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Employers' Implicit Attitudes About the Competence of People who are Blind

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Abstract

Objective: The purpose of this study was to develop and validate an implicit measure of attitudes about the competence of people who are blind, to be used with employers, and to report on these implicit attitudes with a national sample of employers.

Research Method: A sample of 343 employers (i.e., business professionals responsible for making hiring decisions) participated in an online survey that involved answering questions and completing formal instruments, including explicit and implicit attitude measures about blind employees and a knowledge measure about how blind people can perform typical work tasks. The implicit measure was an Implicit Association Test (the IAT-BVI) that was developed for this study.

Results: Employers have strong negative implicit attitudes about the competence of people who are blind, with results indicating a very large IAT effect. These implicit attitudes were not associated with personal characteristics, exposure to people who are blind, or explicit attitudes. Implicit attitudes were significantly associated with knowledge about how blind people perform work tasks and, for employers who had hired a blind person, performance ratings of those employees.

Conclusions: Employers' implicit attitudes about the competence of blind people were mostly unrelated to other measures, as expected, with the exception of knowledge and performance ratings of blind employees. These findings provide support for the validity of the IAT-BVI, and indicate the importance of rehabilitation professionals working with employers to provide education about how blind people perform work tasks as a potential avenue to improve employment opportunities for people who are blind.

Employers' Implicit Attitudes About the Competence of People who are Blind

Impact and Implications

- Employers' attitudes toward people with disabilities are a popular research topic, as these attitudes are assumed to contribute to the consistently low levels of employment for this population. However, employer attitudes have only been evaluated thus far with explicit, or self-report, measures. This is the first study to evaluate employers' implicit attitudes about a specific population of people with disabilities: those who are blind or visually impaired.
- Employers' implicit attitudes about the competence of people who are blind or visually impaired are strongly negative, and these attitudes are associated with knowledge about how blind people can perform work tasks (as knowledge increases, implicit attitudes improve). Therefore, providing education to employers about how blind people can perform work tasks may improve their implicit attitudes and increase blind job candidates' chances to be considered for employment.

Introduction

People who are blind or visually impaired have traditionally experienced greater difficulty obtaining employment than the general population. Recent national employment statistics illustrate the problem: The unemployment rate for working-age people with a visual impairment is approximately double the rate for people without disabilities (11.5% compared to 5.8%), and the employment population ratio is 34 points lower (41.8 compared to 76.0) (U.S. Census Bureau, 2016). One of the primary barriers to employment for this population is thought to be negative employer attitudes (Coffey, Coufopoulos, & Kinghom, 2014; Crudden & McBroom, 1999; Kirchner, Johnson, & Harkins, 1997; McDonnall, Zhou, & Crudden, 2013; Salomone & Paige, 1984). Negative employer attitudes are considered a significant barrier to

employment for persons with all types of disabilities, as illustrated by the large number of studies conducted in this area and multiple literature reviews summarizing the research (e.g., Burke et al., 2013; Hernandez, Keys, & Balcazar, 2000; Ju, Roberts, & Zhang, 2013; Unger, 2002).

Attitudes are typically regarded as conscious or unconscious evaluations based on actions, feelings, or thoughts that can influence subsequent behavior (Eagly & Chaiken, 2007; Fishbein & Ajzen, 1975). Therefore attitudes are important due to their potential influence on behaviors: If employers hold negative attitudes towards people with disabilities, we can assume that people with disabilities may experience discrimination in hiring. Although numerous studies have been conducted on employers' explicit, or self-reported, attitudes towards people with disabilities, with a few of these studies specific to people who are blind[1] (e.g., McDonnall, Crudden & O'Mally, 2015; McDonnall & Crudden, in press), no studies of *employers'* implicit, or unconscious, attitudes towards people with disabilities could be found in the literature. With the advent and refinement of the Implicit Association Test (IAT; Greenwald, Nosek, & Banaji, 2003), the ability to measure implicit attitudes on a wide variety of topics has become readily available.

The IAT

The IAT is a measure that is presumed to be affected by automatic associations in a person's memory regarding particular concepts or social groups. The IAT is an implicit methodology, in that it provides a measure of memory associations without directly asking the person about their attitudes or biases (Fazio & Olson, 2013). These memory associations may indicate a bias or preference that the person holds, even if he or she is not aware or does not overtly subscribe to that opinion; for example, a person may believe that women and men should both be equally associated with science careers, but due to cultural influences and their own

experience, may hold an implicit association that equates men more strongly with science than women. A person may be either unaware, thus unable to report, certain biases or attitudes, or be unwilling to report them due to social desirability pressure, making implicit measures of particular interest to researchers (Nosek, Greenwald, & Banaji, 2005).

The IAT uses a measure of response time to assess the relative strength with which certain concepts, such as race (Black/White) or disability status (Blind/Sighted), are associated with certain attributes, such as Positive/Negative. The IAT task is performed on a computer, and participants use two designated keyboard keys to quickly classify stimuli (either words or images) that represent the concepts or attributes. The more closely a concept (e.g., Blind) is associated with an attribute (e.g., Negative) for that participant, the more quickly and easily the participant will perform the task (i.e., the response time will be shorter for selecting the correct key) when those two categories share the same response key. The weaker the association between the two (e.g., Blind + Positive), the longer the response time will be for selecting the same response key. The IAT score is created by measuring the difference between response times for each pairing, for example, Blind + Positive versus Blind + Negative. The pairing with the shorter response time is taken as an indication of that person's implicit attitude (e.g., they more closely associate Blind + Negative, or vice versa).

IAT responses are considered to be automatic because they occur without intention and are not under the person's control (Greenwald & Banaji, 1995), even when the participant is aware of the purpose of the task and what it is measuring (e.g., Kim & Greenwald, 1998). Because of its ease of use and extensive evidence for its reliability and validity (e.g., Nosek, Greenwald, & Banaji, 2007; Nosek & Smyth, 2007), the IAT is the most widely used measure of

implicit attitudes (Barnes-Holmes, Murtagh, Barnes-Holmes, & Stewart, 2010; De Houwer & De Bruycker, 2007).

The IAT works by having a participant learn the response key mappings for target concepts and evaluative attributes (e.g., Sighted on the left and Blind on the right; Negative on the left and Positive on the right). Test stimuli items are displayed one at a time in the center of the screen. If the participant responds incorrectly to an item, an error message appears until the participant correctly categorizes the item. Participants complete the task over a series of seven trial blocks. See Table 1 for an example sequence. A calculation involving the difference between the participant's response times from the combined trial blocks (the 3rd compared to 6th, 4th compared to 7th blocks) is generated to create the *D* score of the IAT, the measure of the magnitude of bias a particular participant has regarding that category (Greenwald et al., 2003). There is a minor order effect in the IAT based on which pairing (i.e., Sighted + Negative, Sighted + Positive) is shown to an individual participant first. This order effect is mitigated in two ways: First, an extra trial (Block 6) allows the participant to train on the new combination, and second, the order of pairing is counterbalanced across participants (half see Sighted + Negative first, and the other half see Sighted + Positive first).

IATs Specific to Disability

Several IATs specific to disability have been created (see Wilson & Scior, 2014 for a review), including IATs about specific disabilities, such as Down syndrome (Enea-Drapeau, Carlier, & Huguet, 2012) and mental illness and paraplegia (Thomas, Doyle, & Vaughn, 2007), or specific groups of disabilities, such as intellectual or motor disabilities (e.g., Hein, Grumm, & Fingerle, 2011; Proctor, 2012; Robey, Beckley, & Kirschner, 2006). Project Implicit's Disability IAT, which has been used by multiple researchers (e.g., Aaberg, 2012; Archambault, Van Rhee,

Marion, & Crandall, 2008; Pruett and Chan, 2006 [in a paper and pencil version]), represents physical disabilities and includes graphic stimuli representing blindness/visual disability (i.e., symbol of a person walking with a cane and symbol of a guide dog) along with graphic stimuli representing mobility impairments. However, an IAT specific to blindness only has not been published to date.

Reason for Developing a Blindness Competence-Specific IAT

People with disabilities encompass a large, diverse group, with each disability type possessing unique characteristics and experiencing unique challenges. There is also ample evidence that attitudes towards different disability types differ, including employer attitudes (Gilbride, Stensrud, Ehlers, Evans, & Peterson, 2000; Grand, Bernier, & Strohmer, 1982; Hernandez et al., 2000; Strohmer, Grand, & Purcell, 1984). Several studies have documented that employers have even more concerns about hiring individuals who are blind or visually impaired than hiring people with other disabilities (Chen, Blankenship, Austin, Cantu, & Kotbungkair, 2016; Fuqua, Rathbun, & Gade, 1984; Gilbride et al., 2000; Inglis, 2006). Social psychologists recommend that specific contexts or criteria be used when developing attitude instruments (e.g., Ajzen & Fishbein, 1980), as the more specific an attitude measure is, the more likely it will be related to behavior (Ajzen, 1988). For these reasons, when one is interested in a specific disability population such as people who are blind, it is important to measure attitudes towards that group specifically.

Social psychologists' recommendation for specific contexts would also apply to situational contexts—such as work performance or competence—when evaluating attitudes of employers towards potential employees. Implicit stereotypes or associations have also been shown to be situational context-specific (Casper, Rothermund, & Wentura, 2010; Rohmer &

Louvet, 2016). Therefore, when seeking to evaluate employers' implicit attitudes towards people who are blind as employees, it is important for an implicit measure to include words related to competence, rather than the words typically used on disability IATs (e.g., evil, terrible, vomit, rotten, good, excellent, happy, joy; Wilson & Scior, 2014).

Importance of Utilizing an Implicit Measure to Assess Employer Attitudes

It is important to include a measure of implicit attitudes, particularly when assessing a construct or topic that involves social norms or normative pressures and is therefore more prone to socially desirable responding. Due to social pressure and federal laws regarding discrimination against people with disabilities, employers may be less likely to report negative attitudes towards this population. In addition to potentially being unwilling to accurately self-report their attitudes, employers may be unable to report negative attitudes because they do not realize that they exist (Greenwald & Banaji, 1995). Across multiple social topics, the IAT has generally revealed a stronger negative effect than corresponding self-report measures (Nosek et al., 2007). Although explicit and implicit measures of attitudes tend to have a low positive correlation, the size of the relationship varies by topic area and social norms associated with the topic (Nosek et al., 2007). Based on data collected on the Project Implicit website from 38,544 people over a three-year period, preference for people without disabilities was one of the strongest implicit effects exhibited across social group domains (Nosek et al., 2007). The relationship between explicit and implicit attitudes towards people with disabilities has been found to be low and often nonsignificant (Pruett & Chan, 2006; Thomas, Vaughn, Doyle, & Bubb, 2014; Wilson & Scior, 2014). In addition, it is considered socially unacceptable to express prejudice towards people who are blind: In two studies, blind people were the group that was rated the lowest in terms of

normative acceptability of prejudice towards them (Crandall, Eshleman, & O'Brien, 2002; Graziano, Bruce, Sheese, & Tobin, 2007).

In a meta-analysis of predictive validity of the IAT, both implicit and explicit attitude measures were shown to predict behavior, with explicit measures displaying much more variability in ability to predict (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Although predictive validity of explicit measures associated with socially sensitive topics was low, this was not the case for IAT measures. IAT and explicit measures both predicted variability in the behavioral criterions used in the studies, with each explaining additional unique variance. For all of these reasons, it is particularly important to include an implicit attitude measure when evaluating employer attitudes towards people who are blind.

Use of the IAT in Hiring Discrimination Research

A few studies have evaluated the ability of IAT scores to predict hiring discrimination. One study demonstrated that implicit gender stereotypes predicted biased evaluations of female versus male job applicants in certain conditions (only one of four experimental conditions was supported; Rudman & Glick, 2001). Another study, which evaluated racial bias, found that implicit racist attitudes interacted with a business climate for racial bias to predict hiring discrimination (Ziegert & Hanges, 2005). Both of these study samples consisted of university students who were asked to play the role of hiring managers rather than actual employers, which is a limitation of the studies and brings into question whether the results would be the same in a real-world setting.

Only two studies were identified that evaluated the relationship between implicit attitudes and hiring discrimination with actual employers. The first study, which was conducted in Sweden, evaluated employers' implicit attitude bias and performance stereotypes for men with

Swedish versus Arab-Muslim-sounding names (Rooth, 2010). This study provided strong evidence that both forms of automatic associations against Arab-Muslin men (in other words, preference for Swedish-sounding names and higher competence associated with Swedish-sounding names) resulted in a decreased likelihood that Arab-Muslim job applicants would be invited for a job interview. The second study evaluated whether implicit obesity performance stereotype predicted the likelihood of hiring managers to invite obese compared to normal-weight applicants for a job interview (Agerstrom & Rooth, 2011). The participants evaluated obese and normal-weight job applicants for the same job and made decisions on offering a job interview; then the hiring managers were invited to complete an obesity IAT and an explicit hiring-preferences measure. The results indicated that only the IAT was able to predict interview decisions, with hiring managers that held more negative implicit attitudes about the obese less likely to invite an obese applicant for an interview. These studies provide powerful evidence of the importance of implicit attitudes in real-world hiring decisions.

Purpose of Study

The primary purpose of this study was to develop and validate an implicit measure of attitudes about the competence of people who are blind, to be used with employers. An explicit measure of employer attitudes towards people who are blind as employees was previously developed and validated (McDonnall, 2014, 2017), but a related implicit measure is needed to evaluate unconscious attitudes, or attitudes that an employer may not want to express due to normative pressure. A secondary purpose was to report on the implicit attitudes of employers about the competence of people who are blind, utilizing a national sample of employers.

In order to provide evidence for the validity of the new IAT, hypotheses and research questions were investigated. Hypotheses were utilized when previous research provided evidence

to support a specific effect, and research questions were utilized when research did not exist or results were inconsistent. The following research questions and hypotheses were investigated:

1. What are employers' implicit attitudes about the competence of people who are blind?
2. Employers' implicit attitudes about the competence of people who are blind will not be significantly associated with their explicit attitudes.
3. Employers' implicit attitudes about the competence of people who are blind will not be associated with their personal characteristics.
4. Are employers' implicit attitudes about the competence of people who are blind related to exposure to people who are blind, knowledge about how blind people can perform work-related tasks, or performance ratings of blind employees?

Method

Participants

The population of interest for this study was hiring managers, defined as business professionals who are involved in making hiring decisions for their companies. To identify a national sample of hiring managers, we employed Research Now, an online market research company that provides fee-based data samples for targeted audiences, including a business-to-business research panel. Members of their business-to-business research panel are invited to participate in research studies that they qualify for, and for which they receive compensation. Research Now provided survey distribution to a targeted audience of U.S. residents who were identified in their database as managers or high-level administrators (e.g., president, VP, CEO, COO).

Email invitations were sent to 25,843 Research Now panelists who were thought to potentially meet the criteria for our study. Of those, 1,786 opened the email link to read

information about the study, and 1,064 entered the survey, for a 59.6% initial response rate. Of those who entered the survey, 668 confirmed that they were involved in making hiring decisions for their organization and were thus qualified to complete the study. A total of 464 respondents completed the survey, for a completion rate of 69.5% of those who were eligible to participate. After data cleaning based on inclusion criteria of a minimum time spent on the survey questions (at least five minutes) and a valid score on the IAT, a final usable sample of 343 participants was obtained. This data was collected for the purpose of pilot testing the new IAT and answering the research questions and hypotheses. Mississippi State University's Institutional Review Board for the Protection of Human Subjects provided oversight for this study.

Respondents for the study represented 44 states and were split across regions of the United States: 24.6% of the sample came from the Midwest region; 20.7% from Northeast and Southeast regions each; 20.4% from the West region; and 13.5% from the Southwest region. Companies of all sizes were represented in the sample, with 23.0% of the sample coming from businesses with 49 or fewer employees, 14.9% with 50-99 employees, 13.4% with 100-499 employees, 18.1% with 500-999, employees, 12.2% with 1,000-2,499, employees, and 18.4% with 2,500 or more employees. The majority of participants identified their position as manager/supervisor (53.1%), followed by director/chief executive (25.1%), and owner (12.5%); the remainder were human resources personnel (4.1%) or other (5.3%). The majority of the sample was male (59.5%), aged 45-64 (65.3%), and held either bachelor's or graduate degrees (80.5%).

Measures

The IAT-BVI. The IAT-BVI was developed to measure implicit attitudes about the competence of people who are blind. For this purpose, we selected the terms Blind/Sighted to

describe the image categories and Positive/Negative to describe the competence-related word categories. To ensure that words and pictures were representative of the respective IAT categories, we had the stimuli normed to those categories by a convenience sample of 54 sighted adult respondents between the ages of 25 to 65 who were native English speakers. We identified 30 each of potential words and pictures to use as stimuli for the IAT and had respondents rate each stimulus on its respective dimension. Respondents were asked to choose the option that best described the person in the picture or the word, (i.e., for pictures, "This person is…" with options Blind, Sighted, or Not sure; for words, "This word is…" with options Positive, Negative, Not sure). Respondents were asked to select Not Sure if they were unable to make a determination based on the picture or word.

In the initial selection of potential pictures, effort was made to include a variety of activities that would be done by blind or sighted persons and, for the blind person, included symbols that are easily associated with blindness. For example, pictures included people walking with a white cane or a harnessed guide dog (for blind) and without a white cane or with a dog on a leash (for sighted), hands holding a braille book (for blind) and a printed book (for sighted), and hands using a braille display (for blind) and a keyboard (for sighted). However, the only pictures that were consistently rated as being a blind person were those in which the person was holding a white cane or using a guide dog, and consequently, the images including books, keyboards, and braille displays were not included. Based on the most consistent ratings of stimuli, four items from each of the four categories (i.e., Blind, Sighted, Negative, Positive) were selected. All correct percentage ratings of each category were no lower than 94% (for one picture of a sighted person walking), with the majority at 98% or 100%. The final two sets of pictures were roughly matched on the person's environment, activity, and some demographic

characteristics (see Table 2). Words in each set were roughly matched on length. The final selection of stimuli was approved by project consultants at Project Implicit. The word stimuli were *productive, skilled, capable,* and *qualified* representing competence and *incompetent, careless, inefficient,* and *unfit* representing incompetence. See Figure 1 for example picture stimuli depicting Blind and Sighted people.

For test design, programming, and electronic online hosting of the IAT-BVI, we contracted with Project Implicit, a nonprofit organization founded by the creators of the IAT. Project Implicit provides consulting services and an online "virtual laboratory" that allows collaborative researchers to create IAT studies and implement data collection on their website. Project Implicit advised our design methodology, created the IAT-BVI test program according to their standard protocol using stimuli we provided, hosted the online data collection, and scored the data to provide calculated *D* scores (Nosek et al., 2005).

In the IAT, stimuli were displayed in the center of a white screen with word labels to the upper left and right of the screen to remind participants of the category assignment for each side. Words were displayed in black uppercase font and measured approximately one-half inch in height. Pictures were displayed in color and were roughly uniform in size and shape; display size ranged from approximately 3.5-4.5 inches wide and 5.5-6 inches high. The first two learning trial blocks consisted of 20 trials each (i.e., 20 individual items were displayed and required to be categorized); the 3rd and 4th combined sorting blocks included 20 and 40 test trials each, respectively; the 5th block for retraining on the reverse mapping of the target concept (e.g., Blind switched to the left side) consisted of 28 trials; and the 6th and 7th blocks consisted of 20 and 40 trials, respectively, for the new combination.

The *D* score was calculated based on the scoring algorithm recommended by Greenwald and colleagues (2003), which entails first cleaning raw data by eliminating extreme values (e.g., response latencies >10,000 ms); computing means of correct response latencies for critical trial blocks, including Blocks 3, 4, 6, and 7; and incorporating an error penalty for incorrect response latencies. After these procedures, the difference was taken between block means of response times from the two categorization tasks for each type of pairing (e.g., Blind + Positive vs. Blind + Negative) in the four critical blocks (i.e., Blocks 6 minus 3 and Blocks 7 minus 4) and divided by the pooled standard deviation from each set of critical blocks. The average was taken of these two resulting quotients, and this result is the final *D*-score measure.

Scores were eliminated based on criteria recommended by Project Implicit, which included a significant proportion of errors and speeding through the IAT (i.e., error rates on Trials 3, 4, 6, and 7 of greater than 30% and more than 10% fast trials; Greenwald et al., 2003). A measure of internal consistency for the IAT-BVI data for this sample was taken by computing the Spearman-Brown correlation coefficient between the computed *D* scores from the two practice blocks (Blocks 3 and 6) and the two test blocks (Blocks 4 and 7). The resulting reliability measure was $r = .74$, which is on the high end of internal consistency values reported for other IATs in Greenwald et al. (2003).

Personal characteristics. Participants were asked to provide demographic information about themselves, including gender, age group, and education level.

Exposure to blindness. Two items assessed whether participants had a prior relationship or experience with people who are blind. General exposure was measured using the question: "Have you ever had a personal relationship with anyone who is blind or significantly visually impaired, such as a friend, family member, or neighbor?", to which 48.7% ($n = 167$) responded

yes. The other item determined whether the respondent had ever hired someone: "Have you ever hired someone for your business who is blind or significantly visually impaired?", to which 14.6% (n = 50) responded yes.

Performance ratings of blind employees. Participants who responded positively to the question of whether they had hired a person who is blind were asked to rate the job performance of that employee: "Please rate the performance of your blind or significantly visually impaired employee." Response options were *below average*, *average*, *above average*, or *unable to rate*. The employee's performance was rated as *average* by a slight majority (54.0%, n = 27), *above average* by 40.0% (n = 20), with the remaining three unable to rate performance (6.0%).

Employer Attitudes Toward Blind Employees Scale (EABES). This 11-item scale provides an explicit measure of employer attitudes about blind people as employees (McDonnall, 2014, 2017). Agreement with statements is assessed on a seven-point Likert scale, and the measure includes two subscales. One subscale examines employer beliefs about ability and productivity of employees who are blind, with items such as, "A person who is legally blind would be able to successfully supervise others at my workplace." The other subscale relates to perceived difficulty or challenges in employing a person who is blind, with items such as, "Employees would need to provide more help to a coworker who is legally blind than to their sighted coworkers." Total scale scores range from 0 to 66, with higher scores indicating more positive attitudes. Confirmatory factor analysis was used to ascertain validity of the measure (McDonnall, 2017). Reliability for the two subscales is high (.92 and .84, respectively), with predictive validity supported by a significant relationship of total scale score to future likelihood to hire a qualified person who is legally blind (McDonnall, 2017).

Knowledge about work task performance. Five items were used to assess participants' knowledge about ways in which people who are blind can accomplish common work tasks. Participant were asked if they knew of any ways a person who is blind could perform tasks such as accessing preprinted material, using standard computer software, or utilizing standard office equipment, such as a multifunction copier. Participants who responded affirmatively were asked to specify their knowledge in an open-ended response. The open-ended responses were scored for accuracy. Extensive pilot coding was conducted in two previous studies to develop a coding scheme for determining the accuracy of descriptions of how each job task could be performed by an employee who is blind. Data for this study were independently coded by four researchers using the previously devised coding scheme. The researchers discussed all inconsistencies and reached a consensus for scoring discrepant items. One point was assigned for each correct response, for a possible range of scores between 0 and 5. Employer knowledge scores for our sample ranged from 0 to 4, with a mean of 0.40 (SD = 0.78). A majority of the sample scored 0 on the knowledge items (73.2%, n = 251).

Procedure

Potential participants were emailed information about the survey opportunity from Research Now, with a message that they may qualify for the survey based on their account profile. Participants who were interested in learning about the study clicked a link in the email and were taken to the Research Now website to read instructions and begin; there, they were linked to the beginning of our online survey. An initial question in the survey asked if the participant was involved in making hiring decisions at their company; if the participant answered no to this question, he or she was disqualified and exited the survey. An additional disqualification question occurred about halfway through the survey, where participants were

explicitly asked to select a particular answer to demonstrate that they were reading the survey items. Participants who responded to this question incorrectly were disqualified and exited the survey.

Participants who qualified and successfully completed all online survey questions were directed to the Project Implicit beginning instruction page of the IAT-BVI. Participants completed the IAT-BVI according to task instructions and, upon completion, were given the opportunity to view their IAT-results interpretation. The entire survey and IAT process took approximately 12 to 15 minutes to complete.

Data Analysis

Data were analyzed using descriptive statistics to describe sample characteristics and group outcomes on the attitude measures. A one-sample *t*-test was utilized to examine the overall IAT-BVI effect for employers. Pearson correlations were calculated to examine relationships between scores on the IAT-BVI and the explicit measure of attitudes, the EABES, and between IAT-BVI scores and participant knowledge about how work tasks can be performed by people who are blind. One-way ANOVAs were employed to determine whether group differences existed in participant IAT-BVI scores based on personal characteristics, personal relationships or hiring experience with people who are blind, and, where applicable, participants' ratings of work performance of employees who are blind.

Results

To determine employers' implicit attitudes about the competence of people who are blind, the mean *D* score on the IAT-BVI was calculated, $M = 0.76$ ($SD = 0.40$). Scores ranged from -0.69 to 1.67. A score of zero would indicate no automatic association for Blind and Negative or Sighted and Positive. These scores were determined to be significantly different

from zero based on a one-sample *t*-test, indicating a significant IAT effect, $t(342) = 35.42$, $p < .0001$. The standardized effect size (*d*) was 1.91, indicating a very large IAT effect. The scores indicate that, on average, employers more easily, or automatically, associate competence with sighted people and incompetence with blind people. In other words, employers have a strong implicit attitude that sighted people are more competent than blind people.

The mean of the explicit measure of employer attitudes toward blind people as employees (the EABES) was 34.49 ($SD = 12.87$). This score is very similar to the mean score for other samples of employers that have completed the EABES (McDonnall, 2014, 2017) and falls approximately in the middle of the score range. To determine the relationship between explicit attitudes and implicit attitudes related to blind people as employees and to test Hypothesis 1, a Pearson correlation coefficient between the EABES and the IAT-BVI was calculated. As anticipated based on previous research and in support of Hypothesis 1, the EABES had a low, nonsignificant correlation with the IAT-BVI ($N = 343$, $r = -.10$, $p = .06$). The negative correlation does indicate that the two scores tended to vary in the same direction, as higher scores on the EABES indicate a more positive explicit attitude and lower scores on the IAT-BVI indicate a more positive implicit attitude.

One-way, between-groups ANOVAs were conducted to test Hypothesis 2 and determine whether any relationships exist between employers' personal characteristics and their implicit attitudes about the competence of blind people. The three independent variables were gender, education level, and age group. All three tests illustrated little to no difference between groups based on personal characteristics and were not significant (gender: $F(1,341) = 0.04$, $p = .84$; education level: $F(4,337) = 0.12$, $p = .97$; age group: $F(5,337) = 0.97$, $p = .44$). These findings provide support for Hypothesis 2.

One-way, between-groups ANOVAs were utilized to determine whether implicit attitudes are associated with exposure to people who are blind. The existence of a personal relationship with someone who is blind and whether the employer had ever hired someone who is blind served as the independent variables. Neither test was significant, indicating that exposure to people who are blind is not associated with implicit attitudes (personal relationship: $F(1,341) = 2.08$, $p = .15$; having hired someone in the past: $F(1,341) = 0.14$, $p = .71$).

To determine whether knowledge about how someone who is blind can perform job tasks is associated with implicit attitudes, a Pearson correlation coefficient between the knowledge score and the IAT-BVI was calculated. Although the correlation coefficient was relatively small in size, the relationship was statistically significant ($N = 343$, $r = -.15$, $p < .01$). The negative correlation illustrates that, as knowledge increased, IAT *D* scores became smaller, indicating that those with greater knowledge about how blind people perform work tasks were less likely to automatically associate competence with sighted people and incompetence with blind people.

A one-way, between-groups ANOVA was utilized to determine whether implicit attitudes are associated with work performance ratings of employees who are blind. This analysis used a reduced sample of only those employers that had hired someone who is blind or visually impaired and were able to provide a performance rating of that person ($n = 47$). All employers rated the blind employees' performance as *average* or *above average* (none were rated *below average*). There was a statistically significant difference in IAT *D* score based on performance ratings, $F(1,45) = 4.96$, $p = .03$. Employers who rated their blind employee's performance as *above average* had significantly more positive implicit attitudes ($M = 0.59$, $SD = 0.45$) than employers who rated their blind employee's performance as *average*($M = 0.88$, $SD = 0.41$).

Discussion

The purpose of this study was to develop and validate an implicit measure of attitudes about the competence of people who are blind, to be utilized with employers. An additional purpose of the study was to provide information about the implicit attitudes of employers about the competence of people who are blind, utilizing a national sample of employers. Employers' implicit attitudes about the competence of people who are blind was found to be strongly negative compared to the perceived competence of sighted people for our sample of hiring managers. This finding concurs with the finding by Nosek et al. (2007) that the general population has strong negative implicit attitudes towards people with disabilities, as well as Wilson and Scior's (2014) finding of a consistent pattern of moderate to strong negative implicit attitudes towards people with disabilities across multiple studies.

This finding of a strong negative implicit attitude about competence is perhaps not surprising, given that we know most employers have limited knowledge about how people who are blind can perform typical work tasks (McDonnall et al., 2015; McDonnall & Crudden, in press). If employers do not understand how a blind person could function on the job, their implicit attitude about the blind individual's competence might be expected to be low. Our results document that knowledge about how blind people can perform work tasks is in fact associated with the implicit attitudes about competence of people who are blind, providing some evidence for the validity of the IAT-BVI.

The significant difference in employers' IAT scores based on performance ratings of blind employees also provides some evidence for the validity of the IAT-BVI. Interestingly, even those employers who rated their blind employees' performance as *above average* had, on average, a moderate automatic association for Sighted with Positive and Blind with Negative. Perhaps societal views on blindness are so strongly associated with lower competence (Fiske,

Cuddy, Glick, & Xu, 2002) that even those who know from personal experience that blind people can perform well on a job (i.e., be competent) have difficulty associating Blind with Positive competence words.

As expected based on previous research, employers' implicit attitudes about competence were not significantly associated with their explicit attitudes about blind people as employees, nor were they associated at all with the personal characteristics of the employers. The IAT-BVI scores provide additional, unique information about attitudes towards people who are blind, and therefore it is important to include these results in research associated with attitudes toward this population.

Previous research findings have been mixed regarding an association between contact with people with disabilities and implicit attitudes towards them (Wilson & Scior, 2014); only one in three studies that investigated such a relationship found a positive association (Pruett & Chan, 2006). The present study did not find an association between exposure to people who are blind, either in terms of having a personal relationship with someone who is blind or having hired someone who is blind in the past. It is interesting to note that in Pruett and Chan's study, they did not find an association between having a disability oneself or having a family member with a disability and implicit attitudes, just as we did not find a relationship between exposure and implicit attitudes. They did find a relationship, however, between a formal measure of the quality and quantity of contacts with people with disabilities in multiple social contexts (the Contact with Disabled Persons Scale) and implicit attitudes (Pruett & Chan, 2006). This coincides with our findings, if we assume that the more knowledge someone has about how a blind person can perform work tasks, the more contact he or she has had with a person or persons who are blind.

Limitations

There are some limitations to this study that should be acknowledged. Although we believe the use of picture stimuli, instead of word or graphic images, is valuable for the ecological validity of the study, using photographs of people does potentially introduce bias related to characteristics of the people pictured that are not the focus of the study. We did not choose to use the same people in the photos to represent the two groups (e.g., the same person in the Blind photo using a white cane and in the Sighted photo not including a white cane) as other researchers have done (e.g., Agerstrom & Rooth, 2011) because it was thought that this manipulation could be confusing for the participants as to the correct status of the person. We also preferred to include authentic photos of actual people who are blind rather than people posing as blind. A potential limitation to using actual photos is that the attractiveness of the people in the photos may be judged to be different, although we did attempt to match photos in each group on this feature as well as other features, such as style of dress and race. We were not, however, able to match pictures exactly on age, and one person who is blind appears older than people who are sighted. There may be potential for future refinement of the IAT-BVI measure if images can be found that are more closely matched on factors such as age and can also be clearly interpreted as persons who are blind or sighted.

In the interest of simplicity the word "Blind" was used as the selection category in the IAT-BVI, but in explicit measures and other survey items language included the terms "legally blind" or "blind or significantly visually impaired." This variation in language was assumed to be interpreted correctly in each context by respondents, but should be noted as a possible limitation. Finally, although we determined whether participants had a personal relationship with someone who was blind, we did not collect additional information about the extent of the

relationship or amount of exposure. Perhaps more detailed information about their exposure and quantity and quality of contacts, as well as their perceptions of competence of the blind person or people they actually know, would have been associated with their implicit attitudes.

Implications

Because unconscious attitudes can influence hiring decisions (Agerstrom & Rooth, 2011), it is important to include a measure of implicit attitudes when evaluating employer attitudes toward people with disabilities. Despite the extensive amount of research related to employer attitudes, this has not previously been done. The ultimate goal of studying employer attitudes should be to find ways to improve those attitudes in an effort to promote greater employment opportunities for people with disabilities. Our findings show that knowledge about how blind people perform work tasks is associated with more positive implicit attitudes about the competence of blind people, which indicates that providing education to employers in this area could potentially improve their implicit attitudes. This is an important finding for rehabilitation professionals who work to improve employment outcomes for this population: When meeting with employers, providing specific education about how blind people perform work tasks may be a valuable focus of those meetings.

Additionally, it is important to consider both explicit and implicit attitude measures as outcomes for intervention research. Intervention research with employers that attempts to improve their attitudes and hiring behavior toward people with disabilities is sorely needed and mostly absent from the literature (Burke et al., 2013). When studying employer attitudes toward people who are blind, findings from this study support that the IAT-BVI is an appropriate measure to use for this purpose.

A potential negative consequence of use of the IAT-BVI would be interpreting results to indicate prejudice or bias in hiring people who are blind. It should be noted that a finding of implicit bias regarding the competence of blind individuals does not necessarily equate to a person being "prejudiced" or having intentions to act in a detrimental manner toward that group. Exhibiting a strong association between incompetence and blind may mean that an employer will be less likely to hire a blind applicant, but a score on the IAT-BVI should not be taken as proof that this will happen. For example, we would caution against using the IAT-BVI for personnel decisions regarding individual respondents, or to provide evidence that an employer has discriminatory hiring practices. Results from the IAT-BVI should be interpreted and utilized judiciously, as a tool for awareness of implicit associations, education, and to measure implicit attitude change in response to interventions.

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Footnotes

[1] The term "blind" will be used for brevity to represent people who are legally blind and those who have other significant visual impairments.

Table 1

Example Sequence of Stimuli Display Blocks in the IAT-BVI

Block	Number of Trials	Left-side response items	Right-side response items
1	20	Sighted	Blind
2	20	Negative	Positive
3	20	Sighted + Negative	Blind + Positive
4	40	Sighted + Negative	Blind + Positive
5	28	Blind	Sighted
6	20	Blind + Negative	Sighted + Positive
7	40	Blind + Negative	Sighted + Positive

Note. "Sighted" and "Blind" indicate pictures of people who are either sighted or blind; "Negative" and "Positive" indicate words that are associated with either incompetence or competence. The study was counterbalanced for order of pairing, so that half of participants completed the Blind + Negative combination trials first, followed by the Blind + Positive combination (i.e., example blocks 1, 3, and 4 switch with blocks 5, 6, and 7).

Table 2

Description of personal characteristics and activities depicted in IAT-BVI image stimuli

	Vision status	Gender	Race/ethnicity	Apparel/dress	Activity
Image 1	Blind	Male	African American	Business	Walking with guide dog
Image 2	Blind	Male	White	Business	Walking with sighted guide (e.g., hand on elbow) and cane
Image 3	Blind	Male	Asian	Business casual	Standing with companion, hand on shoulder, holding cane
Image 4	Blind	Female	White	Casual	Walking with cane
Image 5	Sighted	Male	African American	Business	Walking, holding briefcase
Image 6	Sighted	Male	White	Business	Walking with companion
Image 7	Sighted	Male	Asian	Business casual	Walking with companion, holding hands
Image 8	Sighted	Female	White	Casual	Walking with dog on leash

Note. Images including companions showed only the other person's hand, arm, or shoulder.

Figure 1. Example pictures of stimuli used to depict blind and sighted people.