Employment Outcomes and Job Quality of Vocational Rehabilitation Consumers with Deaf-blindness

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Author note:

The contents of this publication were developed under a grant from the U.S. Department of Health and Human Services, NIDILRR grant 90RT5040-00-01. However, these contents do not necessarily represent the policy of the Department of Health and Human Services and should not indicate endorsement by the Federal Government.

The published version of this document can be found http://dx.doi.org/10.1177/0034355218769461.

Abstract

The purpose of this study was to investigate employment outcomes for Vocational Rehabilitation (VR) consumers with deaf-blindness, a population that has received no attention in the literature. The sample was obtained from Rehabilitation Services Administration Case Service Report (RSA-911) data and included 1,382 consumers with deaf-blindness identified as their primary or secondary disability whose cases were closed during fiscal years 2013, 2014, and 2015. Independent variables consisted of consumer personal characteristics and VR service-related variables. Two measures of employment outcomes were used: obtainment of competitive employment and a composite measure of job quality. Overall, the results indicate that several VR service-related factors are associated with whether deaf-blind consumers obtain competitive employment, but consumers' personal characteristics are much more important in determining job quality. Implications for improving employment outcomes for consumers who are deaf-blind include providing job-related services, supporting educational advancement, and providing counseling and guidance. Results also support the importance of accounting for employment status at application in RSA-911 analyses and the efficacy of service provision by separate agencies for the blind.

Employment Outcomes and Job Quality of Vocational Rehabilitation Consumers with Deaf-blindness

Deaf-blindness is a low incidence disability affecting less than 1% of the U.S. population; approximately 816,468 working-age adults have self-reported combined hearing and vision loss (Sui, 2017). Although the term "deaf-blind" appears to imply total blindness and total deafness, most individuals who are deaf-blind have some vision and hearing. The Helen Keller National Center Act defines deaf-blindness as a combination of legal blindness (or progressive vision loss) and severe hearing impairment (or progressive hearing loss) that causes "extreme difficulty in attaining independence in daily life activities, achieving psychosocial adjustment, or obtaining a vocation" (29 U.S.C. § 1905 [2]); however, specific criteria for identifying individuals as deaf-blind may vary by state and organization.

Based on American Community Survey estimates for 2011-2015, approximately 30.9% of working-age adults who reported both hearing and vision difficulty were employed, and the unemployment rate for this population was 15.6% (Sui, 2017). Researchers have found similar employment rates, ranging from 30% to 37%, among young adults with deaf-blindness (Authors, in press; Peracchio & Stetler, 2009/2010; Petroff, 2010). Still, about 30% of these employed young adults earned below minimum wage, and most did not receive health insurance or other benefits at their jobs (Authors, in press). Despite these poor employment outcomes, employment-related research for this population is limited. The existing employment-related studies of individuals who are deaf-blind are dated, based on small samples, or include a subset of the population such as transition-age youth, older adults, or working-age adults with a specific diagnosis (e.g., Ehn, Möller, Danermark, & Möller, 2016; McDonnall & LeJeune, 2008; Petroff, 2001, 2010; Segal, 2000; Wolf, Delk, & Schein, 1982).

In the only comprehensive needs assessment conducted with this population, adults who are deaf-blind reported that finding employment was their most severe problem, followed by communication, and that vocational training was their greatest unmet service need (Wolf et al., 1982). In more recent studies, vocational training and vocational services were identified as needs for youth and adults who are deaf-blind (Authors, in press; Ehn et al., 2016; Petroff, 2001, 2010). Only a few researchers have investigated factors associated with employment for people who are deaf-blind. Among older adults with combined hearing and vision loss, being employed was associated with higher levels of education, use of accommodations or assistive technology, and changing job or type of work (McDonnall & LeJeune, 2008). Having a college degree was strongly associated with employment for deaf-blind adults in one study (Segal, 2000), and working was associated with better self-reported physical and psychological health among Swedish adults with Usher syndrome type 2 (Ehn et al., 2016).

Vocational Rehabilitation Research

The Rehabilitation Services Administration Case Service Report (RSA-911) dataset is a valuable data source for examining employment outcomes, particularly among low incidence populations; however, research on Vocational Rehabilitation (VR) consumers who are deaf-blind and their outcomes is absent from the literature. A number of researchers have used RSA data to investigate employment outcomes of VR consumers with other sensory disabilities (i.e., those who are blind or visually impaired and deaf or hard of hearing). These studies can provide insight into factors that may be associated with employment for VR consumers who are deaf-blind. In some cases, researchers focused on specific sub-groups such as consumers with congenital hearing loss (Moore, 2002), transition-age youth with visual impairments (Cimera, Rumrill, Chan, Kaya, & Bezyak, 2015; Giesen & Cavenaugh, 2012); consumers who received

college or university training (Boutin & Wilson, 2009), and Social Security Disability Insurance (SSDI) beneficiaries (Giesen & Cavenaugh, 2013; Giesen & Hierholzer, 2016).

Several personal characteristics have predicted employment outcomes among VR consumers with sensory disabilities, including gender, race, ethnicity, age, and disability-related factors. Male gender was positively associated with employment outcomes across sensory disability groups (Bradley, Geyer, & Ebener, 2013; Cimera et al., 2015; Darensbourg, 2013; Estrada-Hernandez, 2008; Giesen & Cavenaugh, 2012, 2013; Moore, 2002). Findings regarding race, ethnicity, and age have been less conclusive. African American race was negatively associated with employment (Dutta, Gervey, Chan, Chou, & Ditchman, 2008; Giesen & Cavenaugh, 2012) and Asian race was negatively associated with employment for SSDI beneficiaries with visual impairments (Giesen & Cavenaugh, 2013), but race was not associated with employment outcomes in other studies (Capella-McDonnall, 2005; McDonnall, 2016). Hispanic ethnicity predicted positive outcomes for transition-age youth who are blind or visually impaired (Cimera et al., 2015; Giesen & Cavenaugh, 2012), but not for adults with visual impairments (Giesen & Cavenaugh, 2013; McDonnall, 2016) or consumers who are deaf or hard of hearing (Bradley et al., 2013). In some studies, younger age was associated with positive employment outcomes (Capella, 2001; Darensbourg, 2013; Estrada-Hernandez, 2008; McDonnall, 2016), and older age was associated with positive outcomes in another (Dutta et al., 2008). Findings have been mixed regarding severity of hearing loss, with one study supporting higher odds of employment for consumers who are hard of hearing (Bradley et al., 2013) and another supporting higher employment rates for deaf consumers (Moore, 2001). Consumers with less severe visual impairments had higher odds of employment (Cimera et al., 2015; Darensbourg, 2013; Giesen & Cavenaugh, 2012, 2013), and consumers without additional

disabilities were more likely to be employed than those who had additional disabilities (Giesen & Cavenaugh, 2012, 2013; McDonnall, 2016).

Several factors related to consumers' status at application predicted employment at closure, including being employed at application/having earnings at application (Darensbourg, 2013; Dutta et al., 2008; Giesen & Cavenaugh, 2012, 2013), self as referral source (Darensbourg, 2013), and financial independence (self as primary source of support; Bradley et al., 2013). For consumers with sensory disabilities, higher education was associated with employment (Bradley et al., 2013; Cimera et al., 2015; Dutta et al., 2008; Giesen & Cavenaugh, 2012, 2013), higher earnings (Capella, 2001; Estrada-Hernandez, 2008), and job quality (Cimera et al., 2015). Furthermore, receipt of government benefits, including Supplemental Security Income (SSI) and SSDI, was negatively associated with employment (Cimera et al., 2015; Dutta et al., 2008; Giesen & Cavenaugh, 2012) and job quality (Cimera et al., 2015), while monthly SSDI amount was positively associated with obtaining employment (Giesen & Cavenaugh, 2013).

Various VR agency and service-related variables were identified as positive predictors of and risk factors for employment in previous research. Among consumers who are blind or visually impaired, agency type has been associated with employment outcomes, with those served by separate, or blind, agencies having better outcomes (Cavenaugh, 1999; Cavenaugh, Giesen, & Pierce, 2000; Giesen & Cavenaugh, 2013). However, agency type was not a relevant predictor of earnings (Capella, 2001; Estrada-Hernandez, 2008), or employment outcomes or job quality for youth (Cimera et al., 2015). Counselor characteristics did not significantly predict employment for individuals who are deaf or hard of hearing (Bradley et al., 2013), but having a high quality relationship between counselor and consumer was associated with employment for those who are blind or visually impaired (Capella-McDonnall, 2005).

Researchers have consistently found positive outcomes for consumers who received job-related services (Giesen & Cavenaugh, 2012), including job placement assistance (Boutin, 2009; Boutin & Wilson, 2009; Bradley et al., 2013; Cimera et al., 2015; Dutta et al., 2008; Giesen & Hierholzer, 2016; Moore, 2001; Moore, 2002), on-the-job supports (Boutin, 2009; Cimera et al., 2015; Dutta et al., 2008; Giesen & Hierholzer, 2016), and on-the-job training (Moore, 2001). Most studies have supported the efficacy of job search assistance: it was a positive predictor of employment for consumers in three studies (Boutin & Wilson, 2009; Cimera et al., 2015; Giesen & Hierholzer, 2016) but it was a negative predictor for consumers without college/university training in one study (Boutin, 2009). Rehabilitation technology is another service that has frequently been associated with positive employment outcomes for consumers with sensory disabilities (Boutin, 2009; Boutin & Wilson, 2009; Cimera et al., 2015; Dutta et al., 2008; Giesen & Hierholzer, 2016).

College or university training was associated with employment outcomes (Cimera et al., 2015; Giesen & Cavenaugh, 2012; Moore, 2001, 2002) as was receipt of educational services resulting in a certificate or degree (Capella-McDonnall, 2005). VR counseling and guidance has positively predicted employment outcomes in some studies (Boutin, 2009; Giesen & Hierholzer, 2016) but not others (Cimera et al., 2015; Dutta et al., 2008). Receipt of general or vocational supports (Giesen & Cavenaugh, 2012) has also predicted employment outcomes, including business and vocational training (Moore, 2001; Moore, 2002), maintenance (Boutin, 2009; Boutin & Wilson, 2009; Cimera et al., 2015; Dutta et al., 2008), and other services (Boutin & Wilson, 2009; Dutta et al., 2008). Job readiness training, disability-related augmentative skills training, and interpreter services were negative predictors of employment in several studies (Boutin, 2009; Cimera et al., 2015; Giesen & Hierholzer, 2016).

Competitive employment was the most common outcome measure used in previous RSA-911 studies of individuals with sensory disabilities (e.g., Boutin, 2009; Boutin & Wilson, 2009; Darensbourg, 2013; Dutta et al., 2008; Giesen & Cavenaugh, 2012, 2013; Moore, 2001); however, the quality of the job obtained is also important to consider. Although some researchers have used earnings as a proxy for job quality (Estrada-Hernandez, 2008; Capella, 2001; Moore, 2002), composite measures of job quality were far less frequently used. Only two RSA-911 studies have included composite measures of job quality (Chan et al., 2016; Cimera et al., 2015). With the Workforce Innovation and Opportunity Act's (WIOA, 2016) emphasis on "high quality, competitive employment" for all consumers, including those with the most significant disabilities, it is important to look beyond whether VR consumers simply obtained a job or not to identify factors associated with high quality jobs.

Purpose of the Study

In the present study, we extend the literature on predictors of employment outcomes by focusing on an under-researched population of VR consumers with sensory disabilities and including a composite measure of job quality. The purpose of this study was to identify predictors of competitive employment and job quality of consumers who are deaf-blind. Two research questions were posed:

1. What factors predict competitive employment outcomes for deaf-blind consumers served by VR agencies?
2. What factors predict the quality of the job obtained by deaf-blind consumers served by VR agencies?

Method

Sample

Rehabilitation Services Administration Case Service Report (RSA-911) data for federal fiscal years (FY) 2013, 2014, and 2015 were utilized for this study. RSA-911 data include demographic, disability-related, service-related, and outcome information for all consumers closed by VR agencies during the FY. Consumers with a primary or secondary disability of deaf-blindness who were between the ages of 18 and 67 at case closure and received services (i.e., in closure status "exited with an employment outcome" or "exited without an employment outcome, after receiving services") were included in the sample. Consumers who received services but were closed due to death or institutionalization and those who received services in U.S. territories were excluded from the sample.

The sample consisted of 1,382 consumers (946 with a primary and 436 with a secondary disability of deaf-blindness) who met the preceding inclusion criteria and had their cases closed between October 1, 2012 and September 30, 2015. Many consumers had blindness/visual impairment or deafness/hearing impairment identified as their secondary or primary disability (in addition to deaf-blindness), but 6.2% had an unrelated primary disability and 22% had an unrelated secondary disability. A small majority of the sample was male (52.7%) and the average age at application was 39.53 (SD=14.64). Most people in the sample were between the ages of 25 and 54 (61.0%), followed by age 24 or younger (20.7%), and age 55 or older (18.3%). In terms of race, a majority of the sample was White (79.4%), followed by African American (15.7%), Asian (1.8%), multi-race (1.7%), American Indian (0.9%) and Native Hawaiian or Pacific Islander (0.5%); 16.7% were of Hispanic or Latino ethnicity. All consumers had a visual impairment or blindness *and* a hearing impairment or deafness, as they were classified as deaf-blind, but the severity of consumers' sensory impairments is unknown.

Outcome Measures

We utilized two outcome measures: one measured whether consumers were closed with a competitive employment outcome and one measured the quality of the job obtained by those closed with a competitive employment outcome. Competitive employment was defined as being closed in one of the following employment categories: employed with or without supports in an integrated setting (employer job), self-employment, or Business Enterprise Program, and compensated at or above the federal minimum wage.

Job quality was operationalized based on job benefits and earnings in comparison to a living wage and state hourly wage. We created a three-factor measure for this study that consisted of (a) receipt of medical insurance through the job (yes/no coded as 1/0), (b) weekly salary compared to the living wage in that state (a proportion), and (c) hourly wage compared to state median hourly wage (a proportion). Living wage is a minimum income standard that provides financial independence; it is higher than the poverty threshold and considers cost of living in specific areas (Glasmeier & Nadeau, 2017). A living wage has been defined for all states and some large cities.

We conducted a principal components analysis on the three job quality variables to confirm the appropriateness of combining them into a single measure and, if found appropriate, to create a single factor score to use as an outcome measure. The principal axis method was used to extract the components and ones were used as prior communality estimates. The Kaiser-Meye-Olkin Measure of Sampling Adequacy was low (.52) but above the minimum acceptable cutoff (Kaiser, 1974), and Bartlett's Test of Sphericity was significant (911.28, $p < .001$), indicating that the data were appropriate for principal components analysis. Results of this analysis supported the appropriateness of retaining one factor (based on the criterion of having an eigenvalue greater than one) and all factor loadings being high (i.e., .63, .86, and .94). This factor

explained 67.6% of the total variance. A factor score (a linear composite of the weighted observed variables) with a mean of 0 and a standard deviation of 1 was created to represent job quality. The job quality factor score had a range of -1.09 to 6.96 and a median of -0.39 for our sample. Positive scores indicate the person's job quality was higher than the average deaf-blind consumer who was closed with competitive employment and negative scores indicate the person's job quality was lower.

Independent Variables

Two categories of variables were utilized as independent variables in the models: consumer personal characteristics and VR service-related. Variables were selected for inclusion in the models based on the limited previous research findings for people with deaf-blindness and the more extensive findings for VR consumers with blindness/visual impairment and VR consumers with deafness/hearing impairment.

Consumer personal characteristics included these demographic variables: age, gender, Hispanic ethnicity, racial minority status, and education. Other personal characteristic variables were receipt of SSI, receipt of SSDI, presence of three types of additional disabilities (cognitive, physical, and mental), being congenitally deaf-blind, source of referral to VR as self (meant to serve as a rough proxy for motivation), employment at application, and self as the primary source of support at application. With the exception of age and education, all other personal characteristic variables were dichotomous and coded as 1 for yes/presence of condition and 0 for no/lack of condition. Age was the person's age in years at application and education was treated as a continuous variable (range of 0 to 12), with each higher level of education assigned a higher number (0 = no formal education through 12 = any degree above a Master's; see Table 1).

VR service-related variables included type of agency that provided services (separate [blind] agency, combined agency, or general agency), whether the person received an educational degree or certificate while receiving services, and nine service variables thought to potentially be related to employment outcomes for deaf-blind consumers. Receipt of a degree or certificate was determined by comparing education at application to education at closure; if the person had a higher degree or certificate at closure than at application, this variable was assigned a value of 1, otherwise it was assigned a 0. Nine services were included in the models: interpreter services, disability-related skills training (which can include training in orientation and mobility, use of low vision aids, braille, rehabilitation teaching, speech reading, sign language, and cognitive training), rehabilitation technology, job placement assistance, job search assistance, job readiness training, on-the-job supports – short term, on-the-job supports – supported employment, and VR counseling and guidance. The service variables were dichotomous and coded as 1 if the person received the service and 0 if the person did not receive the service.

Data Analysis

Descriptive statistics (frequencies, means/standard deviations) were used to present information about the independent and dependent variables. Logistic regression was used to determine factors that predict competitive employment outcomes, and multiple regression was used to determine factors that predict quality of jobs obtained by those closed in competitive employment. Two-way interactions between variables in the logistic regression model were tested as recommended by Hosmer and Lemeshow (2000), with only significant interactions retained in the final model. Odds ratios were utilized as effect sizes for the logistic regression model and the percentage of unique variance explained (squared semi-partial correlations) was

utilized as an effect size measure for the multiple regression analysis. SAS 9.4 was used to conduct all statistical analyses.

Results

Descriptive Statistics

Descriptive statistics are presented in Table 1. Over a third of the sample received SSDI benefits at application, and about a quarter received SSI benefits. Nearly half of the consumers in the sample referred themselves for services; less than a third were employed at application, and about a quarter had personal income as their primary source of support at application. Consumers most commonly received services from blind agencies, followed by combined agencies, and general agencies. Most consumers had a high school diploma (or equivalency certificate) or higher at closure; a few consumers obtained their degree or certificate while receiving services. Of the nine service variables included in the models, consumers most commonly received VR counseling and guidance, rehabilitation technology, and disability-related skills training. More than half of consumers were competitively employed at closure. About a quarter of employed consumers (26.0%) received medical insurance through their jobs. On average, competitively employed consumers earned 0.96 (SD = .78), or 96%, of the living wage for their state, with a range of 0.03 to 6.84. Consumers' average hourly earnings were 0.83 (SD = .54), or 83%, of their state's median hourly wage; proportions ranged from 0.37 to 4.55.

Competitive Employment Model

A logistic regression analysis was conducted to predict competitive employment based on consumer personal characteristics and VR service-related variables. A significant interaction between cognitive disability and employment at application was found and included in the model. The likelihood ratio test for the model was statistically significant, x^2 (27, N = 1382) =

434.03, $p < .001$, Nagelkerke $R^2 = .36$. The consumer personal characteristics and VR service-related variables in the model correctly predicted competitive employment for 71.9% of consumers. The Hosmer and Lemeshow Goodness-of-Fit Test indicated that the model is a good fit for the data, $x^2 (8) = 8.30$, $p = .41$.

As shown in Table 2, significant main effects included four personal characteristics and seven service-related variables. Eight variables were associated with *higher* odds of competitive employment: education, self as the primary source of support, obtaining a degree or certificate while receiving VR services, job placement assistance, job search assistance, on-the-job supports – short term, on-the-job supports – supported employment, and VR counseling and guidance. Three variables were associated with *lower* odds of competitive employment: female gender, physical disability, and agency type. The odds of competitive employment were lower for consumers served by combined agencies compared to those served by blind agencies. The interaction between cognitive disability and employment at application indicates that the effect of employment at application depends on the presence or absence of a cognitive disability in addition to deaf-blindness. Compared to consumers who were unemployed at application, those who were employed at application had much higher odds of competitive employment at closure *if* they did not have a cognitive disability (*OR* = 7.70; 95% CI: 5.11, 11.61); however, employment at application was not associated with competitive employment for consumers with cognitive disabilities (*OR* = 0.96; 95% CI: 0.27, 3.40).

Job Quality Model

A multiple regression analysis was conducted to predict job quality based on consumer personal characteristics and VR service-related variables for the 781 consumers in the sample who had a competitive employment outcome. The variables in the model accounted for 32% of

the variance in job quality, F (26, 754) = 15.16, $p < .001$, $R^2 = .34$ (Adjusted $R^2 = .32$). Three variables were significant predictors of *higher* job quality: age, education, and self as the primary source of support. Five variables were significant predictors of *lower* job quality: female gender, receipt of SSI, receipt of SSDI, on-the-job supports – short term, and on-the-job supports – supported employment. Education accounted for 10.0% of the unique variance in job quality, receipt of SSDI accounted for 2.9% of unique variance, and self-support at application accounted for 1.5% of unique variance. The unique contributions of the remaining five significant predictors were small (1.1% or less). See Table 3 for detailed results of the job quality analysis.

Discussion

This study is the first investigation of employment outcomes for a national sample of adults with deaf-blindness served by the state VR system. With the low incidence of deaf-blindness, the RSA-911 data is the only data source available to provide a sample large enough for a comprehensive quantitative study such as this. Given the extremely limited published research related to employment for this population, this study provides valuable information about the factors that are associated with competitive employment closures and higher job quality for people who are deaf-blind.

Predictors of Competitive Employment

The most important predictor of competitive employment was being competitively employed at application, as a relatively large percentage of the sample (i.e., 30.5%) were. However, this variable predicted competitive employment only for people without cognitive disabilities: their odds were 7.7 times higher of being competitively employed at closure if they were employed at application. For consumers with cognitive disabilities, being employed at application was not associated with being competitively employed at case closure. It should be

noted that only 15 consumers with cognitive disabilities were employed at application, and 10 of them were competitively employed at case closure. With the small numbers, this result may be an anomaly of this data and should be confirmed with additional research. Studies of consumers with other sensory disabilities have also found employment at application to be an important predictor with the size of the effect large, but varying widely (Darenshourg, 2013; Dutta et al., 2008). Researchers utilizing RSA-911 data have not consistently taken into consideration employment status at application, which is more common among consumers with sensory impairments, including deaf-blindness, compared to consumers with other disabilities. Given its importance, this variable should be included in RSA-911 data models predicting employment for consumers with sensory impairments.

Most other personal characteristics of our sample were not significant predictors of competitive employment, with the exception of education level, having a physical disability, and female gender. Higher levels of education were positively associated with competitive employment, which is supported by the limited existing employment-related research about people who are deaf-blind (McDonnall & LeJeune, 2008; Segal, 2000). Having a physical disability was negatively associated with competitive employment, as supported by studies of people who are deaf-blind (Ehn et al., 2016) and blind or visually impaired (Kirchner, Schmeidler, & Todorov, 1999) in which physical health was strongly associated with employment. Female gender was negatively associated with competitive employment in our study, with males more likely to be competitively employed at case closure. Previous research with consumers with other sensory disabilities has been mixed as to the predictive ability of race, ethnicity, and age on employment outcomes, so it is perhaps not surprising that these factors did not predict employment for consumers who are deaf-blind. Receipt of SSI and SSDI have been

associated with employment outcomes in several studies of consumers who are blind or visually impaired (Cimera et al., 2015; Dutta et al., 2008; Giesen & Cavenaugh, 2012), but SSI and SSDI were not associated with competitive employment for consumers who are deaf-blind in our study. Reasons for the non-significance of these variables are not clear based on the current body of literature; these findings should be confirmed with additional research on this population.

Agency type was an important service-related predictor of competitive employment: consumers served by blind agencies had odds 1.88 times higher of obtaining employment compared to consumers served by combined agencies, although there was no difference in odds of obtaining employment for consumers served by blind versus general agencies. Some previous studies of VR consumers with blindness or visual impairment also documented greater chances of employment for consumers served by blind agencies (Cavenaugh, 1999; Cavenaugh et al., 2000; Giesen & Cavenaugh, 2013). In states with separate agencies, usually only consumers with the least significant visual impairments are served by general rather than blind agencies. However, for consumers with deaf-blindness, the choice of general or blind agency may depend on the disability that the consumer identifies with the most or the one that is causing the most significant problem to employment. For example, a consumer who uses sign language to communicate may prefer to be served by a general agency that has a specialized deafness unit. A consumer who recently lost vision or experienced a worsening of vision might prefer to receive services from a blind agency that has staff with expertise in assistive technology and alternate techniques. The differentiated services that general and blind agencies can provide, based on consumer need, may explain the lack of difference in employment outcome for deaf-blind consumers served by these agency types. These findings suggest that blind agencies, in general, are well prepared to successfully serve consumers with deaf-blindness.

As found in Capella-McDonnall (2005), another important service-related variable was obtainment of a degree or certificate while a VR consumer. Consumers who received a degree or certificate were more likely to be competitively employed at case closure. This finding supports the importance of providing education as a service that ultimately results in an advancement of education level. Services that were significant predictors of competitive employment were the four job-related services and counseling and guidance. It is not surprising that the job-related services (i.e., job placement assistance, job search assistance, on-the-job supports-short term, and on-the-job supports-supported employment) were all positively associated with competitive employment, particularly the on-the-job support services as those services are provided to consumers to help them maintain their jobs. Job-related services have frequently been associated with employment outcomes for blind/visually impaired and deaf/hard of hearing consumers (Boutin, 2009; Cimera et al., 2015; Dutta et al., 2008; Giesen & Cavenaugh, 2012; Moore, 2001). There is less support for the importance of VR counseling and guidance with these other populations, as some researchers found that it did not predict employment (Cimera et al., 2015; Dutta et al., 2008) and others found that it did (Boutin, 2009; Giesen & Hierholzer, 2016). However, receiving VR counseling and guidance predicted competitive employment for deaf-blind consumers; potentially this variable partially represents the counselor's ability to successfully communicate with the consumer.

Predictors of Job Quality

Personal consumer characteristics were the most important predictors of job quality for deaf-blind consumers who achieved competitive employment, whereas few service-related variables were significant predictors. Education level explained the greatest amount of variance in job quality, which is not surprising given that education is an important predictor of earnings

for everyone, regardless of disability status (Baum, 2014). Although obtaining a degree or certificate during VR services was not associated with job quality at case closure, it is expected to be associated with greater earnings potential in the future (Baum, 2014). This phenomenon was documented among the deaf and hard of hearing population, with college graduates having higher lifetime earnings (Schley et al., 2011) compared to non-graduates. Other significant predictors of job quality also common to the general population were gender (males higher than females) and older age. Interestingly, having an additional disability was not associated with job quality.

Receipt of SSDI benefits at application was the second strongest predictor, with receipt of these benefits associated with lower job quality at case closure. A certain history of work experience and earnings are required for receipt of SSDI benefits; therefore, these benefits are likely associated with earning potential in the future, assuming the person returns to work. Although receipt of SSDI benefits did not predict whether a person was closed with competitive employment, it did predict lower job quality. We speculate that SSDI recipients were keeping their earnings low to retain benefits. SSI receipt was also negatively associated with job quality, but the association was much weaker. To qualify for SSI a person must have limited resources and a very limited income, and people receiving SSI are more likely to have a limited work history, which could negatively impact their job quality. Self as primary source of support was also an important predictor of job quality, potentially indicating the importance of having a high quality job at application.

Only two service-related variables were associated with job quality: on-the-job supports – short term and on-the-job supports – supported employment. Although these variables were positively associated with obtaining competitive employment, they were negatively associated

with the quality of the job obtained. This finding indicates that those who need the services to assist them in maintaining a job encounter more challenges, and are less likely to obtain high quality jobs. Another notable finding is that agency type did not predict job quality, as found in previous research on people who are blind or visually impaired (Capella, 2001; Cimera et al., 2015; Estrada-Hernandez, 2008).

Competitive Employment vs. Job Quality

The competitive employment and job quality models shared a few common predictors but had more differences. Only three variables were positively associated with both competitive employment and job quality: male gender, self as primary source of support, and higher education level. Whereas education level was the strongest predictor of job quality, competitive employment at application was the strongest predictor of competitive employment at closure. An overarching difference between the models is that several service-related variables were significant predictors of competitive employment, but they did not significantly predict job quality or were negative predictors. Personal characteristics were more important than service-related variables in determining job quality for deaf-blind consumers, as found by Chan et al. (2016). As illustrated by the differences between the two models, dichotomous measures of competitive employment may not tell the whole story. Inclusion of multidimensional measures of employment outcomes in RSA-911 analyses will provide a more comprehensive perspective on employment outcomes for consumers. If high quality, competitive employment is the goal for all consumers, these analyses should include measures of job quality.

Limitations

Although the RSA-911 Case Service Report is the only source of data available to provide a large enough sample to conduct these analyses, several limitations to the data should

be acknowledged. One such consideration is how VR counselors code primary and secondary disability for consumers with hearing and vision loss, which may vary by agency, individual counselor, or both. Counselors code some consumers with hearing and vision loss with one as the primary disability and the other as the secondary disability, while other consumers are identified as deaf-blind. This study included only those coded as deaf-blind, with the thought that perhaps consumers identified as deaf-blind would have more significant sensory impairments. However, that is only a supposition, as the Reporting Manual for the RSA-911 Case Service Report does not provide any guidance on how to define deaf-blindness. Although we know that all consumers in the study have a combined hearing and vision loss, unfortunately we have no information about the severity of their hearing and vision loss. We expect that there are wide variations in consumers' levels of hearing/vision loss, ranging from totally blind and deaf to mild hearing and vision loss, and these levels may be associated with employment outcomes. Preferred mode of communication is another potentially important factor that is not available in the data. Other factors unavailable in the data may contribute to both of the employment outcomes investigated, which is another limitation of the study. Finally, job quality can be conceptualized in many ways and our job quality measure was restricted to objective measures of benefits and earnings that were available in the data; subjective measures could provide insight into other dimensions of job quality.

Implications for Practice

Although consumers' personal characteristics are more important than VR service-related factors in determining job quality, several service-related factors are associated with whether deaf-blind consumers obtain competitive employment, which indicates an opportunity for VR agencies to improve employment outcomes for these consumers. Job-related services were

important predictors of obtaining competitive employment; therefore, the more VR agencies can provide these services, the more likely deaf-blind consumers will be to obtain competitive employment. Considering the importance of education level for both competitive employment and job quality, supporting consumers to advance their education is a vital service that VR agencies can provide. Only a small percentage of deaf-blind consumers served and closed during the three year-period of this study obtained a degree or certificate, indicating that VR counselors could place additional emphasis on educational advancement. Consumers who are deaf-blind need individualized academic and communication supports to access information and succeed in post-secondary education (Arndt, 2010; Wosley, 2017). VR counselors can facilitate access to these supports by connecting consumers with disability support services offices at post-secondary institutions and providing the assistive technology needed to help them succeed in an academic setting. Even with appropriate supports, consumers who are deaf-blind may take longer to finish their education and obtain a degree or certificate (Arndt, 2010). However, the investment in education is worthwhile, as obtaining an additional educational degree or certificate is associated with higher odds of competitive employment at case closure. Counseling on opportunities for enrollment in secondary transition or post-secondary education programs is a required component of pre-employment transition services (WIOA, 2016) and thus provides an ideal avenue for early discussions with youth about post-secondary opportunities.

Although obtaining a degree or certificate while a VR consumer did not predict job quality, level of education was a strong predictor. People who have recently obtained a degree/certificate may not obtain higher quality jobs immediately, but they are more likely to obtain jobs that will allow advancement to higher quality jobs in the future (Baum, 2014). Although advancing education would be important for anyone's job outlook, it may be

particularly important for creating increased employment opportunities for consumers who are deaf-blind. The impact of hearing and vision loss is multiplicative; thus, many individuals who are deaf-blind have extensive communication and support needs and face societal barriers, all of which can negatively impact their job options more than people with other disabilities. Obtaining a postsecondary degree or certificate can broaden individuals' job options by increasing their qualifications for jobs with advancement potential and greater earnings over the long-term.

These findings also support the importance of providing substantial counseling and guidance to deaf-blind consumers. Although external providers could provide counseling and guidance, for our sample virtually all of the counseling and guidance was provided by the VR counselor, or, for a small percentage, the VR counselor and additional providers. This finding indicates the importance of effective communication between the VR counselor and consumer, in the consumer's preferred method of communication, for adequate provision of counseling. For consumers receiving disability benefits, counseling should include information about available work incentives and encouragement to earn at their full potential. Motivational interviewing is a technique that may be beneficial to use with all consumers, and particularly for those receiving disability benefits (Larson, 2008; Page & Tchernitskaia, 2014).

Consumers who are deaf-blind and have specific personal characteristics may need additional support from VR counselors to obtain high quality, competitive employment. Women who are deaf-blind were more likely to be closed without competitive employment and have lower quality jobs compared to men who are deaf-blind, which could partially be explained by homemaker closures. Of consumers closed in our sample with any type of employment outcome, women were more than twice as likely to be closed as homemakers than men – 21.1% compared to 10.0%. Although WIOA has eliminated the use of the homemaker closure, VR counselors can

still have an impact by encouraging women who are deaf-blind to pursue employment. Some women may come to VR with the belief that they cannot work or they may settle for an employment goal in a lower paying, traditionally female field, but VR counselors can encourage women to establish an employment goal and support their pursuit of higher quality jobs. Finally, VR counselors can connect unemployed women who are deaf-blind with role models and/or mentors – employed females who are deaf-blind – who can provide additional encouragement and support.

Deaf-blind consumers with physical disabilities are also at increased risk for being closed without competitive employment, and approximately 13% of the sample had a physical disability. Touch is critical for communication and environmental access for individuals who are deaf-blind, and having an additional physical disability could affect individuals' use of touch to communicate and access the environment. Individuals with deaf-blindness and physical disabilities may face additional societal barriers that could impact their employment outcomes. For example, compared to job applicants without disabilities, applicants with physical disabilities (i.e., those who use a wheelchair) may be less likely to be chosen for various jobs and perceived as less competent by employers regardless of their actual competencies (Louvet, 2007). VR professionals serving consumers who are deaf-blind should keep this in mind and realize that deaf-blind women and those with additional physical disabilities may need extra assistance to be successful.

Finally, these results support the efficacy of separate services for a subpopulation of consumers who are blind or visually impaired. Although combined agencies can and do provide quality services to consumers who are blind or visually impaired, these results add to the evidence that receiving services from separate blind agencies results in better outcomes for

certain consumers with blindness or visual impairment. These findings should be considered when states are debating whether to continue to support, or to move to, a separate and general agency structure.

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Table 1
Descriptive Statistics for Study Variables

Variable	*n*	%
Education level		
No formal schooling	6	0.4
Elementary education	32	2.3
Secondary education, no high school diploma	120	8.7
Special education, certificate/diploma or in attendance	96	7.0
High school graduate or equivalency certificate	448	32.4
Vocational/technical certificate or license	28	2.0
Postsecondary education, no degree or certificate	235	17.0
Associate degree	159	11.5
Bachelor's degree	175	12.7
Occupational credential beyond undergraduate degree	2	0.1
Master's degree	78	5.6
Any degree above a Master's degree	3	0.2
Cognitive disability	104	7.5
Physical disability	186	13.5
Mental disability	87	6.3
Congenital deaf-blindness	686	49.6
SSI	365	26.4
SSDI	502	36.3
Source of referral as self	687	49.7
Employment at application	422	30.5
Self as primary source of support	342	24.8
Agency type		
Blind	650	47.0
Combined	496	35.9
General	236	17.1
Received degree/certificate	95	6.9
Services received		
VR counseling and guidance	892	64.5
Rehabilitation technology	847	61.3
Disability-related skills training	542	39.2
Interpreter services	344	24.9
Job placement assistance	322	23.3
Job search assistance	276	20.0
Job readiness training	185	13.4
On-the-job supports – short term	153	11.1
On-the-job supports – supported employment	94	6.8
Competitive employment at closure	781	56.5

Note. $N = 1382$

Table 2

Results of Logistic Regression Analysis Predicting Competitive Employment

Variable	*b*	*SE*	Wald χ^2	*p*	*OR*	95% *CI*
Personal Characteristics						
Age	0.004	0.01	0.48	.49	1.00	[0.99, 1.01]
Female	-0.32	0.13	5.81	.02	0.73	[0.56, 0.94]
Hispanic ethnicity	0.18	0.19	0.95	.33	1.20	[0.83, 1.74]
Racial minority	-0.01	0.16	0.01	.93	0.99	[0.72, 1.35]
Education level	0.12	0.03	13.68	<.01	1.13	[1.06, 1.21]
SSI	-0.08	0.15	0.26	.61	0.93	[0.69, 1.25]
SSDI	-0.14	0.15	0.95	.33	0.87	[0.65, 1.16]
Additional disability						
Cognitive	0.30	0.27	1.26	.26		
Physical	-0.53	0.20	6.96	.01	0.59	[0.40, 0.87]
Mental	-0.32	0.27	1.49	.22	0.72	[0.43, 1.22]
Congenital deaf-blindness	0.08	0.13	0.37	.55	1.09	[0.83, 1.41]
Source of referral as self	0.04	0.14	0.07	.80	1.04	[0.79, 1.36]
Employment at application	2.04	0.21	94.93	<.01		
Self as primary source of support	0.60	0.22	7.45	.01	1.82	[1.18, 2.78]
Cognitive x Employment at application	-2.08	0.66	9.99	.00		
Service-Related Factors						
Agency type			23.21	<.01		
Combined vs. blind	-0.63	0.16	15.41	<.01	0.53	[0.39, 0.73]
General vs. blind	0.13	0.22	0.36	.55	1.14	[0.74, 1.75]
Received degree/certificate	0.92	0.29	10.33	.00	2.52	[1.43, 4.42]
Services received						
VR counseling and guidance	0.36	0.14	6.56	.01	1.43	[1.09, 1.88]
Rehabilitation technology	0.16	0.15	1.18	.28	1.18	[0.88, 1.57]
Disability-related skills training	-0.30	0.17	3.25	.07	0.74	[0.54, 1.03]
Interpreter services	-0.22	0.16	1.93	.17	0.80	[0.59, 1.09]
Job placement assistance	0.58	0.16	13.25	<.01	1.79	[1.31, 2.44]
Job search assistance	0.48	0.17	7.69	.01	1.61	[1.15, 2.26]
Job readiness training	0.06	0.19	0.09	.76	1.06	[0.73, 1.54]
On-the-job supports-short term	0.81	0.22	13.12	<.01	2.25	[1.45, 3.48]
On-the-job supports-supported employment	0.96	0.27	12.70	<.01	2.62	[1.54, 4.44]

Note. $N = 1382$. *OR* = odds ratio.

Table 3

Results of Multiple Regression Analysis Predicting Job Quality

Variable	*b*	*SE*	t	*p*	sr^{2a}
Personal Characteristics					
Age	0.01	0.00	2.12	.03	.004
Female	-0.22	0.06	-3.56	<.01	.011
Hispanic Ethnicity	-0.10	0.08	-1.17	.24	.001
Racial Minority	-0.08	0.08	-0.96	.34	.001
Education level	0.16	0.01	10.70	<.01	.100
SSI	-0.16	0.08	-1.99	.05	.003
SSDI	-0.41	0.07	-5.81	<.01	.029
Additional disability					
Cognitive	-0.21	0.13	-1.53	.13	.002
Physical	-0.19	0.10	-1.83	.07	.003
Mental	0.04	0.14	0.27	.79	<.001
Congenital deaf-blindness	0.02	0.06	0.33	.74	<.001
Source of referral as self	0.01	0.06	0.16	.87	<.001
Employment at application	0.07	0.08	0.90	.37	.001
Self as primary source of support	0.34	0.08	4.19	<.01	.015
Service-Related Factors					
Agency type					
Combined vs. blind	-0.04	0.08	-0.46	.64	<.001
General vs. blind	-0.01	0.10	-0.10	.92	<.001
Received degree/certificate	-0.06	0.11	-0.53	.60	<.001
Services received					
VR counseling and guidance	0.02	0.07	0.28	.78	<.001
Rehabilitation technology	-0.05	0.07	-0.75	.45	<.001
Disability-related skills training	0.00	0.08	0.01	.99	<.001
Interpreter	-0.05	0.08	-0.65	.51	<.001
Job placement assistance	-0.05	0.08	-0.68	.49	<.001
Job search assistance	-0.03	0.08	-0.38	.70	<.001
Job readiness training	-0.02	0.10	-0.24	.81	<.001
On-the-job supports-short term	-0.22	0.09	-2.45	.01	.005
On-the-job supports-supported employment	-0.27	0.11	-2.42	.02	.005

Note. $N = 781$.

[a]The squared semi-partial correlations indicate the proportion of unique variance accounted for by each predictor variable.