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**A Systematic Review of Factors Related to Employment in Transition-age Youth with
Visual Impairments**

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Abstract

Purpose/Objective: Individuals with visual impairments, including transition-age youth, have much lower employment rates than their peers without disabilities. We conducted a systematic review to examine the factors that predict employment in American youth with visual impairments. **Research/Method:** We used a three-pronged approach to identify articles via databases search, hand search, and ancestral search. We then coded all articles for study and sample characteristics, study outcomes, and study quality. **Results:** Ten studies met inclusion criteria, nine of which reported secondary analysis of existing datasets. Previous work experience and postsecondary education were consistently significant positive predictors of employment across studies, with previous, self-initiated work experience being the strongest predictor. There is also some evidence for the importance of transportation and travel skills in obtaining employment. Conversely, demographic and disability characteristics generally were not significant predictors of employment. **Conclusions/Implications:** These results highlight the need to teach vocational skills, particularly job search skills, to youth with visual impairments and to support their completion of postsecondary education. Because most studies involved secondary analysis of older datasets, and five relied on the same dataset, additional research should be conducted using novel and current datasets in order to replicate and expand on these findings. Research is also needed to identify factors associated with completion of postsecondary education for youth with visual impairments as well as interventions that lead to positive postsecondary educational and employment outcomes.

Impact

- This article is the first published systematic literature review analyzing factors that predict employment outcomes in transition-age American youth with visual impairments specifically.
- It provides a thorough and comprehensive synthesis of the literature in this area, including its scientific quality.
- It highlights the critical importance of providing youth with visual impairments skills related to independent job procurement and educational advancement.

A Systematic Review of Factors Related to Employment in Transition-age Youth with Visual Impairments

Employment is widely acknowledged as a key rehabilitation outcome, but the employment gap between people with and without disabilities persists. In 2016, 35.9% of working-age people with disabilities were employed compared to 76.6% of those without disabilities (Kraus, Lauer, Coleman, & Houtenville, 2018). Employment disparities are also evident among transition-age youth with disabilities, who have lower employment rates than youth without disabilities. In 2017, 18.1% of youth with disabilities ages 16-19 years were employed versus 30.8% of those without disabilities (Bureau of Labor Statistics, 2018). Similarly, 36.9% of young adults with disabilities ages 20-24 years were employed compared to 67.3% of their peers without disabilities (Bureau of Labor Statistics, 2018).

The *Individuals with Disabilities Education Improvement Act* (IDEA, 2004) includes specific requirements for transition services, defined as a set of coordinated activities that aim to improve the academic and functional achievement of students with disabilities, and to promote their progression from school to post-school activities. Under IDEA, youths' Individualized Education Programs must address transition services no later than age 16. The exact transition services provided under IDEA are individualized but may include instruction, related services, community experiences, development of post-school objectives, acquisition of daily living skills, and vocational evaluations.

Youth may also receive transition services through vocational rehabilitation (VR) agencies, under the *Rehabilitation Act of 1973*, as amended by the *Workforce Innovation and Opportunity Act* (WIOA; 2016). WIOA emphasizes competitive integrated employment for all individuals with disabilities, and several aspects focus specifically on transition to post-school

employment for youth with disabilities. Specifically, WIOA requires VR agencies to reserve at least 15% of federal funding for pre-employment transition services, which encompasses five required activities: (a) job exploration counseling, (b) work-based learning experiences, (c) counseling on postsecondary education opportunities, (d) workplace readiness training, and (e) instruction in self-advocacy. All students with disabilities who may be eligible for VR services could receive pre-employment transition services even if they are not VR consumers. Finally, WIOA mandates pre-employment transition coordination for students with disabilities, which strengthens requirements for interagency collaboration between VR agencies and other organizations. Given this recent expansion of VR funding, eligibility requirements, and available services for transition-age youth with disabilities, identifying factors associated with positive outcomes for these youth is particularly important.

Researchers have conducted systematic reviews in an effort to identify predictors of post-school outcomes (i.e., education, employment, and independent living) for students with disabilities as a broad group (Mazzotti et al., 2016; Test et al., 2009). Test and colleagues identified 16 predictors in their 2009 systematic review, and Mazzotti and colleagues identified four additional predictors in 2016. Researchers from the National Technical Assistance Center on Transition (NTACT) have since classified these 20 predictors according to level of evidence (NTACT, 2016). Five predictors of employment—inclusion in general education, occupational courses, paid employment/work experience, vocational/career and technical education, and work study—have a research-based level of evidence (NTACT, 2018), and an additional 14 predictors have a promising level of evidence, with one predictor unclassified. This body of literature relies on studies of youth with various disabilities, many of which did not disaggregate findings by disability type. Youth with disabilities have heterogeneous characteristics and needs; thus,

factors contributing to post-school success may vary across disability category and should be investigated in a disaggregated manner (Mazzotti, Rowe, Cameto, Test, & Morningstar, 2013).

Youth with Visual Impairments¹

Visual impairment is a low-incidence disability that affects about 1% of children and youth in the United States, including approximately 239,700 transition-age youth, ages 16 to 20 years (Erickson, Lee, & von Schrader, 2019). The broad category of visual impairment often includes various degrees of vision loss and variations in visual functioning. For example, IDEA (2004) defines visual impairment as “an impairment in vision that, even with correction, adversely affects a child’s educational performance,” and it includes both blindness and low vision. Visual impairment typically refers to loss of vision that cannot be corrected with glasses or contacts and creates functional limitations; “legal blindness” refers to best corrected visual acuity of 20/200 or worse in the better eye or a visual field of less than 20 degrees (Social Security Administration, 2018).

Children and youth with visual impairments (i.e., those who are blind or have low vision) have unique developmental and educational needs that warrant specialized attention (Sapp & Hatlen, 2010). Because children with visual impairments may not learn concepts and skills through casual, incidental visual observation (Hatlen, 1996), their conceptual understanding of the world may develop passively, inconsistently, and fragmentedly without appropriate intervention (Bowen & Ferrell, 2003). An understanding of the unique needs of children with visual impairments, and recognition that many of these children had gaps in knowledge upon completion of high school, resulted in formulation of the Expanded Core Curriculum, an educational framework for students with visual impairments (Hatlen, 1996). The Expanded Core Curriculum encompasses the general education core (academic) curriculum, plus individualized

instruction in nine additional areas: assistive technology, career education, compensatory skills, independent living, orientation and mobility, recreation and leisure, self-determination, sensory efficiency, and social interaction (Hatlen, 1996; Sapp & Hatlen, 2010).

Despite efforts to enhance services for youth with visual impairments, poor post-school employment outcomes persist. Compared to young adults with other disabilities and those without disabilities, young adults with visual impairments have high rates of postsecondary school attendance, but low rates of employment (McDonnall, 2010b; Newman et al., 2011). Among young adults who were not attending high school or postsecondary school, 38% of those with visual impairments were employed compared to 73% of the general population (McDonnall, 2010b).

Previous Reviews on Visual Impairment and Employment

We identified three previous literature reviews related to employment for individuals with visual impairments (Cavanaugh & Giesen, 2012; Goertz, van Lierop, Houkes, & Nijhuis; 2010; Nagle, 2001). Nagle (2001) conducted a narrative review of transition services for youth with visual impairments, focusing on alignment of transition services with best practices and factors that may influence poor post-school outcomes for these youth. In a systematic review, Cavanaugh and Giesen (2012) examined transition intervention studies for youth with visual impairments that targeted employment-*related* factors (e.g., career exploration, job-seeking skills, independent living, social skills, and self-concept) but did not report on employment *outcomes*. Goertz and colleagues (2010) conducted a systematic review of factors influencing labor force participation of people with visual impairments. This review included studies of both transition-age youth and working-age adults and both employment outcomes (e.g., employment status, number of hours worked) and employment-*related* outcomes (e.g., employment concerns

and strengths, functioning in work or hobbies). Given the low post-school employment rates of youth with visual impairments and the lack of intervention studies targeting employment outcomes for these youth (Cavanaugh & Giesen, 2012), reviewing the literature on predictors of employment for transition-age youth with visual impairments is essential for identifying in-school factors that precede post-school employment. However, we did not identify any previous systematic reviews focusing on factors predicting employment outcomes specifically for transition-age youth with visual impairments. Focusing on the transition-age population specifically may be important in order to ascertain the effects of variables such as school-to-work programs and Expanded Core Curriculum-related skills on employment outcomes in youth with visual impairments that may not be examined in studies of adults with visual impairments.

Present Study and Aims

To address the aforementioned gap in the literature, we conducted a systematic review of predictors of employment for transition-age youth (i.e. those who ages ranged from approximately 16 to 24 years) with visual impairments. In addition to being the first systematic review on this particular topic, the current study adds to the literature by including correlational studies (rather than intervention studies), focusing on transition-age youth, and including recent research. The aims of our review were as follows:

1. Describe the body of literature on predictors of employment for transition-age youth with visual impairments in the United States and assess its methodological quality.
2. Synthesize the results regarding predictors of employment in transition-age youth with visual impairments in the United States.

Method

Search Strategy

We used the following search string to identify articles related to predictors of employment outcomes in transition-age youth and young adults with blindness and visual impairment: (blindness OR “legally blind” OR “vis* impair*” OR “low vision” OR “vision loss”) AND (“employ*” OR “work*” or “job*” or “earnings”) AND (“predict*” or “correlat*” or “factor*”) in the abstract. We searched the following databases: MEDLINE, PSYCINFO, ERIC, Academic Search Premier, Academic Search Complete, and Psychology and Behavioral Sciences Collection in August 2018.

To further the systematic nature of our search, we searched *Journal of Visual Impairment & Blindness* using the search string (“employ*” OR “work*” or “job*” or “earnings”). We also searched *Rehabilitation Counseling Bulletin*, *Journal of Rehabilitation*, *Journal of Applied Rehabilitation Counseling*, *Journal of Rehabilitation Research and Development*, *International Journal of Rehabilitation Research*, and *Journal of Rehabilitation Administration* using the search string (blindness OR “legally blind” OR “vis* impair*” OR “low vision” OR “vision loss”). Additionally, we conducted a hand search of all 65 articles published in the *Journal of Blindness Innovation and Research* as of August 2018. We also conducted ancestral (reference) searches of all included articles to identify other potentially relevant articles. Finally, we searched the references of three recent review articles (Cavanaugh & Giesen, 2012; Goertz et al., 2010; Nagle, 2001) discussed previously for potential studies. The number of records searched and reviewed is displayed in Figure 1.

Inclusion Criteria

To be included in the present review, articles had to meet the following criteria: (a) published in English; (b) published in a peer-reviewed journal; (c) involved transition-age youth (approximately ages 16 to 24 years; exact age range defined by the study authors) with visual

impairment as a specific population for analysis; (d) examined employment or employment-related outcomes (wages, job quality, etc.); (e) involved quantitative analysis of predictors or correlates of said outcomes; (f) published after 1989; and (g) involved participants from the United States. The last two criteria (year of publication and location) were chosen to reflect sociopolitical contingencies surrounding education and employment of people with disabilities, including the passage of the Americans with Disabilities Act (ADA) in 1990 and the special education, disability pension, and VR systems in the United States. These laws and systems often differ greatly between countries and may considerably influence the transition from school to employment in youth and young adults with disabilities. Hence, our inclusion criteria allows us to examine participant populations who operated within the same overall societal, educational, and employment contingencies.

Coding and Data Extraction

Included articles were coded for (a) study characteristics (participant age, gender, race/ethnicity, vision status, additional disabilities, data source, sample size); (b) study outcomes (type of analyses, outcome variable, predictor variables, effect sizes and statistical significance of predictors); and (c) quality indicators (QIs; described below). If an article included multiple analyses with employment-related outcomes, we reported each analysis separately. If a study included univariate statistics but used those same variables in a multivariable analysis (i.e., a model with multiple predictor variables), we reported only the multivariable outcomes. Both authors extracted and coded data; discrepancies were resolved via discussion and review of the articles. Because of the objective nature of the characteristics coded, coding was not double-blind. Both authors have PhDs in related fields (special education, rehabilitation counseling) and experience in research and practice with transition-age youth with disabilities and their families;

one author's experience is primarily related to individuals, including transition-age youth, with visual impairments.

Effect size metrics. We categorized predictors into four broad groups: (a) demographic predictors; (b) education and services; (c) vocational predictors; and (d) other (predictors that did not fit into the preceding three categories). To analyze results, we examined both statistical significance and effect size. We used the following benchmarks for odds ratios: “very small”: 1.00-1.49 (0.68-0.99); “small”: 1.50-2.49 (0.41-0.67); “medium”: 2.50-3.99 (0.25-0.40); and “large”: 4.00 or greater (0.24 or less). These benchmarks were slightly modified from those suggested by Rosenthal (1996) in order to give credit for significant odds ratios below 1.50 (i.e., our “very small” category) and to better reflect the distribution of effect sizes in this particular body of literature, as is recommended by Thompson (2006). Additionally, we used small, medium, and large benchmarks of 0.2, 0.5, and 0.8 and .1, .3, and .5 for d and phi effect sizes, respectively (Cohen, 1992).

Quality Indicators

In accordance with best practice for systematic reviews (Hartling et al., 2017), we assessed all included studies on a set of QIs. Using Thompson, Diamond, McWilliam, Snyder, and Snyder's (2005) guidelines for methodologically rigorous correlational research as a basis and in consultation with experts in this area of research, we developed a set of nine QIs, as follows:

- Effect sizes: Reported effect sizes for all predictors (final model).
- Confidence intervals: Provided confidence intervals for all effect sizes (final model).
- p -values: Included exact p -values $>.001$ given for all predictors (final model).

- Multivariable analyses: Used one or more multivariable (i.e., multiple predictor) analysis of outcomes.
- Assumptions met: Reported if one or more assumptions of main statistical tests met (final model).
- Longitudinal design: Included variables measured at one time point and outcomes measured at a different time point.
- National sample: Involved participants from at least 45 U.S. states or used a national dataset.
- Representative sample: Used a non-convenience sample.
- Power calculation: Provided a power calculation or other accepted sample size metric.

Results

Included Studies and Data Sources

The results of the literature search, including the number of articles reviewed and the reasons for exclusion, are presented in Figure 1. Ten studies (Cimera, Rumrill, Chan, Kaya, & Bezyak, 2015; Cmar, 2015; DeLaGarza & Erin, 1993; Giesen & Cavanaugh, 2012; McDonnall, 2010a, 2011; McDonnall & Crudden, 2009; McDonnall & O'Mally, 2012; Wolffe & Kelly, 2011; Zhou, Smith, Parker, & Griffin-Shirley, 2013) met inclusion criteria. Of these articles, eight were published in the *Journal of Visual Impairment & Blindness*, one in *Rehabilitation Counseling Bulletin*, and one in the *Journal of Vocational Rehabilitation*. These studies included 20 separate analyses of employment-related outcomes. Study characteristics are detailed in Table 1.

Data sources. All but one study (DeLaGarza & Erin, 1993) involved secondary analyses of pre-existing datasets; DeLaGarza and Erin used a sample of graduates from the Texas School for the Blind and Visually Impaired. The most common dataset used was the National Longitudinal Transition Study-2 (NLTS2) dataset, which was the data source of five studies (Cmar, 2015; McDonnall, 2011; McDonnall & O'Mally, 2012; Wolffe & Kelly, 2011; Zhou et al., 2013). The NLTS2 is longitudinal study of students who received special education services. Data were collected in five waves, starting with Wave 1 in 2000-2001 and ending with Wave 5 in 2008-2009, and the sample is national and representative. As a longitudinal study, the NLTS2 dataset contains data from the same participants across multiple waves; thus, researchers using the NLTS2 data to study transition-age youth with visual impairments used roughly the same sample in their analyses, with variations based on each study's given inclusion and exclusion criteria and variables of interest.

In two studies (Cimera et al., 2015; Giesen & Cavanaugh, 2012), researchers used Rehabilitation Services Administration Case Service Report (RSA-911) data, which includes all VR consumers whose cases were closed during a given fiscal year (FY); they used data from FYs 2012 and 2010, respectively. McDonnall and Crudden (2009) used data from the Longitudinal Study of the Vocational Rehabilitation Services Program (LSVRSP), a representative but non-national study of VR programs and consumers in 32 VR agencies in 30 states that took place between 1995 and 2000. Finally, McDonnall (2010a) used data from the National Longitudinal Survey of Youth (NLSY), a representative national study of youth employment that collected baseline data in 1997; McDonnall (2010a) used outcome data collected between 2002 and 2006 for her analyses. Of note, the NLSY dataset is the only dataset used which was not specific to individuals with disabilities.

Sample Characteristics

Sample size. Sample sizes ranged from 41 to 2,543 ($M=638$; $SD=947$); these figures represent samples for which participant demographic information was reported (see Table 1). Wolffe and Kelly (2011) did not report sample size, and McDonnall and O'Mally (2012) reported complete sample demographics for two samples that were used in different analyses. Additionally, McDonnall (2011) reported demographics for a sample of 180 participants but used samples of 190 and 200 participants in the analyses included in this review. Finally, Cimera and colleagues (2015) reported using a subsample of 1,309 participants in their analysis of job quality but did not report any demographic information on that subsample.

Two studies (Cimera et al., 2015; Giesen & Cavanaugh, 2012), both of which used RSA-911 data, had sample sizes of above 2,000 participants. Sample sizes from studies using NLTS2 or NLSY data ranged from 110-510, with only Cmar (2015) and one analysis from McDonnall and O'Mally (2012) using sample sizes greater than 200 (510 and 310, respectively). The smallest sample ($n=41$) came from the LSVRSP data (McDonnall & Crudden, 2009), followed by DeLaGarza and Erin's (1993) non-national sample of 70 participants.

Participant demographics. NLTS2 participants were 14-18 years old at Wave 1, making them ages 19-23 at Wave 4 (the wave that many studies used for outcome data), and NLSY participants were ages 18-23 at the first outcome data collection point. In terms of other samples, McDonnall and Crudden (2009) and Giesen and Cavanaugh (2012) included participants who were 21 years of age or younger at VR application. Cimera and colleagues (2015) included participants ages 16-25 years.

Most samples were evenly balanced between male and female participants, with a slightly higher representation of males. The LSVRSP sample used by McDonnall and Crudden

(2009) was 61% male, and the NLSY sample used in McDonnall (2010a) was 62.1% female. Wolffe and Kelly (2011) reported that their NLTS2 sample was 87.2% female, providing the only drastically unbalanced sample in terms of gender. Cmar (2015) and Zhou et al. (2013) did not report data on participant gender, although we would expect that their samples would be roughly similar to the other NLTS2 samples.

NLTS2 and RSA-911 samples were 59-65% White, 15-25% African-American, 11-15% Hispanic, and 2-3% Asian-American or Pacific Islander. The NLSY sample used in McDonnall (2010a) had fewer White participants (39.3%) and more Hispanic participants (28.6%). Hispanic participants were also highly represented (24%) in DeLaGarza and Erin's (1993) Texas sample. The LSVRSP sample used in McDonnall and Crudden (2009) was 80% White and 5% Hispanic.

Definitions and categories of visual impairment varied across data sources. Participants in the five NLTS2 studies (Cmar, 2015; McDonnall, 2011; McDonnall & O'Mally, 2012; Wolffe & Kelly, 2011; Zhou et al., 2013) all had a primary disability of visual impairment under IDEA. In those studies, researchers used parent or youth report to identify youth who are completely blind, and they often grouped the remaining youth with visual impairments into a "low vision" category. Participants with low vision tended to comprise about two-thirds of the NLTS2 samples. For the NLSY sample, McDonnall (2010a) identified youth with visual impairments based on (a) self-reported bilateral blindness or (b) unilateral blindness or other vision difficulty plus indication of activity limitations from vision loss. In the studies that used vocational rehabilitation data (i.e., RSA-911 or LSVRSP; Cimera et al., 2015; Giesen & Cavanaugh, 2012; McDonnall & Crudden, 2009), participants were grouped into the categories of legal blindness and other visual impairments resulting in substantial functional limitation. The samples in the two RSA-911 studies included participants with a primary disability of legal blindness or other

visual impairments and the LSVRSP sample included participants who had a primary or secondary disability of legal blindness or other visual impairments. The RSA-911 and LSVRSP samples were approximately evenly split between participants with legal blindness and those with other visual impairments. The researchers who included data on secondary disabilities generally reported that 20-40% of participants had another disability in addition to visual impairment. More information about participants' additional disabilities (as available) is provided in Table 1.

Quality Indicators

The number of QIs met by each study ranged from 0 to 8 with a mean of 4.3 ($SD=2.3$). The most frequently met QIs were representative sample ($n=9$), national sample ($n=8$), longitudinal design ($n=7$), and multivariable analyses ($n=7$). Given the reliance of the studies on secondary data analysis, particularly NLTS2 data, this finding is not surprising. The least frequently met QIs were confidence intervals provided for all effect sizes ($n=1$), power calculations ($n=1$), and noting if assumptions of statistical tests were met ($n=2$). Thus, the corpus of studies has a moderate but variable range of quality, with strengths in data source and weaknesses in methodological *reporting* (although not necessarily methodological *design*). Full QI data for each study is available in Table 2.

Study Outcomes

The following section contains an overview of findings from the included studies. For detailed information about outcome variables, statistical analyses, predictor variables, and effect sizes for each study, see Table 3. The discussion that follows is limited to variables included in the final models, but variables that the study authors noted as being included in preliminary models only are reported in the table.

Outcome variables. The most common outcome variable by far was employment, which was used in 17 of the 20 analyses. The researchers using VR data (Cimera et al., 2015; Giesen & Cavanaugh, 2012; McDonnall & Crudden, 2009) defined this variable as employment at case closure, with Giesen and Cavanaugh (2012) and Cimera and colleagues (2015) examining competitive employment specifically. In four of the NLTS2 studies, employment was defined as paid full- or part-time work outside of the home. In another NLTS2 study, McDonnall (2010a) conducted two separate analyses of part- or full-time (20+ hours per week) employment and full-time only (35+ hours per week) employment. Other, proximal outcome variables were number of paid jobs (McDonnall & O'Mally, 2012), annual number of hours worked (McDonnall, 2010a), and job quality (Cimera et al., 2015).

Statistical analyses. In seven studies, researchers employed multivariable analyses, with the most common being multiple logistic regression. For the two multivariable analyses of continuous outcome variables—number of hours worked and quality of employment—researchers used multilevel modeling and hierarchical regression, respectively. Univariate analyses used included chi-square, Fisher's exact tests, logistic regression, independent samples t-test, and MANOVA (used to assess multiple subscales of a single measure). DeLaGarza and Erin (1993) did not report the statistical analyses used nor the effect sizes, although the type of data analyzed suggests that they likely employed chi-square or Fisher's exact tests.

Demographic predictors. Researchers examined gender in four studies (Cimera et al., 2015; DeLaGarza & Erin, 1993; Giesen & Cavanaugh, 2012; Zhou et al., 2013). All four RSA-911 analyses yielded significant gender effects, which indicated that males had significantly higher competitive employment rates than females, with very small or small effects. The effects of gender on job quality were unclear. Researchers who used other data sources did not find

significant effects for gender. Four analyses across three studies (Cimera et al., 2015; Giesen & Cavanaugh, 2012; McDonnall, 2010a) included race and ethnicity. In three of these analyses, researchers found a positive relationship between Hispanic ethnicity and employment outcomes, with small effect sizes. In one RSA-911 analysis, African American race was a very small, significant negative predictor of competitive employment. There were no other significant differences by race or ethnicity.

In five studies (Cimera et al., 2015; Cmar, 2015; DeLaGarza & Erin, 1993; Giesen & Cavanaugh, 2012; Zhou et al., 2013), researchers examined the relationship between severity of visual impairment and employment. Results of three RSA-911 analyses indicated that legal blindness conveyed a very small to small but statistically significant disadvantage in predicting competitive employment compared to less severe visual impairments. Researchers did not find any significant relationships between severity of visual impairment and employment when comparing total blindness with less severe visual impairments. In four analyses across three studies (Giesen & Cavanaugh, 2012; McDonnall, 2010a; Zhou et al., 2013), researchers examined relationships between additional disabilities and employment outcomes. In two RSA-911 analyses, having additional disabilities negatively predicted competitive employment, with small to medium effect sizes. Poor self-reported health negatively predicted number of hours worked in one analysis of NLSY data.

Education and services. Education level (e.g., highest degree or postsecondary completion) was examined in seven analyses across four studies (Cimera et al., 2015; Giesen & Cavanaugh, 2012; McDonnall, 2010a, 2011). Education level was a significant predictor of job quality; it was also a significant predictor of employment in four analyses, with effect sizes ranging from very small to large. Likewise, receiving college and related VR services (including

college or university training) had a significant, positive very small effect on competitive employment in all three analyses where it was examined; it was also a significant predictor of job quality. Several other VR services were significant predictors of employment outcomes in at least one analysis. For example, job placement services had a small but statistically significant positive effect on competitive employment in two of the three analyses of RSA-911 data, and it was positively associated with job quality.

Academic competence (i.e., reading/verbal and math scores) was included in two studies. In one study (McDonnall, 2010a), univariate analyses yielded large, positive significant effects for math and reading scores. In another study (McDonnall & Crudden, 2009), math and verbal scores on the Armed Services Vocational Aptitude Battery positively predicted number of hours worked in a multivariable analysis. Career counseling in school was a significant positive predictor in three out of four waves of employment data, with effect sizes ranging from very small to medium, providing mixed evidence. Furthermore, braille and orientation and mobility instruction had a significant medium effect on employment in one analysis of youth who are totally blind.

Vocational predictors. The most salient vocational predictor, prior work experience and its proxies, was included in four studies (Giesen & Cavanaugh, 2012; McDonnall, 2011; McDonnall & Crudden, 2009; McDonnall & O'Mally, 2012). Researchers assessed this predictor in a number of ways, including earnings at application, high school and paid work experience, and having worked since the onset of disability. Effect sizes for this predictor were generally medium. Having found one's own job independently was also a small, significant predictor in the two analyses that included it, whereas school-sponsored work was not a significant predictor of

employment. Additionally, a higher number of previous jobs was a significant predictor in four analyses, yielding very small to large effects.

In four RSA-911 analyses, researchers assessed relationships between employment outcomes and disability benefits (i.e., Social Security Disability Insurance [SSDI] and Supplemental Security Income [SSI]), which may function as work disincentives. Two analyses included SSI and SSDI separately, and two included receipt of either SSI or SSDI as a combined variable. In two analyses, receipt of SSI had a significant, small negative effect on competitive employment, but receipt of SSDI was not a significant predictor of competitive employment in either analysis. Receipt of either SSI or SSDI was significantly negatively related to competitive employment, with a small effect; its relation to job quality was not clearly reported.

Other predictors. Two NLTS2 studies (Cmar, 2015; McDonnall, 2011) included variables related to transportation or travel. In two analyses, researchers found travel skills to be significantly positively related to employment—with a medium effect for getting to places outside of the home independently and a very small effect for community travel (i.e., getting to places outside of the home, using public transportation, and arranging plane or train trips). In both analyses that included transportation difficulty, researchers found it to have a significant, small negative effect on employment.

In one analysis, parental support (i.e., youths' ratings of how supportive their parents were, in general) had a significant positive effect on number of hours worked, although an effect size was not provided. Another analysis included outcome expectations (i.e., youths' expectations of their future likelihood of paid employment, financial self-support, and independent living), which had a very small but significant positive effect on employment. Use of assistive technology, social skills, and self-perceived computer competence were statistically

significantly positively related to employment. Assistive technology had a large effect in a univariate analysis, social skills had a medium effect in a multivariable analysis, and the effect size for self-perceived computer competence was not reported.

Discussion

We conducted a systematic review of the literature on employment in transition-age youth with visual impairments. Ten studies met our inclusion criteria; they predominantly involved secondary analyses of existing datasets, most commonly NLTS2. The most commonly assessed predictors of employment included education, previous work experience, gender, and severity of visual impairment. Education level, particularly completion of postsecondary education, was consistently a significant positive predictor of employment, yielding very small to large effects on employment outcomes.

Additionally, previous paid work experience and its proxies were consistently a positive predictor of employment, yielding mostly medium effect sizes. In contrast, demographic and disability characteristics were generally non-significant predictors, except in studies using RSA-911 data, where some yielded significant effects, most of which were small. Many other variables were analyzed in a single study only and sometimes in univariate analyses; thus, despite some tentative evidence for the potential benefits of career counseling, general academic skills, social skills, self-determination, assistive technology, orientation and mobility instruction, and other factors in facilitating employment for youth with visual impairments, the evidence is too limited and mixed to draw strong conclusions about these variables.

Comparison to Previous Systematic Reviews

The results from the present review support key findings from Goertz and colleagues' (2010) systematic review of employment predictors in people with visual impairment as well as

the results of two recent systematic reviews on employment in adults with visual impairments (Authors, in press, a, b). In all of these reviews, the review authors reported that level of education was a consistent positive predictor of employment outcomes in adults with visual impairments. However, our findings add to this body of literature synthesis by examining the effects specifically in transition-age youth. In previous systematic reviews focusing on transition-age youth with disabilities, researchers did not examine postsecondary education as a predictor of employment; rather, they focused on relationships between secondary school programs/practices and post-school outcomes (Cavanaugh & Giesen, 2012; Mazzotti et al., 2016; Test et al., 2009). Cavanaugh and Giesen excluded studies of college students, and both Test and colleagues and Mazzotti and colleagues examined postsecondary education as an outcome rather than as a predictor. Thus, our findings substantiate the importance of postsecondary education in the transition from secondary school to post-school employment for transition-age youth with visual impairments and provide evidence in support of postsecondary completion as a predictor of employment for these youth.

Additionally, our findings provide strong support for the importance of work experience, particularly self-initiated work experience, before leaving school. These findings are similar to those for youth with disabilities in general (NTACT, 2018), as well as adults with visual impairments (Authors, in press a, b). The consistency of these results across reviews and populations is striking and strongly suggests that both postsecondary education and early paid work experience are key to the short- and long-term employment prospects of individuals with visual impairments.

Limitations of the Literature

In nine of the ten studies in this review, researchers utilized secondary datasets, with five studies using NLTS2 data. The one study that did not involve secondary data analysis included graduates from only one school and reported very limited outcome data on employment, thus making it very difficult to compare those results to those of the other studies.

Secondary datasets have many potential advantages, including national, representative samples and relatively large sample sizes of low-incidence populations, such as youth with visual impairments. These advantages are reflected in our QI scores, in which studies generally met the QIs for having national and representative samples. However, secondary data analyses also have some notable disadvantages, particularly when the researchers rely on the same dataset. First, all NLTS2 analyses in this review likely used the same general pool of participants, with some small variation in samples based on the study authors' inclusion and exclusion criteria. Thus, much of our knowledge of the predictors of employment in youth with visual impairments is based on the same set of individuals. Although NLTS2 is demographically representative and rigorously sampled, the heavy reliance on one dataset to understand this phenomenon may inherently limit the generalizability of the body of results as a whole.

Second, secondary data analyses limit researchers to the variables available in the dataset, which may constrain the research questions that can be asked and the conclusions that can be drawn. This necessary inflexibility can also create issues when comparing results across datasets. For example, the RSA-911 datasets only differentiate between *legal* blindness and other visual impairment whereas the NLTS2 dataset only differentiates between *total* blindness and other visual impairment. Because variables are not equivalent across data sources, it is difficult to determine if these differences in findings are due to differences in outcome variables, categorization of visual impairment, participant population, sample size, or other factors.

Third, the age of the data should be considered. LSVRSP, NLSY, and NLTS2 data were collected between 1997 and 2009, making them at least nine years old as of 2018. Although these datasets are immensely useful in transition research due to their large, representative samples and longitudinal outcome data, the generalizability of the findings to youth with visual impairments who are current secondary students or recent graduates is unclear.

Another limitation of this body of literature relates to statistical power. With the exception of the RSA-911 studies, most analyses used relatively small samples. Although this issue may simply be an unavoidable consequence of studying a low-incidence population, it still raises concern over the possibility of Type 2 errors in analyses. Related to this concern, many researchers reported neither effect sizes for non-significant predictors nor power analyses, creating the possibility that some meaningful predictors of employment were not noted as such. Universal effect size reporting would help address this issue (Thompson et al., 2005).

Limitations of This Review

Some limitations of the present review should be noted when interpreting its findings. First, this review was limited to studies conducted in the United States. Although this constraint allowed our review to be fully systematic and within a single broad sociopolitical context, it limits the generalizability of our findings to youth from other countries. Additionally, the restriction of this review to peer-reviewed literature, although again helpful for increasing its systematic nature, may have eliminated potentially interesting findings in the grey literature, such as dissertations and unpublished technical reports. The inclusion of grey literature in systematic reviews is mixed, and most of the writings on it have focused on systematic reviews of intervention studies, where non-publication of non-significant findings is a concern (Hartling

et al., 2017). Publication bias may be less of an issue with multivariable cross-sectional analyses, as an analysis with solely non-significant findings would be unlikely.

Implications for Practice

Despite the limitations noted in the previous section, this body of literature provides some guidance regarding employment outcomes in youth with visual impairments. Level of education and previous work experience were the two most consistently strong predictors of employment outcomes, suggesting that both vocational and academic preparation may be useful for increasing the employment success of youth with visual impairments. On a broad level, these findings provide some support for the importance of pre-employment transition services for youth with visual impairments. The required activities under WIOA, such as workplace readiness training, job exploration counseling, and counseling on postsecondary education opportunities, may help youth with visual impairments explore their interests and options in preparation for competitive employment, particularly if services account for the unique needs of this population.

Practitioners can share information about pre-employment transition services with youth and their families and refer them to their State/Federal VR agency. Youth with visual impairments and their families may not be aware of these services, particularly if youth are not current VR consumers.

In addition to the activities required under WIOA, youth with visual impairments may benefit from direct experiences, specialized interventions, and other supports related to postsecondary education and employment beginning at a young age. Children without visual impairments develop many of the underlying concepts and skills needed for both postsecondary education and employment through incidental visual observation. For example, children without visual impairments learn about eye contact and body language from observing people around

them. They begin learning about careers at an early age by casually observing people doing various jobs in the community. To learn these same concepts and skills, as well as other aspects of the Expanded Core Curriculum, children and youth with visual impairments require systematic, direct intervention throughout their preschool, elementary, and secondary education (Hatlen, 1996; Sapp & Hatlen, 2010). Emerging, although mixed, evidence for transportation and travel skills reinforces the importance of providing orientation and mobility instruction to children and youth with visual impairments. This assertion aligns with the findings of Cmar, McDonnall, and Crudden (2018), who found that transportation self-efficacy was positively related to employment, especially in younger individuals. Effective preparation for postsecondary education and employment begins much earlier than high school for youth with visual impairments.

In this review, we found that supporting youth in completion of postsecondary education should be an area of particular focus for practitioners working with youth with visual impairments. Although youth with visual impairments have high rates of participation in postsecondary education (McDonnall, 2010b), they may take longer to complete their degree than youth without disabilities (Reed & Curtis, 2012). College students with visual impairments often experience academic and social barriers (Reed & Curtis, 2012) that may interfere with timely degree completion, such as inaccessible course materials, websites, and course management systems (Fichten, Asuncion, Barile, Ferraro, & Wolforth, 2009). Postsecondary students with disabilities are responsible for requesting and managing their own services and accommodations, which requires considerable planning, self-advocacy, and self-determination (Lund, Andrews, & Holt, 2016). Youth can begin working on these skills during middle or high school through self-advocacy instruction and interventions that give them practice

understanding, discussing, and obtaining accommodations. In general, youth with visual impairments need to be prepared for a rather abrupt decline in support and increase in responsibility as they transition from high school to postsecondary education (Reed & Curtis, 2011). Strong inter-agency and inter-professional collaboration between high schools, postsecondary schools, VR agencies, and rehabilitation professionals would help to provide some consistency during this transition and increase the likelihood that young adults with visual impairments will enter postsecondary education with the knowledge and skills necessary to succeed.

Paid work experience is a key predictor of employment for youth with visual impairments, which suggests that the experience of working for pay for an employer in the community has important future benefits for these youth. In particular, paid jobs that youth find themselves, as opposed to school-sponsored work experiences, may be especially important for employment outcomes. Finding and obtaining paid employment during high school also gives youth additional opportunities to develop and practice skills such as disclosing their visual impairment and discussing accommodations with employers, both of which are directly relevant to postsecondary education. Pre-employment transition services such as job exploration counseling, work-based learning experiences, and workplace readiness training may be important prerequisites for paid employment, but paid employment is not necessarily a component of these services. Thus, practitioners and researchers may wish to encourage youth to obtain paid jobs during high school and teach them job search skills, rather than simply providing sponsored work experiences. *Putting Your Best Foot Forward* is one example of a job search skills training program specific to youth with visual impairments that has demonstrated promising preliminary effects (Cmar & McDonnall, 2018).

Recommendations specific to rehabilitation psychologists. Rehabilitation psychologists are experts in understanding and accommodating the functional limitations associated with disability in order to maximize community participation and psychological well-being (American Psychological Association, 2019). Thus, rehabilitation psychologists may play a key role in helping to identify barriers and solutions to educational and vocational participation among youth with visual impairments. For example, a rehabilitation psychologist may work to identify and implement an evidence-based program to improve job-seeking skills and job-seeking self-efficacy in a client with visual impairment or work with a client and team to identify and remediate barriers to the effective use of assistive technology. Additionally, a rehabilitation psychologist can also help identify behavioral, psychological, and familial assets of the client and help design strategies that use those assets to maximize opportunities for participation in early work experiences. Similarly, rehabilitation psychologists can also use their expertise to address behavioral, psychological, and familial barriers that may be interfering with participation in work and school. For example, a rehabilitation psychologist could help develop behavioral contingencies to increase client engagement in a work experience program or assist in identifying and treating potential psychological barriers, such as depression, that may be limiting client engagement in work and school. For clients with adolescent-onset or progressive visual impairment, a rehabilitation psychologist could help with emotional or psychological adjustment as needed and also work with vision rehabilitation professionals and orientation and mobility specialists to help develop strategies to maximize functional independence at work and school.

Implications for Policy

Our findings in this review re-iterate the importance of meaningful educational and vocational engagement among youth with visual impairments. Thus, it is critical that adequate

funding be made available to provide support and resources to engage these youth in meaningful work and ensure access to a truly free and appropriate public education. Thus, rehabilitation psychologists should advocate for continued and expanded funding for VR services as well as public education. The recent increase in federal VR funding for pre-employment transition services under WIOA has enabled VR agencies to serve a wider range of youth with disabilities and to provide specific, targeted programming and services to youth. Investigating the efficacy of specific programs, curricula, and practices for provision of pre-employment transition services could help VR agencies that serve youth with visual impairments determine how to use this funding to best meet the needs of this population. As experts in research and program evaluation, rehabilitation psychologists could be key drivers of this initiative, leading or assisting researchers and providers in developing, testing, refining, and scaling interventions that increase educational and vocational engagement and success in youth with visual impairments.

Additionally, advocacy for the protection of core disability rights legislation, such as the ADA and IDEA, is vitally important on both macro and micro levels. On a micro level, rehabilitation psychologists can help families and clients to understand their rights and responsibilities and assist them in addressing potential grievances. Finally, advocating for research funding for the study of youth with visual impairments and other low-incidence but high-need populations is necessary to enhance our ability to serve these youth using evidence-based practices.

Implications for Research

Despite our findings regarding the positive effects of postsecondary degrees on employment outcomes, college graduates with visual impairments continue to face barriers to employment (Antonelli, Steverson, & O'Mally, 2018). In-depth, longitudinal research focusing

on college students with visual impairments would provide additional information on factors associated with postsecondary completion and successful transition from postsecondary education to employment for this population. The nuances of the relationship between paid work experience and employment outcomes also warrants further attention. For instance, school-sponsored work experiences are not associated with future employment for youth with visual impairments (McDonnall & O'Mally, 2012), but the relationship between work experiences sponsored by VR or other agencies and employment has not been explored in this population. Research focusing on youth with visual impairments who participate in work experiences sponsored by entities other than schools would be an important addition to the literature in this area. Furthermore, research is needed to identify interventions for youth with visual impairments that lead directly to employment outcomes (Cavanaugh & Giesen, 2012). This research could include quasi-experimental and randomized controlled studies of potentially promising interventions that address job-seeking, academic, or Expanded Core Curriculum skills in youth with visual impairments and then following up to assess employment outcomes. For example, considering the high prevalence of and reliance on technology in most modern workplaces and the increasing use of technology during the job-seeking process (e.g., to research companies, find job vacancies, complete online applications, and communicate with employers), researchers could investigate if participation in an intervention to improve assistive technology skills results in better employment outcomes in youth with visual impairments.

Many other predictors that were significant in one or two studies should also be investigated in additional studies, including those related to the Expanded Core Curriculum. The forthcoming data from the NLTS 2012, the next iteration of NLTS2, should be helpful in investigating these relationships. Additionally, researchers could conduct further analyses with

RSA-911 data from other FYs and other national datasets, and they could also attempt to replicate or expand these findings in convenience samples. Although research using convenience samples can be difficult in low-incidence populations such as youth with visual impairments, such studies may also allow researchers to examine factors that are not included in the large, national datasets or to expand on certain variables or topics.

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Footnote:

¹Although identity-first language is increasingly used in the disability community (Dunn & Andrews, 2015), we are using person-first language here to reflect the conventions and preferences of the broad community of people with visual impairments specifically.

Table 1
Characteristics of Included Studies

Study	Sample size	Participants						Data source
		Age (years)	Gender	Race/ethnicity	Vision status	Secondary disabilities		
Cimera Rumrill, Chan, Kaya, & Bezyak (2015)	2,543 (competitive employment sample)	16-25 (at application) $M = 19.76$, $SD = 2.88$	53.3% male 46.7% female	59.1% White 20.1% AA 16.2% Hispanic 3.1% AAPI 1.5% AI/AN	52.5% legally blind 47.5% other visual impairments	NR	RSA-911 (FY 2012)	
Cmar (2015)	510	14-18 (at Wave 1)	NR	NR	68% low vision	34% secondary disability	NLTS2 (Waves 1, 2, 4, 5)	
DeLaGarza & Erin (1993)	70	18-22 (at graduation)	56% male 44% female	56% White 24% Hispanic 20% AA	57% low vision 43% totally blind	NR	TSBVI graduates (graduated 1985-1990)	
Giesen & Cavanaugh (2012)	2,282	21 or younger (at application) $M = 17.30$, $SD = 2.20$	46.8% female	63.7% White 15.7% AA 14.9% Hispanic 2.0% Asian American 1.6% American Indian 1.6% multiple races 0.5% Hawaiian or Pacific Islander	54.0% legally blind 46.0% other visual impairments	21.2% noncognitive secondary disability 11.2% cognitive secondary disability	RSA-911 (FY 2010)	
McDonnall (2010a)	140	18-23 (in 2002) $M = 19.80$, $SD = 1.47$	37.9% male	39.3% White 28.6% Hispanic 27.9% AA 2.1% AAPI 1.4% AI/AN 0.7% other or mixed race	NR	26.4% chronic health condition 21.4% learning or emotional disorder	NLSY 1997 (2002-2006 for outcomes)	

McDonnall (2011)	180	19-23	56% male 44% female	61% White 25% AA 13% Hispanic 2% AAPI	37% blind	NR	NLTS2 (Waves 1-4)
McDonnall & Crudden (2009)	41	14-21 (at application)	61% male	80% White 5% Hispanic	54% legally blind	46% secondary disability	LSVRSP
McDonnall & O'Mally (2012)	310	19-23 (at Wave 4)	56% male 44% female	65% White 21% AA 12% Hispanic 2% AAPI	36% blind	38% secondary disability ^a	NLTS2 (Waves 1-4)
McDonnall & O'Mally (2012)	110	19-23 (at Wave 4)	52% male 48% female	63% White 24% AA 11% Hispanic 2% AAPI	31% blind	28% secondary disability ^a	NLTS2 (Waves 2-4)
Wolffe & Kelly (2011)	NR	13-17 (at Wave 1)	87.2% female 12.8% male	62.6% White 19.8% AA 13.8% Hispanic 3.8% other	NR	NR	NLTS2 (Waves 1-4)
Zhou, Smith, Parker, & Griffin-Shirley (2013)	190	NR	52.6% male 47.4% female	NR	63.2% low vision 31.6% blind	36.8% multiple disabilities	NLTS2 (Waves 1-3)

Note. AA = African American; AAPI = Asian American or Pacific Islander; AI/AN = American Indian/Alaska Native; NR = not reported; RSA = Rehabilitation Services Administration; FY = fiscal year; NLTS2 = National Longitudinal Transition Study-2; TSBVI = Texas School for the Blind and Visually Impaired; NLSY = National Longitudinal Survey of Youth; LSVRSP = Longitudinal Study of the Vocational Rehabilitation Services Program.

^aMost common secondary disabilities were attention deficit disorder, physical/orthopedic impairment, cerebral palsy, learning disability, and mental retardation (i.e., intellectual disability).

Table 2

Quality indicators (QIs)

Study	ES	CI	PV	MV	AM	LD	NS	RS	PC	QIs met
Cimera et al. (2015)	N	N	N	Y	N	N	Y	Y	N	3/9
Cmar (2015)	Y	N	Y	Y	N	Y	Y	Y	N	6/9
DeLaGarza & Erin (1993)	N	N	N	N	N	N	N	N	N	0/9
Giesen & Cavanaugh (2012)	Y	N	Y	Y	Y	N	Y	Y	N	6/9
McDonnall (2010a)	N	N	N	Y	N	Y	Y	Y	N	4/9
McDonnall (2011)	Y	Y	Y	Y	N	Y	Y	Y	Y	8/9
McDonnall & Crudden (2009)	N	N	N	N	N	Y	N	Y	N	2/9
McDonnall & O'Mally (2012)	N	N	N	Y	N	Y	Y	Y	N	4/9
Wolffe & Kelly (2011)	N	N	Y	N	N	Y	Y	Y	N	4/9
Zhou et al. (2013)	N	N	Y	Y	Y	Y	Y	Y	N	6/9
Studies meeting each QI	3	1	3	7	2	7	8	9	1	

Notes. ES=Effect sizes provided for all predictors (final model); CI=confidence intervals given for all effect sizes (final model); PV=exact p-values >.001 given for all predictors (final model); MV=multivariable analyses used; AM=reports if statistical assumptions met (final model); LD=longitudinal design; NS=uses a national sample; RS=uses a representative, non-convenience sample; PC=provides a power calculation or other accepted metric regarding sample size; Y=yes; N=no

Table 3
Study Outcomes

Study	Outcome variable	Statistical analysis	Predictors and effect sizes (by category)			
			Demographic	Education and services	Vocational	Other
Cimera, Rumrill, Chan, Kaya, & Bezyak (2015)	Competitive employment	Multiple logistic regression	African American: nr Age at application (19-22 vs. 16-18 years): nr *Age at application (23-25 vs. 16-18 years): 1.63 American Indian or Alaska Native: nr Asian or Pacific Islander: nr *Hispanic: 1.51 *Legally blind ^a : 0.83 *Male gender: 1.21	*Associate degree ^b : 0.40 *College/university training: 1.49 *Diagnosis and treatment: 1.26 *High school diploma ^b : 0.31 !Information and referral *Job placement: 2.12 *Job readiness: 0.67 *Job search: 1.55 *Less than high school education ^b : 0.26 *Maintenance: 1.51 !Occupational/vocational training *On-the-job support: 2.30 !On-the-job training !Other services *Reader or interpreter services: 0.46 *Rehabilitation technology: 1.31 *Special education ^b : 0.16 !Supported employment services	*Disability benefits: 0.54	N/A

				!Technical assistance !Transportation	
Cimera, Rumrill, Chan, Kaya, & Bezyak (2015)	Quality of employment	Hierarchical linear regression	!Age at application *Male gender: nr (pos) !Race/ethnicity !Severity of visual impairment	!Agency type *Augmentative skills training: nr (neg) *College/university training: nr (pos) !Diagnosis and treatment *Education level at application: nr (pos) *Information and referral: nr (neg) *Job placement: nr (pos) *Job readiness: nr (neg) !Job search *Maintenance: nr (pos) !Occupational/vocational training !On-the-job support !On-the-job training !Other services *Reader services: nr (pos) !Rehabilitation technology !Supported employment services !Technical assistance !Transportation	*Disability benefits: nr (neg)

Cmar (2015)	Employment (Wave 4)	Multiple logistic regression	Age: 1.29 (per year) Low vision ^c : 1.62	N/A	N/A	*Community travel: 1.28 (per 1-unit increase)
Cmar (2015)	Employment (Wave 5)	Multiple logistic regression	Age: 1.29 (per year) Low vision ^c : 2.08	N/A	N/A	!Campus travel *Outcome expectations: 1.40 (per 1-unit increase)
DeLaGarza & Erin (1993)	Employment	Not Reported	Gender: nr Totally blind ^d : nr	N/A	N/A	N/A
Giesen & Cavanaugh (2012)	Competitive employment (Objective)	Multiple logistic regression	*African American: 0.70 American Indian: 1.14 Asian American: 1.30 *Cognitive disability: 0.66 *Female gender: 0.82 Hawaiian or Pacific Islander: 0.34 *Hispanic: 1.65 *Legally blind ^a : 0.58 Multiple race: 1.29 *Noncognitive disability: 0.65 Significant disability: 0.71	Adjustment services: 0.93 *College and related services: 1.44 *Education level at application: 1.15 *General/vocational supports: 1.18 IEP: 0.96 *Job placement: 1.96 *Remedial skills/assistance: 0.42	*Any earnings at application: 3.22 SSDI at application: 0.70 *SSI at application: 0.42	N/A

Giesen & Cavanaugh (2012)	Competitive employment (RSA)	Multiple logistic regression	African American: 1.15 American Indian: 1.53 Asian American: 1.42 *Cognitive disability: 0.26 *Female gender: 0.50 Hawaiian or Pacific Islander: 0.16 Hispanic: 0.88 *Legally blind ^a : 0.49 Multiple race: 0.98 Noncognitive disability: 0.74 Significant disability: 0.96	*Adjustment services: 0.58 *College and related services: 1.25 Education level at application: 1.00 General/vocational supports: 1.20 IEP: 1.26 Job placement: 1.46 Remedial skills/assistance: 0.90	*Any earnings at application: 3.19 SSDI at application: 1.26 *SSI at application: 0.48	N/A
McDonnall (2010a)	Annual number of hours worked	Multilevel modeling	!African American !Age (in 2002) !Chronic conditions !Gender *Hispanic: nr (pos) !Learning/emotional disorder *Poor self-reported health: nr (neg)	*ASVAB math/verbal score: nr (pos) !Education level *Number of college credits earned: nr (neg) !School-to-work program participation	N/A	*Parental support: nr (pos) *Time (in years): nr (pos)
McDonnall (2011)	Employment (20+ hours per week)	Multiple logistic regression	!Severity of visual impairment	*Postsecondary completion: 2.25	*High school work: 2.42 *Number of	!Independent travel

					recent jobs: 1.44 (per job) !Receipt of SSI	!Parental expectations *Social skills: 3.51 *Transportation difficulty: 0.42
McDonnall (2011)	Employment (35+ hours per week)	Multiple logistic regression	!Severity of visual impairment	*Postsecondary completion: 3.03	*Number of recent jobs: 1.28 (per job) !Receipt of SSI	*Independent travel: 2.96 !Parental expectations *Transportation difficulty: 0.41
McDonnall & Crudden (2009)	Employment	Fisher's exact test	N/A	N/A	Counselor showed interest: .24 Frequency of meetings with counselor: .19 Frequency of phone calls with counselor: .46 Quality of relationship with counselor: .34 Recency of work experience: .36 *Worked since disability: .40	Need equipment: .00 *Self-determination (decision-making): .39 *Use of assistive technology: .66

McDonnall & Crudden (2009)	Employment	Logistic regression	N/A	N/A	*Number of previous jobs: 5.64 (per job)	N/A
McDonnall & Crudden (2009)	Employment	t test	N/A	*Math competence: 1.03 *Reading competence: 1.58	N/A	Self-esteem: nr
McDonnall & Crudden (2009)	Employment	MANOVA	N/A	N/A	N/A	*Locus of control: Chance subscale: $d=0.80$ Internal subscale: $d=0.79$ *Powerful others subscale: $d=1.25$
McDonnall & O'Mally (2012)	Employment (Wave 4)	Multiple logistic regression	N/A	N/A	*Paid work experience: 3.30 School-sponsored work: nr	N/A
McDonnall & O'Mally (2012)	Employment (Wave 4)	Multiple logistic regression	N/A	N/A	*Found previous job independently: 2.46 *Length of previous jobs: nr *Number of previous paid	N/A

					jobs: 2.18 (per two jobs)	
McDonnall & O'Mally (2012)	Number of paid jobs	t test	N/A	N/A	*Found previous job independently: 0.40	N/A
Wolffe & Kelly (2011)	Employment	Chi-square with Yates' correction	N/A	*Career counseling (Wave 1): .08 *Career counseling (Wave 2): .11 Career counseling (Wave 3): -.02 *Career counseling (Wave 4): .33	N/A	N/A
Wolffe & Kelly (2011)	Employment (Wave 4)	Chi-square with Yates' correction ^e	N/A	*Instruction in braille and O&M: > .30 ^f	N/A	N/A
Zhou, Smith, Parker, & Griffin-Shirley (2013)	Employment (Wave 3)	Multiple logistic regression	Additional disabilities: nr Gender: nr Severity of visual impairment ^g : nr	N/A	N/A	*Self-perceived computer competence: nr (pos)

Note. * = statistically significant. ! = included in preliminary but not final model. Reference group is White for all race predictors. nr = not reported; pos = positive; neg = negative; IEP = Individualized Education Program; SSDI = Social Security Disability Insurance; SSI = Supplemental Security Income; RSA = Rehabilitation Services Administration; ASVAB = Armed Services Vocational Aptitude Battery; O&M = orientation and mobility.

^aReference group = other visual impairments. ^bReference group = bachelor's degree. ^cReference group = totally blind. ^dReference group = low vision. ^eOnly included youth who were totally blind. ^fExact effect size not reported. ^gReference group not specified.

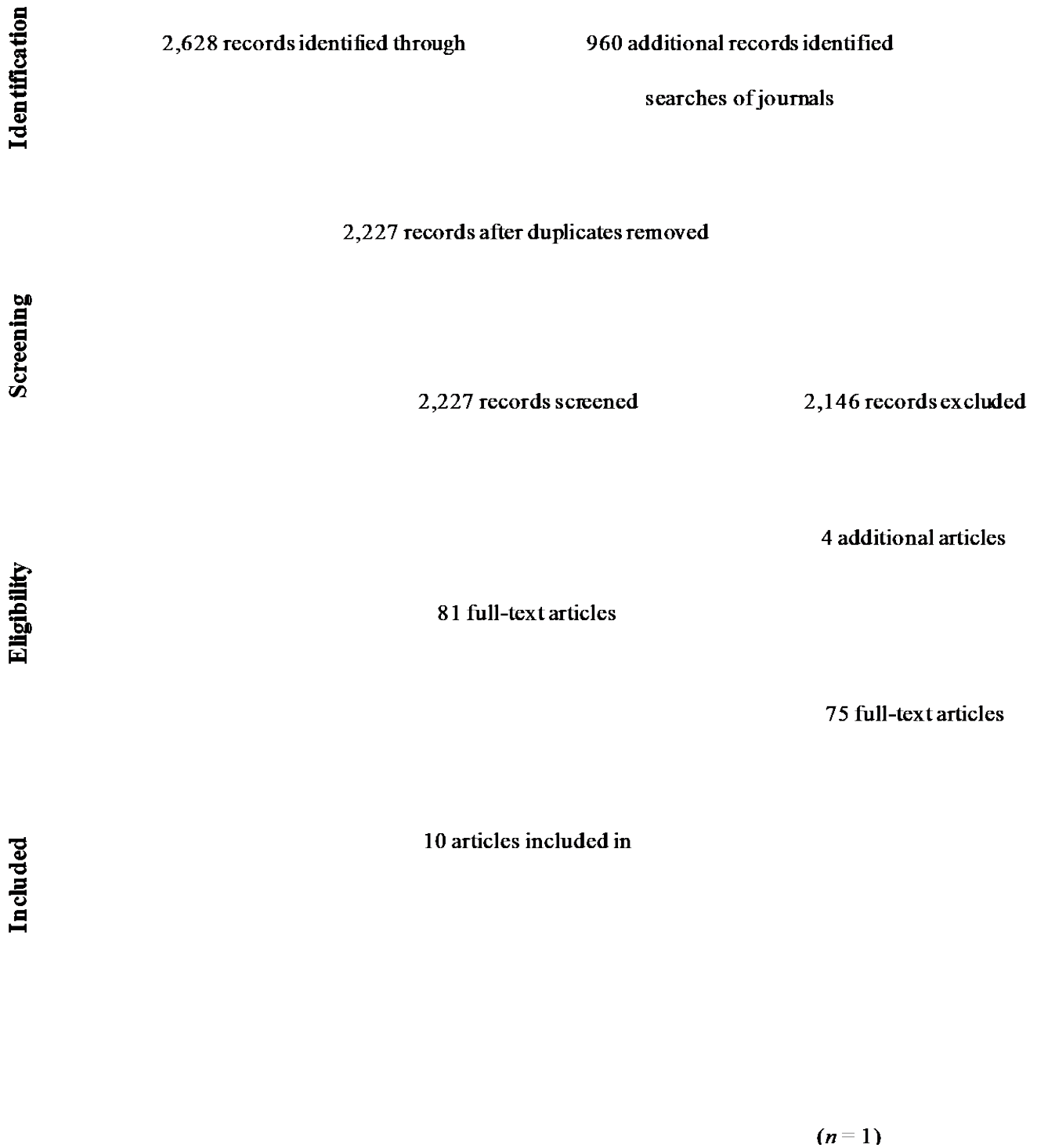


Figure 1. Flow diagram for the systematic review.