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Effects of Disability Exposure on Implicit Association Test Scores

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Abstract
The purpose of this study was to examine the effects of exposure to counter-stereotypical information about physical disabilities on implicit attitudes. Ten undergraduate students completed a mental imagery task relating to physical disabilities while the other ten students were given a filler task prior to the measurement of their implicit and explicit attitudes using an Implicit Association Task (IAT). It was hypothesized that both groups would have equally negative implicit attitudes. However, results revealed that the implicit attitudes of participants who completed the counter-stereotypical task showed significantly more negative implicit attitudes than the no imagery group whose attitudes were also negative (F(1, 16) = 7.61, p=.014, η² =.32). It is believed that exposure to the category group resulted in increased accessibility of negative attitudes because memory prefers stereotype congruent information rather than incongruent information. To overcome this memory bias, repeated presentation of counter-stereotypic information is suggested due to the way the cognitive system responsible for implicit attitudes is thought to function.

Introduction

Attitudes are categorized according to their retrieval from the mind; implicit attitudes are described as unconscious and automatic while explicit attitudes are conscious and “belief-based” (Pruett & Chan, 2006, p. 207). In other words, implicit attitudes are a representation of how an individual would chose to respond if prompted unexpectedly while explicit attitudes show how a person would act with time to reason (Rydell & McConnell, 2006). These attitudes are significant, especially in the area of social psychology, because understanding how attitudes can be altered can result in the weakening of negative attitudes towards individuals with disabilities who encounter social distancing and rejection in society—even among rehabilitation health professionals (Vaughn, Thomas, & Doyle, 2011). The current research focuses on implicit processes which are activated without the knowledge of the individual in response to category cues relating to physical disabilities.

Typically, attitudes towards the disabled are found through the surveying of explicit attitudes (Pruett & Chan, 2006). However, the validity of measures of explicit attitudes is threatened by the consciously-altered opinions of individuals who suppress socially undesirable, negative attitudes such as in the case of attitudes towards the disabled. Therefore, many researchers choose to measure implicit attitudes which occur at the first stage of information processing and avoid these untruthful, altered opinions (Antonak & Livneh, 2000). Implicit attitudes can be measured with an implicit association task (IAT).

The IAT presents a series of words, sometimes along with pictures, that must be classified in one of two categories, usually positive and negative. Previous research has used images of disabled athletes in order to examine implicit disability-related attitudes as well as images in the form of street signs because disability-related words were too cumbersome for rapid association (Pruett & Chan, 2006; White, Jackson, Gordon, 2006). More specifically, the IAT records the reaction time of participants to examine the effort required to pair a specific category with pleasant or unpleasant terms. Previous studies all report discovering that individuals can more quickly and easily associate unpleasant words with disabled people compared to pleasant words (Chen, Ma, & Zhang, 2011; Vaughn, Thomas, & Doyle, 2011; White et al., 2006).
Specifically, one study found that most of the Chinese undergraduate students surveyed exhibited positive explicit attitudes towards the disabled while holding negative implicit attitudes (Chen et al., 2011). These results show that it is possible for an automatic implicit attitude to differ from a participant’s stated beliefs (Pruett & Chan, 2006). The findings also validate the theory that explicit and implicit attitudes stem from different areas within a perceiver’s memory and are “distinct underlying cognitive processes” (Rydell & McConnell, 2006, p. 996). Implicit attitudes can be described as “social category associations” that control individuals’ behavior without their knowledge when shown “a category cue” (Blair et al., 2001, p. 828).

The major question is whether implicit attitudes can be altered. There are two theories from recent research are applicable to determine whether exposure to disability will result in changes in implicit association. The connectionist theory describes implicit stereotypes as activation patterns in memory bound by connection weights of the long-term memory and current inputs representing short-term memory (Blair et al., 2001). The current input can vary according to the internal state of the individual and is thought to be stimulated at the point of information processing, therefore, it should affect implicit attitudes. More specifically, mental imagery was used to increase the accessibility of counter stereotypical associations and the results showed that a mental imagery task evoked positive changes in negative implicit attitudes towards women (Blair et al., 2001).

Rydell and McConnell (2006, p. 996) presented Kahneman’s systems of reasoning—“the fast-learning system and the slow-learning system.” Explicit attitudes are a part of the fast-learning system because they can be altered quickly through conscious logical, verbal representations while implicit attitudes are a part of the slow-learning system because they can be changed during the slower process of accumulating new automatic associations from repeated presentation of counter attitudinal information (Kahneman, 2011). Prior research achieved the alteration of their participants’ implicit attitudes through one hundred initial learning trials and one hundred test trials of the IAT, therefore, concluding that implicit attitude alternation is possible with the presentation of enough counter attitudinal information (Rydell & McConnell, 2006). Also, many studies consistently report the alteration of implicit attitudes as a result of continuous coupling with positive or negative stimuli (Gawronski & Bodenhausen, 2006).

Implicit attitudes are believed to be comparable to “any other memorial structure” which are subject to change whenever priming information increases the availability of a “subset” of data such as the names of individuals who are non-stereotypical group members in a category (Rydell & McConnell, 2006, p. 997). For example, women are stereotyped as being weak and dependent but there are many women who do not fit this description such as Diane Sawyer, Hilary Rodham Clinton, and Mia Hamm (Blair, Ma, & Lenton, 2001).

This present study suggests that if participants are primed with an example of a disabled person who has successfully overcome the difficulties associated with their handicap; it would show in their explicit attitudes due to the increased accessibility of positive members of this stigmatized group. It was also hypothesized that the IAT results would show that participants in the experimental condition
would not have faster reaction times when categorizing the symbols indicating disability with positive words than participants in the control group who were primed with a scenario describing a nondisabled person. The IAT was predicted not to report faster reaction times despite Blair, Ma, and Lenton’s (2001) findings because the theory of the systems of reasoning proposed by Rydell and McConnell (2006) was hypothesized to be true, therefore, it would require more than the mental imagery of a successful disabled person to overcome the strong stereotypical association people hold for disabled individuals which allows for an easier association of disability paired with negative words and nondisabled paired with positive words. To alter implicit attitudes towards the disabled, continuous coupling of positive stimuli with disability would be necessary rather than the mental imagery task used by Blair, Ma, & Lenton (2001).

Method

Participants

Twenty undergraduate college students, age 18 or older, from a liberal arts college in Pennsylvania were recruited through convenience. There were ten women and ten men. The participants were randomly assigned to a treatment or control group. Each group contained ten participants, five women and five men. Participants were asked to devote no more than 30 minutes of their time to complete this study. There were no incentives for participation in this study.

Materials and Apparatus

A mental imagery task was adapted from Blair, Ma, Lenton (2001). Each condition of the study was asked to complete two of the four different mental imagery tasks. Two of the priming tasks instructed participants to describe a woman and a man who have overcome physical handicaps in their lifetime with two minutes to describe each gender. These two tasks were assigned to the treatment group. The other two priming tasks asked participants to describe a man and a woman who have accomplished something noteworthy in the recent news with two minutes to answer for each gender. The latter two tasks were assigned to the control group.

Following the mental imagery tasks, participants were asked to partake in a computerized IAT adapted from Prueett & Chan (2006) and White, Jackson, & Gordon (2006). The IAT operated via the computer program E-prime. This IAT included eight images taken from Prueett and Chan’s 2006 study that reported the source of the images as Project Implicit. The good words used in this study are: honor, lucky, diamond, loyal, freedom, gift, happy, jolly, rich, and love (White, Jackson, & Gordon, 2006). The bad, negative words used in this study include: evil, rotten, poverty, disaster, vomit, hatred, sad, greedy, dirty, and worthless (White, Jackson, & Gordon, 2006). Prueett & Chan (2006) reported the test–retest reliability as $r = .78$.

The Multidimensional Attitudes Scales Towards Persons With Disabilities (MAS) used by Findler, Vilchinsky, & Werner (2007) was included in this study to assess the explicit attitudes of the participants. The MAS was included on the E-prime program after the IAT. This multidimensional scale measured attitudes on three dimensions: cognition, behavior, and affect. The reliability of this scale was reported with a Cronbach’s alpha of .87 (Findler et al, 2007). However, when the MAS was compared with the Attitude Toward Disabled Persons Scale (ATDP) created by
Yuker, Block, & Young (1966) to measure validity, the cognition dimension of the scale did not reveal a positive correlation unlike the behavior and affect dimensions which did correlate with the ATDP (Findler et al., 2007).

The MAS includes a vignette that describes scene in a coffee shop resulting in the participant imagining his or her self alone at a table with a stranger in a wheelchair. The vignette was followed by questions examining the three dimensions of the attitudes that the participant would feel in this situation. The first dimension measured the degree of likelihood that an individual would be experiencing specific emotions on a scale of one, being not at all, to five, being very much. The emotions included tension, stress, helplessness, nervousness, shame, relaxation, serenity, calmness, depression, fear, upset, guilt, shyness, pity, disgust, and alertness. The second dimension examined assessed was cognition using the same degree of likelihood scale mentioned for emotion. The cognition dimension included ten questions such “He/she seems to be an interesting guy/girl” and “We may get along really well.” The third dimension measured the likelihood of eight different behaviors such as “move away” or “start a conversation” while also utilizing the same degree of likelihood scale.

Procedure

In order to test whether exposure to a disabled person affects the results of the IAT, a mixed experimental design was used. Participants were first asked to sign an informed consent form before partaking in this study. The informed consent informed participants that their data would be kept confidential and that all participants were free to drop out of the study at any point. The between subjects experimental structure was used when participants in the treatment group were asked to complete two of the four different mental tasks. The first task assigned to the treatment condition asked participants to describe a woman who has overcome a physical handicap in their lifetime while the second asked participants to complete the same task but instead describe a man. The control condition was asked to describe a man and woman who have accomplished something noteworthy in the recent news. The essays could describe a celebrity, family member, or imaginary person. Participants had 2 minutes to complete each priming task.

After the priming tasks were completed, the participants were asked to complete the within subjects design portion of the experiment by taking the IAT where an individual’s reaction times on the congruent and incongruent critical blocks were compared. The IAT was used in this study in order to assess participants’ attitudes toward the physically disabled. The IAT was presented to participants through the computer program, E-Prime. The IAT included eight images taken from Pruett and Chan’s 2006 study that reported the source of the images as Project Implicit. The first block shown was a practice trial that allowed participants to become accustomed to the placement of the category words. This practice trial was essential because the IAT is a measure of the reaction time (RT) of participants who decided whether a symbol or word pertaining to disabled and non-disabled persons was positive or negative. The IAT relied upon the comparison between how quickly a participant was able to pair a stimulus with negative words compared to positive words. The IAT was made up of blocks. In the case of this study each block contains 20 trials within the block. Trials in this case are the number of
words or signs that were classified under two specific categories in specific placements on the computer screen. The participant were asked to press either the “F” key on their keyboard if the stimulus fits the description of the category on the left or press the “J” key if the category on the right was the appropriate choice. If the participant entered an incorrect response the word, Incorrect, appeared in red font for 400 milliseconds (ms) followed by another trial. If the participant answers correctly, the next stimulus word or sign of the next trial appeared.

The first practice trial required participants to decide whether a disability related sign centered in the middle of the screen relates to the correct category, disability or the incorrect category nondisabled. The first practice block contained the phrase “Disability” on the left hand side of the computer screen while the right hand side displayed the phrase “Nondisabled.” Centered below these labels was an image of a sign relating to disability or no disability. This practice block contained 20 presentations of the eight signs where each sign classification was considered a trial. A second block of 20 trials was exactly the same as the previous block except the category “Disabled” and “Nondisabled” reversed locations so that “Disabled” was found on the right and “Nondisabled” on the left.

The third block asked participants to classify a word as belonging to the attribute good or bad. Bad appeared on the left hand side of the screen while good appeared on the right side. There were 20 trials containing a word centered below the attribute labels. This block began with the classification of the following good words: honor, lucky, diamond, loyal, freedom, gift, happy, jolly, rich, and love (White et al., 2001). Participants were also asked to classify the bad words which include: evil, rotten, poverty, disaster, vomit, hatred, sad, greedy, dirty, and worthless (White et al., 2001). The good and bad words were randomized throughout this block. The fourth block showed “Good” on the left top side of the screen and “Bad” on the top right.

The fifth block and sixth blocks were the critical blocks where the information to accept or reject the hypothesis can be found. The category label at the top left of the screen was “Disability” with the label “bad” underneath, while on the right side of the screen there was “Non-Disabled” with the label “good” below. The words or signs centered below were randomly selected from the good or bad words or disabled and nondisabled sign images which should be classified by participants into the category that is correct for the trial.

The sixth block reversed the category labels at the top of the screen so that the label “Disability” was placed on the right above “good” and “Non-disabled” was placed on the left above “bad”. Data was analyzed by examining each participant’s reaction times when asked to pair a positive vs. a negative word or sign with the categories, “Disability” and “Nondisabled”.

The final part of the E-prime program used the Multidimensional Attitudes Scale Toward Persons With Disabilities (MAS) to measure explicit attitudes. Participants were instructed to read a vignette which described an unexpected, chance meeting with a person in a wheelchair in a coffee shop. This was followed by sixteen questions requiring participants to indicate the likelihood of feeling each of the sixteen emotions on a scale from one, not at all, to five, very likely, if placed in the situation detailed in
the vignette. There were also ten questions asking participants to indicate the degree of likelihood they would be thinking about each of the ten different cognitions during this chance meeting. The final set of questions directed participants to rate the likelihood of behaving in the ways detailed in the eight different behaviors listed. After each participant partakes in the experiment, he or she was shown a debriefing form that explained what his or her personal data would be used for and allowed for questions about the procedure.

**Results**

This study examined the effect of disability exposure on implicit and explicit attitudes towards the disabled. The explicit attitudes of the treatment group, primed by describing a man and a woman who have successfully overcome physical disabilities, were hypothesized to be less negative than the explicit attitudes of the control group. The results of the *Multidimensional Attitudes Scale Toward Persons With Disabilities* (MAS) were analyzed using a paired samples t-test. This test showed that the small differences in the means of the MAS between the treatment and control were insignificant.

The implicit attitudes of the treatment group were hypothesized to show no differences from the implicit attitudes of the control group which are predicted from previous research to be more negative towards the disabled compared to able-bodied individuals. The implicit attitudes shown by the experimental group versus the control group were analyzed with a 2 (Participant Gender: male and female) x 2 (Condition: treatment and control) x 2 (Pairings: good and bad) x 2 (Status: disability and nondisabled) mixed ANOVA with repeated measures between the positive and negative pairings with disability and nondisabled. The test showed that the main effect, positive and negative pairings, was significant, $F(1, 16) = 7.45, p=.015, \eta^2 = .32$. The interaction of between the positive and negative pairings was also significant, $F(1, 16) = 5.28, p=.035, \eta^2 = .25$. The interaction between the pairings of positive and negative with disabled and nondisabled was found to be significant, $F(1, 16) = 27.59, p<.001, \eta^2 = .63$. The interaction between the pairings of good and bad with disabled and nondisabled was significant between the two conditions, treatment and control, $F(1, 16) = 7.61, p=.014, \eta^2 = .32$.

In the control condition, participants recorded faster reaction times when pairing positive category title with signs featuring the nondisabled than the disabled (Appendix A). Participants also reacted more quickly when asked to pair disability related signs with the negative category title versus signs depicting nondisabled individuals. The treatment condition also reports faster response times when pairing positive category titles with signs indicating nondisabled compared to disability related signs and when pairing negative category titles with signs showing a disabled person compared to a nondisabled person (Appendix B). Between the conditions, the treatment group reported slower reaction times when pairing each category, positive and negative, with disabled and nondisabled stimuli than the control condition.

**Discussion**

This study examined the effect of disability exposure on implicit and explicit attitudes. In this study, it was hypothesized that explicit attitudes of the treatment group, which was primed with counter stereotypical information, would be significantly more positive than the explicit attitudes of the
control group. Previous research, using a design similar to this current study, examined whether counter-stereotyped information describing women as strong rather than weak through a mental imagery task could result in positive explicit attitudes (Blair et al., 2001). This prior research found that the mental imagery task altered explicit attitudes (Blair et al., 2001). However, the data analysis performed in this present research showed no significant results when examining explicit attitudes between the treatment group and the control group.

One possible explanation of these results differing from Blair, Ma, and Lenton’s (2001) findings could be because of differences between the amounts of counter-stereotyped information readily available in memory for successful physically disabled persons compared to strong female leaders observed on a daily basis. Most individuals possess reasonably strong subtypes which are incongruent with the negative label women receive as a group, such as women leaders who are involved in politics or in professional sports (Blair et al., 2001). Whereas, other previous research explains that there are various indications of some improvement in the attitudes towards the disabled in recent years, however, damaging stereotypes towards the disabled still are present which limit equal, unbiased participation in society (Chen et al., 2011). Some participants in this present study reported difficulty in recalling an individual who has overcome a physical disability whereas; the previous study did not report these difficulties (Blair et al., 2001).

Primarily, this study is examining the effects of priming with information incongruent to negative stereotypes towards the disabled on IAT results. It was hypothesized that the treatment and control condition would report the fastest reaction times when pairing positive with nondisabled than with disability which would indicate negative implicit attitudes. It is expected that the treatment and control groups will share the same level of negative implicit attitudes. The results of the analysis on IAT scores show that the treatment group reported significantly higher negativity in their implicit attitudes towards the disabled than did the control group. However, both groups reported faster reaction times when pairing negative with disabled and positive with nondisabled.

In order to understand what caused the implicit attitudes of the treatment group to be more negative than the control group, the researchers, Galinsky & Moskowitz (2007, p. 833), provide the following quotation, “the more one tries not to think about a thought, the more prevalent that thought becomes.” This quotation is relevant when considering that in the process of trying to weaken negative attitudes, “the very attempt to control prejudice may initiate automatic processes that promote prejudice” (Galinsky & Moskowitz, 2007, p. 833). One study reported that increasing the saliency of a social group can result in eliciting automatic attitudes that are stereotypically congruent with the social category (Kawakami, Dovidio, & Dijksterhuis, 2003). This increased accessibility to negative attitudes may explain why the treatment group’s implicit attitudes were more negative than the control group’s implicit attitudes in this study.

The theory behind this increased accessibility to negative attitudes is that the feat of suppressing information is a taxing process requiring a large amount of cognitive resources (Galinsky & Moskowitz, 2007). This results in a memory bias preferring stereotype congruent material rather incongruent material (Galinsky &
Consequently, suppressing negative attitudes leads to the negative stereotype becoming more readily available rather than less (Galinsky & Moskowitz, 2007).

Although this study was not able to decrease the negative implicit attitudes held towards the disabled; previous research found that stereotypic associations can be moderated through training by the changing of their participants’ beliefs with enough counter-attitudinal information, meaning that repeated practice with replacing stereotypical constructs with counter-stereotypical information can negate negative attitudes (Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000). Comparable results were reported by researchers who were able to alter participant’s implicit attitudes through 200 trials of the IAT (Pruett & Chan, 2006). This present study resulted in increases in negative implicit attitudes; it reveals the presence of more automatic negative associations than positive associations that cannot simply be altered with the use of two mental imagery tasks.

This information can be used to develop training that would help to reduce negative associations, especially among rehabilitation professionals, because ethically they must not discriminate against their disabled patients (Pruett & Chan, 2006) However, as the IAT shows, maintaining an unbiased attitude requires consistent reminding of counter stereotypical information. Individuals may be unaware that their automatic associations differ from their conscious opinion, therefore, proving the IAT to be a valuable resource for exposing negative automatic associations (Pruett & Chan, 2006).

Based on the results of this study, future researchers should see that to alter implicit attitudes involves the slow accumulation of new automatic associations form repeated presentation of non-stereotypical information, knowing this researchers should include several include more counter-stereotypical examples of people overcoming physical handicaps prior to the administration of the IAT. Also, it may be beneficial to have participants take the IAT and share the participant’s results individually with the participant in order to expose any negative attitudes that they may be unaware of and have them take a follow-up IAT to see if bringing this to their attention resulted in any attitudinal changes.

**References**


Appendix A

Figure 1. Interaction between pairing of disabled and nondisabled with positive and negative in the control condition.
Appendix B

Figure 2. Interaction between pairing of disabled and nondisabled with positive and negative in the treatment condition.