The Implicit Association Test as a Measure of Attitudinal Biases Towards Individuals with Disabilities: Assessing the Convergent Validity with the Interaction with Disabled Persons Scale and Tringo's Disability Social Distance Scale

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THE IMPLICIT ASSOCIATION TEST AS A MEASURE OF ATTITUDINAL BIASES TOWARDS INDIVIDUALS WITH DISABILITIES: ASSESSING THE CONVERGENT VALIDITY WITH THE INTERACTION WITH DISABLED PERSONS SCALE AND TRINGO'S DISABILITY SOCIAL DISTANCE SCALE

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Masters of Arts

by
Julie Elizabeth Nichols

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THE IMPLICIT ASSOCIATION TEST AS A MEASURE OF ATTITUDINAL BIASES TOWARDS INDIVIDUALS WITH DISABILITIES: ASSESSING THE CONVERGENT VALIDITY WITH THE INTERACTION WITH DISABLED PERSONS SCALE AND TRINGO’S DISABILITY SOCIAL DISTANCE SCALE

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The present study addressed attitudes toward individuals with disabilities. Barriers that individuals with disabilities have faced and continue to face were discussed. Drawbacks (e.g., fakeability and unidimensionality) of traditional paper-and-pencil tests were presented. The Implicit Association Test (IAT), Interaction with Disabled Persons Scale (IDP), Tringo’s Disability Social Distance Scale (DSDS), and Marlowe-Crowne Social Desirability Scale (MCSDS) were administered to 74 college students. Participants completed IAT tests for four disability conditions (i.e., paraplegic, alcoholism, cancer, and mental illness) in an effort to replicate Tringo’s Hierarchy of Preference. The Hierarchy of Preference was not replicated in the current study. However, the replication of the Hierarchy of Preference using the DSDS established the stability of the Hierarchy. A relationship was found between the IAT and the IDP. No relationship was established for the DSDS and the IDP. Altogether, measuring attitudes toward individuals with disabilities using the IAT is worthy of continued research.
Introduction and Review of Literature

Individuals with disabilities continue to face both physical and attitudinal barriers. Attitudinal barriers, such as generalized stereotypes and discomfort in social situations with individuals without disabilities, have greatly affected their daily life activities. Physically, it can be challenging for individuals with disabilities. Specifically, inequitable employment practices against individuals with disabilities have produced a lack of individuals with disabilities in the workplace. The presence and job performance of employees with disabilities in organizations have further affected coworker attitudes towards individuals with disabilities. Measuring attitudes toward individuals with disabilities may ultimately help alleviate some of these attitudinal barriers and allow employers and psychologists to better understand preferences employees and employers may have toward individuals with different disabilities.

The importance of studying attitudes toward individuals with disabilities has been acknowledged for many years (Beckwith & Matthews, 1995; Diksa & Rogers 1996; Antonak & Livneh, 1988; Tringo, 1970). Attitudes toward individuals with disabilities in the workplace are meaningful because of the well-established relationship between attitudes and behavior. An individual's attitude toward another individual or group of individuals may help explain and predict his or her own behavior (Antonak & Livneh, 1988). Negative employer attitudes toward individuals with disabilities may limit the hiring of individuals with disabilities, even when they are capable of performing the job.

In fact, individuals with disabilities face at least three specific barriers to becoming a successful member of the workforce. These barriers include getting hired, getting trained, and coping with the effects of coworker attitudes on the job. The first
barrier that individuals with disabilities encounter is getting hired. Levy, Jessop, Rimmerman, and Levy (as cited in Diksa & Rogers, 1996) conducted research on the hiring policies of corporations. Levy et al. found that only 64% of companies with an explicit hiring policy for individuals with disabilities hired at least one individual with a disability; that is, over a third of companies with an explicit hiring policy failed to hire a single individual with a disability. Of those companies without such a policy, 60% failed to hire at least one individual with a disability.

 Apparently, even if an organization has implemented a hiring policy for individuals with disabilities it does not guarantee that individuals with disabilities will be hired. Biased hiring practices toward individuals with disabilities may be a reason for the lack of individuals with disabilities in the workplace. Namely, there may be attitudinal differences toward the recommendation of an applicant with a specific disability. For example, Drehmer and Bordieri (1985) found a significant main effect for disability, meaning that the applicant with a mental illness was less likely to be recommended for hiring than an applicant with paraplegia. Interestingly, the finding is expected given the results of Tringo’s (1970) established hierarchy of preference (discussed in more detail later). The hierarchy has consistently found that paraplegics were more socially accepted than individuals with a mental illness.

 Even if an individual with a disability is hired, he or she may face a second barrier, that of adequate training. For instance, Beckwith and Matthews (1995) acknowledged that employee attitudes are important because of their potential to have a negative impact on the trainer-trainee interaction. This potential trainer-trainee relationship can best be explained by Gold’s expectancy model (1990). According to this
model, negative trainer attitudes result in low expectations towards trainees with disabilities. Low expectations lead to a reduction in learning possibilities, which may lower the individual’s job performance. Low job performance reinforces the trainer’s initial opinion of the individual with a disability, resulting in a ‘deviancy cycle’.

After overcoming the obstacles of being hired and trained, individuals with disabilities confront yet another barrier. Coworker attitudes on the job are a third barrier that individuals with disabilities experience. These attitudes may have a significant impact on the individual with a disability. Jones and Stone (1995) evaluated the displeasure of coworkers who worked with individuals with disabilities. Jones and Stone explained that social situations are different from work situations. In social situations, people can easily withdraw. In a work environment, employees cannot avoid interaction with individuals with disabilities, especially when both individuals are in the same work group.

Jones and Stone (1995) provided participants with twenty disabilities listed in the Americans with Disabilities Act of 1990. Participants rated how comfortable they would feel in working closely with an individual with a particular disability. The results indicated that the participants would be least comfortable working with individuals with a mental illness, HIV infection, alcoholism, mental retardation, epilepsy, or a drug addiction. Females felt more comfortable than men around individuals with such disabilities as HIV, cancer, and arthritis.

Thus, individuals with disabilities face at least three barriers in attempting to successfully join the workforce. Many other barriers obviously exist, but each of the three barriers discussed show the importance that employee and coworker attitudes may play in
the current problem. Due to the existence of these barriers and the link between such attitudes and behavior, the importance of measuring attitudes toward individuals with disabilities should be evident.

Measuring Attitudes

Researchers have measured attitudes toward individuals with disabilities through various approaches (Altman, 1981). The sociometric method measures an individual’s behavioral response to different situations that involve contact with individuals with various disabilities. Picture ranking measures participants’ reactions to photographs or videotapes of individuals with various disabilities. The most widely used, however, is the traditional paper-and-pencil survey, which requests participants to respond to questions concerning various disability issues.

The most common paper-and-pencil surveys are the Attitude Toward Disabled Persons Scale (ATDP; Yuker, Block, & Young, 1960), the Interaction with Disabled Persons Scale (IDP; Gething, 1994), and the Disability Social Distance Scale (DSDS; Tringo, 1970). However, each of these traditional measures has several shortcomings. The goal of the current research is, thus, to check the feasibility of a new methodology for assessing attitudes towards individuals with disabilities. This new method may be free from the shortcomings present in the traditional techniques. First, a discussion of the traditional paper-and-pencil survey is in order.

Attitudes Toward Individuals with Disabilities Scale (ATDP)

The Attitudes Toward Individuals with Disabilities Scale (ATDP) is a 20-item scale that refers to the general term disabled people rather than specific disability groups (e.g., “Disabled people are usually sociable.”). The ATDP is answered using a six-point
Likert-type scale with responses ranging from “−3” to indicate “I disagree very much” to “+3” to indicate “I agree very much.” Higher scores on this measure indicate “acceptance.” In other words, the participant does not recognize an individual with a disability as being different from an individual without a disability. Lower scores indicate that the participants view individuals with disabilities as dissimilar from individuals without disabilities.

Although the ATDP has been one of the most widely used scales in research (Antonak & Livneh, 1988), it does have major drawbacks. One drawback includes the unidimensional concept of disability attitudes tapped by the ATDP (Roush & Klockars, 1988). The scale measures attitudes on a single continuum from positive to negative. The ATDP scale focuses on disabilities in general, making no distinction between types or dimensions of disabilities. But, as cited earlier, both Tringo (1970) and Drehmer and Bordieri (1985) found that individuals view different disabilities in a distinctive way. Accordingly, it would be valuable to have a scale that detects these discrepancies and preferences for different disabilities.

A second major drawback with the ATDP is the potential fakeability of the instrument. The fakeability of the ATDP has been debated throughout the literature (Speakman & Hoffman, 1979; Cannon & Szuhay, 1986; Vargo & Semple, 1984). Some researchers have concluded that answers on the ATDP cannot be faked. Speakman and Hoffman (1979) found no significant difference between participants under normal conditions and those participants instructed to fake his or her answers on the ATDP. In contrast, both Cannon and Szuhay (1986) and Vargo and Semple (1984) found that scores were greater when participants were instructed to provide fake answers, rather than when
instructed to provide honest answers. The higher scores reflected a more favorable and positive attitude of participants.

Fakeability is an especially important concern when an instrument is used as a selection device (Yuker, 1986). For example, a job candidate may be tempted to fake his or her responses in order to be hired. If the ATDP were used for selection purposes, then the instrument should not be used in isolation. The ATDP should be used in addition to other attitude measurements in order to investigate the convergence of the ATDP and other attitude measures. The ATDP should only be used in research as a single measure when an individual has no motivation to fake his or her responses on an instrument. This is rarely the case, however.

The ATDP has been used often in research. Nevertheless, because the ATDP is a unidimensional measure that research has determined to be susceptible to fakeability it will not be used in the present study. Instead, a more recently developed multidimensional scale that is less susceptible to faking will be used.

Interaction with Disabled Persons Scale (IDP)

Gething (1994) designed the twenty-item Interaction with Disabled Persons (IDP) scale to assess how an individual’s level of personal discomfort might affect his/her attitude towards individuals with disabilities. An individual’s feeling of discomfort is assumed to derive from the uncertainty of how to conduct oneself in the presence of an individual with a disability. Contrary to the general term of disabled people used in the ATDP, the IDP attempts to examine disabilities in terms of the specific individual with the disability. However, the IDP does not explore specific disability groups. In this scale, participants are asked to respond to statements that describe how someone might feel
when in contact with an individual with a disability. A typical item is "After frequent contact, I find I just notice the person not the disability." Responses range from 1 ("I disagree very much") to 6 ("I agree very much"), where higher scores suggest greater discomfort.

Whereas the ATDP is a unidimensional measure of personal affect, the IDP has been found to be a solid multidimensional scale. Using both exploratory factor analysis and confirmatory factor analysis, Thomas, Palmer, Coker-Juneau and Williams (in press) found and confirmed three stable factors underlying the IDP: social discomfort, empathy, and fear of having the disability. In addition, the IDP was subsequently found to have adequate reliability, appropriate discriminant validity, and acceptable divergent validity.

Gething (1994) proposed that the IDP was less susceptible to faking than the ATDP. The IDP's overall approach is to measure attitudes on an individual, personal level, whereas the ATDP assesses attitudes at a societal level. Since the IDP involves asking participants to reflect on personal experiences with specific individuals with disabilities, rather than on a societal level, Gething has claimed that participants are less likely to give socially desirable answers. Gething has reported several studies that have found the IDP less susceptible to socially desirable responding than the ATDP.

Thus, the IDP solves the unidimensionality problem of the ATDP and provides a measure of attitudes toward individuals with disabilities that is less susceptible to socially desirable responding. However, neither the IDP nor the ATDP address specific disability groups. Focusing on "the disabled" in a general sense may not be enough to understand attitudes toward individuals with specific disabilities. Another methodology that attempts to resolve this issue is the Disability Social Distance Scale.
In an effort to supplement the assessment of disabilities in a general sense (e.g., disabled people), as with the ATDP or the IDP, the Disability Social Distance Scale (DSDS) can be used to specifically examine attitudes toward different disabilities.

The idea of social distance is beneficial in the process of measuring attitudes (i.e., rejection or acceptance) of individuals without disabilities toward those individuals with disabilities. Bogardus (as cited in Tringo, 1970) defined social distance as the degree of understanding existing between individuals. Tringo (1970) developed the DSDS based on the Social Distance Scale originally developed by Bogardus (1925). The DSDS consists of twenty items representing different stages of social distance. This scale still requests participants to respond to different disabilities by the degree of relationship the participant would engage in on a personal level. The scale values range from “1” being “Would marry” to “9” being “Would put to death.” As the scale value increases the social distance attributed to that disability also increases.

Tringo (1970) confirmed these subsequent hypotheses:

1. A hierarchy of preference exists that consistently establishes the relative position of a specific disability in the hierarchy.
2. Demographic variables affect the extent of social distance expressed toward specific disability groups but do not affect the relative position of disability groups in the hierarchy.
3. Females express less social distance (more acceptance) toward disability groups than do males. (p. 303)

The rank of the twenty disability groups was derived from the mean social distance score from each disability across all participants. The four highest ranked disabilities found on the hierarchy included mental illness, alcoholism, mental retardation, and ex-convict. The disabilities with the greatest level of preference were
physical disabilities, such as diabetes, heart disease, and amputee. These rankings formed what is known as the Hierarchy of Preference.

Lyons and Hayes (1993) used the DSDS to look at occupational therapy and business students' attitudes toward patients with psychiatric and other disorders. A significant difference was found between both male and female preferred social distance for individuals with disabilities. Females indicated less social distance from those individuals with disabilities. Criminal record, alcoholism, mental illness, mental retardation, cerebral palsy, and hunchback were rated the least socially desirable disabilities. Also, asthma, diabetes, arthritis, ulcer, amputation, and heart disease were the most socially accepted disabilities.

This hierarchy of preference provides a basic framework of the order of preference people have for individuals with different disabilities. The hierarchy of preference as measured by the DSDS has been found stable through both time and methodology. Thirty years after the development of the DSDS, Thomas (2000) investigated the stability of Tringo's hierarchy of preference toward disability groups. Thomas altered Tringo's scale by eliminating dwarfism, old age, hunchback, ex-convict, and ulcer. Using sixteen of the original twenty disabilities, Thomas found high agreement between the adjusted scale and the original scale.

To summarize, the ATDP, IDP, and DSDS have been used quite often in investigating attitudes toward individuals with disabilities. The IDP solves the unidimensional problem of the ATDP. The IDP examines an individual's attitude on a personal basis, which decreases the opportunity for participants to provide fake and socially desirable answers. Neither the ATDP nor the IDP assesses specific disability
groups, however. The DSDS complements the IDP's approach by focusing on different, specific disability groups. Each drawback of these attitudinal scales is supplemented by a benefit from another measure. A new, direct approach is needed that entails the advantages of all of the previously discussed measures in order to more efficiently understand attitudes toward individuals with disabilities.

**Implicit Association Test**

Traditional paper-and-pencil methods measure explicit attitudes and are susceptible to both faking and socially desirable responding. However, individuals studying race biases have recently developed a technique to measure implicit attitudes that may not be as susceptible to these problems. Greenwald, McGhee, and Schwartz (1998) developed a new method referred to as the Implicit Association Test (IAT). The IAT attempts to control the problem of social desirability found in traditional paper-and-pencil measures. The IAT is a potentially useful technique that has not yet been used to measure attitudes toward individuals with disabilities.

The IAT offers an indirect method of measuring attitudes toward individuals with disabilities. The purpose of the IAT is to measure implicit attitudes by assessing the primary automatic evaluation (Greenwald et al., 1998). It is assumed that the more related the object and attributes are, the greater the implicit attitude. Implicit attitudes, as defined by Greenwald and Banaji (1995), are “introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects” (p. 8). These attitudes are believed to generally exist outside conscious awareness and control of the individual. Participants may deny
his or her attitudes in an explicit self-report measure. Thus, the goal of the IAT is to uncover attitudes that participants would not normally express in everyday situations.

The idea of the IAT is that if participants require a longer cognitive processing time when non-compatible concepts are paired together (e.g., cancer and pleasant versus cancer-free and unpleasant) than when compatible concepts are paired (e.g., cancer and unpleasant versus cancer-free and pleasant), then he or she has an underlying bias toward individuals with cancer. The difference in response times between non-compatible and compatible categories, which is measured in milliseconds, is known as the IAT effect (Greenwald et al., 1998).

Greenwald et al. (1998) used the IAT in three experiments to test the IAT’s capability to measure implicit attitudes. For example, in experiment 1, pleasant (flower names) and unpleasant (insect names) words were used. Participants performed slower for less associated category (e.g., insect + pleasant) combinations than for highly associated category combinations (e.g., flower + pleasant). Individuals are concluded to have a more positive association with flowers when they respond faster to pleasant and flower combinations on the same response key and respond slower when pleasant and insect are matched. In other words, response times should be faster when the items that are generally liked are matched with positive words. Results confirmed both the IAT’s sensitivity to automatic evaluation associations and the IAT effect.

De Houwer (2001) argued that the IAT is structurally comparable to stimulus-response compatibility tasks. With stimulus-response compatibility tasks, long-term associations are established based on past experiences of positive and negative valence. For example, the word “sunset,” is similar to the response “positive” because both are
stored in memory as having a positive valence. On the other hand, short-term associations are formed from representations of responses (i.e., response keys), and long-term associations are formed from the stimuli, for the IAT; that is, instead of responding "positive" to the word "sunset" the participant would respond with the appropriate response key.

An IAT administration is best understood by using an example from a recent study on racial attitudes. McConnell and Leibold (2001) conducted a study on racial attitudes using the IAT. Two target concepts (i.e., White and Black) were examined in order to measure biases of racial attitudes. The participant was asked to match stimulus words related to White and Black into the comparable category. The stimulus words consisted of Black-associated names (e.g., Jamal and Yolanda) and White-associated names (e.g., Fred and Mary Ann). Participants were requested to answer quickly to a stimulus word that appeared in the middle of the screen by hitting the assigned response key, such as "D" for left responses (e.g., Black) and "K" for right responses (e.g., White). Participants were then asked to respond to another set of stimulus words, which consisted of desirable (e.g., wonderful and awesome) and undesirable (e.g., offensive and disgusting) words.

McConnell and Leibold’s (2001) study consisted of five major steps. The first step of the IAT was to identify the target-concept discrimination as a two-category discrimination (i.e., test to measure biases of racial attitudes, White and Black). The target concept Black was displayed on the top left side of the screen and corresponded to the left response key ("D"), while the other target concept, White, appeared on the top right side of the screen and corresponded to the right response key ("K"). The stimulus
name (e.g., Jamal or Mary Ann) appeared in the middle of the screen. Each time a stimulus name appeared on the screen, participants were asked to hit the response key that matched the stimulus name to the target concept. Any incorrect response produced a red X on the middle of the screen. For example, if the stimulus name that appeared on the screen was Jamal, the correct response key to hit is “D,” which corresponded to the target concept, Black. If the participant hit the “K” key, a red X would appear on the screen.

Second, the attribute dimension was introduced, also as a two-category discrimination. Both desirable (e.g., wonderful and awesome) and undesirable (e.g., offensive and disgusting) words were presented. Participants were again asked to pair words into the corresponding category. The word “undesirable” appeared on the top left of the screen and the word “desirable” appeared on the top right of the screen. As each desirable or undesirable stimulus word appeared on the middle of the screen, the participant hit the appropriate key that matched the stimulus items into the correct category.

During the third step, the target-discrimination and the attribute discrimination were combined (e.g., Black and undesirable versus White and desirable). The words “Black or undesirable” appeared on the top left of the screen, and “White or undesirable” appeared on the top right. The participant placed the stimulus items for each group into the appropriate combined category.

Fourth, the response assignments for the target-discrimination category were reversed (i.e., White is assigned to the left hand and Black is assigned to the right hand). Now, White appeared on the top left of the screen, while Black appeared on the top right.
As before, participants hit the appropriate response key that corresponded to the correct White- or Black-associated stimulus name that appeared in the middle of the screen.

For the final step, the attribute dimension discrimination (i.e., desirable or undesirable), which is not inverted, was added to the reversed target-discrimination, creating a contrasting configuration. White is still on the top left of the screen, and Black is on the right. However, White was paired with the undesirable and Black is paired with desirable; that is, "White or undesirable" appeared on the top left of the screen and "Black or desirable" appeared on the top right.

McConnell and Leibold (2001) found a significant correlation between explicit reports of prejudice and the IAT; that is, participants revealed more positive attitudes for Whites than Blacks on explicit measures of prejudice, and showed more positive attitudes toward Whites than Blacks on the IAT.

Phelps, O'Connor, Cunningham, Funayama, Gatenby, Gore, and Banaji (2000) performed a study on race evaluation using the IAT and found a preference for White over Black. Phelps et al. concluded this preference from the formation of slower response times when Black + good and White + bad was paired, in contrast to the faster response times for the Black + bad and White + good pairings.

The IAT has been successful in measuring attitudes toward gender, race, and other groups. Contrary to McConnell and Leibold (2001), Greenwald et al. (1998) found no relationship between the IAT and explicit measures of prejudice. They did not discover compelling evidence of racial prejudice in the explicit measures. Greenwald et al. found evidence for both convergent and divergent validity of the IAT. Cunningham,
Preacher, and Mahzarin (2001) found convergent validity for the IAT and implicit attitude measures. Specifically, the implicit attitude measures correlated with each other.

Additional evidence of divergent validity has been revealed. Rudman, Greenwald, Mellott, and Schwartz (1999) established divergent validity of the IAT and self-report measures, which suggested that the IAT and self-report measures were measuring independent constructs. Greenwald and Farnham (2000) found low correlations between IAT measures and explicit measures, contrary to the finding of McConnell and Leibold (2001). The IAT was stable in measures of self-concept and self-esteem. The IAT had high sensitivity to gender differences in individual’s self-concept of masculinity and femininity.

In summary, the IAT may uncover attitudes and automatic evaluation associations that would not normally be expressed in everyday situations. The IAT has been used quite often in studying attitudes toward race, gender, self-concept, and other constructs (Greenwald & Farnham, 2000; Greenwald et al., 1998; McConnell & Leibold, 2001; Rudman et al., 1999). To date, the Implicit Association Test has not been used to measure attitudes toward individuals with disabilities.

Present Study

Attitudes toward individuals with disabilities can be measured many different ways. Some attitude scales measure disabilities in general, while other scales assess the differences among different disabilities. The present research examined participants’ attitudes toward interacting with individuals with specific disabilities, disabilities in general, and attitudes of discomfort that a person may have while interacting with individuals with disabilities.
The IAT administration consisted of four disabilities (i.e., Cancer, Paraplegic, Mental Illness, and Alcoholic). These four disabilities were chosen in an effort to replicate Tringo's Hierarchy of Preference (1970). The Hierarchy of Preference has been found to be stable over time and methodology (Lyons & Hayes, 1993; Jones & Stone, 1995; Thomas, 2000). If the IAT can actually measure implicit attitudes of individuals with disabilities, then Tringo’s Hierarchy should be replicated.

Hypothesis 1: The hierarchy of preference will be replicated in both the DSDS and the four disabilities of the IAT administration.

The relationship between the IAT and the IDP and between the IAT and the DSDS will be examined. IAT scores will be compared to scores on the Interaction with Disabled Persons (IDP) scale and scores on the Disability Social Distance Scale (DSDS). As the IAT is another measure of attitudes toward individuals with disabilities, one might expect these scores to be related to the other scores, given they measure the same constructs.

Hypothesis 2: Scores on the IAT will be significantly correlated with scores on the IDP and DSDS.

Gething (1994) found the greater the closeness, extent, and amount of contact the individual spent with an individual with a disability, the less social discomfort the individual would feel around an individual with a disability.

Hypothesis 3: There will be a relationship between the amount, extent, and closeness of contact of individuals with disabilities with scores on the IDP, DSDS, and the IAT.
Previous research (Jones & Stone, 1995; Lyons & Hayes, 1993; Tringo, 1970) found gender differences in social distance and acceptance of individuals with disabilities. Tringo (1970) found that females expressed greater acceptance than did males toward disability groups.

**Hypothesis 4:** Females will demonstrate more positive attitudes toward individuals with disabilities as measured by the IDP, DSDS, and the IAT.

The Marlowe-Crowne Social Desirability Scale (MCSDS) measures social desirability. Both the IDP and the DSDS are direct measures that are vulnerable to socially desirable responses. However, Greenwald et al. (1998) indicated that the IAT entails indirect responses that are not susceptible to socially desirability. The indirect and implicit nature of the IAT may reduce the possibility of participants providing socially desirable responses.

**Hypothesis 5:** There will be a relationship between socially desirable responding and responses to both the IDP and the DSDS, but no relationship between socially desirable responding and the IAT.
Method

Pilot Study

Participants signed an informed consent form (Appendix A) prior to completing a pilot study to obtain the categories and stimulus items for the Implicit Association Test administration. The pilot study was administered to forty-four psychology students at Western Kentucky University. Participants were asked to list one-word adjectives/descriptors that are associated with disability and non-disability conditions. The disabilities chosen to include in the pilot study originated from studies of the Hierarchy of Preference (Jones & Stone, 1995; Lyons & Hayes, 1993; Schmelkin, 1984; Thomas, 2000; Tringo, 1970). In order to represent the hierarchy, disabilities were selected from the bottom, middle, and top of the hierarchy. The twelve disability conditions consisted of asthma, heart disease, blind, drug addicted, mental illness, amputee, alcoholic, cancer, deaf, paralyzed, HIV positive, and learning disabled. The twelve non-disability conditions consisted of no asthma, healthy heart, non-blind, drug free, mental health, non-amputee, nonalcoholic, cancer free, non-deaf, non-paralyzed, HIV negative, and non-learning disabled. The adjectives/descriptor words for each condition were recorded for each participant. The most often occurring adjectives/descriptors were used for the administration of the Implicit Association Test. Two I/O psychology graduate students and one I/O psychologist selected five of the twelve total disability conditions and five non-disability conditions. The five disabilities chosen were HIV positive, Paraplegic, Alcoholic, Cancer, and Mental Illness. However, subsequent research (Doyle, 2002) found HIV positive to be a problematic stimulus word due to the inherent reversal of meaning; that is, participants seemed to have difficulty
identifying HIV positive as a negative condition. The complete pilot study materials can be found in Appendix B.

Participants

Participants were 74 undergraduate and graduate psychology students from Western Kentucky University.

Materials

Participants were provided with an informed consent form, IDP, DSDS, MCSDS (short-form), and a demographic data form.

Informed Consent Form. The informed consent document identified the nature and purpose of the project, explained the testing procedure, and addressed potential discomforts and risks. The informed consent form also provided benefits of participating in the study and addressed the issues of confidentiality and the right to refuse to participate or withdraw from the study at anytime. Participants were asked to read and sign the informed consent document, which can be found in Appendix C.

Interaction with Disabled Persons Scale. Participants completed the IDP scale. The IDP scale consists of 20 items that asked each participant to describe how he or she generally feels during an interaction with an individual with a disability. Responses for each item range from 1, “I disagree very much” to 6, “I agree very much.” Higher scores on the IDP indicated that the participants felt greater discomfort when in contact with an individual with a disability. Scores for each of the three factor scores (i.e., social discomfort, empathy, and fear of having the disability) found by Thomas et al. (in press) were computed. The IDP is located in Appendix D.


**Tringo's Disability Social Distance Scale.** Participants completed Tringo's (1970) DSIDS. The scale that was used in the present study was an altered form of Tringo's scale. Epilepsy and leprosy were eliminated while mental illness was added. Responses ranged from 1 being "Would marry" to 9 being "Would put to death." A response of 1 indicates the closest relationship; 9 indicates the most distant relationship. Tringo's Disability Social Distance scale can be found in Appendix E.

**Marlowe-Crowne Social Desirability Scale.** The Marlowe-Crowne Social Desirability Scale (MCSDS) was developed as a scale to measure social desirability (Crowne & Marlowe, 1960). Strahan and Gerbasi (1972) developed the shorter form of the MCSDS that was psychometrically sound in terms of reliability and validity. Gender and race did not have an affect on responses of the shorter form. Fischer and Fick (1993) found that the shorter form of the MCSDS was equally reliable and valid as the original form. Therefore, the short-form (ten items) of the MCSDS was used. The MCSDS contained a true/false response format. Half of the items were reverse scored. A typical true item is "I have never intensely disliked anyone." A typical reversed item is "I am sometimes irritated by people who ask favors of me." The MCSDS (short-form) can be found in Appendix F.

**Demographic Data.** Participants were asked to provide gender, race, and age. Participants were asked the amount of one-on-one contact, the extent of the contact, and the closeness level the participant had with an individual with a disability. The demographic data form can be found in Appendix G.

**Implicit Association Test Administration.** Four non-disability conditions and four disability conditions were used in the IAT. Each of the four conditions was matched with
pleasant and unpleasant stimulus words. Three psychologists and one graduate student collectively selected three stimulus words for each disability condition to use in the IAT administration. Pleasant and unpleasant words for the current IAT administration were chosen from previous research utilizing the IAT (Cunningham et al., 2001; Greenwald et al., 1998; Rudman, Greenwald, & McGhee, 1996). The categories and stimulus item lists for IAT administration as well as the pleasant and unpleasant stimulus words can be found in Appendix H.

Apparatus

The IAT was administered to each participant individually on a desktop computer. Students were instructed to press the A key for left responses, and the number 5 key on the numeric pad for responses corresponding to the right.

Procedure

After entering the testing room, the participant was given an overview of the research being conducted. Then the participant was asked to read and sign the informed consent document. Next the IAT was administered. Finally, the participant completed the demographic data form, the IDP, DSDS, and the MCSDS.

Instructions for the IAT were displayed on the computer monitor. Participants were encouraged to ask questions during the practice sessions of the IAT before performing the recorded sessions. Completion time for the IAT administration was twenty minutes.

The administration of the IDP, DSDS, and the MCSDS took place in the same testing room as the IAT testing administration. The instructions for the IDP, DSDS, and
the MCSDS were written on the instruments. Completion time for the IDP, DSDS, and
the MCSDS combined was approximately fifteen minutes.

Upon completion of all four of the attitude measures, participants were asked to
place the demographic data form, IDP, DSDS, and the MCSDS in an envelope. The IAT
scores were saved on the computer. Before being released, the participants were
debriefed and thanked for their participation in the study. Total completion time was
approximately thirty-five minutes.
Results

The decision was made to delete those participants who had a congruent pair error rate greater than 27%. Greenwald and Farnham (2000) chose to delete participants with error rates greater than 20%. The current study’s error rate was decided upon arbitrarily, but rationally. Some participants had error rates that suggested excessive inattention to responses. Accordingly, five participants were deleted, leaving fifty-one females and eighteen males. Among the sixty-nine participants, sixty-three indicated they were Caucasian, five were African-American, and one participant identified himself/herself as other.

Means and standard deviations for the continuous variables from the Demographic Information Form are presented in Table 1.

Table 1

*Descriptive Statistics*

<table>
<thead>
<tr>
<th>Continuous Variable</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20.9</td>
<td>4.3</td>
</tr>
<tr>
<td>Extent of Contact</td>
<td>3.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Closeness of Contact</td>
<td>3.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Amount of Contact</td>
<td>2.9</td>
<td>1.4</td>
</tr>
</tbody>
</table>

*Note.* N = 69. Extent and closeness of contact were rated on a scale from 1 to 5.

*Descriptives and the IAT Administration*

A total IAT score was computed for each participant by adding the scores for each IAT test (i.e., Alcoholic, Cancer, Mental Illness, and Paraplegic). The relevant means, standard deviations, and correlations between the four measures are provided in Table 2.
Table 2

**Means, Standard Deviations, and Intercorrelations for IAT Scores and Overall IAT Score**

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alcoholic</td>
<td>477.9</td>
<td>208.6</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Cancer</td>
<td>471.9</td>
<td>208.2</td>
<td>.43**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Mental Illness</td>
<td>306.2</td>
<td>205.5</td>
<td>.50**</td>
<td>.22</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Paraplegic</td>
<td>205.4</td>
<td>185.5</td>
<td>.37**</td>
<td>.23</td>
<td>.49**</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>5. IAT Total Score</td>
<td>1461.4</td>
<td>588.9</td>
<td>.80**</td>
<td>.66**</td>
<td>.76**</td>
<td>.69**</td>
<td>--</td>
</tr>
</tbody>
</table>

*Note.* N = 69. Means reflect differences between congruent and non-congruent pairs in milliseconds.

**p < .01.

As shown in Table 2, all four IAT scores were significantly correlated with the IAT Total Score. Alcoholic was significantly correlated with the other three IAT scores (i.e., Cancer, Mental Illness, Paraplegic) and the IAT Total Score. Cancer was only significantly correlated to Alcoholic and the IAT Total Score. Mental Illness was significantly correlated to both Alcoholic and Paraplegic.

*Analyses for Hierarchy of Preference.*

Hypothesis 1 stated that the hierarchy of preference would be replicated for both the DSDS and the IAT. Means for each of the four IAT administrations were computed. The IAT scores were first placed in order by the predicted rank, which was based on Tringo’s Hierarchy of Preference (1970). The hypothesized order, which was placed in order from most preferred disability condition to the least preferred disability condition,
was Cancer, Paraplegic, Alcoholism, and Mental Illness. The actual ranking based on means from the present study was Alcoholic (M = 477.9, SD = 208.6), Cancer (M = 471.9, SD = 208.2), Mental Illness (M = 306.2, SD = 205.5), and Paraplegic (M = 205.4, SD = 185.5). The Spearman Rank Order correlation was not significant ($r_s = .21, p > .05$). Therefore, Hypothesis 1 was not supported in total.

A Spearman Rank Order Correlation was similarly computed for the DSDS. The ranks of 14 disabilities in the current study were compared to the ranks of the 14 disabilities in Tringo's (1970) original study. This Spearman Rank Order Correlation was significant ($r_s = .92, p > .05$), thus, Hypothesis 1 was partially supported; that is, the hierarchy of preference was replicated for the DSDS, but not the IAT.

Analyses involving Pearson Product Moment Correlations.

A single correlation matrix was used to answer Hypothesis 2, Hypothesis 3, and Hypothesis 5. The correlation matrix can be found in Table 3. Hypothesis 2 stated that scores on the IAT would be significantly correlated with scores on the IDP and DSDS. As seen in Table 3, the IAT Total Score was significantly correlated with the IDP Total Score, but not with the DSDS Total Score. Hypothesis 3 stated that there would be a relationship between the amount, extent, and closeness of contact of individuals with disabilities with scores on the IDP, DSDS, and the IAT. The Amount, Extent, and Closeness of Contact were not significantly correlated with the IAT Total Score. Extent and Closeness of Contact were significantly correlated with IDP Total Score, but Amount of Contact was not. Amount, Extent, and Closeness of Contact were significantly correlated with the DSDS Total Score. Hypothesis 5 stated that there would be a relationship between socially desirable responding and responses to both the IDP and the
Table 3

Intercorrelations for IAT Total Score, IDP Total Score, DSDS Total Score, and Amount, Extent, and Closeness of Contact

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. IAT Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. IDP Total Score</td>
<td>.25*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. DSDS Total Score</td>
<td>.23</td>
<td>.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. MCSDS Total Score</td>
<td>-.30*</td>
<td>-.05</td>
<td>-.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Amount of Contact</td>
<td>.08</td>
<td>.23</td>
<td>.49**</td>
<td>.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Extent of Contact</td>
<td>-.01</td>
<td>-.33**</td>
<td>-.34**</td>
<td>.09</td>
<td>-.57**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Closeness of Contact</td>
<td>-.09</td>
<td>-.29*</td>
<td>-.45**</td>
<td>.00</td>
<td>-.59**</td>
<td>.76**</td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 69

* p < .05. ** p < .01.

DSDS, but no relationship between socially desirable responding and the IAT. Contrary to what was predicted, socially desirable responding, as measured by the MCSDS, was significantly correlated with the IAT Total Score, but not with the IDP Total Score or the DSDS Total Score.

Analyses for Gender.

Hypothesis 4 stated that females would demonstrate more positive attitudes toward individuals with disabilities as measured by the IDP, DSDS, and the IAT. The means and standard deviations are presented in Table 4.

A MANOVA was completed with gender as an independent variable. The dependent variables included the IAT Total Score, the IDP Total Score, and the DSDS Total Score. There was no significant result due to gender for the IAT Total Score,
\( F(1,67) = .00, p > .05, \) the IDP Total Score, \( F(1,67) = .04, p > .05, \) or the DSDS Total Score, \( F(1,67) = .22, p > .05. \)

Table 4

*Descriptives of the IDP Total Score, the DSDS Total Score, and the IAT Total Score*

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Male(^a)</th>
<th>Female(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDP Total Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>72.1</td>
<td>72.8</td>
</tr>
<tr>
<td>SD</td>
<td>9.4</td>
<td>12.3</td>
</tr>
<tr>
<td>DSDS Total Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.9</td>
<td>2.8</td>
</tr>
<tr>
<td>SD</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>IAT Total Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1463.0</td>
<td>1460.8</td>
</tr>
<tr>
<td>SD</td>
<td>873.4</td>
<td>460.7</td>
</tr>
</tbody>
</table>

*Note.* \(^a n = 18. \(^b n = 51.\)
Discussion

The significance of studying attitudes toward individuals with disabilities has been recognized throughout previous research (Beckwith & Matthews, 1995; Diksa & Rogers 1996; Antonak & Livneh, 1988; Tringo, 1970). Individuals with disabilities have faced barriers in the workforce in hiring, training, and coping with the effects of coworker attitudes. Even if individuals with disabilities had the capability of performing the job, negative employer attitudes may restrict the hiring of individuals with disabilities. Inequitable employment practices, such as biased hiring practices, against individuals with disabilities produce a lack of individuals with disabilities in the workplace. Levy et al. (as cited in Diksa & Rogers, 1996) have shown that of those companies that had an explicit hiring policy for individuals with disabilities, 64% hired at least one individual with a disability.

Even if an individual with a disability is hired, he or she may face inadequate training. Beckwith and Matthews (1995) acknowledged that employee attitudes have the potential to have a negative impact on the trainer-trainee interaction. Negative trainer attitudes result in low expectations towards trainees with disabilities, which lead to a reduction in learning possibilities and lower job performance (Gold, 1990). Coworkers’ biased attitudes also have a significant impact on the individual with a disability (Jones & Stone, 1995). Biased attitudes can create a negative work environment, which ultimately could cause the individual with a disability to quit. Employees cannot avoid interacting with individuals with disabilities in a work environment, especially if they are in the same work group.
Both Tringo (1970) and Drehmer and Bordieri (1985) found that individuals view different disabilities in distinctive ways. Research has demonstrated that there are attitudinal differences toward the recommendation of an applicant with a specific disability. Drehmer and Bordieri (1985) found that an applicant with a mental illness was less likely to be recommended for hiring than an applicant with paraplegia. The rank of the different disability groups, which derives from the idea of social distance, is known as the Hierarchy of Preference. The Hierarchy of Preference provides a basic structure of the order of preference people have for individuals with different disabilities. The Hierarchy of Preference has been found to be stable across both time and methodology (Lyons & Hayes, 1993; Jones & Stone, 1995; Thomas, 2000)

It is useful to have a scale that detects discrepancies and preferences for different disabilities. The IAT is an indirect method that attempts to control the problem of social desirability by measuring implicit attitudes toward different disabilities (Greenwald & Banaji, 1995; Greenwald, McGhee, & Schwartz, 1998). The objective of the IAT is to reveal attitudes toward different issues (e.g., race, gender, self-concept) that participants would not normally declare in everyday situations.

The first hypothesis stated that the four disability conditions of the IAT and the disability conditions of the DSDS would replicate the established Hierarchy of Preference. The four disabilities chosen to represent the Hierarchy of Preference in the IAT administration were Alcoholic, Cancer, Mental Illness, and Paraplegic. The results indicated that the four conditions did not replicate the Hierarchy of Preference. Failure to replicate the Hierarchy of Preference raises some questions of the validity of the IAT and the ability to measure implicit attitudes. Results indicated that the disability conditions of
the DSDS replicated the Hierarchy of Preference found in Tringo’s original study in 1970. Both diabetes and heart disease remained the most acceptable disabilities. While most of the disabilities remained consistent in the hierarchy, amputee moved relative positions. Individuals who possessed the disability condition of amputee were less preferred by the current sample. Amputee was more accepted in Tringo’s study that is, amputee was ranked 3rd, whereas amputee was ranked 6th in the current study. The current sample showed greater acceptance for individuals with cancer than the disability condition of amputee. The stability of the hierarchy found throughout research demonstrates that there is a continued perceived stereotype for different disabilities. The results regarding the IAT may indicate the inability of the IAT to accurately tap these attitudes.

A second hypothesis was that there would be a relationship between the IAT and scores on both the IDP and the DSDS. Research is mixed on whether or not the IAT and explicit measures are measuring the same construct (Greenwald & Farnham, 2000; Greenwald et al., 1998; McConnell & Leibold, 2001; Rudman et al., 1999). Nonetheless, it was hypothesized that scores on the IAT would be significantly correlated with scores on the IDP and DSDS. Partial support was found for this hypothesis. The IAT Total Score was significantly correlated with the IDP Total Score. The IAT Total Score was not correlated with the DSDS Total Score. These results again call into question the validity of the IAT. One would expect all measures of attitudes toward individual with disabilities would be related. It is unclear why the IAT was related to the IDP, but not the DSDS.
The third hypothesis stated that there would be a relationship between the amount, extent, and closeness of contact of individuals with disabilities with scores on the IDP, DSDS, and the IAT. Gething (1994) found that the greater the closeness, extent, and amount of contact, the less social discomfort the individual would feel around an individual with a disability. Partial support was found for this hypothesis. Amount of contact, extent of contact, and closeness of contact were not significantly related to the IAT. This finding again may question the validity of the IAT. The IDP was significantly negatively correlated to both extent of contact and closeness of contact; that is, the lower the social discomfort, the greater the extent of experience and level of closeness someone had experienced in a relationship. The DSDS was negatively correlated with the extent and closeness of contact, but positively correlated with amount of contact. Specifically, as the extent and closeness of contact increases, the amount of social distance attributed to that disability decreases. Also, the more often someone has one-on-one contact with an individual with a disability (e.g., hourly), the closer the social distance (e.g., would marry).

The fourth hypothesis stated that gender would have an effect on the responses on the IDP, DSDS, and the IAT. Previous research found gender differences in social distance and acceptance of individuals with disabilities (Jones & Stone, 1995; Lyons & Hayes, 1993; Tringo, 1970). Tringo (1970) found that females expressed greater acceptance than did males toward disability groups. Therefore, it was hypothesized that females would demonstrate more positive attitudes toward individuals with disabilities as measured by the IDP, DSDS, and the IAT. Even though there were differences in means for the IDP, DSDS, and the IAT, there were no significant effects due to gender. It should
be noted that one possible reason for this finding might have been the low sample size for males ($N = 18$).

The fifth Hypothesis stated there would be a relationship between socially desirable responding and responses to both the IDP and the DSDS, but no relationship between socially responding and the IAT. Greenwald et al. (1998) indicated that responses on the IAT were not vulnerable to socially desirability and the implicit nature of the IAT should reduce the possibility of participants providing socially desirable responses. So, one of the objectives for using the IAT was to avoid socially desirable responding. Despite previous research that found socially desirable responding related to the IDP and the DSDS, the fifth hypothesis was not supported. In fact, socially desirable responding was significantly related to the IAT, but not the IDP or the DSDS. The unexpected relationship further calls the IAT into question. It is unclear why a direct measure such as the IAT would be related to socially desirable responding. One plausible explanation might be that participants learned the nature of the experiment and the methodology over the course of the experiment and were able to engage in more socially desirable responding as the experiment continued. It is important to note that IAT scores went down over the course of the experiment. It is also interesting that scales previously found related to socially desirable responding were not related to it in this study. This contradictory finding definitely merits further study.

**Implications**

The IAT did not appear to be as successful at measuring attitudes toward individuals with disabilities as it has measuring attitudes toward gender, race, and self-concept (Cunningham et al., 2001; Greenwald et al., 1998; Greenwald & Farnham, 2000;
McConnell & Leibold, 2001; Rudman et al., 1999). One reason for the lack of success of the current IAT administration was that the four disability conditions did not replicate Tringo’s (1970) Hierarchy of Preference, despite its stability over time. Failure to replicate the Hierarchy may have been attributed to the changing of attitudes of individuals since Tringo’s study in 1970. Since the Hierarchy was not replicated, the validity of the IAT as an implicit measure is questionable. Although the disabilities in the IAT were found to be different, it is not conclusive whether or not the difference was due to attitudes toward different disabilities or the order in which the attitudes were presented. A notable implication is that increasing the number of disabilities used in the IAT administration and using different disabilities may generate completely different results.

Many factors contributed to the lack of validity for the IAT. The IAT was only related to one of the explicit measures of attitudes toward individuals with disabilities (i.e., IDP). The current study did not find a relationship between amount, extent, and closeness of contact and the IAT Total Score. Contrary to what was predicted, the IAT was related to socially desirable responding. Also, despite predictions of more positive attitudes previously demonstrated by females, no gender differences were found with the IAT, IDP, and the DSDS. The indication may be that the current sample had more sensitive males than traditional samples. Based on the current study, the IAT alone is not a valid measurement of attitudes toward individuals with disabilities.

Conclusions

It is important to recognize the significance of studying attitudes toward individuals with disabilities to overcome barriers in the workplace (Beckwith &
Matthews, 1995; Diksa & Rogers 1996; Antonak & Livneh, 1988; Tringo, 1970). The current study explored the validity of the IAT as an implicit measure of attitudes toward individuals with disabilities. Despite the attempt to replicate the Hierarchy of Preference using the four disabilities of the IAT (i.e., Alcoholic, Cancer, Mental Illness, Paraplegic), it was not replicated. The IAT was not significantly correlated with the DSDS, but was significantly correlated with the IDP. The amount, extent, and closeness of contact were not related to the IAT Total Score, but were significantly correlated with the DSDS. The nonsignificant results of amount, extent, and closeness of contact for the IAT indicated that the test does not consider previous experience in participants' responses. There was no significant effect due to gender on scores on the IDP, DSDS, or the IAT. In addition, socially desirable responding was significantly related to the IAT, but not the IDP or the DSDS. Altogether, the validity of the IAT as a measure of implicit attitudes is questionable.

Limitations

There were many possible limitations contributing to the lack of success of the IAT as a measure of attitudes toward individuals with disabilities in the current study. The first area to explain is the failure for the IAT to replicate the Hierarchy of Preference. Only four disabilities were used in the current study. However, due to time restrictions, it was not possible to test most or all disabilities from Tringo's (1970) original Hierarchy of Preference. Limiting the IAT to only four exemplars greatly reduced the power of this analysis. Also, the IAT may have failed to replicate the Hierarchy because attitudes toward individuals with disabilities have changed since Tringo's original study.
A second limitation was the imbalance of sample size of males versus female participants. Out of seventy-four participants, only twenty were male. This lack of male participants may have resulted in low power to detect gender differences. Possibly no gender differences were found because males enrolled in psychology courses may be more sensitive than the typical male. Additionally, the current sample has had more exposure to the issue of individuals with disabilities at an earlier age. Also, participants were students from a university. Therefore, results should be generalized with caution to employees at an organization.

A third limitation was the order in which the disabilities were presented in the IAT administration. The disabilities were presented in the same order (i.e., Alcoholic, Cancer, Mental Illness, Paraplegic) for all participants. Greenwald et al. (1998) established that test order does not have an influence on results of the IAT. However, in both the current study and in Doyle’s (2002) study, mean scores for each condition decreased as the IAT administration continued (see Table 2). It seems as though the participants became more familiarized with the test as each disability condition was completed. In other words, participant’s response task ability for compatible and non-compatible categories improved from beginning to end. Future research might counterbalance the order of disability presentation.

**Future Directions**

In future IAT disability research, more disabilities (e.g., arthritis, amputee, deafness, tuberculosis) should be administered in order to better represent the Hierarchy of Preference. Despite time limitations, increasing the number (e.g., ten) of disabilities administered in the IAT would be valuable to investigate the ability of the IAT to
replicate the Hierarchy. In future research, the order upon which the disabilities are presented should be counterbalanced. By following that procedure, response task ability for compatible and non-compatible categories should not have an effect on results. Furthermore, McConnell and Leibold (2001) recommended that future research should modify the order upon which the IAT and the attitude measures are presented so that the study does not generate inadvertent results.

Two attitude questionnaires were used in the current study, the IDP and the DSDS. Future IAT research should consider adding other measures of attitudes of individuals with disabilities, such as the ATDP (Antonak & Livneh, 1988), so the IAT can be compared to a scale that measures the general concept of disabilities. Despite the drawbacks associated with the ATDP, this scale has been used frequently throughout previous research (Speakman & Hoffman, 1979; Cannon & Szuhay, 1986; Vargo & Semple, 1984).
References


Kentucky University, Bowling Green.


Psychological Measurement.


Appendix A: Pilot Study Informed Consent Form

Western Kentucky University

INFORMED CONSENT FORM

Project Title: Pilot Study: Measurement of Attitudes Toward individuals with Disabilities

Investigator: Andrea Doyle & Julie Nichols, Psychology Department, 745-3820, project approved 11/27/01

You are being asked to participate in a project conducted through Western Kentucky University. The University requires that you give your signed agreement to participate in this project.

The investigator will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and possible risks of participation. You may ask him/her any questions you have to help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss with the researcher any questions you may have.

If you decide to participate in the project, please sign on the last page of this form in the presence of the person who explained the project to you. You should be given a copy of this form to keep.

1. **Nature and Purpose of the Project:** A pilot study is being conducted to develop an instrument to measure attitudes toward individuals with disabilities. We are interested in studying perceptions of individuals with disabilities and determining what disabilities group together.

2. **Explanation of Procedures:** Participants will be asked to sign the consent form. The researchers will explain instructions for the study. Participants will be give a document with 6 disability conditions and 6 non-disability conditions and asked to write one-word adjectives/descriptors of each condition.

3. **Discomfort and Risks:** Some participants may feel uncomfortable or offended by being asked to generate descriptive words on a topic that may be considered very sensitive and controversial.

4. **Benefits:** Participants’ answers will help the investigators understand what disabilities group together. This information will provide more helpful information about different preferences for different disability conditions to employers and psychologists.

5. **Confidentiality:** All answers given by participant will remain confidential and anonymous.
6. **Refusal/Withdrawal:** Refusal to participate in this study will have no effect on any future services you may be entitled to from the University. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

_I understand also that it is not possible to identify all potential risks in an experimental procedure, and I believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks._

______________________________  ___________________________
Signature of Participant        Date

______________________________  ___________________________
Witness                        Date

THE DATED APPROVAL ON THIS CONSENT FORM INDICATES THAT THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY THE WESTERN KENTUCKY UNIVERSITY HUMAN SUBJECTS REVIEW BOARD

TELEPHONE:  (270) 745-4652

For administrative questions about this project please contact:
Dr. Phil Myers
Human Protections Administrator

(270) 745-4652
Appendix B: Pilot Study Materials

INSTRUCTIONS

For the following categories, please list one-word adjectives/descriptors that are associated with each. Feel free to write as many words that come to mind about the category. We are interested in studying perceptions of individuals with disabilities. Your honest, forthright answers will help us understand what disabilities “cluster” together, so that we might be able to better advise employers, rehabilitation psychologists, and individuals with disabilities.

ASTHMA

NO ASTHMA

HEART DISEASE

HEALTHY HEART

BLIND

NON-BLIND
<table>
<thead>
<tr>
<th>DRUG ADDICTED</th>
<th>DRUG FREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENTAL ILLNESS</td>
<td>MENTAL HEALTH</td>
</tr>
<tr>
<td>AMPUTEE</td>
<td>NON-AMPUTEE</td>
</tr>
</tbody>
</table>
INSTRUCTIONS

For the following categories, please list one-word adjectives/descriptors that are associated with each. Feel free to write as many words that come to mind about the category. We are interested in studying perceptions of individuals with disabilities. Your honest, forthright answers will help us understand what disabilities “cluster” together, so that we might be able to better advise employers, rehabilitation psychologists, and individuals with disabilities.

ALCOHOLIC

NON-ALCOHOLIC

CANCER

CANCER FREE

DEAF

NON-DEAF
<table>
<thead>
<tr>
<th>PARALYZED</th>
<th>NON-PARALYZED</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV POSITIVE</td>
<td>HIV NEGATIVE</td>
</tr>
<tr>
<td>LEARNING DISABLED</td>
<td>NON-LEARNING DISABLED</td>
</tr>
</tbody>
</table>
Appendix C: Informed Consent Form

Western Kentucky University
INFORMED CONSENT FORM

Project Title: The Implicit Association Test As A Measure Of Attitudinal Biases Towards Individuals With Disabilities: Assessing The Convergent Validity With The Interaction With Disabled Persons Scale And Tringo's Disability Social Distance Scale

Investigator: Julie Nichols, Psychology Department, 745-3820
Faculty Sponsor: Adrian Thomas, Psychology Department, TPH 247, Phone: 745-3491

You are being asked to participate in a Master of Arts Thesis conducted through Western Kentucky University. The University requires that you give your signed agreement to participate in this project. The investigator will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and possible risks of participation. You may ask him/her any questions you have to help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss with the researcher any questions you may have. If you then decide to participate in the project, please sign on the last page of this form in the presence of the person who explained the project to you. You should be given a copy of this form to keep.

1. **Nature and Purpose of the Project:** A study is being conducted in order to measure attitudes toward individuals with disabilities using the Implicit Association Test (IAT). You will be asked to complete a demographic sheet, the Disability Social Distance Scale (DSDS), the Interaction with Disabled Persons (IDP) Scale, the Marlowe-Crowne Social Desirability Scale (MCSDS), and the IAT administration.

2. **Explanation of Procedures:** You will be asked to sign the consent form. The researchers will explain instructions for the study. You will be asked to complete a demographic sheet, the Disability Social Distance Scale (DSDS), the Interaction with Disabled Persons (IDP) Scale, the Marlowe-Crowne Social Desirability Scale (MCSDS), and finally the IAT administration. A total of 5 disability conditions and 5 non-disability conditions will be used in the IAT administration, with six items for each condition, which will be presented randomly. Pleasant and unpleasant words to be used for the IAT administration will be chosen randomly for each disability and non-disability condition.

3. **Discomfort and Risks:** Some of you may feel uncomfortable or offended by a topic that may be considered very sensitive and controversial.

4. **Benefits:** Your answers will help the investigator to discover a new and feasible way to measure attitudes toward individuals with disabilities. This information will provide more helpful information about attitudes toward disparate disability conditions to employers and psychologists.

5. **Confidentiality:** All answers given will remain confidential and anonymous and stored in an on-campus location.

6. **Refusal/Withdrawal:** Refusal to participate in this study will have no effect on any future services you may be entitled to from the University. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.
(consent form continued)

*I understand that it is not possible to identify all potential risks in an experimental procedure, and I believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.*

_________________________________________  __________________________
Signature of Participant                      Date

_________________________________________  __________________________
Witness                                      Date

THE DATED APPROVAL ON THIS CONSENT FORM INDICATES THAT THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY THE WESTERN KENTUCKY UNIVERSITY HUMAN SUBJECTS REVIEW BOARD. FOR ADMINISTRATIVE QUESTIONS ABOUT THIS PROJECT PLEASE CONTACT DR. PHIL MYERS, HUMAN PROTECTIONS ADMINISTRATOR, AT: (270) 745-4652
Appendix D: Interaction with Disabled Persons Scale

**INTERACTION WITH DISABLED PERSONS SCALE**

Here is a list of statements that some people have said describes how they feel when they have contact with a person with a disability. Of course, how we respond to people depends on how well we know them as individuals. However we would like to know how you feel in general when you meet a person with a disability. Please read each statement carefully and decide how much it describes how you feel.

Please place one tick next to the question under the column that describes how you usually feel.

<table>
<thead>
<tr>
<th>I disagree very much</th>
<th>I disagree somewhat</th>
<th>I disagree a little</th>
<th>I agree a little</th>
<th>I agree somewhat</th>
<th>I agree very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 It is rewarding when I am able to help.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 It hurts me when they want to do something and can't.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 I feel frustrated because I don't know how to help.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Contact with a disabled person reminds me of my own vulnerability.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 I wonder how I would feel if I had this disability.</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>6 I feel ignorant about disabled people.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 I am grateful that I do not have such a burden.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 I try to act normally and to ignore the disability.</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>9 I feel uncomfortable and find it hard to relax.</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>10 I am aware of the problems that disabled people face.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 I can't help staring at them.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 I feel unsure because I don't know how to behave.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 I admire their ability to cope.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 I don't pity them.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 After frequent contact, I find I just notice the person not the disability.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 I feel overwhelmed with discomfort about my lack of disability.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 I am afraid to look at the person straight in the face.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 I tend to make contacts only brief and finish them as quickly as possible.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 I feel better with disabled people after I have discussed their disability with them.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 I dread the thought that I could eventually end up like them.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix E: Tringo's Disability Social Distance Scale

TRINGO'S DISABILITY SOCIAL DISTANCE SCALE

There are many degrees of understanding or closeness that may exist between persons. Nine of these relationships are listed below in order of closeness, with number 1 describing the closest relationship and number 9 the most distant relationship.

1  Would marry
2  Would accept as a close kin by marriage
3  Would have as a next door neighbor
4  Would accept as a casual friend
5  Would accept as a fellow employee
6  Would keep away from
7  Would keep in an institution
8  Would send out of my country
9  Would put to death

Which item on the above scale best describes the closest relationship you feel toward each disability group listed below? Next to each disability place the number of the item on the scale that describes the closest relationship you would be willing to have with a person with such a disability.

____ Alcoholism  ____ Deafness  ____ Mental Illness
____ Amputee  ____ Diabetes  ____ Paraplegic
____ AIDS  ____ Heart Disease  ____ Schizophrenia
____ Blindness  ____ Learning Disorder  ____ Tuberculosis
____ Cancer  ____ Manic/Depressive
Appendix F: Marlowe-Crowne Social Desirability Scale

**MARLOWE-CROWNE SOCIAL DESIRABILITY SCALE (short-form)**

Please circle True (T) or False (F) for the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>T</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I never hesitate to go out of my way to help someone in trouble</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>2. I have never intensely disliked anyone.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>3. I sometimes feel resentful when I don’t get my way.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>4. There have been times when I felt like rebelling against people in authority even though I knew they were right.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>5. I can remember “playing sick” to get out of something.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>6. When I don’t know something I don’t at all mind admitting it.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>7. I am always courteous, even to people who are disagreeable.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>8. I would never think of letting someone else be punished for my wrong doings.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>9. There have been times when I was quite jealous of the good fortune of others.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>10. I am sometimes irritated by people who ask favors of me.</td>
<td>T</td>
<td>F</td>
</tr>
</tbody>
</table>
Appendix G: Demographic Information Form

Please answer the following questions. Keep in mind that your answers are completely confidential. This information will be used for data analysis purposes only.

1. Gender: Male
   Female

2. Race: Caucasian
   African-American
   Native-American
   Hispanic/Latino
   Asian American
   Other

3. Age: ______ years

4. Please indicate the **extent** of your experience with individuals with disabilities.
   No experience                                              Extensive experience
   1   2   3   4   5

5. Please indicate the level of **closeness** that you have experienced in a relationship with an individual with a disability.
   Not close at all                                             Extremely close
   1   2   3   4   5

6. Please indicate the amount of one-on-one **contact** that you have had with a person with a disability.
   Hourly ________
   Daily ________
   Weekly ________
   Once a month ________
   Once every three months ________
   Less often ________
Appendix H: Categories and Stimulus Item Lists for Implicit Association Test Administration

**CATEGORIES AND ITEMS FOR IAT ADMINISTRATION**

<table>
<thead>
<tr>
<th>Paraplegic</th>
<th>Non-Paraplegic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immobile</td>
<td>Mobile</td>
</tr>
<tr>
<td>Impaired</td>
<td>Independent</td>
</tr>
<tr>
<td>Restricted</td>
<td>Functional</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alcoholic</th>
<th>Non-Alcoholic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addicted</td>
<td>Sober</td>
</tr>
<tr>
<td>Impulsive</td>
<td>Disciplined</td>
</tr>
<tr>
<td>Drunk</td>
<td>Responsible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cancer</th>
<th>Cancer Free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak</td>
<td>Healthy</td>
</tr>
<tr>
<td>Sick</td>
<td>Strong</td>
</tr>
<tr>
<td>Terminal</td>
<td>Vibrant</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mental Illness</th>
<th>Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crazy</td>
<td>Capable</td>
</tr>
<tr>
<td>Troubled</td>
<td>Stable</td>
</tr>
<tr>
<td>Confused</td>
<td>Adjusted</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pleasant</th>
<th>Unpleasant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Champion</td>
<td>Bomb</td>
</tr>
<tr>
<td>Diamond</td>
<td>Devil</td>
</tr>
<tr>
<td>Diploma</td>
<td>Hatred</td>
</tr>
<tr>
<td>Rainbow</td>
<td>Pollute</td>
</tr>
<tr>
<td>Sunrise</td>
<td>Slime</td>
</tr>
<tr>
<td>Vacation</td>
<td>Poison</td>
</tr>
</tbody>
</table>