for Employment (IPEs) are devised, and case services are delivered.

For the purpose of this study, the main points to take away from an analysis of aggregate labor market data across all phases of the business cycle are: (a) unemployment consistently is higher for persons with disabilities than for the general population; and (b) unemployment among persons whose primary disability is vision-related is higher than for persons with other kinds of disabilities - despite having attained higher levels of education on average and/or being more likely to have completed occupationally specific training (Pellerin, 2010). On the other

hand, persons who are blind or visually-impaired are more likely to be self-employed than are: (a) persons in the general population; and (b) individuals with other kinds of disabilities. Lastly, among persons with disabilities who were served by VR agencies, those whose primary disability is vision-related are more likely than other consumers to have their cases closed successfully through self-employment.

Table 1

Exogenous Labor Market Factors (National)

Variable	2009	2010	2011	2012
Change in Gross National Product from prior year*	0.48%	4.82%	4.14%	3.67%
Overall Civilian Labor Force (CLF) participation rate[1]	65.4%	64.7%	64.1%	63.7%
CLF participation rate for persons with no disability[2]	70.9%	70.1%	69.7%	69.4%
CLF participation rate for persons with disabilities[3]	22.4%	21.8%	20.9%	20.6%
Overall employment to population ratio[4]	59.3%	58.5%	58.4%	58.6%
Employment to population ratio for persons with no disability[5]	64.5%	63.5%	63.6%	63.9%
Employment to pop. ratio for persons with disabilities[6]	19.2%	18.6%	17.8%	17.8%
Official average monthly unemployment rate[7] (US general population)	9.3%	9.6%	8.9%	8.1%
Official unemployment rate for persons w/ no disability[8] (US)	9.0%	9.4%	8.7%	7.9%
Official unemployment rate for persons with disabilities[9] (US)	14.5%	14.8%	15.0%	13.4%
% employed part-time for non–economic reasons[10] (US)	13.4%	13.1%	13.1%	13.2%
Percent self-employed/not incorporated[11] (US)	7.0%	7.0%	6.8%	6.7%
Official average annual unemployment rate (general population in Texas)[12]	7.5%	8.2%	7.9%	6.8%

* In the absence of BLS data for 2007, change from prior year could not be computed for 2008.

[1]Calculated as $^{\text{employed or actively looking for work}}/_{\text{persons over 16 not institutionalized or in military}}$. Data source Current Population Survey (CPS) from the Bureau of Labor Statistics (BLS) at www.data.bls.gov: CLF from data series LNU01074593 and LNU01074597; employment from data series LNU02074593 and LNU02074597.

[2]BLS/CPS data series LNU01374593

[3]BLS/CPS data series LNU01374597

[4]Calculated as $^{\text{employed full or part-time}}/_{\text{total population over 16}}$ from BLS/CPS data series LNU02032184 & LNU02032187

[5]BLS/CPS data series LNU02374593

[6]BLS/CPS data series LNU0237497

[7]Calculated as $^{\text{Persons receiving Unemployment Insurance}}/_{\text{CLF}}$ unemployment from BLS data series LNU03074593 and LNU03074597

[8]BLS/CPS data series LNU04074593

[9]BLS/CPS data series LNU04074597

[10]BLS/CPS data series LNU02005977

[11]BLS/CPS data series LNU02032185 and LNU02032192

[12]BLS data provided to Rhodes Island Department of Labor and Training under contract to the US Department of Labor to develop and deliver state by state comparison tables at http://www.dlt.ri.gov/lmi/laus/us/annavg.htm.

Table 2

Texas Blind and Visually-impaired Consumers

Variable	Fiscal Year 2008	2009	2010	2011	2012	5 years
Total blind or vision-impaired consumers	2,686	2,825	2,898	2,773	2,810	13,992
Number competitively employed at closure	1,065	1,079	1,080	1,099	1,104	5,427
Competitive closure rate[1]	39.7%	38.2%	37.3%	39.6%	39.3%	38.8%
Self-employed at closure	177	154	148	143	177	799
Self-employed as % competitive employed[2]	6.6%	5.5%	5.1%	5.2%	6.3%	5.7%
Self-employment closure rate[3]	16.6%	14.3%	13.7%	13.0%	16.0%	14.7%

[1] Computed as $^{\text{competitively employed at closure}}/_{\text{N}}$ (Szymanski and Parker, 1989).

[2]Computed as $^{\text{self-employed at closure}}/_{\text{competitively employed at closure}}$

[3]Computed as $^{\text{self-employed at closure}}/_{\text{N}}$

Therefore, within the context of year-to-year changes in the national economy and general labor market conditions, the research questions in this study seek to explain variance (from one row to the next within any given year) in the employment rates (and especially in self-employment) for different subpopulations – especially for VR consumers whose primary disability is vision-related relative to: (a) all persons in the civilian labor force; (b) all persons with disabilities; (c) all persons whose primary disability is vision-related; and (d) all VR consumers regardless of disability type. This study will test hypotheses about the relationship of endogenous variables (within the VR setting including consumer characteristics at time of application and case services) to: (a) successful case closure through self-employment; and (b) self-employed consumers' earnings at case closure.

Barriers to and Supports for Competitive Employment

Across peaks and valleys of the business cycle, the unemployment rate among persons with disabilities consistently is higher than for the general population. Inferences drawn from those data by researchers, advocates, and VR professionals suggest that persons with various disabilities face barriers to employment. Identifying those barriers is an essential first step in: formulating policy; creating effective financial incentives; allocating resources efficiently; and devising effective case service strategies or supports to help persons with disabilities achieve successful employment.

The ADA, for example, was designed to eliminate barriers that do not relate to performing essential job functions by persons with disabilities. The ADA also prescribes that businesses make accommodations and adopt assistive technologies as appropriate to help persons with disabilities: (a) access and adapt to the workplace; and (b) perform essential job functions. But inferences drawn from analysis of labor market data indicate that disparities in employment

rates have persisted over time despite passage of the ADA and the allocation of resources to support accommodations, adaptive technologies, and employment-related VR case services to overcome barriers.

The barriers identified by researchers fall into three general categories. Some of the barriers are "external" to both the consumer and the services provided; e.g., negative societal attitudes and discriminatory practices in business and industry. Others are "programmatic" insofar as they are manifest in services provided to consumers who are blind or visually-impaired; e.g., disincentives to work in SSI and SSDI benefit eligibility rules and limited availability of, or access to, information in suitable formats – such as Braille - about viable careers, training options, job opportunities or employment-related case service and supports. A third set of barriers can be attributed to consumers themselves; e.g., negative attitudes that are "self-imposed" as well as a lack of skills to perform essential functions of some jobs.

Leonard (2002) makes a critical distinction to keep in mind when devising strategies and supports for overcoming barriers to employment. Some barriers can be addressed directly by the rehabilitation process while others largely are outside the control of the VR agency or the consumer. Given O&M training, consumers who are blind or visually-impaired can develop mobility skills to get to and move about a place of employment. But the absence of public transportation presents a more formidable barrier to consumers in rural communities. Vocational training and adaptive technology can provide blind or visually-impaired consumers with the skills to perform essential job functions. But the presence of secondary disabilities and/or overall poor health can constrain their job-search activities and, should they get jobs, their attendance.

The distinction made by Leonard (2002) is critically important for VR professionals to consider when collaborating with consumers to develop viable IPEs, determining the best mix of

case services, and devising strategies to tap resources to overcome barriers outside their scope of control. In rural communities where lack of public transportation is especially problematic, for example, VR counselors are more likely to help consumers start their own businesses.

In 1988, while Congress was debating proposals that led to the ADA, Kirchner and Johnson used qualitative analysis to develop grounded theory about the barriers to and supports for successful employment outcomes among VR consumers who are blind or visually-impaired (released with annotations as Kirchner, Johnson, & Harkins, 1997). They convened three sets of focus groups to determine what barriers various stakeholders believed that empowering legislation and implementation guidelines ought to address. They found differences in prevailing opinions across the three types of focus groups about barriers to employment faced by persons who are blind or visually-impaired. Members of the business leader focus groups expressed fears that hiring persons who are blind and visually-impaired would hamper their firm's operational performance. Business leaders also believed that they would be saddled with the costs for making accommodations or for acquiring adaptive technologies. The behaviors that employers attributed to fear of economic risks were interpreted as discriminatory, misinformed, and stereotyping by members of the study's focus groups that were comprised respectively of consumers and VR professionals.

A decade after ADA was passed, unemployed consumers interviewed by O'Day (1999) and employed consumers surveyed by Crudden and McBroom (1999) still were critical of employer attitudes towards hiring persons who are blind or visually-impaired and discriminatory practices as barriers. Pellerin (2010) found that, two decades after the ADA was passed, blind and visually-impaired persons who responded to a survey believed that they have to work harder

to overachieve in school and on the job in order to gain and retain employment in the face of negative societal stereotyping and employer biases.

An alternative approach to assessing employer attitudes emerged as part of the "demand-side component" of employment characterized by "an increasing emphasis on business interactions… most often referred to as the business relations model or dual customer approach" (Capella-McDonnall, Crudden, & Zhou, 2013, p. 17). Seen from the demand-side perspective, (Stensrud, 2007) takes employer fears as logical in a competitive economy where: a) owners are "less connected to local communities;" and (b) financial capital and talent are obtained from global markets "in which investors pursue a high rate of return on their investments, with less regard for issues related to human and social capital" (p. 227). In that environment, supervisors focus on the bottom line because "their (own) jobs depend on meeting deadlines and performance goals" (p. 231). A prevailing opinion among employers surveyed by Stensrud was, "This is not a time when a company can invest in the social capital of a community by providing employment to people who seem like risky hires" (p. 233). Unless VR professionals have established a sound track record of placing consumers based on goodness of fit between their skills and job requirements, employers will fear that persons with disabilities will: not meet performance expectations; increase the risk of incurring legal and medical costs; and alienate coworkers if given special accommodations (pp. 233-235).

Demand-side qualitative research led to the development and validation of a "non-threatening" Employer Openness Survey (OES) that overcomes "their reticence about discussing hiring procedures" (Gilbride, Vandergroot, Golden, & Stensrud, 2006, p. 85). It probes beyond their "desire to appear in compliance with the Americans with Disabilities Act" (p. 81). The OES can be used to identify: (a) which employers will be most likely to partner with VR agencies to

hire appropriately skilled consumers; and (b) what strategies to use to assuage a particular employer about the risks they fear most.

Capella-McDonnall, Crudden, and Zhou (2013) surveyed a national sample of both rehabilitation counselors and business service representatives (BSRs) from 41 state VR agencies (20 blind agencies, 21 combined agencies) regarding their views about employer attitudes. The counselors were more likely to assert that employers had negative attitudes about hiring persons with disabilities. Counselors and BSRs from blind-serving agencies were more likely than those from combined agencies to believe that employers had more negative attitudes about hiring persons who are blind or visually-impaired than they did about hiring persons with other disabilities. However, while differences of opinion by role (counselors vs. BRSs) were statistically significant, differences of opinions by agency/consumer type were not.

While acknowledging that initial negative attitudes among employers must be overcome, BSRs were more likely to operate under the dual customer/demand side approach. That is, they were more likely to: approach contacts from the employer's risk-adverse business perspective; establish a long term relationship with an employer (rather than attempting to place consumers *ad hoc*/one at a time; understand and help meet the employer's needs through careful applicant to job skill matching; engage in open discussions about fears and uncertainties; provide information about tax incentives, adaptive technologies and managerial strategies for dealing with persons with disabilities and their coworkers; and arranging for consumers to demonstrate their skills, trial employment, and additional on-the-job training.

In Kircher and Johnson's 1988 study (Kirchner, Johnson, & Harkins, 1997), focus groups comprised of VR staff members (i.e., supervisors/managers, counselors, placement specialists, orientation & mobility instructors, and rehabilitation teachers) generally were of the opinion that,

as professionals, they lacked the training and essential resources (e.g., employment-related data and career exploration materials in Braille, large type or audio files) they need to help blind and visually-impaired consumers overcome multiple barriers to successful employment (e.g., literacy deficiencies and presence of secondary disabilities).

A decade later, researchers continued to hear complaints about programmatic barriers (i.e., limitations of VR services and supports for achieving employment). Blind and visually-impaired unemployed adults interviewed by O'Day (1999) "thought that lack of information about job openings," rather than their blindness, was their primary personal problem (p. 633). Of the employed blind and visually-impaired consumers surveyed by Crudden and McBroom (1999), 48% reported that they'd had trouble finding information in suitable formats about job openings. Unemployed persons interviewed by O'Day (1999) gave mixed reviews on the responsiveness, timeliness, and usefulness of guidance provided by VR professionals. Complaints voiced by O'Day's unemployed interviewees indicated that they were: (a) "not challenged to think realistically about the skills they need to give them a competitive edge in the job market" (p. 632); and (b) "allowed to flounder for extended periods with no concrete career goals, and become pigeonholed into specific occupations that are designed for persons who are blind" (p. 638). Only 26% of the employed consumers surveyed by Crudden and McBroom (1999) indicated that VR professionals had been the ones of most help to them in finding a job. More than a third (36%) of their respondents reported that "the skills or attitudes of rehabilitation counselors or placement staff" had been an issue.

In 1988, members of Kirchner and Johnson's consumer focus groups were more likely to emphasize psychological and social barriers to employment (e.g., discouraging prior work histories, family attitudes, and employer reluctance) than they were to mention access to career

exploration materials or labor market information in varied media (Kirchner, Johnson, & Harkins, 1997). However, Kirchner and Johnson found differences of opinion among persons with disabilities that varied according to their employment histories and interest in obtaining work. Blind and visually-impaired consumers with prior successful employment were more likely to continue expressing an interest in obtaining employment for pay. Those who had never worked or whose prior bouts of employment were intermittent were more likely to: (a) be discouraged (i.e., pessimistic about obtaining work); and (b) prefer non-work income supports. Indeed, 12% of the blind and visually-impaired consumers who participated in the focus group discussions revealed that they were not genuinely interested in finding work.

Kirchner and Johnson's findings regarding low motivation among consumers with discouraging prior work histories were consistent with pessimistic attitudes and lack of self-confidence expressed by the unemployed blind and visually-impaired persons interviewed a decade later by O'Day (1999). Even employed persons surveyed by Crudden and McBroom (1999) admitted that they had to struggle to overcome their fear that they would lose economic benefits (18%), medical insurance (8%), and housing benefits (4%) if they worked.

Research by Beveridge and Fabian (2007) also emphasized the importance of screening for motivation and a consumer's genuine interest when collaborating on an IPE. They theorized that, whereas VR counselors invest considerable effort to assist consumers in carefully exploring and identifying their vocational goals (i.e., in the process of collaborating on the IPE), consumers are more likely to: (a) complete the elements in their IPEs; (b) have their cases closed through successful employment; (c) be placed in jobs congruent with their vocational goals; (d) earn higher wages at case closure; and (e) be satisfied with and stay longer in the job they got at case closure.

In 1988, Kircher and Johnson acknowledged the non-representativeness of their focus groups' composition (Kirchner, Johnson, & Harkins, 1997). They did not make generalizations or statistical inferences about opinions held by the respective populations of employers, VR professionals, or consumers from their qualitative research. Taking a practice-oriented approach, they recommended using pilot studies to demonstrate the effectiveness of suggested supports and services to help blind and visually-impaired consumers achieve competitive employment. Similarly O'Day (1999) and Crudden and McBroom (1999) did not draw statistical inferences from the opinions and beliefs of their respective interviewees and survey respondents. Those authors also focused instead on recommending supports that they theorized would be helpful in overcoming the barriers that their blind and visually-impaired subjects had identified.

Kirchner and Johnson's findings from their 1988 study were re-released (Kirchner, Johnson, & Harkins, 1997) to remind stakeholders about the baseline views recorded on the eve of ADA's passage. They noted anecdotally that the original report and recommendations therein were disseminated widely among practitioners and policy-makers during the ADA's roll out. They also noted anecdotally that the ADA was being criticized because unemployment among blind and vision-impaired consumers remained disproportionately high six years after the law was passed. Pellerin (2010) also cited studies which found that "eighty percent of the cases brought under Title I of the ADA are thrown out by the federal courts and six to eight percent of the remainder are settled in favor of the person with disabilities" (p. 25). However, Pellerin did not expressly assert that the law is ineffective because of loopholes or unenthusiastic judicial support. In interpreting the persistently high unemployment among blind and visually-impaired person a full decade after the ADA was passed, Pellerin reiterated Kirchner, Johnson and Harkins's rebuttals to the law's critics. Pellerin concluded that post-ADA persistence of

disproportionally high unemployment among persons who are blind or visually-impaired reflects the depth to which prejudices, stereotyping, misconceptions, and fears are deeply ingrained rather than a reflection of inadequacies in the law. But he did not gather opinion data from employers about blind and visually-impaired individuals to either rebut or support his blind and visually-impaired respondents' attribution of barriers to employers' misconceptions, fears, and biases.

Similarly, rather than taking persistently low employment figures as an indicator of defects in the ADA, Kirchner, Johnson, and Harkin offered several points in rebuttal. There was no reason to expect huge immediate employment gains as the result of ADA because it was not implemented in full instantly upon passage. Moreover, some of the recommendations in the original 1989 article had not yet been adopted or fully funded. It would require years of accumulating data on successful placements to form a body of evidence persuasive enough to erode deeply entrenched but unsubstantiated fears employers often had about hiring blind and visually-impaired persons. Sticking to Kirchner and Johnson's practice-oriented approach in the original 1988 study, Kirchner, Johnson, and Harkin (1997) suggested that their recommendations should drive pilot studies to test hypotheses about ways to increase successful employment outcomes among individuals who are blind or visually-impaired.

Authors of qualitative studies (i.e., those who captured the attitudes and opinions of various stakeholders through focus groups or surveys) offered recommendations to policy-makers, practitioners, and VR consumers. Their recommendations are normative rather than evidence-based. That is, they offered prescriptions about what, in their judgment, ought to work - in theory - to eliminate or overcome barriers to employment for persons with disabilities. In suggesting that their recommendations should be piloted, the authors provided hypotheses that

can be tested empirically about what works for whom under what condition. A data-driven approach to policy-making and strategic delivery of case services requires hard evidence of effectiveness and efficiency that can be replicated rather than advocacy (no matter how well-intended), anecdotal discussions (no matter how emotive and evocative), or speculation (regardless of the author's credentials, reputation, or gravitas).

In 1988, Kirchner and Johnson made action recommendations grouped around five themes (Kirchner, Johnson, & Harkins, 1997). Facilitate better communications among all stakeholders – particularly by providing feedback from employers and former consumers to VR counselors and administrators for continuous improvement of case services. Provide greater access to career exploration materials and information about employment opportunities – particularly in Braille and other disability-friendly formats and media. Give more attention to basic job readiness – such as literacy, mobility, job-search and interview skills, and in making transportation arrangements. Define, provide professional development for, and support separate VR staff roles – e.g., specializing in job-loss aversion, placement, or post-placement. Facilitate networking for VR consumers with blind or visually-impaired mentors who are successfully employed.

In 1988, Kirchner and Johnson found those consumers who were employed and those who were not working but interested in finding employment differed from those not working and not interested in finding employment (Kirchner, Johnson, & Harkins, 1997). The latter were less educated, older at onset of vision loss, reported previous problems in finding or keeping jobs, and had more general health problems. Based on this set of observations, the authors recommended carefully screening consumers regarding their motivation and genuine interest in finding work before referring them to, and expending scarce resources on, vocational training

and employment-related case services. Specifically, before being referred for employment-related training, consumers should be: (a) more closely prescreened to identify those not genuinely interested in obtaining work or who prefer non-work income supports; and/or (b) provided counseling or coaching to foster more positive personal attitudes regarding employment outcomes as the service objective.

O'Day (1999) was particularly adamant about changing the "substantial gainful activity" rule (SGA) that reduces or eliminates SSI and SSDI benefits for consumers who become employed. O'Day also advocated providing health care coverage to employed consumers whose employers do not provide it. In particular, he suggested: (a) a "two-for-one offset" that would allow employed consumers to keep $1.00 of SSDI/SSI benefits for every $2.00 they earned; and (b) a buy-in arrangement that would allow them to continue participating in state Medicaid on an "income-based sliding scale when they return to work" (p. 640).

Kirchner and Johnson also found that, in advance of ADA's passage, employers had concerns about: getting enough technical assistance to comply with the law; the cost of compliance (e.g., impact on human resource management's overhead); and availability post-placement support to sustain viable relationships between blind or visually-impaired consumers and their employers and coworkers (Kirchner, Johnson, & Harkins, 1997). They provided specific recommendations to address employers' concerns with improving communications as well as developing and supporting specialized roles among VR staff. To overcome their fears, employers might be assured that: (a) resources will be available to cover any added expenses in accommodating persons with disabilities in the workplace and providing them with job-appropriate adaptive technologies; and (b) they have legal remedies in cases where the

consumers they hired do not perform essential job functions adequately despite being provided accommodations and adaptive technology.

Kirchner and Johnson recommended specific supports and/or practices to overcome the barriers identified by their focus groups (Kirchner, Johnson, & Harkins, 1997). Per the observations and opinions of the VR practitioners' focus groups, the authors advocated committing more resources to their professional development and training. Both the consumer focus groups and the VR professional focus groups emphasized committing more resources to developing and disseminating employment-related information in formats on media appropriate for persons who are blind or visually-impaired. The prescriptive recommendations originally advocated by Kirchner and Johnson for overcoming barriers to employment for blind or visually-impaired consumers were reiterated when the original study was annotated, updated and published by Kirchner, Johnson, and Harkin (1997).

Crudden and McBroom (1999) recommended that VR agencies provide more financial assistance: a) to help employers cover the cost of accommodations and adaptive technologies; and b) for consumers to get vocational training, on-the-job training, clerical assistance in applying for jobs, transportation services; and, after starting a job, extended disability benefits and post-closure supports.

In deriving recommendations from his respondents' opinions, Pellerin (2010) asserted that consumer self-advocacy likely needs to be augmented with special efforts by VR professionals regarding job-readiness preparation, placement, and post-placement follow up and support. Pellerin made additional recommendations that are consistent with those regarding development of, and support for, specialized roles for VR professionals by Kirchner, Johnson, and Harkin (1997). For example, he reported, that even a second decade after ADA's adoption,

blind and visually-impaired consumers continue to complain about the availability of, and access to, job postings in Braille or other suitable formats.

Without respondents who had never been employed, Pellerin (2010) did not comment on disinterest in employment or preference for non-work income supports as self-imposed barriers to work among blind and visually-impaired person. However, his rich narrative on the themes of positive work attitudes and overachieving expressed by his successfully employed respondents suggests fruitful avenues for developing the kind of pre-referral motivational/attitudinal screening that Kirchner, Johnson, and Harkin (1997) had recommended to prevent squandering scarce VR funds available for vocational training on disinterested and unmotivated consumers. He also echoed their opinions about raising the ceiling on allowable earnings among Social Security recipients to overcome their reluctance to work for fear of losing benefits such as Medicare coverage. Thus, one of Pellerin's most useful contributions is his suggestion of testable hypotheses for future quantitative research to determine the degree of correlation between employment at closure and consumers' attitudes about themselves, the value they place on work, fears about losing financial incentives (e.g., under Social Security program earnings caps), their motivation when initially seeking VR services, and other self-imposed barriers to employment.

For the purposes of this study, the most useful way to summarize the qualitative research on barriers to employment for persons with disabilities is to restate their recommendations as questions that can be addressed empirically. For example:

1. Are blind or visually-impaired consumers who are provided access to career exploration materials and information about available case services, supports, and job opportunities in Braille or other appropriate formats/media more likely to have their cases closed through competitive employment? And, by extending that logic, are they more likely to have their cases closed

through self-employment if provided materials in Braille, etc. on starting their own businesses and entrepreneurial opportunities?

2. Are they more likely to achieve competitive employment in general or self-employment in particular if mentored by a successful blind or visually-impaired business person?

3. Is the likelihood that a blind or visually-impaired consumer will achieve competitive employment (or self-employment) correlated with the specialized, role-specific professional development completed by members of the individual's case management team?

4. Are blind or visually-impaired consumers more likely to achieve employment goals in their IPEs if:

   a. prescreened regarding their attitudes about non-work financial incentives and motivation for seeking VR services; and/or
   b. counseled/coached about the meaning and value of work?

5. Are individuals who are blind or visually-impaired more likely to be hired by employers who have been:

   a. informed about the consumer's abilities to perform essential job functions;
   b. advised about available resources to cover the costs of accommodations and/or adaptive technology;
   c. satisfied with the performance of consumers previously placed in their firms; or
   d. coached about ways to resolve issue that might arise on the job between persons with disabilities and their coworkers.

Variance in Employment Closures by Disability Type

Studies have been done using secondary analysis of RSA911 data to determine empirically what VR services help which consumers achieve various kinds of employment at case closure. The studies differ in their degree of specificity. Some researchers studied the correlates of all types of employment outcomes achieved by VR consumers while others studied the correlates of specific employment outcomes including self-employment. Some researchers examined employment outcomes for VR consumers regardless of disability type. Others specifically studied the correlates of employment outcomes achieved by consumers who are blind or visually-impaired. In addition to looking at successful employment at case closure, some researchers studied the correlates of VR consumers' earnings at case closure.

All types of competitive employment among VR consumers.

Consumers' employment outcomes regardless of disability type. Darensbourg (2008) analyzed a national sample of cases in the RSA911 to assess the capacity of twenty consumer demographic variables and fourteen case service variables to predict of successful employment outcomes for VR consumers. Because her dependent variable was dichotomous, Darensbourg used logistic regression to assess the predictive capacity of those variables. The following were the most important predictors of competitive employment at case closure: (a) six of the twenty demographic variables – age, gender, receipt of Medicaid, severity of vision loss, source of referral, and weekly earnings at application; and (b) four of the fourteen case service variables – receiving job placement assistance and maintenance services (both were correlated positively to competitive employment) and receipt of disability-related augmentative skills training and miscellaneous training (both negatively correlated).

Jones (2008) also used logistic regression to assess the capacity of demographic and case services variables to predict competitive employment at closure. Among blind and visually-impaired consumers of VR services in Alabama from 2002 to 2005, Jones found that, in terms of odds ratios, the best demographic predictors of successful employment outcomes were in order: gender, earnings at application, and congenital onset. But, when controlling for demographic and consumer characteristics at application, service variables still had significant capacity to predict successful employment outcomes. As did Darensbourg (2008), Jones found negative correlations between augmentative disability skills services and competitive employment. He acknowledged that these findings were counter-intuitive and inconsistent with recommendations from qualitative, advocacy-oriented studies of barriers to employment.

Correlates of consumers' earnings at case closure. Darensbourg (2008) and Jones (2008) also examined post-closure earnings. Because continuous data were available on that dependent variable, both used multiple regression to assess the predictive capacity of demographic and case services variables. Darensbourg found that the most important predictors of weekly earnings at closure were: (a) four of the demographic variables – gender, higher level of education at closure, receiving Social Security Disability Insurance (SSDI), and weekly earnings at application; and (b) one case service variable – disability-related augmentative skills training (negatively related). Jones (2008) found that the best predictors of earnings at closure were: earnings at application, being competitively employed at application, and both the type of educational services and academic credentials awarded.

Employment outcomes among consumers who are blind or visually-impaired. Goertz et al. (2010) conducted a cross-national review of the literature on factors related to persons who are blind or visually-impaired. They found mixed results regarding the correlation

between visual function (e.g., severity of vision loss, age of onset, presence of other disability conditions) and employment. The following consumer characteristics were associated positively with employment among persons who are blind and visually-impaired: age (more specifically, being between 30 and 40); being male (even controlling for education); being white; living in an urban community; being married or living with a partner; higher level of educational attainment; having blind competencies/proficient in alternative techniques (e.g., Braille, mobility); and possessing skills necessary to perform jobs that pay more than minimum wage. The authors note, however, that the gender gap in employment among persons who are blind or visually-impaired seems to be narrowing. Fatigue, drug-use, and being disorganized were correlated negatively with employment.

Among attitudinal variables, Goertz et al. found four (i.e., low self-esteem, cynicism, lack of self-confidence, negative self-image) were correlated negatively with employment. Meanwhile, confidence in the future, independent attitude (e.g., motivation to work, strong work ethic, persistence), expecting to be held to same work performance standards, not using blindness as an excuse, high expectations of self, good work etiquette (soft skills), and taking responsibility for one's own happiness and success were related positively to employment.

Six service-related variables were found to be related positively to employment: communications training; amount spent on case in vocational rehabilitation; availability of and access to information on health insurance and Social Security while working; use of mentors and role models; personal adjustment training; computer training; and mobility training. One service-related variable was related negatively to employment; i.e., deficit of career support services. Among post-service variables, the following were related positively to employment: on-the-job training; supportive attitude of employer and coworkers; being held to same work performance

expectations; availability of transportation; accommodations; job restructuring; availability and access to equipment and facilities; schedule flexibility; work culture that rewards individual achievement; and work performance evaluations done in conjunction with vision care specialists (Goertz et al., 2010).

Bell (2010) examined the cases of all consumers of the federal-state VR system from 1997 through 2007 whose primary disability was legally blind. He focused largely on the change in employment status from the time of their applications to the time their cases were closed. Because at both points in time a consumer's status was either employed or unemployed, Bell constructed four categories: (a) "none" (i.e., not employed at either point in time); (b) "lost employment" (i.e.; employed at application, unemployed at closure): (c) "already employed" (i.e., employed at both points); and (d) "VR employed" (i.e., unemployed at application then employed at closure after receiving VR services).

He found that a majority of consumers each year fell into the "none" category. The mean equaled 61%. The annual percentage that lost employment average nearly 7% but the percentages steadily declined from 1997 to 2007. The number already employed rose nearly 3.7 percentage points from 13.52% in 1997 to 17.20% in 2002. The number of VR employed rose 6.44 percentage points to 19.96% in 2007. Over the same period, the total number of cases closed annually in the federal-state VR system decreased by more than 4,000. Among blind and visually-impaired consumers who were employed at closure, average earnings increased by almost $130 per week between 1997 and 2007. Among those already employed, the increase in weekly earnings was even higher and the difference rose steadily from $167.16 in 1997 to $215.01 in 2007. Earnings at closure for all consumers with employment as well as earnings gains for those already employed at application were: (a) higher for men than for women; (b)

varied directly with level of educational attainment; and (c) varied by racial and ethnic group ── with Native Americans having the lowest earnings on average and Asian/Pacific Islanders having the highest earnings at closure.

Bell's findings need to be interpreted in context. First, they are consistent with what economists would expect in years preceding a recession. Second, the author suggests that variance among states in their successful closures through competitive employment among blind and visually-impaired consumers and earnings at closure may, in large part, be explained by different service patterns. "[W]hile some state agencies closed a considerably higher portion of consumers with blindness in competitive employment, these same agencies also had a significantly higher proportion of consumers with blindness already employed when they applied for services" (p.113). Overall, Bell's study indicates that variables outside the counselor's control (e.g., consumer demographics like gender and status at application such as educational attainment and employment status) are correlated with the odds of competitive employment and earnings at closure.

Capella-McDonnall (2005) conducted longitudinal analysis of RSA911 data for 1995-2000 and supplemental data gathered at several post-closure intervals through the Longitudinal Study of the Vocational Rehabilitation Services Program (LSVRSP). The study was designed to provide empirical evidence about those factors which were known, per an extensive literature review, to best predict competitive closures for blind and visually-impaired consumers. Cappella-McDonnall included all consumers of the VR system under 66 whose cases were closed, whose primary or secondary disability was blindness or visual impairment, who were not employed at the time of application for VR services, and for whom data were collected for the LSVRSP over any of the three post-closure years between 1995 and 2000. She did logistic

regression to analyze the data with Wald X^2 (chi-squared) to test the significance of the regression model's goodness of fit and R^2 as the measure of variance explained by the model as variables were entered in stepwise fashion. Odds ratios were compared to help determine the size of effect for each variable in predicting successful employment outcomes. The model was able to classify outcomes correctly in 70% of the cases indicating a good fit.

Cappella-McDonnall found that the best predictors of successful employment at case closure for blind or visually-impaired consumers (in order of size of effects) were: (a) the VR consumer received educational services which resulted in a diploma or certificate; (b) the reason the consumer applied for VR services was employment-related; and (c) the consumer reported having a high quality relationship with the VR counselor. In discussing the results, Cappella-McDonnall compared their findings to those reported in the literature. The most important conclusion from this study was that many of the consumers' personal characteristics which, in the more limited regression models of prior research, had been found to be significant predictors of employment outcomes (e.g., race, gender, age, vision loss, presence of a secondary disability, education level, and receipt of financial assistance) were not significant when all of the variables in her model were taken into account. When intervening variables (i.e., receiving education services resulting in a degree – rather than merely receiving education services; having worked between the onset of vision loss and application for services; having applied to the VR system specifically to enhance employability; and positive relationship with VR counselor) were entered into the regression model, they explained more of the variance in, and significantly raised the odds of, successful employment outcomes.

Capella-McDonnall's study (2005) provides two important reminders to researchers as they design future studies. First, explore the changes in predictive capacity of regression models

as more plausible and theoretically sound variables are added to it sequentially. It is important to identify those factors that have moderating, mediating, and/or interaction effects. Second, the factors that significantly raise the odds of successful employment at case closure may not be within the full control of the VR counselor.

Warren, Giesen, and Cavenaugh (2004), used regression analysis to test two regression models for predicting which blind or visually-impaired consumers would have their cases closed for successful employment outcomes as "homemakers." Their study found that: (a) the best predictors of homemaker as employment closure type for blind and visually-impaired VR consumers, in order of size of effects were age, having been self-supported at application, gender (female), education at application; presence of a secondary disability, and marital status; and (b) the significance of race (per their first regression model) disappears when controlling for other factors added stepwise to the second regression model.

Warren, Geisen, and Cavenaugh's (2004) study is of interest to those researchers looking at varience in the types of employment outcomes achieved by consumers who are blind or visually-impaired. Historically, a much larger percentage of blind and visually-impaired consumers were coded as "homemakers" than were VR consumers with other kinds of disabilities. The percentage of blind and visually-impaired consumers who were self-employed at closure also was higher than for VR consumers with other kinds of disabilities. Since passage of the ADA, the homemaker closures have been criticized by practitioners and consumer advocacy groups (Bell, 2010). Meanwhile, empahsis on, and incentives for, self-employment have increased. Warren, Geisen, and Cavenaugh (2004) report that there has been a long-term decline in homemaker outcomes as a percentage of employment closures across all disability groups. However the percentage of blind and vision impaired consumers with homemaker outcomes is

still dramatically higher than for VR consumers with other kinds of disabilities. But Warren, Geisen, and Cavenaugh did not compare trends on the percentages of self-employment outcomes for blind and vision impaired consumers versus those for persons with other kinds of disabilities. Data on the crosscurrents of changes in employment closures would be useful to VR case managers in determining how shifts in emphasis in disability employment policies and varied incentive structures impact their vocational counseling, pre-training screening, and training referral practices.

Specific employment outcomes.

Self-employment outcomes regardless of disability type. Ipsen, Arnold, and Colling (2005) noted that the percentage of persons with disabilities who are self-employed is slightly higher than for the general population. Since the passage of Rehabilitation Act Amendments in 1998, federal legislation clearly has encouraged self-employment as a positive outcome for VR consumers. Prior to the 1998 amendments, eleven of the 45 states (24%) whose VR administrators responded to a survey by the Research and Training Center on Rural Rehabilitation had no written self-employment policies or procedures. Ten (22%) of the states required that counselors eliminate all other viable rehabilitation options for salaried employment before considering self-employment and eleven (24%) contained negative statements about self-employment in their policy guidelines (Arnold & Seekins, 1994).

A follow-up study showed that, after the 1998 amendments to the federal Rehabilitation Act, states had taken steps to provide proactive guidance on the following aspects of self-employment case services: assessing individual consumer's business potential; developing business ideas, exploring feasibility and conducting market analysis; providing training on business planning and management – especially through collaboration with SBDCs and the

Senior Corps of Retired Executives (SCORE); obtaining technical assistance – again, most often through SBDCs and SCORE; increasing the required components of a business development plan; exploring resources available from other sources – sometimes before spending VR funds; rigorousness of VR agency review before committing resources; and providing follow-up review and support (Arnold & Seekins, 2005). None of the studies conducted by Arnold and Seekins explored correlations between policy changes and rates at which cases were closed through self-employment. Nor did Arnold and Seekins differentiate self-employment case services by disability type or other consumer characteristics.

Despite increased emphasis among policy-makers and program administrators after the 1998 amendments, the percentage of consumers with self-employment closures has remained stable (between two and three percent annually). Policy changes did not go so far as to propel self-employment from a last resort consideration to one that is given precedence over other options. The changes did more to: (a) get consumers to explore self-employment as an option; and (b) give VR counselors more latitude, support, and guidance in delivering self-employment case services. But within the broad federal guidelines and regulations, state VR agencies and individual VR counselors still have wide latitude in developing IPEs. While consumers and counselors are, "[t]theoretically… free to pursue a wide range of employment options… counselors make many judgments and recommendations that influence the course of a consumer's rehabilitation choices… [Even though self-employment is a legitimate option, supervisors may convey, and staff may develop, the attitude that competitive employment in existing jobs is preferred or that the use of self-employment as an option is discouraged]" (Ravesloot & Seekins, 1996, p. 2).

In other words, field-level counselors' views on the relative value and importance of various employment outcomes are as important as broad top-down policy considerations in the choices made by consumers on their caseloads. For example, taking Ipsen et al. (2005) and Warren et al. (2004) together, it appears that trends in homemaker closures changed more dramatically in the wake of informal criticism than did trends in self-employment closures in the wake of positive federal legislative intent and revisions in state policy guidelines.

The following factors were found by Ravesloot and Seekins to be correlated with the percentage of a VR counselor's cases that were closed through self-employment and the counselor's score on a Self-Employment Attitude Scale (SEAS). Counselors' scores on the SEAS co-varied with: (a) a counselor's past experience in providing self-employment case services; and (b) the atmosphere in the office (i.e., local interpretation of the significance of self-employment in their state's interpretation of federal policy). The extent to which counselors facilitated self-employment outcomes correlated significantly to: (a) the counselor's personal reaction to self-employment; (b) expectations about the consumer's experience; (c) availability of relevant supports and case services; and (d) view of the state's investment in self-employment outcomes. Of those variables, counselors' prior experiences with self-employment case services were the best predictor of their facilitation efforts (Ravesloot & Seekins, 1996).

Office atmosphere can be more or less conducive to pursuing self-employment outcomes depending on the importance of placement rates in the ways that supervisors evaluate the performance of VR counselors in a local office; lingering views of self-employment as a last resort, costly and/or inefficient; and impressions about the availability of salaried employment opportunities in an office's service area (Ravesloot & Seekins, 1996).

Ipsen, Arnold, and Colling (2005) focused on how operational conditions among state VR agencies and local offices influenced referrals to and development of self-employment case service. In particular, they looked at the how the presence or absence of arrangements (formal and informal) between VR agencies and SBDCs might increase self-employment closures. Using a t-test of independent samples, the authors compared the opinions of VR professionals and SBDC directors regarding the effectiveness of services designed to help blind and visually-impaired consumers achieve self-employment. They found that the presence of formal and informal agreements at the state and local levels between VR entities and SBDCs increased cross-agency referrals to improve teamwork that is integral to delivering an effective, individually-tailored mix of rehabilitation and entrepreneurial services. VR professionals were confident that they had the subject matter expertise to help consumers achieve mobility, independent living, and disability-specific and occupationally specific skills. But some felt they lacked experience or training in business that would enable them to helping VR consumers arrange finances or to set up and operate their own enterprises.

Revell, Smith, and Inge (2009) did secondary analysis of the national RSA911 data sets for Fiscal Years 2003-2007 (i.e., during the pre-recession boom) to explore trends in self-employment case closures. The study found that, despite heightened emphasis by policy makers, self-employment closures comprised only two percent or less of all 26 closures. Moreover, the rate of self-employment closures declined over the three-year study period. During the same period, however, average earnings (both hourly and weekly) among consumers with self-employment closures were higher than the average for all 26 closures and the earnings gap widened over time.

Revell et al. (2009) ranked self-employment outcomes as a percentage of 26 closures and the average earnings of self-employed consumers for the top ten states in each category. However, they did not test any hypotheses to explain what those top states were doing differently. Nor did the authors attempt to identify best practices that could be replicated by other states' VR services. They did note that states with the highest percentage of self-employment closures tended to be rural. Average earnings for self-employment closures were highest in the more urban states. But, with the exception of North Dakota, states where average earnings were highest were not among the states ranked in the top ten by percentage of self-employment closures.

Self-employment outcomes among consumers who are blind or visually-impaired. Arnold and Seekins (1995) examined differences in self-employment outcomes at the state level. They found that the degree of "ruralness" (p. 13) - based on population density and distance - was related directly to the percentage of cases closed through self-employment. They attributed the differences to macroeconomic factors and to VR professionals' views. In rural communities opportunities to be employed by others may be limited because: (a) the long term trends in comparative advantage has shifted most job creation to urban areas; (b) the industrial composition of rural economies tends to be less varied and where small business establishments are the norm; (c) more predominantly agricultural in which self-employment overall is more likely regardless of disability status; d) distance from metropolitan business locations; and e) absence of public transportation. Moreover, rural counselors who responded to their survey (i.e., those who served in "remote," "rural," and "nonmetro" communities) evaluated self-employment higher than did those from urban/metropolitan communities in terms of: efficiency, successfulness, flexibility, realistic, less risky, less difficult, and familiar. Whereas "ruralness"

and VR counselors' views on self-employment outcomes were correlated significantly with self-employment closures, consumer characteristics were not.

Revell et al. (2009) did examine the variance in self-employment closure rates by consumers' primary disability status. They found that consumers whose primary disability was a visual impairment had the highest rate of self-employment closures (4.7 percent of all 26 closures) – a rate that was almost three times higher than that for all consumers with 26 closures (1.7 percent). Consumers whose primary disability was cognitive (i.e., mental health/mental illness, traumatic brain injury, or learning disability) were the least likely of all VR consumers to be self-employed at case closure. But this study did not test any hypotheses that might explain why self-employment closures varied by disability type. In particular, Revell et al. did not attempt to explore differences in self-employment closures for consumers served by general and combined VR agencies versus those served by VR entities set up specifically to serve blind and visually-impaired consumers (e.g., the Division of Blind Services with the Texas Department of Assistive and Rehabilitative Services).

Moore and Cavenaugh (2003) also examined aggregate data on self-employment outcomes among blind and visually-impaired VR consumers. Their study compared the returns on investments in case services directed to self-employment, the Business Enterprise Program (BEP), and other kinds of competitive employment at closure. In their study of successful case closures nationwide for 1994-2001, Moore and Cavenaugh found that the cost of VR services per successful employment outcome were lower for blind or visually-impaired consumers who became self-employed than they were for consumers who entered BEP or found competitive employment in an integrated setting. Nonetheless, self-employment among blind or visually-

impaired VR consumers with successful employment case closures was lower than for self-employment among persons in the general population who are blind or visually-impaired.

In looking at the association between demographic characteristics and type of competitive employment, Moore and Cavenaugh (2003) found that blind or visually-impaired female and African-American consumers were less likely to have their cases closed as self-employed. As was the case in a study on homemaker closures by Warren, Geisen, and Cavenaugh (2004), Moore and Cavenaugh's (2003) study of self-employment closures raised more questions than it answered about the relative impact of shifting policy emphases, VR counselors' screening practices, and consumer self-selection on type of case services rendered and the type of employment achieved at case closure.

Summary of Recent Research

Findings from the ten studies covered in this literature review touch closely on the central research questions. None looked directly at the determinants of self-employment case closures for VR consumers who are blind or visually-impaired. Practical implications for VR counselors and suggestions for additional research to fill gaps in the current literature can be derived from a discussion of findings from studies included in this review and their limitations. Five of the studies empirically examined successful employment outcomes among VR consumers at case closure: Pellerin (2010); Kirchner, Johnson, and Harkin (1997); Jones (2008); and Darensbourgh (2008). Two studies, Bell (2010) and Capella-McDonnall (2005), specifically examined outcomes achieved by blind and visually-impaired consumers. None of those seven studies differentiated self-employment from other types of 26 case closures in the RSA911 commonly defined as "successful employment." The cross-national review of the literature by Goertz et al. (2010) also did not differentiate self-employment from other kinds of competitive employment.

One study examined a specific type of 26 case closure – homemaker rather than self-employment. Warren, Cavenaugh, and Geisen (2004) looked expressly at homemaker rather than at self-employment. Their focus was on disparities in case management related to demographic factors (e.g., race/ethnicity, age, education, and marital status).

Three studies looked at the relationship between structural variables and self-employment outcomes for VR consumers. Ipsen, et al. (2005) found that referrals to self-employment case services increased when VR agencies had agreements with SBDCs. Members of their focus groups opined that collaboration was needed to: (a) leverage funds jointly; and (b) blend the professional expertise of VR counselors (i.e., regarding rehabilitation case services) and of small business specialists (i.e., entrepreneurship). However, the study was not disability-specific. Unlike Kirchner, Johnson, and Harkins's qualitative examination of successful employment outcomes (1998), Ipsen et al., did not discuss the needs of, or recommend specific policies and resource allocations to, blind and visually-impaired consumers who want to start their own businesses. Rather, they focused on the presence/absence of formal/informal agreements at the agency/local levels between VR and SBDC as predictors of cross-referrals among consumers regardless of their disability type.

Revell et al., (2009) found that most states ranked in the top ten for self-employments outcomes were rural. However, with the exception of North Dakota, states with the highest average earnings among self-employed consumers were not among those ranked in the top ten by percentage of 26 closures through self-employment. Moore and Cavenaugh (2003) compared: (a) trends in self-employment and BEP program participation rates over time by race/ethnicity and gender among consumers who are blind or visually-impaired; and (b) expenditures on those two pathways to successful employment. Their findings relate to possible biases in referrals to those

two training pathways and relative returns on investments in them. In other words, they compared the processing of BEP and self-employment candidates (i.e., referrals as inputs and expenditures) rather than directly examining the determinants of success in either type of cases.

But the study by Revell et al. (2009) was not disability-specific. Rather, they focused on: (a) differences at the state level in the percentage of VR consumers whose cases are successfully closed through self-employment; (b) differential participation rates between racial/ethnic groups (specifically Native Americans compared to other groups of VR consumers) in self-employment; and (c) the earnings of all self-employed consumers compared to the earnings of consumers who achieved other kinds of successful employment outcomes. The study is most useful in suggesting a testable hypotheses. Namely, the "rurality" of the labor market that a VR agency serves may be: a) directly related to the percentage of cases closed through self-employment; and b) inversely related to average earnings among those consumers who are self-employed.

While some of the studies have identified factors which predict types of employment case closures and earnings at closure for blind and visually-impaired VR consumers, causal relationships between specific services (i.e., interventions, treatments) and those outcomes have not been established empirically. That is because none of the studies have used an experimental design. Random assignment of VR consumers to control groups and experimental groups would be required to establish causal relationships (Campbell & Stanley, 1963). However, as a matter of policy, experimentation in the delivery of VR services is not be allowed. VR case management is governed strictly by legislation and directives which stipulate that consumer choice is integral to the mix of services provided: (a) the Rehabilitation Act of 1973 (and subsequent amendments); (b) the Americans with Disabilities Act; and (c) the Workforce Investment Act. Those policy guidelines and VR profession's code of ethical conduct prevent

random assignment of consumers to treatment groups or withholding services from others to create a control group for the sake of comparing outcomes to establish causal relationships.

The second limitation of studies done to date is that the economic and political environment has changed since they were conducted. The data they examined, for example, predate the 2007-2009 recession and the subsequent "jobless recovery." To what extent are the barriers to employment that existed prior to the recession exacerbated by the possibility that they must now compete during the jobless recovery with dislocated workers who are sighted and who may have the education & training and prior work experience that give them transferable skills to fill jobs sought by blind and visually-impaired VR consumers?

In the current political and economic environment, the federal government and state legislatures are tackling current budget shortfalls and taxpayer demands for fiscal restraint, in part, by cutting funds for social and human services. To what extent is funding for vocational rehabilitation programs in general, and self-employment training in particular, impacted by competition by VR agencies with education, general workforce development programs, and other social or human services as the pool of resources they share dwindle? If program funding is cut or partially sequestered, what will be the impact on the number of consumers who can be referred to self-employment training and how much assistance can they be provided to start up their own businesses and for post-startup supports?

The data examined by the studies included in this review also predate President Obama's remarks supporting self-employment outcomes for all persons with disabilities ─ especially for returning veterans with disabilities resulting from battlefield trauma. Just as the study by Warren, Cavenaugh, and Geisen (2004) questioned the treatment of homemaker case closures as successful employment outcomes in the VR system, how might increased advocacy of self-

employment impact: (a) pre-referral VR applicant screening; (b) the number of referrals – particularly among veterans with battlefield-related visual impairments; and the resources provided?

Although the politico-economic environment has changed and more than twenty-five years have passed since the lead study was conducted by Kirchner and Johnson in 1988, no qualitative replication studies have been conducted (Kirchner, Johnson, & Harkins, 1997). Do employers still express reservations about the risks entailed and expenses related to hiring persons with disabilities? Is the level of employer reticence related to the type of disability (e.g., *vis a vis* blind and visually-impaired consumers versus those with other disabilities)? What percentage of the VR consumer population in general (and the blind and visually-impaired consumers): (a) are not genuinely interested in obtaining employments; and (b) prefer nonwork income supports? Are VR counselors doing more rigorous pre-referral screening of consumers who want occupationally specific training or support for starting their own businesses?

Almost ten years have elapsed since Cavenaugh and various co-authors raised concerns about possible biases in referrals to homemaker programs (Warren, Cavenaugh, & Geisen, 2004) and disparities in referrals to BEP and self-employment training (Moore & Cavenaugh, 2003). Has there been an increase in the percentage of consumers assisted in starting their own businesses as: (a) referrals to homemaking decline; (b) BEP work opportunities are reaching a point of near saturation; and (c) the current administration touts self-employment as an option for VR consumers in general and for returning veterans in particular?

In the intervening years since Ipsen, et al. (2005) conducted their study, have more VR and SBDCs entered into formal agreements at the agency and local levels to collaborate in serving persons with disabilities who want to start their own businesses? Do current agreements

address concerns raised by focus group participants in that study regarding shared responsibilities and leveraging of resources? Similarly, in the years that have elapsed since Revell et al. (2009) conducted their study, have VR professionals determined what agencies are doing differently, and adopted the best practices, in states atop the rankings for self-employment outcomes and post-closure earnings of self-employed VR consumers? Have any best practices or policies been identified and replicated to increase self-employment outcomes and post-closure earnings among blind and visually-impaired consumers? Does the rate of 26 case closures through self-employment case closured vary at the sub-state level according to regional unemployment rates and/or degree of urbanization?

VR agencies, professionals and consumers are paying more attention to self-employment for several reasons. While the unemployment rate among VR consumers has always been higher than it is for the civilian labor force, those who are blind or visually-impaired have one of the highest rates of unemployment compared to those with other types of disabilities. In addition to the persistence of barriers to employment described by consumers, VR professionals, and business leaders at the time the ADA was passed, blind and visually-impaired consumers now face more competition in the jobless recovery from sighted dislocated workers with the education, training and work experience that may qualify them for reemployment. As opportunities for placement in competitive employment lag and BEP slots are reaching near saturation, many - including President Obama - extol the virtues of self-employment and, in theory, as a viable option for persons with disabilities, blind and visually-impaired consumers, and returning veterans with battlefield-related disabilities.

As studies in this review indicate, it takes more than advocacy and hyperbole to improve the likelihood that the cases of blind and visually-impaired consumers will be closed through

self-employment. Some consumers may not be good candidates for self-employment if they prefer nonwork income supports to employment. And those who desire to start their own businesses may lack the entrepreneurial skills, marketable ideas, or personal resources to succeed without the support of both VR professional and small business development specialists.

VR professionals in particular need to know more about what works for whom under what circumstances in order to provide effective case management and support. What commitments at the agency level enable them to identify and meet their consumers' needs (e.g., in making financial and informational resources available, adoption of best practices used by states with the highest success rates, formal agreements for collaboration and joint resource leveraging with SBDCs)? What demographic, consumer work-attitudes, and service variables are correlated with successful self-employment and what are the interaction effects among those variables? And what kinds of professional development (or outside assistance) do VR professionals need in order to engage in evidence-based case management and service delivery? More research is needed to address the central research question directly: What are the determinants of self-employment case closures for VR consumers who are blind or visually-impaired?

Chapter 3: Method

The main purpose of this study was to identify determinates of self-employment outcomes among VR consumers who are blind or visually-impaired and of self-employed consumers' earnings at closure. I analyzed administrative records in the RSA911 from Fiscal (FY) 2008 through FY2012 to answer the following research questions.

1. What are the determinants of successful self-employment among blind and visually-impaired consumers of the state's VR agency at case closure? (a) Which personal characteristics are most likely to increase the odds that a consumer's case will be closed successfully through self-employment? (b) Which case services are most likely to increase the odds of self-employment at closure?

2. For blind and visually-impaired consumers whose cases were closed successfully through self-employment: (a) Which personal characteristics best predict earnings at closure? and (b) Which case service variables best predict earnings at closure?

Data Collection

The RSA collects information on all individuals who use public state/federal rehabilitation funds from the time of initial referral at application to their employment outcomes at case closure. The data are recorded in federally-prescribed administrative records for accountability and performance reporting called the RSA911. The RSA assigns codes for each demographic, service, and outcome variable. The codebook for the manual on the case service report for 2008 was used as a reference throughout this study. The same variable names and values were used during the entire FY2008 to FY2012 timeframe.

In the RSA reporting, a state-federal agency must be categorized as either "general/ combined" or "blind specific." In some states, a single agency serves individuals of all disability

types including those with vision impairments. In other states a separate agency serves those with visual impairments while another agency serves the balance of consumers with various other impairments. In Texas, consumers with vision impairments are referred specifically to the Division of Blind Services (DBS) within the Department of Assistive and Rehabilitative Services (DARS). This study examined only those consumers who were served by DBS in FY2008 through FY2012.

The 11 characteristics of consumers at application examined in this study are: age; gender; race; education at application; veteran status; diabetes as cause of primary impairment; presence of secondary disability; type of employment at application; types of public support received; primary source of support at application; and medical coverage at application.

The 22 case service variables were: assessment; diagnostics and treatment; vocational and guidance counseling; college/university training; occupational/vocational training; on-the-job training; basic academic remedial, or literacy training; job readiness training; disability-related augmentative skills training; job search assistance; job placement assistance; miscellaneous training; on-the-job support; transportation; maintenance; rehabilitation technology; technical assistance; information and referral; reader service; personal attendant services; interpreter; and other services.

Case Selection

This study used data for a five year period from the federal RSA911files respectively for FY2008 through FY2012. Each of the files includes cases that were closed in the specified year for all state and federal rehabilitation agencies in the United States. The following criteria were used to select cases for the study: (a) individuals whose primary disability was blindness or visual impairment; and (b) they were served by the Texas state-federal agency; i.e., the DBS (agency code = 104). Case selection also was limited to consumers who were between the ages of 18 and 65 at the time of application (select if 17 < age < 66). Outside of that range, consumers are not considered to be of "working age." Therefore no expectation of case closure through employment applies to them.

There were 13,992 cases in the data set extracted from the federal RSA911 files for FY2008 through FY2012 and selected for inclusion in this study. Only the subset of consumers whose cases were closed through self-employment was studied to answer research question two regarding predictors of their earning at closure.

Variables

The following variables were selected or constructed from data elements as defined in the FY2008 edition of the RSA911 codebook either as employment outcomes or predictor variables. A smaller subset was generated only for those whose cases were closed successfully through self-employment from FY2008 to FY2012. The following consumer characteristic variables at application were used in this study.

1. *Age at application*. Age is a continuous variable in the specialized-use files released age at application to authorized researchers. This variable was recoded into a categorical variable with Age group 1= 18-34, Age group 2= 35-44, Age group 3= 45-54, and Age group 4= 55-65.

2. *Gender.* Gender is a dichotomous variable with values in the RSA911 recoded to male = 1 and female= 0.

3. *Race.* To create non-overlapping race/ethnicity variables, the original data in the RSA were recoded in sequence. A new, temporary variable was created by summing the values of the recoded original race/ethnicity variable. The temporary variable thus contained a unique value for each possible combination or permutation of self-identifications. Five new dichotomous race/ethnicity variables were extracted from the temporary variable.

a. *White only.* Consumers who self-identified as white with no other self-identification = 1; else = 0.

b. *Black/African American only.* Consumers who self-identified as Black with no other self-identification = 1; else = 0.

c. *Asian.* Consumers who self identified as Asian with no other self-identification = 1; else = 0.

d. *White Hispanic or Latino.* None of the consumers self-identified exclusively as Hispanic/Latino. The vast majority who referred to themselves as Hispanic or Latino also self-identified as white and were coded as = 1; else = 0.

e. *Other racial/ethnic groups and other multiple self-identifications (Mixed)* were code as 1, else = 0. This category included small numbers who self-identified as *Hawaiian or Other Pacific Islander, American Indian or Native Alaskan* and any combination of self-identifications (including a small number who identified themselves as Hispanic/Latino plus black).

4. *Education at application.* The highest level of education attained by a consumer at application is reported in the RSA911 on an ordinal scale. The RSA911 values were recoded

with any consumer having less than a high school diploma = 0; high school diploma or GED = 1; postsecondary education, no degree =2; Associate's degree or postsecondary vocational/ technical certification = 3; Bachelor's degree = 4; and Master's degree or higher = 5.

5. *Veteran.* Veteran status is recorded in the RSA911 as a dichotomous variable with consumers who are veterans = 1, else 0.

6. *Diabetes as cause of primary disability*. This cause of primary impairment was recoded into a dichotomous variable (Diabetes =1, else 0).

7. *Presence of a secondary disability*. This variable indicates whether or not the consumer has a disability that is an impediment to employment in addition to being blind or visually impaired. Separate values are used in the RSA911 to record the specific nature of impairments. I created a dichotomous variable, presence of secondary disability, with 1 = yes and 0 = no.

8. *Employment status at application.* The RSA911 provides eleven categories for recording type of employment at application. Three categories of employment at application are defined operationally as "competitive" for the purpose of this study: employed without supports in an integrated setting (value = 1); self-employed other than BEP (recode value 3 = 2); state-managed Randolph-Sheppard Business Enterprise Program (recode value 4 = 3). Four categories of employment, for the purpose of this study are considered "not competitive." Those four (homemaker, employment with support in integrated setting, extended employment and unpaid family worker) were collapsed into a single category employed/not competitive (recode value 2, 5, 6, and 7 = 4). Note that treating employment with support in an integrated setting (value = 7) as "not competitively employed" differs from the RSA911 codebook which provides directions for recording them as "competitively employed at closure."

a. *Self-employed at application.* A separate dichotomous variable was created by using <Transform> <Recode into another variable> to distinguish consumers who were self-employed at application (recode value 3 = 1) from all other consumers (else = 0).

b. *Students or otherwise engaged in training at application.* Consumers who were students, interns, or volunteers at application are classified in the RSA911 as "unemployed" along with consumers that were unemployed for other reasons. To determine if the odds of closure through self-employment differ for students versus other types of consumers who were unemployed at application, I created a new dichotomous variable using <Transform> <Recode into different variable>. Values 8, 9 and 10 for type of employment at application were recoded as 1 in Student at application; else = 0.

9. *Types of public supports*

a. *Supplemental Security Income at application*. This is a dichotomous variable in the RSA911 with those consumers receiving SSI = 1, else 0.

b. *Temporary Assistance for Needy Families at application*. This is a dichotomous variable in the RSA911 with those consumers receiving TANF = 1, else 0.

c. *General (state or local) assistance at application*. This is a dichotomous variable in the RSA911 with those consumers receiving general assistance = 1, else 0.

d. *Social Security Disability Insurance benefit at application.* This is a dichotomous variable in the RSA911 with those consumers receiving SSDI = 1, else 0.

e. *Veterans' Disability benefits at application*. This is a dichotomous variable in the RSA911 with those consumers receiving Veterans' Disability benefits = 1, else 0.

f. *Workers' compensation benefits at application*. This is a dichotomous variable in the RSA911 with those consumers receiving workers' comp = 1, else 0.

g. *Other public support at application*. This is a dichotomous variable in the RSA911 with those consumers receiving any other type of public support = 1, else 0.

10. *Primary source of support at application.* This categorical variable in the RSA911 records primary source of support at application in one of four categories: personal income; family and friends; public support; and other. Insofar as one source (personal income) represents a degree of financial independence at application, this variable was recoded dichotomously with Personal income = 1, else = 0.

11. *Medical insurance coverage.* In the RSA911 these data are coded in a series of dichotomous variables.

a. *Medicaid at application*. Coded as consumers covered by Medicaid = 1, else 0.

b. *Medicare at application.* Coded as consumers covered by Medicare = 1, else 0.

c. *Other public medical insurance at application*. Coded as consumers covered by other public medical insurance = 1, else 0.

d. *Private medical insurance through own employer at application*. Coded as consumers covered by private medical insurance through their own employer = 1, else 0.

e. *Other private medical insurance at application.* Coded as consumers covered by other types of private medical insurance = 1, else 0.

Types of case services provided are recorded in the RSA911 as a series of dichotomous variables since each consumer receives an individually tailored mix that best meets his or her specific needs. The following case service variables were selected for this study.

1. *Assessment.* Recoded as received = 1, did not receive = 0.

2. *Diagnosis and treatment (of an underlying impairment).* Recoded as received = 1, did not receive = 0.

3. *Vocational rehabilitation counseling and guidance* is defined in the codebook as discrete therapeutic counseling and guidance services necessary to achieve an employment outcome. This service category includes but is not limited to counseling for personal adjustment and family, medical, or social issues. Recoded as received = 1, did not receive = 0.

4. *College or university training* includes full-time or part-time academic training above the high school level leading to a degree a certificate or other recognized educational credential. Recoded as received = 1, did not receive = 0.

5. *Occupational vocational training* includes job skill training provided by a community college and/or business, vocational/trade or technical school to prepare students for gainful employment in a recognized occupation, not leading to an academic degree or certification. Recoded as received = 1, did not receive = 0.

6. *On-the-job training* (OJT) refers to training in specific job skills by a prospective employer at the workplace. Generally the individual is paid during this training and will remain in the same or a similar job upon successful completion. Recoded as received = 1, did not receive = 0.

7. *Basic academic-remedial or literacy training* is a dichotomous variable that refers to remedial or literacy training for basic academic skills necessary to perform on the job. Recoded received=1, did not receive= 0

8. *Job readiness training* refers to generalized training to prepare an individual for the world of work (e.g., appropriate work behaviors such as getting to work on time, and appropriate attire or grooming). Recoded as received = 1, did not receive = 0.

9. *Disability related augmentative skills training* includes but is not limited to: orientation and mobility (O&M); use of low vision aids; and Braille. Recoded as received = 1, did not receive = 0.

10. *Miscellaneous training* means services not covered in any category above. Recoded as received = 1, did not receive = 0.

11. *Job search assistance* includes but is not limited to resume preparation, identifying appropriate job opportunities, developing interview skills, and making contacts with companies on behalf of the consumer. Recoded as received = 1, did not receive = 0.

12. *Job placement assistance* is a referral to a specific job resulting in an interview, whether or not the individual obtained the job. Recoded as received = 1, did not receive = 0.

13. *On-the-job supports* are provided to a consumer who has been placed in employment in order to stabilize the placement and enhance job retention. Such services include: job coaching; follow-up and follow-along with the consumer, coworkers and/or supervisor(s); and job retention services. Recoded as received = 1, did not receive = 0.

14. *Transportation services* include adequate training in the use of public transportation and travel-related expenses necessary to enable a consumer to participate in a VR service. Recoded as received = 1, did not receive = 0.

15. *Maintenance* includes monetary support provided for such items as food, shelter and clothing (in excess of the normal expenses of the individual) as are necessary for the individual's participation in an assessment for determining eligibility and VR needs or while receiving services under an IPE. Recoded as received = 1, did not receive = 0

16. *Rehabilitation technology* means the systematic application of technologies, engineering methodologies, or scientific principles to meet the needs of, and address the barriers confronted

by, consumers in areas that include education, rehabilitation, employment, transportation, independent living, and recreation. Recoded as received = 1, did not receive = 0.

17. *Technical assistance* means employment-related services received from specialists outside the VR agency. Technical assistance includes business plan development and review or commercial viability analysis by a SBDC or from the SCORE. Recoded as received = 1, did not receive = 0.

18. *Information and referral services* means sending the consumer to another entity (e.g., an SBDC or SCORE) or obtaining information from another agency on the consumer's behalf. Recoded as received = 1, did not receive = 0.

19. *Reader services* refer to the provision of a reader to assist the consumer with written materials. Recorded in the RSA911 as received = 1, did not receive = 0.

20. *Interpreter services refer* to the provision of assistance to the consumer with translation of materials in English to another language. Recorded in the RSA911 as received = 1, did not receive = 0.

21. *Personal attendant services refer* to providing assistance to the consumer with physical activities. Recorded in the RSA911 as received = 1, did not receive = 0.

22. *Other services* includes providing a consumer tools and equipment essential to work as well as initial stock and supplies for a new business started by a consumer who becomes self-employed. Recoded as received = 1, did not receive = 0.

The outcome variables of chief interest in this study are: self-employment at closure, earning at closure and total income at closure. Other outcome variables will be used to help compare returns on investments in case services across various strategies and service populations.

1. *Self-employment at closure* was computed from the employment status at closure variable with those who were self-employed (value = 3) were coded as 1; else 0. The calculated values for this variable are consistent with those used to code self-employment at application.

2. *Weekly earnings at closure* like weekly earnings at application, is a continuous variable. The field is four characters wide with no decimals. Values ≥ $9,999 were recorded as $9,999.

Data Analysis Methods

The Statistical Package for the Social Science (SPSS) version 20 was to analyze data in this study. The first step was to run descriptive statistics (including frequencies, means, medians and standard deviations) and to identify any outliers for each variable. Based on that output, some variables were recoded into dichotomous or categorical variables. After recoding and data transformations, the 11 consumer characteristic increased to 24 variables. In addition, there were 22 case service variables resulting in a total of 46 predictor variables. (See Appendix B.)

For the purpose of logistic regression the variables were recoded to 1 for the membership group or response group and 0 for the non- membership group or reference group. (Tabachnick & Fidell, 1996)

Descriptive statistics revealed that response values for the case service variables ranged from 0.2% to 60.8%. Because less than 10% of the cases were closed successfully through self-employment, it is logically possible that those consumers who became self-employed were disproportionately likely to receive some of the case services with overall low response values among the entire consumer population. Therefore, all the case service variables were retained for initial analysis.

Logistic regression was used to answer the following research questions regarding VR consumers who are blind or visually-impaired:

1. Which personal characteristics are most likely to increase the odds that a consumer's case will be closed successfully through self-employment?
2. Which case services are most likely to increase the odds of self-employment at closure?

Multiple regression was used to answer the following research questions regarding blind or visually-impaired VR consumers whose cases were closed successfully through self-employment.

1. Which personal characteristics best predict earnings at closure?
2. Which case service variables best predict earnings at closure?

Multiple regression and logistic regression are multivariate techniques that allow for analysis of each independent variable's impact on a dependent variable while holding other predictor variables in the model constant.

Logistic regression was used where the dependent variable (successful case closure through self-employment) is dichotomous. Logistic regression allows for the calculation odds ratios. Odds ratios can be used to determine how two consumers who are the same on all but one variable will differ on the basis of that one variable (Tate, 1998; Hosmer & Lemeshow, 1989). An odds ratio is a measure of association and is the parameter of interest in logistic regression because it is easy to interpret. An odds ratio greater than 1 for an independent variable indicates that a person who exhibits a characteristic will obtain the desired outcomes (i.e., successful employment at case closure) are greater than for a consumer who does not exhibit that characteristic. The *p* values, the Wald statistic and the odds ratios for the predictor variables were used to determine the significance of the logistic regression model of self-employment outcomes. The Wald statistic compares the maximum likelihood estimate of the slope parameter to the

estimate of its standard error. The larger the Wald statistic, the more impact the covariate has on the logistic model (Hosmer & Lemeshow, 1989).

Multiple regression is used when the dependent variable is ordinal, interval, or ratio. This method allows both categorical and continuous variables to be used as independent predictor variables. Multiple regression allows a researcher to regress a dependent variable on multiple independent variables. In a multiple linear regression model, the residuals of each observation results from the difference between the observed and the fitted models. For multiple regression to be valid, several assumptions should be met: (a) linearity, i.e., where errors are independent of each other; (b) no outliers; and (c) observations are normally distributed. The Durbin Watson estimate was used to determine if the data points were independent where estimates will range from 0 to 4. Values closer to 0 suggests a strong positive relationship and values closer to 4 suggest a strong negative relationship. Durbin Watson closer to 2 will indicate that the data points are independent (Seber, 1977; Stevens, 2009).

Chapter 4: Results

I analyzed administrative records in the RSA911 from FY 2008 through FY2012 to answer two research questions.

1. What are the determinants of successful self-employment among blind and visually-impaired consumers of the state's VR agency at closure? (a) Which personal characteristics are most likely to increase the odds that a consumer's case will be closed successfully through self-employment? (b) Which case services are most likely to increase the odds of self-employment at closure?

2. For blind and visually-impaired consumers whose cases were closed successfully through self-employment: (a) which personal characteristics best predict earnings at closure? and (b) Which case services best predict earnings at closure?

Research Question One

Descriptive statistics for 13,992 cases in the original file show that 24 were missing earnings data and six had outliers (i.e., yearly wages > $250,000). Cases with missing data or outliers were filtered from the data set before doing further analyses resulting in $N = 13,962$. Of those 13,962 consumers, 7,421 (53.2%) were male and 6,541 (46.8%) were female. Thirty-nine percent of those consumers identified themselves as Hispanic/white and 37% self-identified as white only. Fifty-one percent had a secondary disability. At application, 44% were competitively employed. Moreover, 5.6% of competitively employed consumers were self-employed at application. Twelve percent of the consumers were receiving SSI; 19% were receiving SSDI at application; and 10.1% were covered by private insurance through their own employer.

The VR agency provided consumers a variety of case services. Sixty-one percent received assessments. Forty-nine percent received diagnosis and treatment for an impairment;

35.9% received vocational rehabilitation counseling and guidance; 35.5% received disability augmentative training; 24.9% received some form of rehabilitation technology; 22.7% received transportation assistance; 20.5% received information from or were referred to another agency or provider for additional services; and 13.4% received other services (e.g., license fees, tool, initial stock and supplies). A relatively small number of consumers received the following: on the job training (2.3%); job readiness training (3.5%); reader services (1.8 %); interpreter services (1.0%); and personal attendant services (0.2%).

Table 3

Pre-Service Variables of Interest for Predicting Self-Employment at Closure

Consumer Demographics & Characteristics	Number	Percent
Gender (Male)	7,421	53.2%
Age by group		
18-34	3,215	23.0%
35-44	2,582	18.5%
45-54	4,336	31.1%
55-65	3,829	27.4%
Racial/ethnic self identification		
White Only	5,203	37.2%
Hispanic-White	5,515	39.4%
Black-Only	2,943	21.0%
Asian-Only	162	1.2%
All other race/ethnicity mixes	139	1.2%
Veteran	525	3.8%
Diabetes as cause of impairment	2,378	17.0%
Secondary impairment	7,150	51.2%
Competitively employed at application	6,187	44.3%
Self-employed at application	777	5.6%
Student or other training at application	622	4.5%

Table 3 Continued

Consumer Demographics & Characteristics	Number	Percent
Education level at application		
Less than HS diploma or GED	3,575	25.6%
HS diploma or GED	4,974	35.6%
Some postsecondary, no award or degree	2,661	19.1%
Associate's degree or VoTech certificate	1,209	8.7%
Master's degree or higher	438	3.1%
Types of public assistance or benefits received at application		
SSI	1,673	12.0%
TANF	279	2.0%
General (state/local) assistance	245	1.8%
SSDI	2,669	19.1%
Veterans' Disability	62	0.4%
Workers' Compensation	53	0.4%
Other public assistance	809	5.8%
Type of insurance coverage at application		
Medicaid	1,523	10.9%
Medicare	1,972	14.1%
Other public insurance	10	0.1%
Private insurance through own employer	1,413	10.1%
Other private insurance at application	1,018	7.3%

Table 4

Case Service Variables of Interest for Predicting Self-Employment at Closure

Case services received and post-closure characteristics	Number	Percent
Assessment	8,503	60.8%
Diagnosis & treatment of an impairment	6,905	49.4%
VR counseling and guidance	5,018	35.9%
College or university training	718	5.1%
Occupational/vocational training	467	3.3%
On-the-job training	317	2.3%

Table 4 Continued

Case services received and post-closure characteristics	Number	Percent
Basic academic, remedial or literacy training	154	1.1%
Job-readiness training	488	3.5%
Disability augmentative training	4,969	35.56%
Miscellaneous training	1,353	9.7%
Job search assistance	668	4.8%
Job placement assistance	600	4.3%
On-the-job supports	216	1.5%
Transportation assistance	3,181	22.8%
Maintenance	1,869	13.4%
Rehabilitation technology	3,476	24.9%
Reader services	247	1.8%
Interpreter services	138	1.0%
Personal attendant services	28	0.2%
Technical assistance	982	7.0%
Information and referral	2,857	20.5%
Other services (e.g., license fees, tools, initial stock & supplies)	1,869	13.4%

Using the regression diagnostics function in SPSS, none of the 46 consumer demographic/pre-service characteristics and case service variables/post-service characteristics in the correlation matrix had a variance inflation factor > 5. Therefore, none of the variables had to be deleted from the analysis because of multicollineary.

However, nine consumer characteristic variables with valid percentages greater than 90% or more in a referent group were excluded from the logistic regression model: (a) veteran status; (b) student or in other training at application; (c) received TANF at application; (d) received general (state/local) assistance at application; (e) received Veterans' Disability benefits at application; (f) received Workers' Compensation at application; (g) received other public assistance at application; (h) covered under other private insurance at application; and (i) covered by other public insurance at application.

Based on the same criteria, twelve case service variables were excluded from the logistic regression model: (a) college or university training; (b) occupational/vocational training; (c) on-the-job training; (d) basic academic, remedial or literacy training; (e) job-readiness training; (f) miscellaneous training; (g) job search assistance; (h) job placement assistance; (i) on-the-job supports; (j) interpreter services; (k) reader services; and (l) personal attendant services.

Only 5.6% of the consumers were self-employed at application and only 7.0% received technical assistance (which can include business plan reviews and market analysis by subject matter experts outside the VR agency). Neither variable was removed from the model based on their theoretical importance. Policy guidelines for case services indicate that a permissible service objective is to help those who are already self-employed to sustain or increase their earnings (Arnold & Ipsen, 2005). The guidelines and the literature indicate that business planning and market analysis (forms of technical assistance) are critically important to successful self-employment. Including those two factors, 25 variables were used in the logistic regression model.

Logistic regression model of self-employment outcomes

I analyzed 13,962 cases using 15 consumer demographic/pre-service characteristics and ten case service variables in a logistic regression model. Of the 25 variables, three consumer demographic/pre-service characteristics were statistically significant predictors of consumers' odds of self-employment at closure ($p < .01$). Four case service variables were statistically significant predictors of consumers' odds of successful case closure through self-employment.

Based on the Wald statistic, the seven covariates that showed significant impact in the logistic model of self-employment at closure in descending order were: (a) being self-employed at application, Wald = 1215.28; (b) being assessed, Wald = 81.78; (c) being 55 to 65, Wald = 74.07; (d) being diagnosed and treated for an impairment, Wald = 56.68; (e) receiving some form of rehabilitation technology, Wald = 14.28; (f) receiving some form of technical assistance, Wald = 12.28; and (g) gender (male), Wald = 11.30.

Independent variables which yield odds ratios of two or more generally are considered strong predictors of outcomes. Consumers who were self-employed at application were 50 times more likely than other consumers to be self-employed at closure. Consumers who received assessments were five times more likely to be self-employed at closure than those who were not assessed. Those consumers who were 55 to 65 were five times more likely to be self-employed at closure. Those receiving diagnosis of and treatment for impairments were three times more likely to be self-employed at closure. Both those receiving some form of technical assistance and those receiving some form rehabilitation technology were almost twice as likely to have their cases closed successfully through self-employment. Males were 1.37 times more likely than females to be self-employed at closure. On the other hand, those consumers without a secondary disability were seven times more likely to be self-employed at closure.

Table 5

Results for the Logistic Regression Model of Self-Employment Outcomes

Variable	Wald	Significance	Exp (*B*)
Gender (i.e., males)	11.30	$p \leq .001$	1.37
Self-employed at application	1215.28	$p < .001$	50.37
Age Group 55 to 65	74.07	$p < .001$	4.57
Assessment	81.78	$p < .001$	4.96
Diagnosis and treatment of an impairment	56.68	$p < .001$	2.77
Rehabilitation technology	14.28	$p < .001$	1.56
Technical assistance	12.28	$p < .001$	1.63

The Nagelkerke R square of .435 obtained for the logistic regression indicates that nearly 44% of the variance in consumers' self-employment outcomes was explained by the model. The Hosmer and Lemeshow goodness of fit chi-square had a value of 23.948 which indicates that the model's goodness of fit is statistically significant ($p \leq .002$).

Research Question Two

For the FY2008 to FY2012 timeframe, 799 of the 13,962 consumers whose cases were analyzed to answer research question one were self-employed at closure. After one outlier was deleted, 798 consumers' cases were analyzed to answer research question two based on their reported weekly earnings at closure. Weekly earnings at closure across all fiscal years in the study's timeframe ranged from a low of $9.00 to $3,488.00 with a mean of $326.45. Weekly hours worked ranged from one hour to 70 hours with a mean of 24.15 hours per week. The mean wage was computed as $13.51 per hour. A comparison was done of average hourly wages to the prevailing minimum wage by fiscal year for blind and visually-impaired consumers who were

self-employed at closure. While the minimum wage went up at several points during this timeframe, blind and visually-impaired consumers who were self-employed consistently earned twice the minimum hourly wage on average at closure.

Table 6

Self-Employed Consumers' Earnings at Closure Compared to Minimum Wage by Fiscal Year

Fiscal Year	Average earnings/wk.	Average hours worked/wk.	Average hourly wage	Prevailing min. wage/hour	Percent of minimum wage
2008	266.93	24.07	$11.09	$5.85	190%
2009	323.58	25.01	$12.94	$6.55	200%
2010	372.75	25.24	$14.77	$7.25	200%
2011	355.64	23.73	$14.99	$7.25	210%
2012	326.11	22.90	$14.24	$7.25	200%

All selected cases closed through self-employment were saved as a separate data set for analysis to answer the second research question. That is, what are the best predictors of earnings at closure for blind and visually-impaired consumers who were self-employed at closure?

According to the RSA codebook, case managers enter $999 for any consumer whose weekly earnings at closure are greater than or equal to $999. In examining the frequency distribution for that dependent variable, I found one consumer whose weekly earnings at closure were coded as $999. I treated that case as an outlier and deleted it from the data set used to answer research question two, resulting in $N = 798$.

Those data included: 485 males (61%) and 313 females (39 %). Forty-six percent identified themselves as white only and 40.9 percent self-identified as White + Hispanic. Consumers who were 55 to 65 comprised 43% of the data set followed by: 45 to 54 years old

(33%); 35 to 44 (17%); and 18 to 34 (7%). Fifty percent of the consumers who were self-employed at case closure had a secondary disability. Sixty-two percent had been competitively employed at application. Moreover, 51% had been self-employed at application. Fifty-four percent had earned no more than a high school diploma or a GED. At application, ten percent were receiving SSI and 25% were receiving SSDI.

Blind or visually-impaired consumers who were self-employed at closure had received a variety of case services: (a) 93% were assessed; (b) 83% were diagnosed and treated for an impairment; (c) 55% received vocational counseling and guidance; (d) 55% received disability augmentative training; (e) 45% received some form of rehabilitation technology; (f) 34% received transportation assistance; (g) 31% received information from or referral to another agency or outside service provider; (h) 21% received other services (e.g., license, tools, stock, supplies); and (i) 17% received some form of technical assistance.

Table 7

Pre-Closure Variables of Interest for Predicting Earnings at Closure

Consumer demographics and pre-closure characteristics	Frequency	Percent
Gender (Male)	485	60.8%
Racial/ethnic self-identification		
White only	364	45.6%
Hispanic + white	327	40.9%
Black only	94	11.8%
Asian only	9	1.1%
Other race/ethnicity or mixes	4	0.6%
Veteran	35	4.4%
Diabetes as cause of impairment	170	21.3%
Secondary impairment	397	49.7%
Competitively employed at application	84	10.6%
Self-employed at application	409	51.3%
Student or in other training at application	16	2.0%

Table 7 Continued

Consumer demographics and pre-closure characteristics	Frequency	Percent
Type of public assistance or benefits received at application		
SSI	83	10.4%
TANF	7	0.9%
General (state/local) assistance	6	0.8%
SSDI	198	24.8%
Veterans' Disability benefits	7	0.9%
Workers' Compensation	1	0.1%
Other public assistance	1	0.1%
Type of insurance coverage at application		
Medicaid	57	7.1%
Medicare	153	19.2%
Other public insurance	0	0.0%
Private insurance through own employer	39	4.9%
Private insurance, other	68	8.5%
Education level at closure		
Less than HS	218	27.3%
HS or GED	217	27.2%
Some postsecondary	167	20.9%
Associate's degree or vocational/technical certificate	72	9.0%
Bachelor's degree	81	10.1%
Master's degree or higher	43	5.4%

Table 8

Case Service Variables of Interest for Predicting Earnings at Closure

Case services received	Number	Percent
Assessment	740	92.7%
Diagnosis & treatment of an impairment	658	82.5%
VR counseling and guidance	444	55.6%
College or university training	37	4.6%
Occupational/vocational training	41	5.1%
On-the-job training	6	0.8%

Table 8 Continued

Case services received	Number	Percent
Basic academic, remedial or literacy training	4	0.5%
Job-readiness training	23	2.9%
Disability augmentative training	438	54.9%
Miscellaneous training	108	13.5%
Job search assistance	34	4.3%
Job placement assistance	18	2.3%
On-the-job supports	15	1.9%
Transportation assistance	274	34.3%
Maintenance	165	20.7%
Rehabilitation technology	362	45.4%
Reader services	14	1.8%
Interpreter services	3	0.4%
Personal attendant services	1	0.1%
Technical assistance	137	17.2%
Information and referral	247	31.0%
Other services (license fees, tools, or initial stock and supplies)	167	20.9%

Using the regression diagnostics function in SPSS, none of the independent variables in the matrix were found to have a Variance Inflation Factor (VIF) > 5. Therefore, no variables were removed from the regression model used to answer research question two. I also examined variables to determine if any had values of 90% or more in a reference group. The following consumer characteristic variables were removed on that basis: (a) veteran status; (b) student or in other training at application; (c) received TANF at application; (d) receiving general assistance at application; (e) received Veterans' Disability benefits at application; (f) received Workers' Compensation at application; (g) received other public assistance at application; (h) covered by Medicated at application; (i) covered by other public insurance at application; (j) covered by

private insurance through own employer at application; and (k) covered by other private insurance at application.

The consumers who were self-employed at closure had received a variety of services. Some case service variables were deleted because the percentages in a reference category exceeded 90%: (a) assessment; (b) college or university education; (c) vocational or technical training; (d) on-the-job training; (e) basic academic, literacy or remedial training; (f) job readiness training; (g) job search assistance; (h) job placement assistance; (i) on-the-job-support; (j) reader services; (k) interpreter services; and (l) personal attendant services.

Multiple linear regression model of self-employed consumers' earnings

The following 16 consumer characteristics were entered into a multiple linear regression model: (a) gender; (b) age; (c) five racial/ethnicity self-identifications; (d) diabetes as the cause of disability; (e) presence of secondary disability; (f) competitively employed at application; (g) self-employed at application; (h) education level at closure; (i) received SSI at application; (j) received SSI at application; and (k) received Medicare at application.

Ten case service variables were entered into the regression model. The following case service variables were kept because they had less than 90% in the reference group: (a) diagnosed and treated for an impairment; (b) received vocational rehabilitation counseling; (c) received disability augmentative training; (d) were provided some sort of rehabilitation technology; (e) received transportation assistance; (f) received information from or were referred to an entity outside of DBS for services; (g) received maintenance; (h) received technical assistance; (i) received miscellaneous training; and (j) received other services (e.g., license fees, tools, initial stock and supplies).

Multiple linear regression was used to answer research question two; i.e., to determine which of the 16 consumer demographic variables and ten case service variables were significantly related to weekly earnings for those whose cases were closed to self-employment. From the original set of 13,968 cases, 798 were used to answer research question two after cases were omitted based on low frequencies, missing key data or outliers.

The model summary showed the Durbin-Watson statistic = 2.02. That indicates there is no correlation among residuals in the regression model. Based on the *R*-square value, 13% of variance in weekly earnings for self-employment consumers was explained by the 26 consumer demographic/pre-service characteristics and case service variables.

Of the 16 consumer characteristics, two were statistically significant predictors of weekly earnings for self-employment case closure: gender ($p < .001$); and being self-employed at application ($p < .001$). Among the consumer characteristics, being self-employed at application had the highest correlation with weekly earnings of those who were self-employment case closure. On average, those who were self-employed at application earned $118 more per week at closure than other consumers whose cases were closed through self-employment (95 CI $70.68 to $164.72). Men earned $119.51 per week on average than females who were self-employed at closure (95 CI 73.62 to 165.40).

Table 9

Results for Linear Regression Model of Earnings at Closure

Variable	Unstandardized coefficient B	Standardized (β)	Lower Boundary	Upper Boundary
Gender*	119.51	.174	73.62	165.40
Self-employed at application*	117.70	.176	70.68	164.72
Rehabilitation technology*	79.07	.117	20.91	137.09

*$p < .01$.

Only one of the case service variables was a statistically significant predictor of weekly earnings for among blind and visually-impaired consumers who were self-employed at closure; i.e., received some form of rehabilitation technology ($p \leq .008$). On average, consumers who received some form of rehabilitation technology earned $79.07 more per week than those who did not receive technical assistance (95 CI 20.91 to 137.09).

Subpopulations of consumers who were self-employed at closure. Because self-employment at application was the strongest predictor of earnings at closure, additional analysis was done to determine if there were significant differences between consumers grouped by type of employment at application in terms of earnings at closure. To do this analysis, a new variable (app_emp_grp) was created by combining categories in employment at application for the 798 consumers who were self-employed at closure: 0 = Unemployed (for any reason), homemaker and unpaid family member; 1 = self-employed; and 2 = employed in an integrated setting without supports. Five cases were disregarded: 1 who was employed in a BET facility at application; and 4 consumers who were either employed in an integrated setting with supports or in extended employment. The resultant working file was comprised of 793 cases.

Table 10

Consumers Self-Employed at Closure by Employment Type at Application

Employment at application	N	%
0 Unemployed, homemaker or unpaid family member	300	37.8%
1 Self-employed	409	51.6%
2 Employed in an integrated setting, no supports	84	10.6%
Total	793	100%

A comparison of means showed significant differences in weekly earnings at closure between the three groups of consumers whose case were closed successfully through self-employment.

Table 11

Differences in Means between Groups for Weekly Earnings at Closure

Weekly earnings at closure*	Unemployed, homemaker, and unpaid family	Self-employed	Employed, integrated no supports	Grand mean	df	F	Sig. p <
Mean earnings	$265.41	$380.87	$277.69	$326.76	2	11.477	.001

* $N = 793$

Crosstabulations were done using employment group at application in columns and several demographic in row to determine if, and on what factors, composition of the three groups of consumers who were self-employed at closure was significantly different. The groups' composition was significantly different (Pearson's χ^2 had $p < .05$) on five variables: (a) age at application; (b) self-identified as any reference to Black; (c) self-identified as any reference to White; (d) received SSDI at application; and (e) received SSI at application. Tables 12 through 16 show how the composition of the three groups differ.

Table 12

Age at Application among Consumers Grouped by Employment Type at Application

Age at Application*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
18 to 34	10.3%	3.4%	10.7%	6.8%
35 to 44	19.0%	15.2%	21.4%	17.3%
45 to 54	35.3%	32.8%	31.0%	33.5%
55 or more	35.3%	48.7%	36.9%	42.2%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 25.096$; $df = 6$; Asymp. significance ≤ .001

Table 13

Self-Identified as Black among Consumers Grouped by Employment Type at Application

Self-identified as Black*	Unemployed, homemaker or unpaid family member	Self-employed	Employed integrated no supports	Row total %
Black, African American	17.3%	9.0%	8.3%	12.1%
Other	82.7%	91.0%	91.7%	89.7%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 12.462$; $df = 2$; Asymp. significance ≤ .002

Table 14

Self-Identified as White among Consumers Grouped by Employment Type at Application

Self-identified as White*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
White	81.7%	90.0%	91.7%	87.0%
Other	18.3%	10.0%	8.3%	13.0%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 12.373$; $df = 2$; Asymp. significance ≤ .002

Table 15

SSDI Recipients among Consumers Grouped by Employment Type at Application

Received SSDI at application*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	32.7%	21.0%	14.3%	24.7%
No	67.3%	79.0%	85.7%	75.3%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 18.094$; $df = 2$; Asymp. significance < .001

Table 16

SSI Recipients among Consumers Grouped by Employment Type at Application

Received SSI at application*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	16.0%	7.1%	7.1%	10.5%
No	84.0%	92.9%	92.9%	89.5%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 15.761$; $df = 2$; Asymp. significance < .001

Crosstabulations also were done using employment group at application in columns and several case service variables in rows to determine if the mix of services provided to the three groups of consumers were significantly different (Pearson's χ^2 had $p < .05$). Tables 17 through 24 show the eight variables on which the groups' differed significantly in the types of services they were provided: (a) provided diagnosis & treatment; (b) disability augmentative services; (c) vocational rehabilitation counseling; (d) miscellaneous training; (e) maintenance; (f) transportation services or assistance; (g) other services such as license fees, tools, initial stock or supplies; and (h) information from or referral to another provider.

Table 17

Consumers by Employment Type at Application who were Provided Diagnosis & Treatment

Provided diagnosis & treatment*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	78.3%	84.6%	86.9%	82.5%
No	21.7%	15.4%	13.1%	17.5%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 5.974$; $df = 2$; Asymp. significance $\leq .05$

Table 18

Consumers by Employment Type at Application who were Provided Disability Augmentative Services

Provided disability augmentative services*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	60.3%	49.4%	61.9%	54.9%
No	39.7%	50.6%	38.1%	45.1%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 10.256$; $df = 2$; Asymp. significance $\leq .006$

Table 19

Consumers by Employment Type at Application who were Provided Vocational Rehabilitation Counseling

Provided voc. rehabilitation counseling*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	62.3%	48.7%	64.3%	55.5%
No	37.7%	51.3%	35.7%	44.5%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 16.055$; $df = 2$; Asymp. significance $< .001$

Table 20

Consumers by Employment Type at Application who were Provided Miscellaneous Training

Provided miscellaneous training*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	18.0%	10.3%	14.3%	13.6%
No	82.0%	89.7%	85.7%	86.4%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 8.828$; $df = 2$; Asymp. significance $\leq .012$

Table 21

Consumers by Employment Type at Application who were Provided Maintenance

Provided maintenance*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	28.7%	12.5%	29.8%	20.4%
No	71.3%	87.5%	70.2%	79.6%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 32.965$; $df = 2$; Asymp. significance $< .001$

Table 22

Consumers by Employment Type at Application who were Provided Transportation Services or Assistance

Provided transportation service/assistance*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	42.0%	25.7%	48.8%	34.3%
No	58.0%	74.3%	51.2%	65.7%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 29.252$; $df = 2$; Asymp. significance $< .001$

Table 23

Consumers by Employment at Application who were Provided Other Services (e.g., license fees, tool, initial stock and/or supplied)

Provided other services (license, tools, Stock or supplies)*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	29.3%	15.4%	17.9%	20.9%
No	70.7%	84.6%	82.1%	79.1%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 20.826$; $df = 2$; Asymp. significance < .001

Table 24

Consumers by Employment Type at Application who were Provided Information & Referral

Provided information from or referral to another provider*	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Row total %
Yes	37.3%	25.7%	34.5%	31.0%
No	62.7%	74.3%	65.5%	69.0%
Column total %	100.0%	100.0%	100.0%	100.0%

*$N = 793$, $\chi^2 = 11.536$; $df = 2$; Asymp. significance < .001

Variables for which consumers who were self-employed at closure were in the 90% reference group but for which composition of employment at application groups did not differ significantly at $p < .05$ on Pearson's χ^2 in the crosstabulations: education at application; gender; self-identified Hispanic, diabetes as primary cause of disability; presence of a secondary disability; provided assessment; provided rehabilitation technology; and provided technical assistance.

Mean wages at closure were compared for each group of consumers to determine if they varied significantly by the type of case services they received. Case services where the means were significantly different ($p < .05$) are shown in Tables 25 and 26.

Table 25

Significantly Different Mean Weekly Earnings for Self-Employed at Closure who were Unemployed, Homemakers, or Unpaid Family Members at Application

Case service provided?*	No	Yes	Grand mean	*df*	F	Significance
Diagnosis and treatment	$363.05	$238.40	$265.41	1	9.869	p = .002
Rehabilitation technology	$200.73	$333.62	$265.41	1	16.888	p < .001
Technical assistance	$228.43	$410.28	$265.41	1	20.757	p < .001

*N= 300

Table 26

Significantly Different Mean Weekly Earnings at Closure for Self-Employed Consumers who were Self-Employed at Application

Case service provided?*	No	Yes	Grand mean	Df	F	Significance
Information and referral	$354.91	$456.01	$380.87	1	5.567	p = .019
Maintenance	$364.84	$493.35	$380.87	1	5.140	p = .024
Rehabilitation technology	$336.20	$443.04	$380.87	1	7.973	p < .005
Transportation assist./services	$345.90	4482.11	$380.87	1	10.222	p < .001

*N = 409

Note that mean weekly earnings at closure did not differ significantly by any of the case services provided to the group of consumers who were employed in an integrated setting without supports at application ($N = 84$).

Mean weekly earning at closure also were compared by several continuous variables across the three sets of consumers grouped by employment at application. Table 27 shows seven variables on which mean earnings at closure differed significantly across the three groups of consumers whose case were closed successfully through self-employment: (a) cost of purchased

services; (b) months served; (c) number of services provided; (d) weekly earnings at application; (e) change in weekly earnings; (f) annualized ROI for change in weekly earnings; (g) hours worked per week at closure; and (h) change in hours worked per week.

Table 27

Significant Differences in Intervening Variables

Variable	Unemployed, homemaker or unpaid family member	Self-employed	Employed, integrated no supports	Grand mean	Difference in means between groups df	F	Sig. p <
Cost of purchased services	$10,865	$7,383	$11,951	$9,190	2	16.572	.001
Months consumer was served	27.88	15.13	27.30	21.24	2	55.195	.001
Number of service provided	5.60	4.31	5.48	4.92	2	30.087	.001
Weekly earnings at application	$0.51	$323.17	$355.99	$204.58	2	129.082	.001
Change in weekly earnings	$264.90	$57.70	- $78.30	$121.68	2	103.63	.001
ROI for change in weekly earnings	3.24	0.68	- 0.80	1.57	2	25.35	.001
Hours worked per week at closure	20.94	26.57	23.20	24.08	2	14.839	.001
Change in hours worked per week	20.86	0.76	- 8.79	7.35	2	347.456	.001

Chapter 5: Discussion

The purpose of this study was to determine predictors of self-employment and weekly earnings at case closure for consumers who are blind or visually-impaired. To answer research question one, demographic and the case service variables in the RSA911 files were examined for 13,992 consumers who were served by the DBS from FY2008 through FY2012. Of the 799 cases closed successfully through self-employment, data for 798 consumers with valid reported weekly earnings at case closure were examined to answer research question two.

Findings

Background and economic context

Case closures through self-employment varied from one year to another between FY2008 and FY2012. Over that time, the Texas economy entered a recession along with the rest of the nation then slowly began to recover. A recession is characterized by rising unemployment as payroll workers are dislocated and opportunities for reemployment in payroll jobs are reduced. These conditions combine to push some consumers who previously were employed without supports and the unemployed to seek self-employment. Declining revenues also may push those already self-employed to seek assistance in sustaining their businesses.

Coming out of the recession, Texas and the nation experienced a "jobless recovery." Employment demand rose very slowly despite increased economic activity. Consumers may be pulled into self-employment during a slow recovery as they see opportunities to provide products or services on their own to meet market demands when opportunities for payroll employment are still lagging.

Broad changes can be seen from year to year in the RSA911 data: (a) in percentage of consumers seeking self-employment or assistance in sustaining their own businesses; and (b)

self-employment case closure rates. (See Tables 1 & 2.) However, the RSA does not capture personal information about consumers' motives. It also does not contain information about consumers' employment and earnings in the years leading up to application. Without one or both kinds of information, one cannot determine: (a) whether consumers coming into the VR system are being pushed or pulled into self-employment; or (b) how economic conditions impact the relative effectiveness of various case services.

Research question one

The best predictors of self-employment at case closures were: (a) self-employment at application, Wald = 1215.28: (b) being assessed, Wald = 81.78: (c) being diagnosed and treated for an impairment, Wald = 56.68; (d) being provided rehabilitation technology, Wald = 14.28; (e) being provided technical assistance services, Wald = 12.28; and (f) gender, Wald = 11.30. Specifically, a consumer who was self-employed at application was 50 times more likely to achieve self-employment at closure. Those consumers who received assessments were five times likely to have their cases closed to self-employment. Those who received diagnosis and treatment for impairments were almost three times more likely to be self-employed compared to those who did not receive these services. Those receiving technical assistant services or rehabilitation technology were almost twice as likely to be self-employed. Males were 1.3 times more likely than females to be self-employed at closure.

Research question two

The most important variables related to weekly earnings for consumers self-employed at closure were: gender ($p < .001$); self-employed at application ($p < .001$); and received some form of rehabilitation technology ($p \leq .005$). On average, those who were self-employed at application earned $117.70 more per week at closure than other consumers whose cases were closed through

self-employment (95 CI 70.68 to 164.72). Males earn $ 119.51 per week more on average than females who were self-employed at closure (95 CI 73.62 to 165.40). On average, consumers who received some form of rehabilitation technology earned $79.07 more per week than those who did not receive such services (95 CI 20.91 to 137.09).

A primary finding is that there is not a single "one-size fits all" case service strategy. Indeed, overarching policy emphasizes tailoring services to the needs and aspirations of individual consumers through their collaboration with the case management team in developing an IPE. Nonetheless, examining patterns in the mix of services provided to subgroups within the population and the impacts of those services on weekly earnings at closure can provide case managers useful insights into what works for whom.

The split file procedure provides more granular detail regarding alternative case management strategies. Data for consumers who were self-employed at closure were split into three groups by type of employment at application to determine if there were significant differences in the composition of the subpopulations and patterns in the mix of case services delivered respectively to them.

Unemployed, homemakers, or unpaid family members at application

Disproportionate numbers of those who were unemployed, homemakers, or unpaid family members at application ($N = 300$) were under 55 and self-identified as Black. On average they virtually worked zero hours per week and had almost no weekly earnings at application. They were more likely than members of the other two service populations to have been receiving SSDI or SSI at application. Their annualized income (i.e., earnings plus all forms of public assistance and benefits) was, on average slightly more than one-fourth of the average annualized of the other two groups.

Those who were unemployed, homemakers, or unpaid family members at application were more likely than consumers in the other two groups to be: (a) provided miscellaneous training; (b) information from or referral to another provider – such as SBDC or SCORE; and (c) other services – such a assistance with licensing fees, acquiring work tools, and obtaining initial stock and supplies for a new business. Overall, they were provided more services on average over a longer period than were members of the other two groups. Among consumers in this group, mean earnings at closure were significantly higher (F with df = 1 and $p < .05$) for those who received diagnosis and treatment, rehabilitation technology assistance/services, and technical assistance. While they still lagged significantly behind members of the other two groups in weekly earnings and hours worked per week at closure, the changes in the average hours they worked per week and in their weekly earnings – having started at nil – represent the largest net gains.

The average cost of services provided to those who were unemployed, homemakers, or unpaid family members at application was greater than the mean cost for services delivered to the entire population of consumers whose cases were closed successfully through self-employment. Nonetheless, since all of the weekly earnings at closure represented a net gain, the return on investment in case services provided to them (relative to annualized earnings = 3.24) was significantly higher than the ROIs for services rendered to the other two groups. In sum, one could conclude that, on average, a strategic mix of services provided to help unemployed, homemakers, and unpaid family members become self-employed was cost-effective.

Mean weekly earnings at closure were significantly higher among this group of consumers if they received: (a) diagnosis and treatment for an impairment; (b) rehabilitation technology; or (c) technical assistance.

Self-employed at application

Disproportionate numbers of those who were self-employed at application ($N = 409$) were 55 to 65 and self-identified as White. Their weekly earnings at application were above the mean for the entire population of consumers whose cases were closed through self-employment. Overall, compared to the other two groups, they received the fewest services on average over the shortest period of time at the lowest average cost. Of the three groups, they were the least likely to receive disability augmentative services, VR counseling, miscellaneous training, maintenance, transportation services/assistance, other services (i.e., licensure assistance, tools, initial stock and supplies), and information from or referral to another agency (e.g., and SBDC or SCORE office). Since they already were self-employed at application, then one can infer that: (a) their vocational objectives and business plans were solidified previously; (b) they already had achieved sufficient competence in O&M and other disability augmentative competencies; (c) and had received any necessary miscellaneous training related to licensure and/or operating a small business. Some were provided maintenance and transportation assistance while taking time away from their own businesses to obtain services. Average earnings at closure were higher for those who received maintenance and transportation assistance. Average earnings at closure also were higher for those who received: (a) information from or referral to another provider such as an SBDC or the SCORE ─ presumably for help in adjusting their business operations; and (b) rehabilitation technology ─ presumably to help them be more productive in the absence of adaptive technology or accommodations that otherwise would have been provided by an employer under the ADA.

Thus, while the focus of policy directives refers most often to helping consumers "achieve self-employment" or in "starting their own businesses," more than half of the consumers whose cases were closed successfully through self-employment had been self-

employed at application. As opposed to a "start-up assistance" strategy behind services provided to those who were unemployed, homemakers, or unpaid family members at application, the strategic thrust of services provided to those who were self-employed at application would be described more aptly as "maintaining" or "sustaining" their efforts to earn income from their own business ventures. On average, they realized positive but modest gains in both the number of hours worked per week and in weekly earnings. The return on investments in serving those who were self-employed at application also were positive but small. On average, members of this group would have to sustain the same weekly earnings for 18 months to reach the breakeven point on investments made in serving them.

In sum, a "sustaining" strategy behind the mix of services provided to those who were self-employed at application is a "breakeven" proposition. Indeed, they might be construed as especially successful if the reason these consumers sought VR services was to forestall anticipated decreases in earnings due to lagging productivity. Such a conclusion, however, would require "counterfactual analysis," that is, projecting how revenues from their own business would have declined had it not been for the provision of VR services. Such counterfactual analysis would require data from several points in time prior to application in weekly earnings derived from their own businesses. The data necessary for counterfactual analysis are not available in the RSA911.

Employed in an integrated setting without supports at application

Those who were employed at application in an integrated setting without supports (N = 84), were more likely than members of the other two groups to be diagnosed and treated for an impairment and disability augmentative services. Presumably these services can mitigate loss of productivity that put their payroll jobs in jeopardy. Insofar as they were the least likely of the

three groups to receive SSDI, they were the most likely to receive maintenance and transportation assistance while weathering cash flow changes during the transition from payroll employment to self-employment. Of the three groups, the average cost of services provided to those employed at application was the highest. However, on average, they experienced decreases in the hours worked per week and in weekly earnings. With the highest cost of services and decreases in weekly earnings, the return on investments made in serving members of this subgroup was, on average, negative. Nonetheless, services provided to help consumers transition from employment to self-employment could be construed as a successful "stop-loss" strategy. Again, it would take counterfactual analysis to support such a conclusion. That is, would consumers who were employed in integrated settings without supports have: (a) lost their payroll jobs anyway; (b) worked fewer hours per week if they did keep their payroll jobs; and (c) become more reliant on public assistance and benefits? The data necessary for doing such counterfactual analysis are not contained in the RSA911.

Limitations

This study focused on the cases of consumers served by The Texas Division of Blind Services (DBS) over a five year period from FY 2008 through 2012. The DBS is a state VR agency that only serves consumers who are blind or visually-impaired. The general conditions prevailing in Texas at the time are not necessarily representative of: (a) timeframes falling into other trends in business and employment cycles; or (b) economic conditions outside of Texas between FY2008 and FY2012 Moreover, the policies, case service strategies, and procedures of the DBS might not be representative of those implemented by blind-specific VR agencies in other states or combined VR agencies that serve consumers with other impairments in addition to those who are blind or visually-impaired. Findings from this study may well serve to form

empirically testable hypotheses regarding self-employment outcomes and earnings at closure under other conditions in other states.

Previous research suggests that several factors not included in the RSA911 data set are important determinants of competitive employment and self-employment at closure and of weekly earnings at closure:

1. Kirchner, Johnson, and Harkins (1997), O'Day (1999), Crudden and McBroom (1999), Pellerin (2010), Capella-McDonnall et al. (2013), and Stensrud et al. (2006) examined barriers to employment as perceived by blind or visually-impaired consumers, VR case managers, VR business service representatives, and business people. Because the RSA911 does not include opinion data, secondary analysis of the administrative records cannot provide insights into changes that have occurred in recent years or what affect any changes might have on case management strategies. Qualitative studies using surveys and/or focus groups need to be done to update our understanding of any lingering barriers in the workplace.
2. In 1988, Kirchner and Johnson advocated spending more on VR professional development (Kirchner, Johnson, & Harkins, 1997). But focusing on consumer activities, the RSA911 captures nothing about the case manager – qualifications, experiences, additional areas of expertise, or frequency/content of professional development. The RSA911 does not identify the lead counselor on a consumer's case, his/her professional qualifications by degree or field of study, years on the job with the agency, prior kinds of work experience or frequency and dollar value of professional development activities, or the content of professional development. Nor does it evaluate the quality of consumer-case manager interactions, the office environment of the VR agency where cases were managed, or

relationships (formal or informal) with other agencies with special expertise related to self-employment; e.g., the SBDCs or SCORE.

The RSA911 does not contain data on consumers' aptitudes, attitudes, motivations, interests, intentions, or pre-application employment histories. Nor does the RSA911 contain information about consumer-counselor development of an Individual Plan for Employment (IPE). Such information is critically important to determining: (a) the factors which lead a consumer to seek self-employment; and (b) why a particular set of case services was provided to the consumer.

One objective of this study was to identify what mix of rehabilitation and entrepreneurial services is most effective. But the RSA911 only captures case services by broad type. It does not specify: (a) the entrepreneurial content of those services; (b) the specific entity which provided such services; or (c) the special expertise of the person(s) providing those services. In particular, more detailed data about the following case services are needed to determine more definitively which are most efficacious: (a) information and referral; (b) technical assistance; and (c) miscellaneous training. Similarly, the rehabilitation technology variable in the RSA911 lacks specificity regarding what kinds of adaptive techniques were taught or what specific equipment was used in training or purchased on behalf of a consumer.

Similarly, questions of self-esteem on the other hand cannot be addressed using the RSA data because the 911 report does not capture consumer attitudes (at the time of application or at closure) or satisfaction at closure.

Implications for Practice

The study revealed that consumers who were already self-employed at application for VR services were highly likely to have their cases closed to self-employment. Rehabilitation technology services were found to be highly correlated with earnings and self-employment status. Therefore, agencies need to evaluate their programs and services offered to identify practices to develop effective and timely distribution of and instruction on rehabilitation technology and technical assistance. Based on an initial evaluation of consumers' technology needs, VR counselors should pay particular attention to meeting consumers' needs for acquiring and being trained on products to increase, maintain, or improve their functionality.

In a study almost two decades ago (Ravesloot & Seekins, 1996) found that cases closed to self-employment were correlated significantly to the counselors attitude towards self-employment and the counselor's prior experience with self-employment case services and their facilitation efforts. Given wide latitude in developing IPEs in collaboration with the consumer, counselors unknowingly or unintentionally may make recommendations that could discourage consumers from seeking self-employment and influence them to pursue competitive employment in payroll jobs. But openings for payroll jobs in rural communities may be limited because long terms trends in comparative advantage have shifted most jobs creation to urban areas. Moreover, the industrial composition of rural economies tends to be less varied with: (a) small business establishments being the norm; (b) self-employment (regardless of disability status) being more likely where the economic base is predominately agricultural; and (c) distance and the absence of public transportation comprising barriers to accessing jobs in metropolitan locations. Furthermore, because of the lower cost of services per successful employment outcome, self-employment at closure yields higher returns on investment on average than those realized for

consumers whose cases were closed through employment in the BEP or other types of competitive employment (Moore & Cavenaugh, 2003). Revell (2009) found that consumers whose primary disability was a visual impairment had the highest rates of self-employment closures compared to all 26 closures, a rate that was almost three times higher than for all consumers with 26 closures. After the 1998 amendments to the federal Rehabilitation Act when states had taken proactive steps to self-employment closure, for example, DBS dedicated a chapter in the Vocational Rehabilitation Manual (VRM) and a computer-based self-employment training module for VR counselors. There needs to be stronger emphasis on developing interagency collaboration between VR entities and both SBDCs and SCORE to increase self-employment outcomes for consumers who are blind or visually-impaired. While the codebook for the RSA911 mentions business planning and market analysis as examples of technical services, the data do not specify the exact nature of the services or the service provider.

The results of this study reflect a disproportionate number of whites with cases closed through self-employment (60 %) during this study's timeframe compared to 63% of the national population as of the 2010 census but only 44.5% of the Texas population (Census Bureau, 2011). VR agencies need to be aware of the consumers they serve from culturally diverse backgrounds. Previous research (Adkins & Wright, 1980; Wilson & Senices, 2005) indicates that a disproportionate number of white individuals were accepted for services compared to African Americans and Hispanics.

Future Research

Since Revell's study in 2009, national data indicate a slow and disappointing increase in self-employment for all persons with disabilities from years 2003 to 2007 except for rural states whose populations are smaller and more dispersed. Future research should gather information from VR counselors with the highest percentage of case closures through self-employment and/or in states with the highest self-employment closure rates to determine best practices – especially regarding the rehabilitation technology, technical assistance, information & referral, and other services that were integral to their consumers' IPEs. Policies regarding formal agreements with SBDC should be compared for states with the highest self-employment closures to those with the lowest. Counselors with higher self-employment closure rates could be surveyed to identify their attitudes, process, supports systems, and business background if any.

This study focused on FY2008 to FY2012 when self-employment rates hovered around five or six percent of all cases closed for their respective fiscal years. A comparison over ten years for Texas may identify the trends and the effects of recession and recovery cycles on self-employment. Self-employment is considered a successful outcome for persons with other disabilities. To identify best case service practices, results obtained for consumers served by DBS should be compared to results obtained by consumers served by other divisions of Texas's Department of Assistive and Rehabilitation Services.

Because a large portion of all new businesses fail within the first five years, a survey of blind and visually-impaired consumers whose cases were closed five years earlier through self-employment should be conducted. Such a survey will provide feedback on long-term success in self-employment which may provide additional insights into career exploration, collaborative and proactive development of Individual Plans for Employment, case interventions, and post-

closures supports that VR counselors can provide their consumers who are blind or visually-impaired.

Because the RSA does not capture attitudinal variables, there are no data that can be used to determine if consumers seeking self-employment are doing so because they are discouraged by employer reluctance, attitudes, stereotypes, and biases as barriers to payroll employment. A qualitative study should be done to determine if the decision to pursue self-employment as a goal is the result of family pressures and attitudes or the consumer's cultural and work values. The RSA911 does capture provision of vocational rehabilitation counseling and information and referral services. However, it does not capture the adequacy and comprehensiveness of, and consumer satisfaction with, labor market or career exploration materials and their availability. Qualitative studies should be designed to capture those factors. Nor does the RSA911 capture the consumers' pre-service work histories and earnings that would be useful in looking longitudinally at factors that may have pushed or pulled them into self-employment.

Previous studies that examined self-employment closure rates in predominantly rural states like Montana suggest that self-employment programs are likely to be strongest in rural/agricultural communities. Previous studies used state as a proxy variable for the rural or agricultural orientation of the communities where self-employed consumers reside and work. But Texas is a diverse state with non-agricultural metropolitan and suburban counties arrayed in the triangle bounded by San Antonio on the south, Denton on the north and east to Houston-Galveston-Beaumont on the east. However, the RSA does not capture the characteristics of the consumer's pre-service community of residence or location of post-closure employment. One could use data mining of case notes to find: (a) community of origin/field office providing the referral; and (b) the consumer's post-closure business location. If captured by county, these data

can be used to look-up population density in Census figures or "degree of rurality" in the Department of Agriculture's Economic Analysis Bureau. Data from the geographic profiles of labor market regions from the Texas Workforce Commission (TWC) at www.texasindustryprofiles.com could be used to identify the economic bases of each county by industry for: (a) additional insights into the agricultural orientation of the consumer's pre-service place of residence or post-closure employment; and (b) the prevailing firm size (small, medium or larger) in their respective counties of residence.

Since the majority of consumers whose cases were closed through self-employment already were self-employed at application, one should determine what factors lead them to enter self-employment in the first place. Such information is not contained in the RSA911. It would have to be obtained through interviews or by data mining their case files and IPEs.

Also because the majority of those who were self-employed at closure also were self-employed at application, further research should be done on the counterfactual situation; i.e., study the characteristics of and case services of those who were self-employed at application but who cases were: (a) closed through some other type of competitive employment; and (b) not closed through successful employment.

This study was limited to demographic and case service variables collected in the RSA911. A qualitative study also would be warranted to examine the environmental, human, and programmatic factors that contribute to a successful self-employment outcome: (a) barriers to transportation; (b) level of family and community supports; (c) motivation; (d) pre-service repertoire of marketable knowledge, skills and abilities levels; (e) willingness to take risks; (f) state policy; (g) attitudes and experience of VR personnel; (h) funding and technical resources available to help consumers devise and implement strong business plans and sustain their start-

up business. Additionally, data mining of case files and IPEs could yield useful insights into the consumers' aspirations, motives, pre-service human capital (knowledge, skill and ability levels), work values and personality traits, or aptitudes which might significantly influence their choice of and success in running a business of their own.

By and large, data mining and predictive analytics have not been used in the study of social services such as vocational rehabilitation for two reasons. First, the technology was not well developed. Second, analysis of case files raises questions of consumers' data privacy and confidentiality rights. The first obstacle has been overcome with improvements in distributed processing of "big data," "web-crawlers," "spidering," and scraping files across the World Wide Web. Advances also have been made in natural language processing, artificial intelligence/ machine learning, and predictive analytics to distill meaning from unformatted data.

With respect to data privacy and confidentiality issues, precedents have been set in other domains to balance protection of individual data rights with "meaningful use" of data mined from individual records then aggregated to a level that inform practitioners about patterns in assessments/diagnoses and the effectiveness of interventions, treatments, and services. (See, for example: HIPPA and meaningful use of medical records in the HITECH Act; Gainful Employment reporting with respect to federal student loans; placement and earning analysis by program of study for education and training programs; and data modeling of case service management for Unemployment Insurance benefit claimants). In the future, research in vocational rehabilitation likely will not be constrained by the limitations of the data structures of and content in administrative records. Moving into new arenas of research can help inform consumers, case managers, and other interested stakeholders about what case services are

effective for whom, and under what conditions without jeopardizing individual data privacy rights.

APPENDIX A

Variables

The following variables were selected or constructed from data elements as defined in the FY2008 edition of the RSA911 codebook either as employment outcomes or predictor variables. A smaller subset was generated only for those whose cases were closed successfully through self-employment from FY2008 to FY2012. The recoding or computing of variables are explained. The following 31 consumer characteristic variables were used in this study.

1. *Age at application*. Age is a continuous variable in the specialized-use files released age at application to authorized researchers. This variable was recoded into categorical variable into Age group 1= 18-34, Age group 2= 35-44, Age group 3= 45-54. and Age group 4= 55 -65.
2. *Gender.* Gender is a dichotomous variable with values in the RSA911 recoded to male = 1 and female= 0.
3. *Race.* For race and ethnicity, consumers self-identify under one or more of the following: white; black or African American; American Indian or Alaskan Native; Asian; Native Hawaiian or other Pacific Islander; and Hispanic or Latino. Because consumers are allowed to identify with more than one category, data in the RSA911 are recorded in dichotomous but overlapping variables. For example, those who identify themselves as both White and Hispanic are coded as a 1 in the White variable and as a 1 in the Hispanic variable but as 0 (other) in the four remaining race/ethnic variables. Thus, the sum of race/ethnicity self-identifications exceeds the number of cases selected for this study. To create non-overlapping race/ethnicity variables, the original data in the RSA were recoded in sequence. A new, temporary variable was created by summing the values of the recoded original race/ethnicity variable. The temporary variable thus contained a unique value for each possible combination or permutation of self-identifications. Five new

dichotomous race/ethnicity variables were extracted from the temporary variable. This variable was recoded as

a. *White only.* Consumers who self-identified as white with no other self-identification = 1; else = 0.

b. *Black/African American only.* Consumers who self-identified as Black with no other self-identification = 1; else = 0.

c. *Asian only.* Consumers who self identified as Asian with no other self-identification = 1; else = 0.

d. *White/Hispanic or Latino.* None of the consumers self-identified exclusively as Hispanic/Latino. The vast majority who referred to themselves as Hispanic or Latino also self-identified as white and were coded as = 1; else = 0.

e. *Other racial/ethnic groups and other multiple self-identifications (Mixed)* were code as 1, else = 0. This category included small numbers who self-identified as *Hawaiian or Other Pacific Islander, American Indian or Native Alaskan* and any combination of self-identifications including a small number who identified themselves as Hispanic/Latino and black.

4. *Education at application.* The highest level of education attained by a consumer at application is reported in the RSA911 on an ordinal scale. The RSA911 values were recoded with any consumer having less than a high school diploma = 0; high school diploma or GED = 1; postsecondary education, no degree =2; Associate's degree or postsecondary vocational/ technical certification = 3; Bachelor's degree = 4; and Master's degree or higher = 5.

5. *Diabetes as cause of primary disability*. The RSA contains two variables related to the nature and cause of the consumer's primary disability. The only specific cause of consumers' visual

impairments with sufficient cases (N=2,443; 15.3%) to examine further was Diabetes Mellitus (value = 16). The <Transform><Recode into Same Variable> function in SPSS was used to change the cause_pri into a dichotomous variable, Diabetes (with 1 = yes, else 0).

a. *Primary impairment.* This variable in the RSA911 was not used. The study focused on the cases of consumers served by DBS, all of whom, as a matter of eligibility for services, have a vision-related primary disability. Three values are used in the RSA to code primary vision-specific disabilities (Blind = 1; Other visual impairment = 2; Deaf-blind = 8). However, operational definitions are not provided in the RSA manual for differentiating among the three coding choices. Thus, two consumers with comparable visual impairments may be coded differently by their respective field service representatives or case managers. Moreover, a consumer who is both blind and deaf may be coded under primary disability as "deaf-blind" or "blind" with "deaf" treated as a secondary sensory disability. In the absence of operational definitions that can be applied consistently and reliably, this variable was not used.

b. *Cause of primary impairment*. The RSA provides 37 categories for recording the cause of a consumer's primary impairment. The frequency distribution on cause of primary disability shows that the vast majority (87.3%) of DBS consumers in the FY2008-2012 timeframe had the cause of their visual impairment recorded officially as 13 = physical disorder/unspecified (N=13,350). Theoretically, it would be interesting to determine if the odds of self-employment were different for those whose visual impairment was congenital versus consumers whose cause was recorded in any post-birth category. However, only 12 consumers (0.1%) had the cause of their primary impairment recorded officially as congenital (value = 13). Because of the small number of consumers

in each of the categories, with the exception of Diabetes, this variable was not used in the study.

6. *Presence of a secondary disability*. This variable indicates whether or not the consumer has a disability that is an impediment to employment in addition to being blind or visual impaired. Separate values are used in the RSA911 to record the specific nature of impairments. A dichotomous variable was created, presence of secondary disability, with 1 = yes and 0 = no.

7. *Employment status at application.* The RSA911 provides eleven categories for recording type of employment at application. Three categories of employment at application are defined operationally as "competitive" for the purpose of this study: employed without supports in integrated setting (value = 1); self-employed other than BEP (recode value 3 = 2); state-managed Randolph-Sheppard Business Enterprise Program (recode value 4 = 3). Four categories of employment, for the purpose of this study are considered "not competitive." Those four (homemaker, employment with support in integrated setting, extended employment and unpaid family worker) were collapsed into a single category employed/not competitive (recode value 2, 5, 6, and 7 = 4). Note that treating employment with support in an integrated setting (value = 7) as "not competitively employed" differs from the RSA911 codebook which provides directions for recording them as "competitively employed at closure."

8. *Self-employed at application.* A separate dichotomous variable was created by using <Transform> <Recode into another variable> in SPSS to distinguish consumers who were self-employed at application (recode value 3 = 1) from all other consumers (else = 0).

9. *Students or otherwise engaged in training at application.* Consumers who were students, interns or volunteers at application are classified in the RSA911 as "unemployed" along with consumers that were unemployed for other reasons. To determine if the odds of closure through

self-employment differ for students versus other types of consumers who were unemployed at application, a new dichotomous variable was created by using <Transform> <Recode into different variable>. Values 8, 9 and 10 for type of employment at application were recoded as 1 in Student at application; else = 0.

10. *Weekly earnings at application.* This continuous variable in the RSA911 refers to dollars earned through work in a typical week at the time of application. Note that this field in the RSA911 is four characters wide with no decimal points (rounded to whole dollars, no cents). Any weekly earnings ≥ $9,999 are recorded as $9,999.

11. *Hours worked per week at application*. This continuous variable refers to the average hours work in a typical week at the time of application. Note that this field in the RSA911 is two characters wide. Any hours worked per week ≥ 99 are recorded as 99.

Types of public support at application are recoded in the RSA911 in a series of dichotomous variables.

12. *Supplemental Security Income*. This is a dichotomous variable in the RSA911 with those consumers receiving SSI = 1, else 0.

13. *Temporary Assistance for Needy Families*. This is a dichotomous variable in the RSA911 with those consumers receiving TANF = 1, else 0.

14. *General (state or local) assistance*. This is a dichotomous variable in the RSA911 with those consumers receiving general assistance = 1, else 0.

15. *Social Security Disability Insurance benefits.* This is a dichotomous variable in the RSA911 with those consumers receiving SSDI = 1, else 0.

16. *Veterans' Disability benefits*. This is a dichotomous variable in the RSA911 with those consumers receiving Veterans' Disability benefits = 1, else 0.

17. *Workers' compensation benefits*. This is a dichotomous variable in the RSA911 with those consumers receiving workers' comp = 1, else 0.

18. *Other public support*. This is a dichotomous variable in the RSA911 with those consumers receiving any other type of public support = 1, else 0.

Amount of public assistance received per month is recorded in the RSA911 separately in four continuous variables rather than seven categories used for reporting the separate sources of public support; i.e., for SSI, SSDI, TANF and Other.

19. *SSI received/month at application*. These amounts are recorded separately in a continuous variable.

20. *SSDI received/month at application*. These amounts are recorded separately in a continuous variable.

21. *TANF received/month at application*. These amounts are recorded separately in a continuous variable.

22. *Other public support received/month*. These amounts are recorded in a continuous variable as the sum of amounts received through Veterans' Disability, Workers' Compensation, general (state or local) assistance and other forms of public supports.

23. *Total public assistance received/month at application*. A new continuous variable was computed as the sum of amounts received monthly from SSI, SSDI, TANF and other public supports.

24. *Primary source of support at application.* This categorical variable in the RSA911 records primary source of support at application in one of four categories: personal income; family and friends; public support; and other. Insofar as one source (personal income) represents

25. degree of financial independence at application, this variable was recoded dichotomously with Personal income = 1, else = 0.

26. *Total annualized income at application*. A new continuous variable was computed as the sum of earnings from work plus income received through any kind of public support. Because consumers' earnings are recorded for an average week and amounts of public supports are record for an average month in the RSA, I annualize the total by multiplying the former by 52 and the latter by 12.

Type of medical insurance coverage at application is recorded in the RSA as a series of dichotomous variables.

27. *Medicaid at application*. Coded as consumers covered by Medicaid = 1, else 0.

28. *Medicare at application.* Coded as consumers covered by Medicare = 1, else 0.

29. *Other public medical insurance at application*. Coded as consumers covered by other public medical insurance = 1, else 0.

30. *Private medical insurance through own employer at application*. Coded as consumers covered by private medical insurance through their own employer = 1, else 0.

31. *Other private medical insurance at application.* Coded as consumers covered by other types of private medical insurance = 1, else 0.

The following 19 case service variables were selected for this study:

1. Months served by the agency. This variable was calculated as the time span between the year and month for the initial application and the year and month of closure. <Transform> <Compute Variable> was used to calculate that span of months as

((Year_closed - Year_app) * 12))+ (Month_clo – Month_app)

Since the data were highly skewed, they were collapsed into five ordinal spans: less than one month = 0; one month to six months = 1; seven months to twelve months = 2; thirteen months to 24 months = 3; and more than 24 months = 4.

2. *Cost of services provided* is a continuous variable that refers to the total dollar amount spent by the State VR agency and partner agencies to purchase services for a consumer over the life of the current case record. The total includes all payments made to public and/or private vendors, individuals or organizations. It include expenditures for all types of purchased services such as assessment, training, medical services, maintenance, transportation, tuition for higher education, rehabilitation technology services, personal attendant services, or any other rehabilitation services as well as supplies and initial stock for a new business for self-employed consumers.

Types of services provided are recorded in the RSA911 as a series of dichotomous variables since each consumer receives an individually tailored mix that best meets his or her specific needs. For each type of service, the variable is two characters wide to capture who provided the service and who funded it. The RSA911 uses "0" in the first position to indicate that the service was not received. A "0" in the second position indicates that the service was not funded. Having run frequency distributions, one provider type accounted for delivering a specified service to most eligible consumers and one funding source paid for its delivery. For the purposes of this study, it was important only to determine whether or not the consumer received the specified service. Therefore each service type was transformed into a dichotomous variable by recoding 00 = 0 (did not receive) else 1 (received). Values of 01 (not received but paid for) would be anomalous. However, no such values occurred in this data set. Thus values 1 through 6 in the first position indicating what agency or combination of agencies provided the services and

values 1 through 6 in the second indicating the funding source were collapsed to indicate that the service was received regardless of provider or funding source. The 19 case services include:

1. *Assessment.* Recoded as received = 1, did not receive = 0.
2. *Diagnosis and treatment (of an underlying impairment).* Recoded as received = 1, did not receive = 0.
3. *Vocational rehabilitation counseling and guidance* is defined in the codebook as discrete therapeutic counseling and guidance services necessary to achieve an employment outcome. This service category includes but is not limited to counseling for personal adjustment and family, medical, or social issues. Recoded as received = 1, did not receive = 0.
4. *College or university training* includes 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. Recoded as received = 1, did not receive = 0.
5. *Occupational vocational training* includes job skill training provided by a community college and/or business, vocational/trade or technical school to prepare students for gainful employment in a recognized occupation, not leading to an academic degree or certification. Recoded as received = 1, did not receive = 0.
6. *On-the-job training* (OJT) refers to training in specific job skills by a prospective employer at the workplace. Generally the individual is paid during this training and will remain in the same or a similar job upon successful completion. OJTs also include apprenticeship-training programs conducted or sponsored by an employer, a group of employers, or a joint apprenticeship committee representing both employers and a union. Recoded as received = 1, did not receive = 0.

7. Basic academic-remedial or literacy training is a dichotomous variable that refers to remedial or literacy training for basic academic skills necessary to perform on the job. Recoded received=1, did not receive= 0

8. Job readiness training refers to generalized training to prepare an individual for the world of work (e.g., appropriate work behaviors such as getting to work on time, and appropriate attire or grooming). Recoded as received = 1, did not receive = 0.

9. Disability related augmentative skills training includes but is not limited to: orientation and mobility (O&M); use of low vision aids; and Braille. Recoded as received = 1, did not receive = 0.

10. Miscellaneous training means services not covered in any category above. Recoded as received = 1, did not receive = 0.

11. Job search assistance includes but is not limited to resume preparation, identifying appropriate job opportunities, developing interview skills, and making contacts with companies on behalf of the consumer. Recoded as received = 1, did not receive = 0.

12. Job placement assistance is a referral to a specific job resulting in an interview, whether or not the individual obtained the job. Recoded as received = 1, did not receive = 0.

13. On-the-job supports are provided to a consumer who has been placed in employment in order to stabilize the placement and enhance job retention. Such services include: job coaching; follow-up and follow-along with the consumer, coworkers and/or supervisor(s); and job retention services. Recoded as received = 1, did not receive = 0.

14. Transportation services include adequate training in the use of public transportation and travel-related expenses necessary to enable a consumer to participate in a VR service. Recoded as received = 1, did not receive = 0.

15. Maintenance includes monetary support provided for such items as food, shelter and clothing (in excess of the normal expenses of the individual) as are necessary for the individual's participation in an assessment for determining eligibility and VR needs or while receiving services under an IPE. Recoded as received = 1, did not receive = 0.

16. Rehabilitation Technology means the systematic application of technologies, engineering methodologies, or scientific principles to meet the needs of, and address the barriers confronted by, consumers in areas that include education, rehabilitation, employment, transportation, independent living, and recreation. Recoded as received = 1, did not receive = 0. The term includes:

a. rehabilitation engineering services (e.g., workplace accommodations);

b. assistive technology devices (i.e., any item, equipment, or product used to maintain or improve a consumer's functional capabilities); and/or

c. assistive technology service (i.e., any service that directly assists a consumer in selecting, acquiring, or using an assistive technology device). Such services may include:

i. evaluating the needs of an individual with a disability;

ii. purchasing or otherwise providing an assistive technology device;

iii. selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing assistive technology devices;

iv. coordinating and using other therapies, interventions, or services with assistive technology devices;

v. training providing technical assistance for an individual with a disability or, if appropriate, authorized representatives of the individual; and

vi. providing technical assistance for professionals, employers, or others who are substantially involved in the major life functions of individuals with disabilities to the extent necessary for the consumer to achieve an employment outcome.

17. Technical Assistance means employment-related services received from specialists outside the VR agency. Technical assistance includes business plan development and review or commercial viability analysis by a Small Business Development Center (SBDC) or from the SCORE. Recoded as received = 1, did not receive = 0.

18. Information and referral services means sending the consumer to another entity (e.g., an SBDC or SCORE) or obtaining information from another agency on the consumer's behalf. Recoded as received = 1, did not receive = 0.

19. Other services includes providing a consumer tools and equipment essential to work as well as initial stock and supplies for a new business started by a consumer who becomes self-employed. Recoded as received = 1, did not receive = 0.

The following thirty-one consumer characteristics at case closure were selected or created for use in this study:

1. *Level of education attained at closure* refers to the highest level of education a consumer attained at the time of closure. This variable was recoded into six ordinal categories consistent with the recoding of the educational attainment at application. That is, any consumer having less than a high school diploma = 0; high school diploma or GED = 1; postsecondary education, no degree =2; Associate's degree or postsecondary vocational/technical certification = 3; Bachelor's degree = 4; Master's degree or higher = 5.

2. *Change in level of educational attainment* is a computed variable: (educational attainment at closure) – (educational attainment at application). The variable has a possible range from -5 to +5 but negative values would indicate either a miscoding of either or both input variables.

3. *Occupation at closure* is record in the RSA911 as the job title's six digit code number in the Standard Occupational Classification (SOC) taxonomy. The Department of Labor provides a lookup table of SOC codes at www.onetonline.org.

   a. The SOC taxonomy is hierarchical. Six digit SOC codes can be truncated to:

      i. four digit codes to look at frequency distributions at the job family level (e.g., various machine operators versus various agricultural production workers);

      ii. at the two digit level to look at frequency distributions in broad categories (e.g., managerial and professional versus administrative and clerical workers).

   b. In addition, four values available in the RSA911 for recording VR-relevant occupations not contained in the SOC taxonomy: Homemaker = 599999; Unpaid family member = 799999; Randolph-Sheppard/BEP facility clerk = 899999; and Randolph-Sheppard/BEP facility manager = 999999. Assignment of those values does not conflict with the SOC since they are unused in that taxonomy's numbering schema.

4. *Employment status at closure* uses the same values as the employment status at application with the exception that all of the unemployed categories (values 8 through 11) do not apply. Cases closed without an employment outcome are coded elsewhere in the RSA911 under type of closure.

5. *Competitively employed at closure.* Whereas the RSA911 treats consumers who are employed with supports in an integrated setting as "competitively employed," they are excluded from the operational definition of competitively employed used in this study. The variable was

deleted from the DBS consumer FY2008_2012 database. It was replaced by a newly computed variable using the values in employment status at closure with: 1 (employed without supports in an integrated setting), 3 (self-employed) and 4 (BEP) were recoded as 1 = competitively employed; else = 0. This recoding is consistent with the way the competitively employed at application variable was computed.

6. *Self-employment at closure* was computed from the employment status at closure variable with those who were self-employed (value = 3) were coded as 1; else 0. The calculated values for this variable are consistent with those used to calculate self-employment at application. This variable was created to track movement in and out of self-employment and persistence in self-employment between the time of application and case closure.

7. *Weekly earnings at closure,* like weekly earnings at application, is a continuous variable. The field is four characters wide with no decimals. Values ≥ $9,999 were recorded as $9,999.

8. *Change in weekly earnings* was computed as (earnings at closure) – (earnings at application). Negative values are possible.

9. *Hours worked per week at closure,* like hours worked per week at application, is a continuous variable. Note that this field in the RSA911 is two characters wide. Any hours worked per week ≥ 99 are recorded as 99.

10. *Change in hours worked per week* was calculated as (hours worked per week at closure) – (hours worked per week at application). Negative values are possible. This variable was calculated to help determine if changes in earnings were due more to adjustments in work schedules than to changes in the consumer's type of employment between the time of application and case closure.

Types of public support at closure are captured in the RSA911 through a series of dichotomous variables. The values for these variables are the same as they are for the respective types of public supports at application:

11. *SSI*: Received = 1, else 0.

12. *TANF*: Received = 1, else 0.

13. *General Assistance* (state/local): Received = 1, else 0.

14. *SSDI*: Received = 1, else 0.

15. *Veterans' Disability benefits*: Received = 1, else 0.

16. *Workers' Compensation benefits*: Received = 1, else 0.

17. *Other public supports*: Received = 1, else 0.

Amounts received through public support programs at closure are recorded as a continuous variable in the RSA911 for an average month separately for SSI, SSDI and TANF. Amounts received through any of the following, or combination thereof, are rolled into the Other public support amount variable: General assistance; Veterans' Disability; Workers' Compensation; and Other public supports.

18. *SSI amount/month at closure* is four characters wide filed with amounts ≥ $9,999 entered as $9,999.

19. *TANF amount/month at closure* is four characters wide filed with amounts ≥ $9,999 entered as $9,999.

20. *SSDI amount/month at closure* is four characters wide filed with amounts ≥ $9,999 entered as $9,999.

21. *Other public support amount total/month closure* is four characters wide filed with amounts ≥ $9,999 entered as $9,999.

22. *Total public supports/month at closure* was calculated as the sum of monthly amounts received through SSI, TANF, SSDI and other public support programs. This calculation was consistent with the way total public supports/month at application was calculated.
23. *Change in total public supports/month* was computed as (total at closure) – (total at application). Negative values are not only possible, but could be construed as a positive return on the investment of VR dollars in case services insofar as that would indicate: (a) an increase the consumers' economic independence; and (b) a decrease in public dollars spent to support the consumer.
24. *Total income at closure* was computed as a continuous variable by adding earnings at closure to total public supports at closure. The amount was annualized because earnings at closure was reported as a weekly figure while each of the public support amounts was reported as a monthly figure: (earnings at closure * 52) + (total monthly supports at closure * 12). That calculation is consistent with the formula used to calculate total income at application. The same assumptions about continuous employment over the year were made for both calculations.
25. *Change in total income* was computed as (total income at closure) – (total income at application). This variable reflects the net change in a consumer's financial well-being between the time of application and case closure. Negative values are possible.
26. *Primary source of support at closure* is recorded in the RSA911 using the same values as primary source of support at application. Comparison of the two variables can be used to track movements of interest between personal resources and public supports.

Health insurance/medical coverage at closure is captured in the RSA911 through a series of dichotomous variables.

27. *Medicaid*: Received = 1, else = 0.

28. *Medicare*: Received = 1, else = 0.

29. *Other public source of coverage*: Received = 1, else = 0.

30. *Private insurance coverage through employer*: Received = 1, else = 0.

31. *Private insurance, other*: Received = 1, else = 0.

The outcome variables of chief interest in this study were:

1. *Self-employment at closure* was computed from the employment status at closure variable with those who were self-employed (value = 3) were coded as 1; else 0. The calculated values for this variable are consistent with those used to code self-employment at application.

2. *Weekly earnings at closure* like weekly earnings at application, is a continuous variable. The field is four characters wide with no decimals. Values ≥ $9,999 were recorded as $9,999.

APPENDIX B

Table B1

Master Table of Variables of Interest
N= 13,392

Consumer Characteristic/Demographic Variables	N with Yes	% of all consumers
White Only (self-identified)	5,203	37.2%
White Hispanic/Latinos (self-identified)	5,515	39.4%
Black Only (self-identified)	2,943	21.0%
Asian Only (self-identified)	162	1.2%
Other race/ethic self-identifications or mixes	139	1.2%
Veteran	525	3.8%
Diabetes as cause of impairment	2,380	17.0%
Secondary impairment	7,164	51.2%
Competitively employed at app	6,193	44.3%
Self-employed at application	778	5.6%
Student or other training at app	622	4.4%
SSI at application	1,677	12.0%
TANF at application	279	2.0%
General (state/local) assist at app	245	1.8%
SSDI at application	2,672	19.1%
Veterans' Disability at app	62	0.4%
Workers' Compensation at app	53	0.4%
Other public assistance at app	809	5.8%
Medicaid at application	1,526	10.9%
Medicare at application	1,976	14.1%
Other public insurance	16	0.1%
Private insurance, own employer	1,416	10.1%
Private insurance, other	1,019	7.3%
Gender (male)	7,441	53.2%

Case Services Variables	N with Yes	% Yes
Assessment	8,506	60.8%
Diagnosis & treatment of impairment	6,908	49.4%
VR counseling and guidance	5,019	35.9%
College or university training	718	5.1%
Occupational/vocational training	467	3.3%
On the job training	318	2.3%
Basic academic, remedial, literacy training	154	1.1%
Job-readiness training	488	3.5%
Disability augmentative training	4,792	35.5%
Miscellaneous training	1,354	9.7%
Job search assistance	668	4.8%
Job placement assistance	600	4.3%
On-the-job supports	216	1.5%
Transportation	3,183	22.7%
Maintenance	1,869	13.4%
Rehabilitation technology	3,479	24.9%
Reader services	247	1.8%
Interpreter services	138	1.0%
Personal attendant services	28	0.2%
Technical assistance	983	7.0%
Information and referral	2,858	20.4%
Other services (license, tools, stock, supplies)	1,869	13.4%

References

Atkins, B.J., & Wright, G.N. (1980). Three views vocational rehabilitation of blacks. *Journal of Rehabilitation, 46*(2), 40-50.

Arnold, N.L., & Seekins, T. (1995). Self-employment as a vocational rehabilitation closure: An examination of state policies. *Journal of Disability Policy Studies*, 5(*2*), 65-80.

Arnold, N.L., & Ipsen, C. (2005). Self-employment policies: Changes through the decade. *Journal of Disability Policy Studies*, 16(2), 115-122.

Bell, E. (2010). Competitive employment for consumers who are legally blind: A 10-year retrospective study. *Journal of Rehabilitation Research & Development*, 47(November), 109-116.

Beveridge, S., & Fabian, E. (2007). Vocational rehabilitation outcomes: Relationship between Individualized Plan for Employment goals and employment outcomes. *Rehabilitation Counseling Bulletin,* 50, 238-246.

Bureau of Labor Statistics. (2011). Minimum wage history chart. Accessed through the World Wide Web on May 18, 2014 at http://www.dol.gov/whd/minwage/chart.htm.

Campbell, Donald T., & Stanley, Julian. (1963). Experimental and quasi-experimental designs for research. Boston: Houghton Mifflin.

Capella-McDonnall, M. E. (2005). Predictors of competitive employment for blind and visually-impaired consumers of vocational rehabilitation services. *Journal of Visual Impairment and Blindness*, 99(5), 303-315.

Capella-McDonnall, M.E., Crudden, A., & Zhou, L. (2013). Employer attitudes towards persons who are blind of visually-impaired: Perspectives and Recommendations from vocational rehabilitation personnel. *Journal of Rehabilitation* 79(*3*) 17-24.

Crudden, A., & McBroom, L.W. (1999). Barriers to employment: A survey of employed persons who are visually-impaired. *Journal of Vision Impairment and Blindness*, 93(*6*).

Darensbourg, B.L. (2008). *An investigation of the variables related to competitive employment and earnings of vocational rehabilitation consumers with blindness or visual impairments.*(doctoral dissertation). Retrieved from Infopysc Dissertations and Theses database. (UMI Number 3324837).

Gersten, R. (2006). Relationship between the quality of the research design and the quality of the evidence for improvement of special education practice. In B. G. Cook & B. R. Schirmer (Eds.), *What is special about special education?* (pp.154-164). Austin, TX: Pro-Ed, Inc.

Gilbride, D., Vandergroot, D., Golden, K., & Stensrud, R. (2006). Development and validation of the Employer Openness Survey. *Rehabilitation Counseling Bulletin*, 49(*2*) 81-89.

Goertz, Y.H.H., van Lierop, B.G., Houkes, I., & Nijhuis, F.J.N. (2010). Factors related to the employment of Visually-impaired Persons: A systematic literature review. *Journal of Vision Impairment and Blindness,* July, 404-418.

Hosmer, D. W., & Lemeshow, S. (1989). Applied logistic regression. New York: John Wiley & Sons, Inc.

Ipsen, C., & Arnold, N.L. (1995). Self-employment as a vocational rehabilitation employment outcome in rural and urban areas. *Rehabilitation Counseling Bulletin*, 39(*2*), 12-22.

Ipsen, C., Arnold, N. L., & Colling, K. (2005). Self-employment for people with disabilities. *Journal of Disability.* 15(4), 231-239.

Jones, M. J. (2008). *Factors that correlate with employment and earnings for people who are blind in Alabama*. (doctoral dissertation). Retreived from Infopsyc Dissertations and Theses database.(UMI Number 333133).

Kirchner, C., Johnson, G., & Harkins, D. (1997). Research to improve vocational rehabilitation: Employment barriers and strategies for clients who are blind. *Journal of Visual Impairment & Blindness*, 91*(4)*, 377-392.

Kirchner, C., & Schmeidler, E. (1997). Prevalence and employment of people in the United States who are blind or visually-impaired. *Journal of Visual Impairment and Blindness*, 91(*5*), 508-511.

Kirchner, C., &. Smith, B. (2005). Transition to what? Education and employment outcomes for visually-impaired youths after high school. *Journal of Visual Impairment and Blindness*, 98(*8*) 499-504.

Leonard, R. (2002). Predictors of job-seeking behavior among persons with visual impairments. *Journal of Visual Impairment & Blindness*, September, 635-644.

Moore, E. J., & Cavenaugh, B. S. (2003). Self-employment for persons who are blind. *Journal of Visual Impairment and Blindness*, 97, 366-369.

Obama, Barack. (April 26, 2010). Executive Order 13540: Interagency taskforce on veterans' small business development. *Federal Register* 75:82 (pp. 22497-22498). Accessed online from the World Wide Web on June 26, 2014 at http://www.gpo.gov/fdsys/pkg/FR-2010-04-29/pdf/2010-10172.pdf.

O'Day, B. (1999). Employment barriers for people with visual impairments. *Journal of Visual Impairment and Blindness,* 93(*10*), 627-624.

Pellerin, R.M. (2010). *The experience of employment and unemployment of Californians with visual disabilities.* (doctoral dissertation). Retreived from Infopsyc Dissertations and Theses database. (UMI Number 3421097).

Rehabilitation Service Administration. (2008). RSA911 case reporting manual (No. 1820-0508). Washington, D.C: U.S. Department of Education, Office of Education and Rehabilitative Services.

Ravesloot, C., & Seekins, T. (1996). Vocational rehabilitation counselors' attitudes towards self-employment outcomes. *Rehabilitation Counseling Bulletin*, 39(*3*).

Revell, G., Smith, F., & Inge, K. (2009). An analysis of self-employment outcomes within the Federal/State Vocational Rehabilitation System. *Journal of Vocational Rehabilitation*, 31, 11-18.

Seber, G.A.F. (1977). Linear regression analysis. New York: John Wiley & Sons.

Stensrud, R. (2007). Developing relationships with employers means considering the competitive business environment and the risks it produces. *Rehabilitation Counseling Bulletin*, 50(*4*) 226-237.

Stevens, J.P. (2009). Applied multivariate statistics for the social sciences. New York: Routledge, Taylor & Francis Group.

Szymanski, E.M., & Parker, R.M. (June 1989). Competitive closure rate of rehabilitation clients with severe disabilities as a function of counselor education and experience. *Rehabilitation Counseling Bulletin*, 32(*4*) 292-299.

Tabachnick, B., & Fidell, L. (1996) *Using multivariate statistics* (3 rd ed.) New York: Harper Collins

Tate, R. L. (1998). An introduction to modeling outcomes in the behavioral and social sciences (2nd edition). Edina, MN: Burgess Publishing.

United States Bureau of the Census (Census Bureau). (2011). State and county quick facts. Accessed online through the World Wide Web on June 8, 2014 a5 http://quickfacts.census.gov/qfd.states/48000.html.

Warren, P. R., Giesen, J. M., & Cavenaugh, B. S. (2004). Effects of race, gender, and other characteristics of legally blind consumers on homemaker closure. *Journal of Rehabilitation*, 70(*4*), 16-21.

Wilson, K. B., & Senices, J. (2005). Exploring the vocational rehabilitation acceptance rates for Hispanics versus non-Hispanics in the United States. *Rehabilitation Counseling Bulletin*, *83*(1), 86-96.

Vita

Rafelina Gerardine Emuang was born in Singapore on March 26, 1963, the daughter of Raphael Emuang and Victoria Valberg. After completing high school in 1979 at Ahmad Ibrahim Secondary School in Singapore, she entered Hawaii Pacific College in Manoa, Hawaii in 1983. She transferred to the University of Hawaii in 1984. She completed her Bachelor of Science at the University of Hawaii in Manoa, Hawaii and Park University in Austin, Texas in 2007. In fall 2009, she entered the Graduate School at the University of Texas in Austin. She earned a Masters of Education in May 2009. In spring of 2010, she continued her doctoral study in the University of Texas at Austin. Currently, she works as a Vocational Rehabilitation Counselor III for the Division of Bind Services under the Department of Assistive and Rehabilitative Services (DARS).

Permanence address: 11209 Sage Hollow Drive, Austin, Texas 78758

This dissertation was typed by the author.