Improving Knowledge and Attitudes via an Interactive Video: A Randomized Controlled Trial

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Abstract

Purpose: This study evaluated the effectiveness of an interactive video (IV) to improve knowledge, attitudes, and intent to hire people who are blind or have low vision (B/LV) and determined whether immediate improvements were retained three months later.

Method: We conducted two randomized controlled trials to evaluate the IV's effectiveness, one involving 157 management students, and the second including 63 adults involved in making hiring decisions for their organizations. In both studies, participants took a pretest consisting of six outcome measures, viewed the IV or a control video, and completed an immediate posttest. Study 1 participants also completed a 3-month follow-up.

Results: Viewing the IV was associated with large improvements in knowledge about B/LV and explicit attitudes about employing people who are B/LV and medium increases in intent to hire. Changes in discomfort around people who are B/LV and implicit attitudes about their competence were mixed. Improvements exhibited immediately after viewing the IV were retained.

Conclusions: Research supports that improvements in these outcome measures may be associated with an increased likelihood of hiring an applicant who is B/LV. Organizations could adopt the video as a training for personnel who are involved in making hiring decisions to promote inclusive hiring.

Keywords: blindness, low vision, knowledge, employer attitudes, video intervention

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Impact

- Viewing the interactive video resulted in improvements in knowledge, attitudes, and intent to hire people who are blind or have low vision, which may be associated with an increased likelihood to hire an applicant who is blind or has low vision.
- To reduce discrimination and promote hiring of people who are blind or have low vision, organizations could adopt the interactive video as a component of their annual training, require managers to view the interactive video before interviewing a blind or low vision applicant, or both.
- The interactive video could be a beneficial tool to educate other professionals who may encounter people who are blind or have low vision in the course of their work, such as health care providers.

While the Americans with Disabilities Act of 1990 (ADA) increased access and inclusion of people with disability in the U.S. by prohibiting discrimination based on disability, employment of people with disabilities has made slow progress as the law approaches its 35th anniversary. In 2024, employers still lack basic knowledge about how to support employees with disabilities, what accommodations exist, and how to navigate the requirements of the ADA (Goodman et al., 2024). People who are blind or have low vision (B/LV) face particular barriers to employment, with employers' historical greater resistance to hiring people who are B/LV than people with other types of disabilities (Fuqua et al., 1984; Williams, 1972) continuing to this day (Goodman et al., 2024). In 2023, only 52.3% of people who reported B/LV were employed in the U.S., and the rate of unemployment for B/LV people was more than twice the rate of unemployment for people without disabilities (U.S. Census Bureau, 2024). With 437.5 million working-age people with B/LV worldwide (Chen et al., 2024), the underemployment of these talented and innovative individuals

represents a significant loss to the global economy (Marques et al., 2021). Research indicates that corporations that are champions of hiring people with disabilities experience financial benefits, earning higher levels of income and enjoying larger profit margins (Aichner, 2021).

Negative employer attitudes about people who are B/LV have long been a concern and are thought to contribute to their challenges with employment (Coffey et al., 2014; Crudden & McBroom, 1999; Kirchner et al., 1997; McDonnall et al., 2013; Salomone & Paige, 1984) and people who are B/LV have reported experiencing discrimination in the workplace (Silverman et al., 2019; Steverson, 2020). Research has also demonstrated that employers have very limited knowledge about how people who are B/LV perform common work tasks or the accommodations they use (Goodman et al., 2024; McDonnall et al., 2014; McDonnall & Crudden, 2018). Lack of this knowledge is a barrier to employment, as employers will be less likely to consider a B/LV job applicant if uncertain of how they could perform job tasks and what type of accommodations would be needed. There is a need for effective strategies to increase employer knowledge about and improve attitudes toward people who are B/LV.

A variety of strategies to address reducing prejudicial stereotypes have been examined in the literature (Paluck & Green, 2009). One of the most successful strategies for reducing negative attitudes toward people from minority groups is Allport's intergroup contact hypothesis (Paluck et al., 2019). With this approach, negative bias toward people from minority groups is reduced through direct contact with members of that group, under appropriate conditions, which Allport identified as equal group status, intergroup cooperation, common goals, and authority support (Allport, 1954). However, a meta-analysis of 515 contact hypothesis studies found that while meeting Allport's conditions tended to result in greater effects, reduction in prejudice can occur without meeting all of these conditions (Pettigrew & Tropp, 2006). Research indicates that direct contact successfully reduces prejudice in a variety of experimental settings, ranging from educational

interventions, diversity trainings, exchange programs, to incidental encounters in the community (Paluck et al., 2019). Researchers have begun to explore whether the intergroup contact hypotheses could be extended and applied to other contexts, like media-based interactions, such as television and other video portrayals of people with disabilities.

Media-Based Attitude Studies

Results to date of research exploring whether the effects of the intergroup contact hypotheses could be extended to media portrayals are mixed, most likely due to the wide range of methodologies deployed and the vast difference in the video portrayals utilized. In one of the first of these media-based studies, Smedema and colleagues (2012) found that watching a video of a stand-up comedy routine by a person with a disability led to more positive attitudes about people with disabilities. Reinhardt and colleagues (2014) found that individuals who viewed a paraplegic working as a police detective in a television series were more likely to perceive that paraplegics could be eligible to work in that profession. More recently, Lorenze and Frisby (2022) found that regular viewers of Glee, a series that prominently featured a wheelchair user as a main character, had more positive attitudes toward people who use wheelchairs. Two studies examined the impact of seeing disabled athletes competing in the Paralympics on television. Carew and colleagues (2019) found that exposure to the 2012 Paralympic Games was associated with an increase in perceived competence and positive feelings about interacting with people with disabilities, and Ferrara and colleagues (2015) found that exposure to the games had a positive influence on explicit and implicit attitudes about people with intellectual disabilities.

Despite these positive findings, other media studies that included both explicit and implicit attitude measures had negative or mixed results. A video intervention showing undergraduate students' positive models of disabled people led to no change in implicit attitudes and a slight *increase* in negative explicit attitudes when compared to participants who were not exposed to the

intervention (Kallman, 2017). In another study that showed videos of people with disabilities to undergraduate students, implicit attitudes became more negative while explicit attitudes improved (Lu et al., 2018). These findings indicate that video interventions may have differing effects on explicit and implicit attitudes, suggesting the importance of measuring both.

Implicit Attitudes

While research examining explicit attitudes must contend with the influence of social desirability bias, implicit attitudes are unconscious and automatic; thus they are not subject to this bias as individuals are not aware of these held beliefs (Devine et al., 2012; Nosek et al., 2007). Because of this, many researchers believe that implicit attitudes are more accurate predictors of behaviors and outcomes (Greenwald et al., 2009), and they are being increasingly utilized in disability research (Antonopolous et al., 2023; Huang et al., 2023). As societal attitudes toward disability have progressed and openly negative attitudes toward disabled people have become less socially acceptable, the importance of examining implicit attitudes toward these groups has increased.

Research utilizing Allport's (1954) contact hypothesis to investigate implicit bias toward people with disabilities has generated inconsistent findings (Antonopolous et al., 2023). Previous contact with people with disabilities has been associated with lower levels of implicit bias in some studies but not in others. The only study to investigate exposure to people who are B/LV and its impact on implicit attitudes about their competence found that professionals who work with this population had significantly lower implicit bias than employers did (McDonnall et al., 2019). Evidence is also mixed as to whether interventions can positively influence implicit attitudes towards people with disabilities. Two previously mentioned studies documented no change or an increase in implicit bias after viewing videos of people with disabilities (Kallman, 2017; Lu et al., 2018). In an experiential lab-based study, participants who experienced wheelchair use in an

immersive virtual reality intervention exhibited a decrease in negative implicit attitudes toward disabled people (Chowdhury & Quarles, 2022). Employers who participated in an educational session with a blind vocational rehabilitation (VR) professional experienced a significant decrease in negative implicit bias about blind people which persisted over the 4-month follow-up, while participants in an identical session led by a sighted VR professional did not have a significant decrease in implicit bias (McDonnall & Antonelli, 2022).

The Present Study

Previous research demonstrated that an in-person educational session with employers can improve knowledge about and attitudes toward hiring people who are B/LV (McDonnall & Antonelli, 2020, 2022). However, one-on-one meetings with employers are labor-intensive and require trained, knowledgeable personnel to implement, making it less likely that a large number of employers can be reached with this method. Continuing this line of inquiry is important to determine if a less labor-intensive method to share information with employers can be effective. This study examines whether an interactive video can influence knowledge about and attitudes toward people who are B/LV and will explore whether Allport's (1954) intergroup contact hypothesis can be extended to include video-based educational sessions about people who are B/LV. An advantage to a video-based approach is the opportunity for the viewer to obtain answers to questions that would not be appropriate to ask a professional in a one-on-one meeting (e.g., personal questions about blindness). Based on past research findings indicating that media portrayals of disabled people improve attitudes and increase perceptions of capability, we proposed one research hypothesis: *(H1) Viewing an interactive video featuring blind individuals will result in improvements in knowledge about, attitudes towards, and intent to hire people who are B/LV*. We also investigated two research questions related to the use of an interactive video to educate about blindness and low vision:

RQ1: Are improvements in knowledge about, attitudes towards, and intent to hire people who are B/LV obtained after viewing an interactive video retained over time?

RQ2: Does the opportunity to view answers to personal (curiosity) questions about blindness result in greater improvements in attitudes towards and intent to hire people who are B/LV?

Study 1 Method

Participants and Procedures

Criteria and Sampling Procedures

The study was reviewed and approved by the authors' university Institutional Review Board, #IRB-21-538. Participants for Study 1 were university students enrolled in junior or senior-level human resource management classes during spring 2023, considered to be future hiring managers. Students were invited to participate in the study and were offered class credit for their participation; students who did not want to participate were provided with alternative credit opportunities. Of the 177 eligible students invited to participate, 166 completed the study.

Data Collection

Students completed the study in university classroom computer labs in group sessions with researchers present, during their normal class periods. Pretests and posttests were completed on computers using Qualtrics. Researchers followed a written protocol of participant instructions at each data collection session. Pre- and posttest data collection was completed in January 2023. Participants provided informed consent, completed the pretest survey, and were automatically randomly assigned by Qualtrics to one of the three study conditions and immediately routed to the corresponding interactive video. Participants independently viewed the interactive video until being directed to complete the immediate posttest survey. Participants spent between 30 and 40 minutes viewing the video, based on how long they took to complete the pretest. Three months after the initial data collection, in April 2023, participants completed the follow-up survey

at in-person group sessions in the same computer lab classrooms.

Measures

The pretest survey included questions about basic demographics, management and hiring experience, and the six outcome measures. Participants completed the outcome measures at all three data collection points. Because we used the term "vision loss" in the interactive video, we also used that term in the measures, after defining it as meaning someone who is B/LV.

Knowledge

General Knowledge. To measure participants' general knowledge about B/LV, we created a list of 15 true/false statements regarding people who are B/LV. The statements (e.g., "People with vision loss have better hearing and sense of smell than people who are sighted." and "Most people with vision loss read braille.") were generated by researchers and were reviewed and validated by professionals in the blindness field, including several people who are B/LV. We pilot tested the items with a convenience sample (N = 111) and removed items that were too easy, resulting in the final 12-item measure. Participants indicated whether the statement was *True* or *False* if they knew the answer, or *Don't Know* if they were unsure. The measure has a range of 0 to 12.

Work Task Knowledge. Knowledge about how people who are B/LV complete work tasks was assessed using six questions. Participants were first asked a yes/no question of whether they knew of any way a person who is B/LV could perform the six work-related tasks (e.g., access a computer to use the internet, email, or utilize standard computer software; use general office equipment, such as a multi-function document center (copier/printer/scanner with LED display) or multi-line telephone system). If participants responded *yes,* they were asked to specify how the person could complete the task. We scored these responses for accuracy using a rubric established for the items in previous studies (McDonnall et al., 2014; McDonnall & Crudden, 2018). The rubric was reviewed and updated as needed based on changes in technology prior to scoring

the items. Responses were independently scored by three researchers; any discrepancies were discussed until a consensus was reached. Scorers were unaware of group assignment or data collection time point for participant responses. Responses received a score from 0 to 2 points, with 1 point for partially correct answers and 2 points for completely correct answers, for a total possible score range of 0 to 12.

Attitudes

Employer Attitudes Toward Blind Employees Scale (EABES). The EABES, developed by McDonnall (2014, 2017), was used to measure explicit attitudes toward people who are B/LV as employees. This 11-item measure utilizes a 7-point (0 to 6) agreement scale from *Strongly Agree* to *Strongly Disagree*. Item scores are summed for a possible score range of 0 to 66, where higher scores indicate more positive attitudes. The measure consists of two subscales: productivity (e.g., "People with vision loss would be able to perform work of the same quantity as sighted people at my company") and challenges with hiring (e.g., "Hiring a person with vision loss would be too costly for my company, considering accommodations or other extra expenses."). The productivity and challenges subscales have evidence for high reliability (Cronbach's alpha of 0.92 and 0.84, respectively) and validity supported by confirmatory factor analysis (McDonnall, 2017; McDonnall & Cmar, 2022). In this study, Cronbach's alpha was .88 for the overall scale and .89 (productivity) and .76 (challenges) for the subscales.

Discomfort. As one measure of attitudes, we used a subscale of the Interaction with Disabled Persons Scale (Gething, 1994) to measure participants' discomfort with social interaction with people who are B/LV. This five-item subscale, recommended by Iacono et al. (2009), uses a 6-point scale from 1 (*I disagree very much*) to 6 (*I agree very much*) and consists of statements about the person's feelings in general when meeting a person with a disability. We edited the wording to be B/LV-specific by replacing "disability" with "vision loss." It includes items such as "I feel unsure

because I do not know how to behave." The measure has a possible range of 5 to 30, with higher scores indicating more discomfort. Cronbach's alpha for this measure was .81 in this study.

Implicit Association Test – Blind/Visually Impaired (IAT-BVI). The IAT-BVI (McDonnall & Antonelli, 2018) was used to assess implicit attitudes regarding the competence of people who are B/LV. Implicit association tests (IATs) measure the implicit or unconscious beliefs or attitudes that one may have about a particular group or concept (e.g., gender), as it relates to an attribute or evaluation (e.g., athleticism). IATs use a timed sorting task completed on a computer, in which participants quickly sort displayed words or images into categories using an assigned keystroke. The faster the response time for a particular pairing (e.g., male/athletic), the stronger the association or bias toward that pairing is assumed to be. The IAT-BVI requires sorting of images of blind or sighted people in natural settings (4 each) with words that indicate competence or incompetence (4 each), across a total of 108 trials, including training and test trials. IATs are scored by using participants' reaction times to calculate a *D* score, which ranges from -2 to 2, with values closer to 2 indicating stronger bias (i.e., a more negative attitude) about the competence of blind people. For this study, the IAT-BVI was embedded in the Qualtrics survey using open-source coding and tools from iatgen.org (Carpenter et al., 2019) to create the measure in Qualtrics and to score the data according to the revised scoring algorithm by the creators of the IAT (Greenwald et al., 2003).

Intent to Hire. To assess participants' intention to hire an individual person with visual impairment, we used modified items from an intent to hire measure (Fraser et al., 2011) that was created based on the Theory of Planned Behavior (Ajzen, 1985). This 3-item measure asks participants to assume a qualified person with vision loss had applied to their company, and indicate likelihood for statements, such as "I am ready to hire an individual who is blind or has low vision." Ratings are on a 7-point scale, from 0 (*Unlikely*) to 6 (*Likely*), for a possible range of 0 to 21,

with higher scores indicating greater intent to hire. Reliability for this scale was supported by confirmatory factor analysis (Cronbach's α = .91) from a previous study that utilized the items (McDonnall & Lund, 2019) and by a Cronbach's α of .93 in the current study.

Study Design and Conditions

This study included three experimental conditions based on the interactive video viewed, for a 3 (group) x 3 (time points) experimental design.

Intervention Description

Our intervention was an interactive video (IV) developed to educate people about blindness and low vision and provide exposure to multiple individuals who are B/LV. The IV begins with an introduction video that all viewers see, in which some key information is shared (e.g., myths and facts about blindness, job accommodations). The content for the introduction video was based on an effective intervention that consisted of an in-person educational meeting between a VR professional and a hiring manager (McDonnall & Antonelli, 2020, 2022). After watching the introduction video (which lasts between 7 to 14 minutes, depending on viewer selections), viewers are directed to a menu to choose questions in three topic areas: (a) Employment-related (e.g., What kind of jobs can people with B/LV do?), (b) General Blindness (e.g., What does someone who is legally blind see?), and (c) Curiosity (e.g., Do you enjoy movies, TV, and sports, or are they boring since you can't see them?). Within each topic area there are subtopics, and within the subtopics are specific questions for which different people with B/LV provide answers in the videos. Viewers select a topic area, then a subtopic area, then they are able to select questions which lead to video answers. Viewers can go back to previous menus at any time. Video length ranges from 30 seconds to 5 minutes, with many videos between 1 to 3 minutes. All participants watched the introduction video, then made their own selections of other videos to view. The number of videos viewed by participants varied, but all watched 30 to 40 minutes of video.

To determine the questions to include in the IV, we obtained input from several sources. Five VR professionals who work with employers to help people who are B/LV to obtain jobs provided input about key questions that employers typically ask and questions they want to know the answer to but are afraid to ask. Multiple people who are B/LV provided input about the questions related to blindness/low vision they are most often asked by sighted people. Finally, college students in management classes provided written feedback about (a) the concerns they would have about the ability of a person who is B/LV to perform a job they were interviewing them for and (b) questions they would ask a B/LV person if they could ask anything without fear or embarrassment.

Based on the information obtained from these sources, we identified 42 questions to include in the IV. We next identified existing videos that provided answers to the questions or created scripts for filming new videos. We also invited several individuals who are B/LV to provide their video answers to some of the personal, or curiosity, questions. The introduction video and several other videos were professionally filmed at a TV Center. The initial version of the IV was pilot tested with a group of students and adults, and several revisions were made based on their feedback. The final version of the IV consists of 117 videos that provide an answer, or multiple answers from different perspectives, to the questions available in the IV. All people in the videos that comprise the IV are B/LV.

To address RQ 2 in Study 1, we created two versions of the IV for two intervention conditions. The first version was the IV with all videos included, or the Full IV. The second version (i.e., Limited IV) excluded the Curiosity questions menu, so that viewers could only select between the Employment-related questions and the General blindness questions.

Control Condition

We created a control condition IV similar in design to the intervention Full IV, with video

topics to choose from related to general human resources management and workplace issues (e.g., How to keep your team motivated). The Control IV included a total of 11 videos to choose from, sourced from publicly available videos, for approximately 102 minutes of total viewing time.

Transparency and Openness

We reported all data exclusions, outcome measures, and followed JARS guidelines. Materials and analysis code for this study are available by emailing the corresponding author. Data were analyzed using SAS Version 9.4. This study's design and analysis were not pre-registered.

Study 1 Results

Participant Flow and Characteristics

One participant's random assignment could not be determined from Qualtrics due to her lab computer shutting down immediately prior to being randomly assigned to a video. Other participants were randomly assigned at pretest as follows: (a) Full IV, n = 53, (b) Limited IV, n = 54, and (c) Control IV, n = 58. One participant (randomly assigned to the Full IV condition) only had a few minutes to view the video due to extensive time completing the pretest and, therefore, did not participate in the remainder of the study. Five participants did not pass an attention check item, and two participants provided the same answer to all items on one of the measures; their data was not included in the analyses (3 Full IV condition, 2 Limited IV condition, and 2 Control IV condition). The final sample size available for analysis was 157, assigned to the following conditions: (a) Full IV, n = 49, (b) Limited IV, n = 52, and (c) Control IV, n = 56. Nine participants did not participate in the 3-month follow-up data collection (3 Full IV condition, 3 Limited IV condition, and 3 Control IV condition).

Participants' average age was 21.27 (SD=2.84). Although they ranged in age from 18 to 51, 77.7% were between the ages of 20 and 22. Just over half of the participants were female (51%), and most were White (84.1%, n=132), followed by African American (10.8%, n=17), Asian (3.2%,

n=5), Native Hawaiian or Other Pacific Islander (0.6%, *n*=1), and two were of mixed race (1.3%). Nine people (5.7%) reported being of Hispanic or Latino ethnicity. Approximately 10% of participants were currently or had previously been involved in making hiring decisions for an organization they worked for.

Adverse Events

Some lab computers utilized for the study experienced problems during implementation. As mentioned under Participant Flow, one participant's condition could not be determined due to computer shutdown immediately following the pretest. Another participant experienced a computer shutdown after beginning to view the Full IV; their time within the video was limited to 28 minutes as a result. Another student inadvertently exited the control condition video and was moved to another computer; they spent approximately 25 minutes interacting with that video. The audio on six participants' computers was not working; these participants utilized closed captions will viewing the videos. We conducted analyses with and without these six participants' data, and the results were almost identical; thus, we retained their data for analyses.

Intervention Assessment

To examine our hypothesis and research questions, we conducted multilevel, repeated measures analyses utilizing PROC MIXED in SAS 9.4. Time (pre, post, and 3-month follow-up) was our within-subjects factor, and condition (Full IV, Limited IV, Control IV) was our between-subjects factor. To address our hypothesis, the Full IV and Limited IV conditions were combined, resulting in a 2-group (intervention compared to control) between-subjects analysis. Our 157 participants had 462 observations for all outcome measures except for the IAT-BVI measure, which included 446 observations, as some IAT scores were not calculated due to excessive response speed as per (Greenwald et al., 2003). To address RQ 1, we evaluated change over time from the pretest to the follow-up for the intervention group for outcome measures that showed significant improvement

between the pretest and posttest. To address RQ 2, models for two attitude and the intent to hire outcome measures that included only the Full IV and Limited IV conditions were conducted, with a reduced sample of 101 people with 297 observations for outcome measures other than the IAT-BVI, which included 288 observations. An a priori type I error rate of .05 was used and Cohen's f^2 was utilized as an effect size measure for the overall model's change across time (Selya et al., 2012). Cohen's (1992) guidelines to determine the size of the effect were utilized: 0.02 = small, 0.15 = medium, 0.35 = large.

Means for the three groups, as well as the combined IV group, are provided in table 1 for each outcome measure at the three data collection times. Results indicated that the intervention was effective at improving five of the six outcome measures, providing support for our research hypothesis. Immediate improvements exhibited at posttest for the five outcome measures were also exhibited at follow-up, which addressed RQ 1 and indicated that positive changes exhibited from viewing the IV were retained three months later. Improvements in the outcome measures were similar for the two IV conditions, as evidenced by their means and non-significant interactions between condition and time in the second set of multilevel models. These findings suggest that the opportunity to view answers to personal questions about blindness (RQ 2) does not result in greater improvements in attitudes and intent to hire. Statistical results by outcome measure are provided in the following sections.

[Insert table 1 approximately here]

Knowledge

Our results provide strong evidence that viewing the IV resulted in increases in knowledge in the two domains tested. For general knowledge about B/LV, the condition X time interaction was significant, $F(2,155) = 103.12$, $p < .0001$, $f^2 = 1.53$. Simple effects over time were examined; the control condition exhibited no change ($F(2,155) = 0.34$, $p = .71$) while general knowledge increased

significantly for the IV condition ($F(2,155) = 314.67$, $p < .0001$). A significant increase in general knowledge for the intervention group was exhibited between pretest and follow-up, $t(155) = -16.33$, $p < .0001$.

For knowledge about how B/LV people perform work tasks, the condition X time interaction was significant, $F(2,155) = 39.65$, $p < .0001$, $f^2 = 0.51$. Simple effects over time were examined, and again the control condition exhibited no change ($F(2,155) = 0.69$, $p = .50$) while work task knowledge increased significantly for the IV condition ($F(2,155) = 106.51$, $p < .0001$). Work task knowledge significantly increased between pretest and follow-up for the intervention group, $t(155) = -8.07$, $p < .0001$.

Attitudes

Our results provide some evidence for improvements in attitudes towards people who are B/LV after viewing the IV, with differing results based on outcome measure. Explicit attitudes towards B/LV people as employees improved significantly, as documented by a significant EABES condition X time interaction, $F(2,301) = 33.61$, $p < .0001$, $f^2 = 0.50$. Although scores decreased slightly between posttest and follow-up, the increase in the intervention group's EABES scores between pretest and follow-up was significant, $t(301) = -8.23$, $p < .0001$. There was not a significant condition X time interaction for EABES scores for the Full IV and Limited IV conditions, $F(2,192) = 0.60$, $p = .55$.

Discomfort with people who are B/LV did not improve as a result of the intervention; there was a significant condition X time interaction, but discomfort scores increased slightly, $F(2,155) = 3.61$, $p = .03$, $f^2 = 0.03$. Simple effects over time indicated that scores for both the control and intervention groups increased ($F(2,155) = 3.48$, $p = .03$ and $F(2,155) = 5.68$, $p = .004$, respectively). The control group's scores increased significantly between pretest and posttest ($t(155) = -2.37$, $p = .02$), while the IV group's scores did not change pretest to posttest ($t(155) = 1.00$, $p = .32$) but did

increase between posttest and follow-up ($t(155) = -3.37$, $p = .001$.)

The IAT-BVI condition X time interaction was not significant, $F(2,155) = 0.27$, $p = .76$, $f^2 = 0.02$. The effects of condition ($F(2,155) = 5.02$, $p = .03$) and time ($F(2,155) = 3.55$, $p = .03$) were significant. The intervention group had significantly higher (worse) scores at pretest ($t(155) = -2.02$, $p = .045$). Simple effects over time indicated that the intervention group exhibited a significant improvement in implicit attitudes about the competence of people who are B/LV ($F(2,155) = 4.12$, $p = .02$) while the control group did not ($F(2,155) = 0.71$, $p = .49$). An improvement in intervention group IAT-BVI scores was also exhibited between pretest and follow-up, $t(155) = 2.13$, $p = .03$). The condition X time interaction for IAT-BVI scores for the Full IV and Limited IV conditions was not significant, $F(2,183) = 0.03$, $p = .97$.

Intent to Hire

We found a significant condition X time interaction for intent to hire scores, $F(2,301) = 12.83$, $p < .0001$, $f^2 = 0.16$. Simple effects over time were examined, and the control condition exhibited no change ($F(2,301) = 0.05$, p = .95), while the intervention group exhibited a significant increase in intent to hire scores ($F(2,301) = 39.64$, $p < .0001$). Intent to hire scores did not change three months later, and there was a significant increase in these scores between pretest and follow-up, $t(301) = -6.53$, $p < .0001$. The condition X time interaction for intent to hire scores for the Full IV and Limited IV conditions was not significant, $F(2,192) = 0.91$, $p = .40$.

Study 2 Method

Participants and Procedures

Criteria and Sampling Procedures

The study was reviewed by the authors' university Institutional Review Board and was granted an exemption determination, #IRB-23-237. Criteria for participation in Study 2 was having current or previous involvement in making hiring decisions for an organization. Our target sample

size was 62 based on a G*Power analysis that indicated this would provide power of .80 for a small-medium effect (f = .175). Participants were recruited from local businesses, professional and civic organizations, and the authors' university. We used a combination of email invitations, event advertising via the university website, and visited local business organization meetings to recruit participants. Participants were informed of the study procedures and offered a $35 gift card for their participation in the study.

Data Collection

Data was collected between September 2023 and March 2024. Data collection occurred in various settings, including university campus meeting rooms, offices, and classrooms, and at participants' organizations. Data collection session group sizes ranged from individual sessions to a group of 19. As with Study 1, sessions were held in person with researchers present, following the same protocols. A total of 70 participants took part in the study.

All data collection for Study 2 participants was completed within a single meeting. Participants provided informed consent, completed the pretest, and were automatically randomly assigned by Qualtrics to either the Full IV or Control IV conditions and immediately routed to the corresponding interactive video. Participants independently viewed the interactive video until being directed to complete the immediate posttest. In group sessions, participants spent between 30 and 40 minutes viewing the video, based on how long they took to complete the pretest. In individual sessions, participants spent at least 32 minutes viewing the video before being directed to the posttest.

Measures

The outcome measures and survey questions for Study 2 are the same as those for Study 1, described previously. In this study, Cronbach's alpha was .89 for the overall EABES scale (.91 for productivity and .80 for challenges subscales), and .91 for the intent to hire measure.

Study Design and Conditions

This study included two conditions based on the video viewed: Full IV or Control IV, for a 2 (group) x 2 (time points) experimental design. A description of the Full IV, the intervention condition, is provided in the Study 1 Method section.

Control Condition

The control condition consisted of an interactive video about neurodiversity in the workplace. Similar in design to the intervention Full IV, overall topic categories included autism spectrum disorder, attention deficit hyperactivity disorder, dyslexia, dysgraphia, and dyscalculia, with individual videos to choose from (e.g., How to empower autistic talent in the workforce). The control IV included a total of 24 videos to choose from, sourced from publicly available videos, for approximately 140 minutes of total viewing time.

Study 2 Results

Participant Flow and Characteristics

Seven participants indicated they were not currently or previously involved in making hiring decisions for an organization they worked for, and thus did not meet study criteria. Therefore, their data was not included in the statistical analyses, resulting in a sample of 63. Participants ranged in age from 26 to 79 and their average age was 44.68 (SD=10.30). Most participants were female (65.1%, *n*=41) and White (77.8%, *n*=49). The remaining 14 participants were African American (22.2%, *n*=14), and one person (1.6%) reported being of Hispanic or Latino ethnicity.

Adverse Events

For four participants for whom data was collected at their organization, internet connectivity was weak at times, causing interruption during the video for one participant (who was able to restart the video) and during the survey for three others. One participant with survey interruption at the pretest was able to start the survey over, but the other two participants,

interrupted during the posttest, had to complete the posttest survey later that same day. Three participants had to step out of study sessions for short texts or calls to handle work tasks, but none were away for more than about two minutes total. The audio on two participants' computers was not working for portions of the video; these participants utilized closed captions when audio was unavailable.

Intervention Assessment

We conducted multilevel, repeated measures analyses utilizing PROC MIXED in SAS 9.4 to investigate our hypothesis. Time (pre, post) was the within-subjects factor, and condition (Full IV, Control IV) was the between-subjects factor. Our 63 participants had 126 observations for all outcome measures except for the IAT-BVI, which included 62 participants with 124 observations, as some IAT scores were not calculated due to excessive response speed as per (Greenwald et al., 2003). An a priori type I error rate of .05 was used and Cohen's f^2 was utilized as an effect size measure for the overall model's change across time (Selya et al., 2012). We again utilized Cohen's (1992) guidelines to determine the size of the effects.

Means for the two groups are provided in Table 2 for each outcome measure at the two data collection times. The means illustrate that the intervention group had slightly greater general knowledge and work task knowledge (differences significant at $p < .10$) and slightly better implicit attitudes about the competence of people who are B/LV at pretest. Five of the six outcome measures significantly improved following the intervention, providing support for our research hypothesis. Statistical results by outcome measure are provided in the following sections.

[Insert table 2 approximately here]

Knowledge

Study 2 results also provided strong evidence that viewing the Full IV resulted in increases in knowledge in the two domains tested. The condition X time interaction was significant for

general knowledge, $F(1,61) = 45.65$, $p < .0001$, $f^2 = 1.49$. Simple effects over time were examined, and general knowledge increased for both groups. The control condition's increase was smaller ($F(1,61) = 8.31$, $p = .005$) than the IV condition's increase ($F(1,61) = 151.71$, $p < .0001$). For work task knowledge, the condition X time interaction was significant, $F(1,61) = 36.15$, $p < .0001$, $f^2 = 0.68$. Simple effects over time were examined, and the control group exhibited no change ($F(1,61) = 0.10$, $p = .75$) while work task knowledge increased significantly for the intervention group ($F(1,61) = 66.06$, $p < .0001$).

Attitudes

Study 2 results also provided evidence for improvements in attitudes towards people who are B/LV after viewing the Full IV, with results again differing based on outcome measure. Explicit attitudes towards people who are B/LV as employees improved significantly, as documented by a significant condition X time interaction for EABES, $F(1,61) = 13.49$, $p = .0005$, $f^2 = 0.33$. Examination of simple effects over time documented that the control group's EABES scores did not significantly improve ($F(1,61) = 1.61$, $p = .21$) while the intervention group's EABES scores did significantly improve ($F(1,61) = 41.00$, $p < .0001$). Discomfort with people who are B/LV decreased for both groups from pretest to posttest, and the condition X time interaction was not significant, $F(1,61) = 2.26$, $p = .14$, $f^2 = 0.13$. The main effect for time was significant ($F(1,61) = 15.27$, $p = .0002$), but the main effect for condition was not significant ($F(1,61) = 2.21$, $p = .14$). Although there was not a significant interaction, simple effects over time indicated that scores for the intervention group decreased significantly ($F(1,61) = 14.41$, $p = .0003$) while the control group's decrease was not significant ($F(1,61) = 2.93$, $p = .09$).

The condition X time interaction for implicit attitudes toward the competence of people who are B/LV was not significant, $F(1,60) = 0.82$, $p = .37$, $f^2 = 0.02$. The main effect for condition was significant ($F(1,60) = 4.15$, $p = .046$) but the main effect for time was not ($F(1,60) = 1.02$, $p = .32$).

Simple effects over time indicated that the control group's scores did not change $F(1,60) = 0.01$, $p = .94$) and the intervention group's decrease in IAT-BVI scores was not significant ($F(1,60) = 1.83$, $p = .18$). However, the intervention group did exhibit significantly lower scores at posttest compared to the control group, $t(60) = 2.20$, $p = .03$.

Intent to Hire

The condition X time interaction for intent to hire scores was significant, $F(1,61) = 7.36$, $p = .009$, $f^2 = 0.13$. Simple effects over time were examined, and the control condition exhibited no change ($F(1,61) = 0.24$, p = .63), while the intervention group exhibited a significant increase in intent to hire ($F(1,61) = 18.39$, $p < .0001$).

Discussion

People who are B/LV report experiencing discrimination in the workplace (Silverman et al., 2019; Steverson, 2020), which is supported by their consistently higher rates of unemployment and lower rates of employment and earnings compared to the general population (McDonnall et al., 2022; McDonnall & Sui, 2019). In an effort to address this issue, we developed an IV to educate employers about people who are B/LV. The purpose of this study was to evaluate the effectiveness of the IV to improve knowledge about, attitudes toward, and intent to hire people who are B/LV. Our hypothesis was that the IV would result in improvements in these three areas, and our results provide evidence to support that hypothesis. In addition, we investigated two research questions regarding retention of improvements over time and whether the ability to view answers to personal questions in the IV would result in greater improvements. We found that improvements were retained at 3-month follow-up and that the ability to view answers to personal questions did not result in different outcomes.

Our findings are consistent with past research supporting Allport's contact hypothesis that exposure (in this case, within videos) to members of underrepresented groups improves explicit

attitudes toward that group (Paluck et al., 2019). Past research investigating the impact of exposure to video portrayals of people with disabilities has had mostly positive, but some mixed, results (Reinhardt et al., 2014; Smedema et al., 2012; Kallman, 2017; Ferrara et al., 2015; Lu et al., 2018). Although reasons for the success of our IV compared to unsuccessful video interventions (Kallman, 2017; Lu et al., 2018) cannot be determined, potential reasons are the interactive nature of our video and differences in content and duration. Only one of the previous studies included brief video footage of a B/LV person, and attitudes toward B/LV people were not measured specifically (Kallman, 2017). Our study is the first to expose participants to 30 minutes (or more) of positive videos showing people who are B/LV in both work and personal contexts; thus our study extends the research about the ability of video-based interventions to impact attitudes towards people with B/LV in a work context.

A primary purpose of the IV is to increase viewers' knowledge. Our results provide strong evidence that viewing the IV results in improvements in general knowledge about blindness/low vision and knowledge about how people with B/LV perform work tasks, both with a large effect. The work task knowledge gains exhibited by the IV group were larger than those documented after a face-to-face meeting with a VR professional (McDonnall & Antonelli, 2020). Our results also provide strong evidence that viewing the IV results in large improvements in explicit attitudes towards people who are B/LV as employees, as documented in both Study 1 and Study 2. Evidence for improvements in other attitude measures after viewing the IV were less clear, as results varied by study.

Impact on the discomfort around people who are B/LV attitude measure had mixed results across the studies, with only Study 2 participants demonstrating an improvement in discomfort scores of a small-to-medium size after viewing the IV. Study 1 participants who viewed the IV exhibited a significant, although slight, increase in discomfort scores from pretest to follow up

(although not from pretest to posttest as the control group did). Reasons for these differences are not clear, although it is relevant to note that discomfort scores for both groups at all time points were relatively low. Average scores across items corresponded to a response of "disagree somewhat" to feelings of discomfort. This is the first study to utilize the measure for people with B/LV as opposed to people with disabilities in general, and mean scores for this discomfort subscale reported in previous studies were slightly higher than the scores obtained in our study (Iacono et al., 2009; Loo, 2004).

The impact of the IV on implicit attitudes about the competence of people who are B/LV also varied by study. Although there was not a significant interaction between condition and time in either study, IV groups in both studies exhibited a small decrease in implicit bias between pretest and posttest. The decrease and effect size were similar in Study 1 and Study 2, but only Study 1 decreases were statistically significant. It is common to see only small, or no, change in implicit attitudes in intervention studies (Forscher et al., 2019). The magnitude of the changes in IAT-BVI scores in this study was similar to changes in scores after in-person meetings with VR professionals (McDonnall & Antonelli, 2022).

Intent to hire a qualified candidate who is B/LV in the future also improved significantly in both studies with a medium effect size. On average, participants went from being moderately likely to hire to more likely to hire someone who is B/LV. In the Theory of Planned Behavior (Ajzen, 1985), behavioral intention as measured with this scale is considered a direct antecedent of behavior, suggesting that viewing the IV may ultimately influence viewers to increase their likelihood of hiring a B/LV person.

We utilized results from Study 1 to address the study's two research questions. Regarding whether improvements in outcomes were retained over time, we found that all measures that exhibited positive change through viewing the IV retained a significant improvement three months

later. Knowledge and explicit attitude scores decreased slightly during the period but retained a significant improvement compared to pretest scores. The lasting effect of the reduction in implicit bias exhibited for Study 1 participants at follow-up is important, as few previous studies have documented lasting effects on improvements in implicit attitudes (Forscher et al., 2019). Regarding the potential beneficial impact of being able to obtain answers to personal questions about people who are B/LV, we did not find any difference in improvements for participants who had access to the entire IV versus those who did not have access to the personal, or curiosity, questions.

Limitations

This study has several limitations. Time constraints for the data collection sessions or lack of effort could have limited participants from providing their fullest possible answers to open-ended questions such as the work task knowledge measure. Most of our outcome measures rely on self-report, which is inherently susceptible to social desirability bias (van de Mortel, 2008). Our samples were primarily White and Study 2 participants were primarily female, diminishing our ability to explore how cultural or demographic differences might impact the effectiveness of the IV. Also, most Study 1 participants did not have experience making hiring decisions; thus, their responses on outcome measures related to hiring were hypothetical and may not reflect real-world perspectives of employers. Finally, in the implementation of the intervention and data collection, there were several minor adverse events that occurred during either the viewing of the video or completion of the surveys, related to computer issues or interruptions initiated by the participant. However, it is relevant to note that our findings support the efficacy of the IV even with interruption or less than ideal viewing conditions.

Constraints on Generality

This study is the first test of a new intervention designed to improve knowledge, attitudes, and intent to hire people who are B/LV. We intended to test the intervention with people who

currently are, have been, or will be involved in making hiring decisions for an organization. For Study 1, our sample of junior and senior-level students in management classes was conceptualized as future hiring managers. We believe that our findings from Study 1 would apply to college students in other disciplines and at other universities. We believe our findings from Study 2 would apply to other people across the country currently or previously involved in making hiring decisions for an organization. However, the type of organization and positions that the person hires for may impact the size of the effect, particularly for attitudes and intent to hire. The intervention itself is a video that will not change; thus, there is no reason that the materials used in this study will affect generality. We do not consider our procedures for collecting data from participants to be essential to the success of the intervention. The IV could be viewed in other settings with the same results. We have no reason to believe that our results depend on other characteristics of the participants, materials, or context.

Implications

This study documented that viewing the IV for a short period of time results in improvements in knowledge, attitudes, and intent to hire people who are B/LV for people of varying ages and of varying initial levels on these measures and that these effects persist over time. In Study 2, adults in the intervention group had higher or more positive scores than the control group on the two knowledge measures and implicit attitudes. They also had noticeably higher or more positive scores on work task knowledge, explicit attitudes, and implicit attitudes at pretest than previous study samples (McDonnall et al., 2014; McDonnall & Antonelli, 2018, 2020, 2022), suggesting that people holding more positive attitudes were more likely to volunteer for the study. The ability of the IV to improve knowledge and attitudes in people with higher than average initial scores is a particularly positive study finding, and indicative of the benefit of viewing the IV regardless of one's previous exposure to people who are B/LV. The ability to obtain more personal

information about B/LV people by viewing questions in the Curiosity topic area did not have an impact on outcomes, suggesting that the opportunity to see multiple people with B/LV respond to questions, regardless of the topic, is enough to bring about positive change.

Improvements observed in the outcome measures of this study are important due to their potential relationship with a reduction in stereotypes and discrimination and an increased likelihood to hire people who are B/LV. Previous research has supported the ability of increasing knowledge to change attitudes toward people with disabilities (Hall, 2008; Hunt & Hunt, 2004; Zahn & Kelly, 1995), and work task knowledge has been linked to better explicit and implicit attitudes (McDonnall & Antonelli, 2018; McDonnall & Cmar, 2022; McDonnall & Crudden, 2018). Better explicit attitudes were associated with having hired a person who is B/LV, even after accounting for whether the employer had ever received an application from someone who is B/LV (McDonnall, 2018; McDonnall & Antonelli, 2019). A substantial amount of research has supported the idea that attitudes lead to behavioral intentions, such as intent to hire measured in this study, which in turn lead to actual behaviors (Armitage & Conner, 2001; McDermott et al., 2015; McEachan et al., 2011).

The IV was created as a tool to educate employers, and this study's findings have policy implications for organizations who wish to reduce discrimination and promote hiring of people with disabilities. Organizations could adopt the IV as a component of their annual employee training. The ability to view the IV at any time and place with an internet connection makes it convenient and accessible for organizations to use, and the ability of viewers to access information that is most relevant to them makes it flexible and applicable to a wide audience. Because blindness and low vision are low-incidence disabilities, people who view the video may only infrequently encounter applicants with B/LV. Thus another, or additional, alternative would be to require hiring personnel to view the IV when the organization has an applicant who is B/LV. This proposed real-time application may make the information available in the IV particularly relevant and meaningful to the

hiring manager interacting with it. This study's results suggest that implementing the IV as an organization-wide training could decrease bias against B/LV candidates and allow the organization to hire more people who are B/LV.

Rehabilitation professionals who work with employers to help people with B/LV obtain jobs may also find the IV a helpful tool. In some cases, these professionals work with people with all types of disabilities and have limited knowledge about B/LV. Professionals with limited knowledge might particularly find the video helpful as a tool to educate employers when they have a client who is B/LV. Additionally, the video affords an easy opportunity for a sighted rehabilitation professional to provide an employer exposure to people who are B/LV. Finally, although the IV was created specifically to educate employers, many other people may benefit from viewing it. The IV could be used to educate professionals in other fields who may encounter people who are B/LV in the course of their work, such as social workers, counselors, psychologists, doctors, and other health care providers. Family members of people with B/LV may benefit from viewing the IV, and even people who begin losing their vision as adults may find the IV a source of hope and a tool to help with adjustment to vision loss.

References

Aichner, T. (2021). The economic argument for hiring people with disabilities. *Humanities and Social Sciences Communications*, *8*. https://www.nature.com/articles/s41599-021-00707-y

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action Control: From Cognition to Behavior* (pp. 11–39). Springer. https://doi.org/10.1007/978-3-642-69746-3_2

Allport, G. W. (1954). *The nature of prejudice*. Addison-Wesley.

Antonopolous et al. (2023). Implicit bias toward people with disability: A systematic review and meta-analysis. *Rehabilitation Psychology*, *68*(2), 121–134.

Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: A meta-analytic review. *British Journal of Social Psychology*, *40*, 471–499.

Carew et al. (2019). The impact of exposure to media coverage of the 2012 Paralympic Games on mixed physical ability interactions. *J. Community Applied Social Psychology*, *29*, 104–120.

Carpenter, T. P., Pogacar, R., Pullig, C., Kouril, M., Aguilar, S., LaBouff, Jordan., Isenberg, N., & Chakroff, A. (2019). Survey-software implicit association tests: A methodological and empirical analysis. *Behavior Research Methods*, *51*, 2194–2208. https://doi.org/2194-2208

Chen, J., Yang, C., Zheng, W., Li, Z., Huang, Y., Yao, S., Chen, X., Chen, X., Xie, R., Luo, R., Zhang, Y., Ye, G., Shen, X., Xiao, Y., Zhu, Y., & Huang, W. (2024). Global, regional, and national epidemiology of visual impairment in working-age individuals, 1990-2019. *JAMA Ophthalmology*, *142*(1), 25–32. https://doi.org/10.1001/jamaophthalmol.2023.5617

Chowdhury, & Quarles. (2022). A wheelchair locomotion interface in a VR disability simulation reduces implicit bias. *IEEE Transactions on Visualization and Computer Graphics*, *28*(12), 4658–4670.

Coffey, M., Coufopoulos, A., & Kinghorn, K. (2014). Barriers to employment for visually impaired women. *International Journal of Workplace Health Management*, *7*(3), 171–185. https://doi.org/10.1108/IJWHM-06-2013-0022

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Crudden, A., & McBroom, L. W. (1999). Barriers to employment: A survey of employed persons who are visually impaired. *Journal of Visual Impairment & Blindness*, *93*(6), 341–350. https://doi.org/10.1177/0145482X9909300602

Devine, P. G., Forscher, P. S., Austin, A. J., & Cox, W. T. L. (2012). Long-term reduction in implicit race bias: A prejudice habit-breaking intervention. *Journal of Experimental Social Psychology*, *48*(6), 1267–1278. https://doi.org/10.1016/j.jesp.2012.06.003

Ferrara, K., Burns, J., & Mills, H. (2015). Public attitudes toward people with intellectual disabilities after viewing Olympic or Paralympic performance. *Adapted Physical Activity Quarterly*, *32*(1), 19–33.

Forscher, P. S., Lai, C. K., Axt, J. R., Ebersole, C. R., Herman, M., Devine, P. G., & Nosek, B. A. (2019). A meta-analysis of procedures to change implicit measures. *Journal of Personality and Social Psychology*, *117*(3), 522–559. https://doi.org/10.1037/h0021466

Fraser, R., Ajzen, I., Johnson, K., Hebert, J., & Chan, F. (2011). Understanding employers' hiring intention in relation to qualified workers with disabilities. *Journal of Vocational Rehabilitation*, *35*(1), 1–11. https://doi.org/10.3233/JVR-2011-0548

Fuqua, D. R., Rathbun, M., & Gade, E. M. (1984). A comparison of employer attitudes toward the worker problems of eight types of disabled workers. *Journal of Applied Rehabilitation Counseling*, *15*, 40–43.

Gething, L. (1994). The interaction with disabled persons scale. *Journal of Social Behavior and*

Personality, *9*(5), 23–42.

Goodman, N., Deane, S., Hyseni, F., Soffer, M., Shaheen, G., & Blanck, P. (2024). Perceptions and bias of small business leaders in employing people with different types of disabilities. *Journal of Occupational Rehabilitation*. https://doi.org/10.1007/s10926-024-10201-2

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the implicit association test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, *85*(2), 197–216. https://doi.org/10.1037/0022-3514.85.2.197

Greenwald, A. G., Poehlman, T. A., Uhlmann, E. L., & Banaji, M. R. (2009). Understanding and using the implicit association test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology*, *97*(1), 17–41. https://doi.org/10.1037/a0015575

Hall, E. W. (2008). Changing the way employees interact with guests with disabilities. *Journal of Disability Policy Studies*, *19*(1), 15–23. https://doi.org/10.1177/1044207308315284

Huang, Y., Kim, J., Levine, A., Park, J., & Kuo, H. J. (2023). Measuring implicit biases about disability: A scoping review. *Rehabilitation Counseling Bulletin*. https://doi.org/10.1177/00343552231199246

Hunt, C. S., & Hunt, B. (2004). Changing attitudes toward people with disabilities: Experimenting with an educational intervention. *Journal of Managerial Issues*, *16*(2), 266–280.

Iacono, T., Tracy, J., Keating, J., & Brown, T. (2009). The Interaction with Disabled Persons Scale: Revisiting its internal consistency and factor structure, and examining item-level properties. *Research in Developmental Disabilities*, *30*(6), 1490–1501. https://doi.org/10.1016/J.RIDD.2009.07.010

Kallman, D. (2017). Integrating disability: Boomerang effects when using positive media exemplars to reduce disability prejudice. *International Journal of Disability, Development and Education*, *64*(6), 644–662. https://doi.org/10.1080/1034912X.2017.1316012

Kirchner, C., Johnson, G., & Harkins, D. (1997). Research to improve vocational rehabilitation: Employment barriers and strategies for clients who are blind or visually impaired. *Journal of Visual Impairment & Blindness*, *91*(4), 377–392. https://doi.org/10.1177/0145482x9709100406

Loo, R. (2004). Attitudes toward employing persons with disabilities: A test of the sympathy-discomfort categories. *Journal of Applied Social Psychology*, *34*(10), 2200–2214. https://doi.org/10.1111/j.1559-1816.2004.tb02697.x

Lorah, J. (2018). Effect size measures for multilevel models: Definition, interpretation, and TIMSS example. *Large-Scale Assessments in Education*, *6*(1). https://doi.org/10.1186/s40536-018-0061-2

Lorenz, E. P., & Frisby, C. M. (2022). Disability on drama TV: How attitudes about disability in the US relate to viewing frequency and identification with a character with a disability on "Glee." *Media Education*, *13*(1), 81–91.

Lu, J., Webber, W. B., Romero, D., & Chirino, C. (2018). Changing attitudes toward people with disabilities using public media: An experimental study. *Rehabilitation Counseling Bulletin*, *61*(3), 175–186. https://doi.org/10.1177/0034355217700820

Marques, A. P., Ramke, J., Cairns, J., Butt, T., Zhang, J. H., Muirhead, D., Jones, I., Tong, B. A. M. A., Swenor, B. K., Faal, H., Bourne, R. R. A., Frick, K. D., & Burton, M. J. (2021). Global economic productivity losses from vision impairment and blindness. *EClinicalMedicine*, *35*, Article e100852. https://doi.org/10.1016/J.ECLINM.2021.100852

McDermott, M. S., Oliver, M., Simnadis, T., Beck, E. J., Coltman, T., Iverson, D., Caputi, P., & Sharma, R. (2015). The Theory of Planned Behaviour and dietary patterns: A systematic review and meta-analysis. *Preventive Medicine*, *81*, 150–156. https://doi.org/10.1016/j.ypmed.2015.08.020

McDonnall, M. C. (2014). Employer attitudes toward blind or visually impaired employees: Initial development of a measurement instrument. *Rehabilitation Counseling Bulletin*, *58*(1), 29–36. https://doi.org/10.1177/0034355213504140

McDonnall, M. C. (2017). Additional evidence for the validity of the employer attitudes toward blind employees scale. *Rehabilitation Counseling Bulletin*, *60*(3), 155–162. https://doi.org/10.1177/0034355216642598

McDonnall, M. C. (2018). Factors associated with employer hiring decisions regarding people who are blind or have low vision. *Journal of Visual Impairment & Blindness*, *112*(2), 197–203. https://doi.org/10.1177/0145482X1811200207

McDonnall, M. C., & Antonelli, K. (2018). Employers' implicit attitudes about the competence of people who are blind. *Rehabilitation Psychology*, *63*(4), 502–511. https://doi.org/10.1037/rep0000235

McDonnall, M. C., & Antonelli, K. (2019). A second look at factors associated with employer hiring behavior regarding people who are blind or have low vision. *Journal of Visual Impairment & Blindness*, *113*(6), 538–550. https://doi.org/10.1177/0145482X19887642

McDonnall, M. C., & Antonelli, K. (2020). The impact of a brief meeting on employer attitudes, knowledge, and intent to hire. *Rehabilitation Counseling Bulletin*, *63*(3), 131–142. https://doi.org/10.1177/0034355219889409

McDonnall, M. C., & Antonelli, K. (2022). Changing employers' implicit attitudes about the competence of people who are blind. *Journal of Visual Impairment & Blindness*, *116*(3), 361–372. https://doi.org/10.1177/0145482X221105512

McDonnall, M. C., & Cmar, J. L. (2022). Structural relationships among predictors of employer attitudes toward blind employees. *Journal of Vocational Rehabilitation*, *57*(1), 73–84. https://doi.org/10.3233/JVR-221200

McDonnall, M. C., Cmar, J. L., Antonelli, K., & Markoski, K. M. (2019). Professionals' implicit attitudes about the competence of people who are blind. *Journal of Visual Impairment & Blindness*, *113*(4), 341–354. https://doi.org/10.1177/0145482x19865391

McDonnall, M. C., Cmar, J. L., & McKnight, Z. S. (2022). Beyond employment rates: Earnings of people with visual impairments. *Journal of Visual Impairment & Blindness*, *116*(4), 526–532. https://doi.org/10.11770145482X221121830/

McDonnall, M. C., & Crudden, A. (2018). Predictors of employer attitudes toward blind employees, revisited. *Journal of Vocational Rehabilitation*, *48*(2), 221–231. https://doi.org/10.3233/JVR-180933

McDonnall, M. C., & Lund, E. M. (2019). Employers' intent to hire people who are blind or visually impaired: A test of the Theory of Planned Behavior. *Rehabilitation Counseling Bulletin*, 1–10. https://doi.org/10.1177/0034355219893061

McDonnall, M. C., O'Mally, J., & Crudden, A. (2014). Employer knowledge of and attitudes toward employees who are blind or visually impaired. *Journal of Visual Impairment & Blindness*, *108*(3), 213–225. https://doi.org/10.1177/0145482X1410800305

McDonnall, M. C., & Sui, Z. (2019). Employment and unemployment rates of people who are blind or visually impaired: Estimates from multiple sources. *Journal of Visual Impairment & Blindness*, *113*(6), 481–492. https://doi.org/10.1177/0145482X19887620

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

McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review*, *5*(2), 97–144. https://doi.org/10.1080/17437199.2010.521684

Nosek, B. A., Smyth, F. L., Hansen, J. J., Devos, T., Lindner, N. M., Ranganath, K. A., Smith, C. T., Olson, K. R., Chugh, D., Greenwald, A. G., & Banaji, M. R. (2007). Pervasiveness and correlates of implicit attitudes and stereotypes. *European Review of Social Psychology*, *18*(1), 36–88. https://doi.org/10.1080/10463280701489053

Paluck, E. L., & Green, D. P. (2009). Prejudice reduction: What works? A review and assessment of research and practice. *Annual Review of Psychology*, *60*(1), 339–367. https://doi.org/10.1146/annurev.psych.60.110707.163607

Paluck, E. L., Green, S. A., & Green, D. P. (2019). The contact hypothesis re-evaluated. *Behavioral Public Policy*, *3*(2), 129–158.

Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, *90*(5), 751–783. https://doi.org/10.1037/0022-3514.90.5.751

Reinhardt, J. D., Pennycott, A., & Fellinghauer, B. A. G. (2014). Impact of a film portrayal of a police officer with spinal cord injury on attitudes towards disability: A media effects experiment. *Disability and Rehabilitation*, *36*(4), 289–294. https://doi.org/10.3109/09638288.2013.788219

Salomone, P. R., & Paige, R. E. (1984). Employment problems and solutions: Perceptions of blind and visually impaired adults. *Vocational Guidance Quarterly*, *33*(2), 147–156.

Selya, A. S., Rose, J. S., Dierker, L. C., Hedeker, D., & Mermelstein, R. J. (2012). A practical guide to calculating Cohen's f 2, a measure of local effect size, from PROC MIXED. *Frontiers in Psychology*, *3*(APR), 1–6. https://doi.org/10.3389/fpsyg.2012.00111

Silverman, A. M., Bell, E. C., & Mendez, M. A. (2019). Understanding the employment experiences of Americans who are legally blind. *Journal of Rehabilitation*, *85*(1), 44–52.

Smedema, S. M., Ebener, D., & Grist-Gordon, V. (2012). The impact of humorous media on

attitudes toward persons with disabilities. *Disability and Rehabilitation*, *34*(17), 1431–1437. https://doi.org/10.3109/09638288.2011.645109

Steverson, A. (2020). Relationship of employment barriers to age of onset of vision loss. *Journal of Visual Impairment & Blindness*, *114*(1), 63–69. https://doi.org/10.1177/0145482X20901382

U.S. Census Bureau. (2024). *2023 American Community Survey 1-year estimates: Employment status by disability status and type, Table B18120*. https://data.census.gov/table?q=B18120:%20EMPLOYMENT%20STATUS%20BY%20DISABILITY%20STATUS%20AND%20TYPE&g=010XX00US&y=2023

van de Mortel, T. (2008). Faking it: Social desirability response bias in self-report research. *Australian Journal of Advanced Nursing*, *25*(4), 40–48.

Williams, C. A. (1972). Is hiring the handicapped good business? *Journal of Rehabilitation*, *38*(2), 30–34.

Zahn, S. B., & Kelly, L. J. (1995). Changing attitudes about the employability of the deaf and hard of hearing. *American Annals of the Deaf*, *140*(5), 381–385. https://doi.org/10.1353/aad.2012.0355

Table 1

Study 1 Means and Standard Deviations for Measures at Pretest, Posttest, Follow-Up by Group

	Pretest		Posttest		Follow Up	
	Mean	SD	Mean	SD	Mean	SD
General Knowledge						
Full IV	3.92[a]	2.41	9.65[a]	1.92	8.52[i]	2.74
Limited IV	4.40[b]	2.72	10.21[b]	1.70	8.82[a]	2.36
Intervention Combined	4.17[c]	2.57	9.94[c]	1.82	8.67[j]	2.54
Control	4.41[d]	2.34	4.64[d]	2.19	4.64[k]	2.25
Work Task Knowledge						
Full IV	0.96[a]	1.80	3.90[a]	2.67	2.74[i]	3.20
Limited IV	1.29[b]	1.99	4.44[b]	2.84	3.29[a]	3.01
Intervention Combined	1.13[c]	1.90	4.18[c]	2.76	3.02[j]	3.10
Control	0.91[d]	1.39	0.86[d]	1.29	1.21[k]	1.71
EABES						
Full IV	31.37[a]	10.55	42.59[a]	10.21	37.72[i]	11.08
Limited IV	29.92[b]	12.16	41.75[b]	11.80	38.47[a]	11.42
Intervention Combined	30.62[c]	11.37	42.16[c]	11.01	38.11[j]	11.21
Control	31.36[d]	10.50	32.68[d]	11.24	34.06[k]	11.17
Discomfort						
Full IV	10.51[a]	4.15	10.22[a]	4.27	11.48[i]	4.74
Limited IV	10.31[b]	4.60	10.08[b]	4.30	11.31[a]	4.66
Intervention Combined	10.41[c]	4.37	10.15[c]	4.27	11.39[j]	4.68
Control	9.91[d]	4.43	10.73[d]	4.61	11.02[k]	4.68
IAT-BVI						
Full IV	0.67[a]	0.48	0.54[e]	0.32	0.56[l]	0.32
Limited IV	0.65[b]	0.40	0.54[f]	0.38	0.57[m]	0.38
Intervention Combined	0.66[c]	0.44	0.54[g]	0.35	0.57[n]	0.35
Control	0.52[d]	0.39	0.46[h]	0.38	0.47[h]	0.32
Intent to Hire						

Full IV	7.86[a]	3.39	10.39[a]	3.91	9.78[i]	3.84
Limited IV	6.81[b]	4.44	9.69[b]	4.72	10.02[a]	3.95
Intervention Combined	7.32[c]	3.98	10.03[c]	4.34	9.91[j]	3.88
Control	8.93[d]	4.98	9.05[d]	4.93	9.13[k]	4.62

Note. EABES is the Employer Attitudes Toward Blind Employees Scale. IAT-BVI is the Implicit Association Test – Blind/Visually Impaired. Intervention Combined includes Full IV and Limited IV participants. Number of participants per group (*n*): a=49; b=52; c =101; d=56; e=48; f=50; g=98; h=51; i=46; j=95; k=53; l=44; m=45; n=89.

Table 2

Study 2 Means and Standard Deviations for Measures at Pretest and Posttest by Group

	Pretest		Posttest	
	Mean	SD	Mean	SD
General Knowledge				
Intervention	6.06[a]	2.85	10.68[a]	1.72
Control	4.72[b]	2.74	5.78[b]	2.66
Work Task Knowledge				
Intervention	2.58[a]	2.83	5.87[a]	3.49
Control	1.41[b]	2.26	1.28[b]	1.95
EABES				
Intervention	41.52[a]	12.83	49.84[a]	10.05
Control	41.44[b]	10.76	43.06[b]	10.11
Discomfort				
Intervention	9.84[a]	4.55	8.29[a]	3.56
Control	11.03[b]	4.76	10.34[b]	4.90
IAT-BVI				
Intervention	0.55[a]	0.46	0.43[a]	0.39
Control	0.68[a]	0.45	0.68[a]	0.44
Intent to Hire				
Intervention	9.61[a]	4.24	11.84[a]	3.87
Control	9.94[b]	5.22	10.19[b]	4.88

Note. EABES is the Employer Attitudes Toward Blind Employees Scale. IAT-BVI is the Implicit Association Test – Blind/Visually Impaired. Number of participants per group (*n*): a=31; b=32.