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Transportation Self-Efficacy and Employment among Individuals with Visual Impairments

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Abstract

BACKGROUND: Many people who are blind or visually impaired face difficulties with transportation due to their inability to drive. Accordingly, transportation is widely considered a barrier to employment for people who are blind or visually impaired, and transportation self-efficacy is a factor that may minimize the impact of this barrier.

OBJECTIVE: The aim of this study was to examine transportation self-efficacy and its association with employment among working-age adults with visual impairments who were non-drivers.

METHOD: This study included data from 327 people who participated in a national transportation survey of individuals with visual impairments. A multiple logistic regression analysis was conducted to predict full-time employment based on transportation self-efficacy and other factors.

RESULTS: Factors predicting full-time employment included census region, severity of vision loss, and years of education. Interaction effects indicated that odds of employment generally increased as transportation self-efficacy increased; however, the effect of self-efficacy was dependent upon age and age at onset of visual impairment.

CONCLUSIONS: Transportation self-efficacy was an important predictor of employment, particularly for younger people and for those who experienced significant vision loss more recently. Vocational rehabilitation counselors and other service providers can provide support to consumers to increase their transportation self-efficacy.

Keywords: visual impairment, blindness, employment, transportation, self-efficacy, vocational rehabilitation

1. Introduction

Having access to reliable transportation is a critical factor for employment, independence, and quality of life. Many people with disabilities who are non-drivers struggle with securing a consistent, affordable method to get to and from work (Gonzales, Stombaugh, Seekins, & Kasnitz, 2006; Samuel, Lacey, Giertz, Hobden, & Leroy, 2013). These transportation struggles can profoundly impact the lives of people who are blind or visually impaired (Rosenblum & Corn, 2002). Although transportation issues have been investigated in previous research focusing on individuals with visual impairments (Crudden, 2015; Crudden, Antonelli, & O'Mally, 2016; Crudden & McBroom, 1999; Crudden, McDonnall, & Hierholzer, 2015; Crudden & Sansing, 2011; Joseph & Robinson, 2012; Wolffe, 1999), transportation self-efficacy (i.e., having confidence in the ability to plan and use transportation) has received little attention to date.

In accordance with self-efficacy theory (e.g., Bandura, 1977, 1994), we speculated that transportation self-efficacy would be an important factor in the employment of people with visual impairments who do not drive. High transportation self-efficacy may help people persevere through transportation difficulties that arise to overcome employment-related transportation barriers. Thus, the aim of this study was to examine transportation self-efficacy and its association with employment among working-age adults who are blind or visually impaired.

1.1. Self-efficacy

Self-efficacy is one's perception of the ability to successfully perform a task or influence an event (Bandura, 1977, 1994). While there may be a difference between one's perceived ability and functional ability, perception of ability influences behavior, including the effort one will expend to achieve a goal (Erozkan, 2013). Typically, a person with high self-efficacy regards

problems as challenges rather than obstacles or threats, and that perspective leads to personal accomplishment and reduced stress and depression (Bandura, 1994).

Self-efficacy is developed in four major ways: successful experience, social modeling, social persuasion, and individual emotional and physical reactions, with successful experience being the most effective method (Bandura, 1994). Adults reevaluate confidence in their abilities as employment, technological, biological, and societal changes occur; strong personal self-efficacy is required to generate the effort that coping with these changes requires (Bandura, 1994). As adults with disabilities become more independent, their self-efficacy regarding employment increases (Olney, Compton, Tucker, Emery-Flores, & Zuniga, 2014). Because blindness and visual impairment present distinct challenges, and ability to respond to those challenges is associated with self-efficacy, it would be helpful to gain greater understanding of potential associations among self-efficacy, transportation, and employment.

1.2. Self-efficacy and transportation

Because self-efficacy is domain specific (Bandura, 1994), past experiences arranging and using transportation can influence transportation self-efficacy development and the level of transportation self-efficacy can impact how the person responds to future needs to arrange transportation. The various steps involved in negotiating transportation arrangements can be a complicated process for anyone unable to drive and some may have difficulty making successful arrangements. A person with high transportation self-efficacy would be expected to respond to the task of finding and using transportation as a challenge to overcome, while a person with low transportation self-efficacy might see the task as overwhelming. A person who has been successful navigating transportation options would be expected to have higher transportation self-efficacy than a person who has not been successful (Crudden, O'Mally, & Antonelli, 2016).

1.3. Transportation and employment

Transportation links people to important activities of daily life, particularly employment, where arriving at work regularly and on time is an important component of success. Difficulty with transportation has been identified as an employment barrier for persons with disabilities (Kessler Foundation, 2015; Loprest & Maag, 2001); this barrier can be even more pronounced for those who reside in rural areas where public transportation options are limited or nonexistent (Gonzales et al., 2006). Transportation has also been widely recognized as a barrier to employment for persons who are blind or visually impaired (Crudden & McBroom, 1999; Crudden & Sansing, 2011; Joseph & Robinson, 2012; Wolffe, 1999).

A number of strategies have been used by persons with visual impairments to overcome employment-related transportation barriers, including relocation, riding with co-workers, using private transportation systems, and hiring drivers (Crudden, Sansing, & Butler, 2005). In a national survey of persons who are blind or visually impaired, the most common method of getting to work was public transportation, followed by paratransit, walking, or having a spouse or family member provide transportation (Crudden et al., 2015).

To learn how to use public transportation and become more independent in their travel skills, many people who are blind or visually impaired receive orientation and mobility (O&M) training from an O&M specialist. Instruction typically includes how to safely travel on foot as well as how to use various transportation options, including public transit (U.S. Department of Education, 2000). Many youth with early onset vision loss receive this training during their educational programs (Cameto & Nagle, 2007) while persons with later onset vision loss typically receive O&M training through adult rehabilitation programs (Welsch, 2010). The ability to travel independently in the community is associated with employment for individuals

who are blind or visually impaired (Cmar, 2015; Golub, 2003; McDonnall, 2011).

1.4. Employment and visual impairment

Persons who are blind or visually impaired continue to have employment rates well below their peers without disabilities (32.3% versus 72.2%) (U.S. Bureau of Labor Statistics, 2016b). Data from the state-federal vocational rehabilitation (VR) system has been used to identify specific factors associated with positive employment outcomes for persons who are blind or visually impaired. Among transition-age youth who are blind or visually impaired, academic competence was a predictor of employment (McDonnall, 2010; McDonnall & Crudden, 2009). Higher educational level, including receipt of a degree or certificate, has been associated with positive employment outcomes (Capella-McDonnall, 2005; Giesen & Cavenaugh, 2012; Hill, 1989; Kirchner, Schmeidler, & Todorov, 1999; Leonard, D'Allura, & Horowitz, 1999; McDonnall, 2011). People with previous work experience were also more likely to be competitively employed (Capella-McDonnall, 2005; Giesen et al., 1985; Kirchner & Peterson, 1982; Kirchner et al., 1999; McDonnall, 2010, 2011; McDonnall & Crudden, 2009).

Age has been associated with employment, with older people who are blind or visually impaired less likely to be employed (Hill, 1989; Kirchner & Peterson, 1982; Kirchner et al., 1999). Age at onset of visual impairment has also been predictive of employment outcomes, with persons who experienced earlier onset of vision loss more likely to be employed (Giesen et al., 1985; Knowles, 1969). More recent research concerning age of onset and its impact is scarce, perhaps because the state-federal VR program does not require reporting that information.

Relationships between other personal characteristics and employment have been investigated in several studies. Presence of an additional disability was found to negatively impact employment outcomes in some studies (Giesen & Cavenaugh, 2012; Giesen et al., 1985;

Kirchner & Peterson, 1982), though Capella-McDonnall (2005) found no association between presence of a secondary disability and employment outcomes. Race was a significant predictor of employment in some studies (Giesen & Cavenaugh, 2012; Giesen et al., 1985; Kirchner et al., 1999), but race was not associated with employment outcomes in other studies (Bell & Mino, 2013; Capella-McDonnall, 2005). In some studies, people with less severe visual impairment were more likely to be closed in competitive employment outcomes (Giesen & Cavenaugh, 2012; Hill, 1989; Kirchner & Peterson, 1982), while severity of vision loss was not associated with employment outcomes in other studies (Bell & Mino, 2013; Capella-McDonnall, 2005).

Given the challenges that people who are blind and visually impaired face to obtaining employment, it is important to expand our knowledge regarding malleable factors that may be associated with employment. One such factor is transportation self-efficacy. The purpose of this study was to examine transportation self-efficacy and its relationship with full-time employment among working-age adults with visual impairments. Our research questions were as follows:

1. How confident are people with visual impairments in their ability to plan and use transportation to work?
2. Does transportation self-efficacy predict full-time employment for people with visual impairments?
3. What additional factors predict full-time employment for people with visual impairments?

2. Method

2.1. Participants

Data were drawn from a larger study that involved a national transportation survey of 503 individuals with visual impairments, conducted by the National Research and Training Center on

Blindness and Low Vision (NRTC). Participants lived in the U.S. and were at least 18 years old. The sample for this study was restricted to non-drivers who were not retired and were between the ages of 18 and 65. We further limited the sample to those who provided data for the main variables of interest, resulting in a sample size of 327 people from 46 U.S. states.

2.2. Procedure

2.2.1. Transportation survey

The national transportation survey was developed with input from the NRTC's advisory council that included O&M specialists and individuals with visual impairments. The survey collected information about respondents' transportation experiences and the impact of transportation on their employment endeavors. Some questions were modeled after those used in other surveys that focused on transportation (i.e., Bureau of Transportation Statistics, 2002; McKenzie & Rapino, 2011; Santos, McGuckin, Nakamoto, Gray, & Liss, 2011; Straight, 1997). Other questions were added that focused on O&M, as transportation use and experiences of people who are blind or visually impaired often depend on their travel skills. The Institutional Review Board for the Protection of Human Subjects at Mississippi State University approved the study.

The survey was administered using a web-based electronic platform. It was pilot tested with multiple individuals with visual impairments prior to administration, which resulted in minor edits to the questions and additional formatting changes to facilitate accessibility. Two administrations of the survey were conducted over a 6-month period with volunteer samples. The first administration was to people between the ages of 18 to 65, who were recruited from our participant registry, a list of individuals who are blind or have low vision who have volunteered to be contacted regarding participation in research studies. Approximately 255 members of the

registry were invited to participate in the study and sent a link to the survey. Between September and November 2013, 140 people submitted useable survey responses.

The second administration was open to anyone in the U.S. ages 18 or older who had a visual impairment. A link to the survey was posted on the NRTC's website, and emails were sent to major consumer groups, NRTC advisory council members, and personal contacts with a link to the survey and a request to forward the survey link to people who met eligibility criteria. From January to February 2014, 353 people completed the survey. The two administrations yielded 492 unique survey responses, as one person completed both versions of the survey. Several respondents did not answer all of the survey questions.

2.2.2. Transportation Self-efficacy Scale

The survey included a transportation self-efficacy scale that measured participants' confidence in finding and arranging transportation. Participants rated their confidence in their ability to accomplish a list of tasks related to securing employment-related transportation (see Table 2). Confidence was rated on a 0 to 10 scale, where a zero indicated no confidence at all and a 10 indicated complete confidence.

Instrument development followed recommendations for constructing self-efficacy scales (Bandura, 2006). After determining domains of functioning applicable to transportation, specific transportation challenges were identified for each domain, resulting in 14 items. An advisory council that included several people who were blind or visually impaired assisted in generating items and pilot testing the instrument. Items were further refined based on the feedback obtained.

To assess the suitability of combining the items into a single scale, analyses were conducted using a sample of 437 individuals with visual impairments. The items were reviewed for their conceptual similarity in an effort to produce a more parsimonious scale. We dropped

one item due to redundancy and another item that was not as directly related to the construct of interest. Eliminating these two items resulted in a 12-item scale. An exploratory factor analysis was conducted on the 12 items to evaluate unidimensionality of the scale. The principal factors method was used to extract factors, and a single factor was retained based on the scree test. This factor accounted for 87% of the common variance in the items. Factor loadings for all items were above .55. These results indicate that the items are measuring a single construct. Internal consistency was measured using Cronbach's alpha. The reliability coefficient for the 12 items was .91, which is an indication of very good internal consistency.

2.3. Variables

Variables were chosen from the transportation survey for inclusion in our analyses based on previous research. The selected variables relate to participants' employment status, transportation self-efficacy, and other factors that could impact employment status.

2.3.1. Independent variables

Transportation self-efficacy was measured using participants' responses to the 12 items on the transportation self-efficacy scale. A composite variable was created by calculating the mean of the individual items for participants with data on 10 or more items. The composite variable used the same scale as the individual items, resulting in possible values between 0 and 10, with higher scores indicating greater levels of confidence.

Participants' zip codes were used to create a categorical variable based on the four U.S. census regions: South, Northeast, Midwest, and West (U.S. Census Bureau, 2016). This variable was used to account for regional characteristics, such as differences in employment rates and other potential factors. To distinguish between participants' severity of vision loss, we used a categorical variable with four levels of vision. The first category consisted of participants who

indicated that they were totally blind. The remaining participants, who indicated that they were legally blind or had a less severe visual impairment, were divided into three categories based on a functional indicator of their ability to read print. Participants in the profound vision loss category could not read normal-sized print, even with assistive devices. The moderate/severe vision loss category included those who could read normal-sized print, but only when using assistive devices. The mild vision loss category was comprised of those who could read normal-sized print without assistive devices.

A dichotomous variable based on self-reported race and ethnicity was created to indicate minority status. For this variable, the 'minority' category included participants who indicated that they were Black or African American, Hispanic, Asian, American Indian, Alaskan Native, Mixed, or Multiracial. The 'non-minority' category consisted of participants who reported that they were White or Caucasian. Other independent variables included: presence of a physical limitation (other than vision loss) that impacted a person's transportation options, availability of public transportation in the person's community, the number of years of education a person completed, receipt of VR services, age, and age at onset of visual impairment.

2.3.2. Dependent variable

The dependent variable in this study was full-time employment. Participants were asked to identify their current employment status from the following options: unemployed, employed, volunteer work only, and self-employed. Those who were employed or self-employed were asked to report the number of hours they worked in a typical week. A dichotomous variable was created for full-time employment, which was defined as being employed or self-employed and working 35 or more hours per week.

2.4. Data analysis

Descriptive statistics were generated to investigate participants' transportation self-efficacy and employment status. Multiple logistic regression was used to identify factors predicting full-time employment. As transportation self-efficacy was the main construct of interest, interactions were tested between the transportation self-efficacy composite variable and the other independent variables. The independent variables and significant interaction effects were entered into a multiple logistic regression model with full-time employment as the dependent variable. Data analyses were conducted using SAS 9.4.

3. Results

3.1. Demographics

The mean age of participants was 45.89 (*S.D.* = 12.27). Age at onset of visual impairment ranged from birth to 57 (*M* = 10.08, *S.D.* = 14.60), with 40.7% of participants (*n* = 133) indicating that their vision loss began at birth. Nearly 40% of the sample reported being totally blind, and less than half (44.3%, *n* = 145) had a physical limitation that impacted their transportation options. Most participants (81.4%) had access to public transportation in their communities. The majority of participants (75.5%, *n* = 247) received services from a state VR agency, 16.8% (*n* = 55) did not receive VR services, and 7.6% (*n* = 25) did not provide an answer to the question. Of those who received services, 27.9% (*n* = 69) reported that the agency provided assistance with locating transportation to and from work. See Table 1 for additional demographic information.

3.2. Transportation self-efficacy

Composite scores for the transportation self-efficacy scale ranged from 0 to 10, with a mean of 7.00 (*S.D.* = 2.09, α = .91). Participants who were employed full-time had significantly higher transportation self-efficacy scale scores (*M* = 7.59, *S.D.* = 1.82) than those who were not

employed full-time (M = 6.51, $S.D.$ = 2.17), $t(325) = -4.90$, $p < .001$. For both groups, the range for the 12 individual transportation self-efficacy items was 0 to 10, and the means ranged from 4.41 to 8.35. Regardless of employment status, participants were the least confident in their ability to arrange transportation to and from work with someone who works nearby, and the most confident in their ability to tell a driver where they need to go. Participants who were employed full-time reported higher confidence for all of the items compared to those who were not employed full-time. Table 2 provides the means and standard deviations for the 12 self-efficacy items.

3.3. Employment

In response to a query about employment status, 63.6% (n = 208) of participants reported being employed or self-employed, 25.7% (n = 84) were unemployed, and the remaining 10.7% (n = 35) did volunteer work only. Of those who were employed or self-employed, 71.6% (n = 149) worked full-time and 28.4% (n = 59) worked part-time. The full-time employment rate for the entire sample was 45.6%.

Full-time employment rates were highest for participants who lived in the Midwest (54.2%, n = 32) and South (51.8%, n = 71) regions compared to those living in the Northeast (38.8%, n = 33) and West (28.3%, n = 13). Just over half (51.1%, n = 23) of participants with mild vision loss were employed full-time, followed by 50% (n = 65) of participants who were totally blind, 42.4% (n = 39) who had moderate/severe vision loss, and 36.7% (n = 22) with profound vision loss. A slightly higher percentage of participants who were White (46.3%, n = 118) reported working full-time than participants from the other racial/ethnic groups (43.1%, n = 31).

A higher percentage of participants who did not have a physical limitation (49.5%, n =

90) were employed full-time than those who had a physical limitation (40.7%, *n* = 59). Forty-seven percent (*n* = 125) of those who had access to public transportation worked full-time compared to 39.3% (*n* = 24) without access. Higher full-time employment rates were reported for participants with at least a Bachelor's degree (59%, *n* = 118) than those with lower levels of education (24.4%, *n* = 31). Of those who received VR services, 46.6% (*n* = 115) were employed full-time compared to 41.8% (*n* = 23) who did not receive VR services.

3.4. Predictors of full-time employment

A multiple logistic regression analysis was conducted to predict the probability of full-time employment for individuals with visual impairments. The independent variables in the final model were transportation self-efficacy, census region, severity of vision loss, minority status, presence of a physical limitation, availability of public transportation, years of education, age, and age at onset. The VR services variable was not included in the final model because it was not significant and adding it reduced the sample size but did not change interpretation of the model. Interactions between transportation self-efficacy and all other variables in the model were tested, as recommended by Hosmer and Lemeshow (2000). Two significant interaction effects were identified and included in the model: 'self-efficacy by age' and 'self-efficacy by age at onset.'

The overall test for the model was statistically significant, x^2 (15, N = 327) = 97.23, p < .001, Nagelkerke R^2 = .34, and the variables in the model correctly predicted full-time employment for 80% of respondents. Results of the Hosmer and Lemeshow Goodness-of-Fit Test indicate that the model is a good fit for the data, x^2 (8) = 5.28, p = .73.

Significant main effects in the model were census region, severity of vision loss, and years of education (see Table 3). For each additional year of education completed, the odds of full-time employment increased by 36% (*OR* = 1.36; 95% CI: 1.20, 1.54). The odds of

employment were 3.43 times higher for someone with four additional years of education, such as a high school graduate compared to a college graduate. The odds of being employed full-time were 2.82 times higher for people with mild vision loss (*OR* = 2.82; 95% CI: 1.19, 6.68) compared to those with total blindness. The odds of full-time employment for people who lived in the Midwest were 2.29 times higher compared to the Northeast (*OR* = 2.29; 95% CI: 1.05, 5.03) and 4.24 times higher than the West (*OR* = 4.24; 95% CI: 1.63, 11.02). The significant interactions between 'self-efficacy and age' and 'self-efficacy and age at onset' indicate that the effect of transportation self-efficacy on employment depends on age and age at onset. Overall, high self-efficacy is associated with higher odds of employment; however, the effect of self-efficacy decreased with age and increased with age at onset (see Table 4).

4. Discussion

Being able to get to work on time – in other words, having reliable transportation – is a prerequisite to employment for everyone who works outside the home. Being unable to drive makes transportation to work more challenging for people who are blind or visually impaired, as well as people with other disabilities that prohibit driving. Despite the challenge that transportation presents, many people who cannot drive are employed. One factor that was thought to be important to employment for those who cannot drive was transportation self-efficacy, and this study evaluated its association with full-time employment with a national sample of adults who are blind or visually impaired.

The composite scores for the transportation self-efficacy measure indicated that participants generally were confident in their ability to plan and use transportation. Participants who were employed full-time had higher overall transportation self-efficacy compared to those who were not employed full-time. Those who were employed full-time also expressed higher

confidence in their ability to perform each of the 12 transportation tasks included in the transportation self-efficacy scale. Confidence was highest for giving directions to a driver, asking for assistance, and riding a bus or shuttle. Confidence was lowest for arranging transportation to and from work with a co-worker or a person who works at a nearby business, finding and hiring a driver, and negotiating a fair price with a driver.

Transportation self-efficacy was an important predictor of full-time employment, although this association was dependent upon both age of respondents and their age at onset of vision loss. Transportation self-efficacy increased the odds of employment much more for people who were younger, with odds ratios decreasing as people aged. In addition, transportation self-efficacy increased the odds of employment more for people who lost their vision at a later age than for those who lost their vision at a younger age. The closer that respondents' current age was to their age of onset (i.e., the less time the person had experienced vision loss), the more important transportation self-efficacy was to their likelihood of being employed. By age 60, transportation self-efficacy was only associated with employment if age at onset occurred around age 30 or later. However, regardless of age at onset, transportation self-efficacy was important for people of younger ages, with the strongest association occurring at age 20.

Although transportation self-efficacy was expected to be associated with employment, these specific interactions were not anticipated. Reasons for the existence of the associations should be considered. In regard to the association with age, perhaps what younger people lack in experience, they can partially make up for with high transportation self-efficacy. Younger people generally will not have as much experience or work-related skills, perhaps making transportation self-efficacy more important to their employment. People with high transportation self-efficacy might seek jobs in a broader geographical area, which would increase their job options and

chances for employment, a factor that might be particularly relevant for younger and less experienced job-seekers. If we assume that many people who are older and employed have been employed for a long time, this finding could indicate that transportation self-efficacy may not be as important to maintenance of employment as it is to obtaining employment. Experiencing vision loss results in an adjustment process, unless the vision loss happened at a very young age. These results indicate that transportation self-efficacy was particularly important to employment for those with less time to adjust to a vision loss. When someone loses his or her vision as an adult, after the experience of driving and independent transportation, perhaps being confident in the ability to get to work is particularly important. Transportation may be perceived as one of the foremost barriers to employment for those who recently lost their vision, as opposed to those with years of experience with vision loss.

Several other variables were important predictors of full-time employment, including years of education. This finding was anticipated, and it was the factor that had the largest association with employment. Another anticipated finding was that people with the mildest visual impairments (in terms of ability to access print) would be more likely to be employed than those who were totally blind. However, there was no difference in likelihood of employment between those who were totally blind and the other visual impairment categories. Previous research about level of visual impairment and employment has had mixed results, although those who are totally blind are often perceived as experiencing the most difficulty obtaining employment. In our sample, those who were totally blind were *more* likely to be employed than those in the other two severe visual impairment categories, but these differences were not significant when other factors were controlled for in the logistic regression model.

Location in terms of census region also significantly predicted employment in the model. People who lived in the Midwest were more likely to be employed than those who lived in the West and the Northeast, and as likely to be employed as those who lived in the South. These differences by region coincide with unemployment rates for the regions at the time of the surveys; unemployment rates were highest in the West, followed by the Northeast, then the South and Midwest (U.S. Bureau of Labor Statistics, 2014, 2016a). High unemployment may particularly affect persons with disabilities, resulting in a greater likelihood of unemployment compared to people without disabilities (Fogg, Harrington, & McMahon, 2010; Kaye, 2010; Livermore & Honeycutt, 2015), making regional differences in unemployment rates particularly pertinent for our sample. Another possibility is that other regional differences contributed to the differences in employment observed across the regions.

Several variables were not significant predictors of full-time employment. Although some studies have documented poorer employment outcomes for minorities and those with additional disabilities (e.g., Giesen & Cavenaugh, 2012; Giesen et al., 1985; Kirchner & Peterson, 1982), minority status and having a physical limitation that impacts transportation were not associated with employment in the model. Having access to public transportation was also not associated with employment, nor was receipt of VR services (which was not retained in the final model due to sample reduction caused by its inclusion).

4.1. Implications

These findings support a number of important implications for service providers. A key finding was the importance of transportation self-efficacy, particularly for those who are younger or who recently lost their vision. This finding reinforces the value of O&M training for youth who are blind or visually impaired. Learning O&M skills from an early age provides the

necessary foundation for successful experiences with various transportation methods, which can contribute to transportation self-efficacy. People who lose their vision as adults can also benefit from learning O&M skills as soon as possible after they experience vision loss, although adults in the early stages of adjustment to vision loss may not seek O&M training (Welsch, 2010). Adults with recent vision loss may have used some types of public transportation in the past; however, successfully using public transportation and arranging other types of transportation with limited or no vision requires learning a new skillset. O&M training is critical for helping people develop these skills and the confidence to use them.

O&M training is an important service provided to people with vision loss, and it is often included as a related service as a part of youths' Individualized Education Programs (U.S. Department of Education, 2000). Yet some youth do not receive this service or they receive only limited services in elementary and secondary schools (Cameto & Nagle, 2007; U.S. Department of Education, 2000). Whether youth receive O&M services could depend on many factors such as their educational setting and level of vision (Cameto & Nagle, 2007). Some O&M specialists face restrictions by their school districts that limit or prohibit off-campus instruction, which could reduce services available to youth in community settings (Erin, 2015; Kircher-Herring, 2015). To develop the skills needed for employment, it may be necessary for youth to seek additional O&M training beyond school hours and after completion of secondary school. Those who lose their vision as adults may be unaware of services available to them, such as VR, or may not have access to other services if they are not pursuing employment. It is also debatable whether all VR consumers obtain an adequate amount of O&M training (Crudden, Antonelli, & O'Mally, 2016), perhaps due to limited funding for services or lack of qualified O&M specialists in agencies serving adults (Welsch, 2010).

Additionally, O&M training does not generally focus on helping a person find transportation to work (Crudden, 2015). Even when O&M has been received, consumers may need additional instruction or support in this area. There appears to be a significant gap in service provision in terms of this assistance – it is not clearly identified as any service providers' job to assist consumers with finding transportation to work, or to help them generate potential solutions for work transportation. The majority of those in our study who received VR services reported that they did not receive help with transportation to work through VR, yet VR counselors could provide assistance in this area. Participants had the lowest self-efficacy on items related to arranging transportation with/through others, which is an area where VR counselors could provide guidance and assistance. To increase transportation self-efficacy, it is important that counselors do not simply find and arrange transportation for consumers, but instead provide information and support to help consumers make their own transportation arrangements. Resources to assist VR counselors in facilitating transportation for individuals who are blind or visually impaired are available online (http://blind.msstate.edu/our-products/transportation/).

Although successful experiences are the most powerful source of self-efficacy (Bandura, 1994), the other three sources identified by Bandura (i.e., social modeling, social persuasion, and emotional and physical reactions) can also influence consumers' transportation self-efficacy. Accordingly, experienced consumers with visual impairments who have been successful at arranging and using transportation can serve as role models for those who lack that experience. Service providers can facilitate connections between novice and experienced transportation users by encouraging participation in organized social activities, such as support groups, discussion groups, and mentoring programs. These types of social activities also create opportunities for consumers to share transportation experiences, provide verbal encouragement to each other, and

support each other in devising transportation solutions. Counseling and support groups may help consumers who experience stress, fear, anxiety, or other reactions toward public transportation reduce their negative responses and thus increase transportation self-efficacy. O&M training can also be effective in helping consumers overcome fear and anxiety, particularly when training is structured in a manner that promotes success.

4.2. Limitations

A limitation of the study is that it relies on data collected online from a volunteer convenience sample. Participants were volunteers who learned about the survey through electronic communications and possessed the technology skills and equipment that enabled them to participate. Consequently, this survey represents only people who have some degree of experience and skill with technology as well as access to the internet. A relatively large portion of the sample was employed full-time (45.6%), which may be associated with this fact. The sample also consists of a majority of people who lost their vision early in life, are White, have obtained higher education, and live in metropolitan areas with access to public transportation, resulting in a sample that is likely not representative of the entire population of working age adults with vision loss.

This was a cross-sectional study and, although a regression model was used to predict employment, we cannot determine whether any of the independent variables caused employment, or were just associated with it. For example, transportation self-efficacy was associated with employment, but we do not know whether high self-efficacy increased the likelihood of employment or whether the daily experience of getting to work (i.e., mastery experience) resulted in higher self-efficacy. The clear differences based on age and age at onset

provide some support for the former explanation, but the nature of the data does not enable us to make that determination.

5. Conclusion

In this research, we investigated predictors of full-time employment for individuals with visual impairments who were non-drivers, with an emphasis on transportation self-efficacy. High transportation self-efficacy was associated with increased odds of employment; however, its effect was more prominent for younger people and for those whose vision loss occurred more recently. Other significant predictors of employment were completing more years of education, having mild vision loss (versus total blindness), and living in the Midwest or South regions (compared to the West and Northeast). These results add to the literature as a study of predictors of employment with a non-VR sample (i.e., not based on RSA-911 data), which is somewhat rare for the blind/visually impaired population. Our findings support the importance of transportation self-efficacy for employment of individuals with visual impairments, a relationship that was previously unexplored in this population. Although we cannot infer a causal relationship between self-efficacy and employment, it is possible that people who have high transportation self-efficacy are more likely to put forth the effort to overcome transportation barriers that would otherwise impede their employment efforts. Furthermore, having the confidence to plan and use various types of transportation may facilitate employment among non-drivers by helping them devise creative solutions to transportation problems rather than avoiding them.

Service providers should aim to promote consumers' involvement in activities that could increase their transportation self-efficacy. Thus, evaluating strategies for strengthening transportation self-efficacy that could be infused into transition and rehabilitation services may be a worthwhile direction for future investigation. Discussions between VR counselors and

O&M specialists could bridge the gap between the transportation services provided by these professionals while capitalizing on the strengths and resources of both professions. Efforts to promote communication and collaboration between service providers may expedite the development of effective strategies for strengthening transportation self-efficacy and minimize the impact of non-driving on employment.

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Table 1
Demographic characteristics of the sample

Variable	*n*	%
Region		
South	137	41.9
Northeast	85	26.0
Midwest	59	18.0
West	46	14.1
Race/Ethnicity		
White or Caucasian	255	78.0
Black or African American	32	9.8
Hispanic	20	6.1
Asian	9	2.8
Mixed or Multiracial	9	2.8
American Indian or Alaskan Native	2	0.6
Annual household income		
< 25,000	104	31.8
25,000 to 50,000	75	22.9
50,000 to 75,000	47	14.4
75,000 to 100,000	35	10.7
> 100,000	31	9.5
Not reported	35	10.7
Education level		
No high school diploma	8	2.5
High school graduate	27	8.3
Some college	55	16.8
Associate's degree	37	11.3
Bachelor's degree	91	27.8
Graduate or professional degree	109	33.3
Vision level		
Totally blind	130	39.8
Profound vision loss	60	18.4
Moderate/severe vision loss	92	28.1
Mild vision loss	45	13.8

Table 2
Descriptive statistics for transportation self-efficacy items

Item	Mean (*SD*)		
	Not employed full-time	Employed full-time	All
1. Arrange transportation to and from work with someone who works nearby at another business	4.10(*3.18*)	4.78(*3.61*)	4.41(*3.39*)
2. Go through the process of finding and hiring a safe and reliable driver	5.20(*3.41*)	6.54(*3.20*)	5.81(*3.38*)
3. Arrange transportation to and from work with co-workers	5.39(*3.20*)	6.33(*3.31*)	5.82(*3.28*)
4. Arrange a fair price for daily transportation to and from work with a driver	5.56(*3.42*)	6.48(*3.13*)	5.98(*3.32*)
5. Create a back-up plan for times when my regular transportation to or from work is not available	6.03(*3.23*)	7.97(*2.60*)	6.91(*3.11*)
6. Identify two or more ways to get to and from work	6.36(*3.30*)	7.78(*2.72*)	7.01(*3.13*)
7. Use the internet to find information about transportation options nearby	7.06(*3.13*)	8.09(*2.54*)	7.53(*2.91*)
8. Find out about average costs of different transportation options in the area	7.26(*2.84*)	8.54(*2.13*)	7.85(*2.61*)
9. Call community agencies to request and/or schedule transportation to work	7.62(*3.31*)	8.44(*2.85*)	8.00(*3.13*)
10. Ride a bus or shuttle (if it were available)	7.69(*2.73*)	8.66(*2.10*)	8.14(*2.51*)
11. If needed, ask for assistance upon arriving at a destination	7.87(*2.44*)	8.64(*1.93*)	8.22(*2.25*)
12. Explain to a driver where I need to go	7.94(*2.51*)	8.83(*1.71*)	8.35(*2.22*)

Table 3

Summary of logistic regression results predicting full-time employment (N = 327)

Variable	*B*	*SE*	*Wald* x^2
Intercept	-12.49	2.71	21.19**
Census region (ref. = Midwest)	--	--	15.61**
South	0.01	0.37	0.001
Northeast	-0.83	0.40	4.29*
West	-1.44	0.49	8.77**
Severity of vision loss (ref. = totally blind)	--	--	8.65*
Profound vision loss	-0.41	0.38	1.12
Moderate/severe vision loss	0.18	0.33	0.29
Mild vision loss	1.03	0.44	5.51*
Physical limitation	-0.34	0.27	1.58
Public transportation available	0.54	0.35	2.35
Minority status	-0.01	0.33	0.0004
Years of education	0.31	0.06	23.36**
Transportation self-efficacy	0.91	0.32	8.20**
Age	0.14	0.05	8.07**
Age at onset	-0.13	0.05	6.92**
Transportation self-efficacy x age	-0.02	0.01	5.93*
Transportation self-efficacy x age at onset	0.01	0.01	4.49*

*$p < .05$, **$p < .01$

Table 4

Odds ratios for full-time employment based on transportation self-efficacy by age and age at onset of visual impairment

	OR (95% CI)				
Age at onset	Age 20	Age 30	Age 40	Age 50	Age 60
birth	1.80 (1.23, 2.64)	1.54 (1.17, 2.02)	1.31 (1.09, 1.58)	1.12 (0.95, 1.32)	0.96 (0.76, 1.21)
10	2.07 (1.40, 3.07)	1.77 (1.34, 2.34)	1.51 (1.25, 1.81)	1.29 (1.11, 1.50)	1.10 (0.89, 1.35)
20	2.38 (1.52, 3.72)	2.03 (1.44, 2.86)	1.73 (1.34, 2.24)	1.48 (1.18, 1.85)	1.26 (0.98, 1.63)
30	--	2.33 (1.51, 3.60)	1.99 (1.38, 2.87)	1.70 (1.22, 2.37)	1.45 (1.02, 2.05)
40	--	--	2.29 (1.41, 3.70)	1.95 (1.24, 3.06)	1.66 (1.05, 2.63)
50	--	--	--	2.24 (1.26, 3.98)	1.91 (1.08, 3.39)