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The Viability of the Implicit Association Test Applied to Attitudes Toward Individuals with Disabilities and Measurement of Coworker Attitudes Toward Individuals with a Disability

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THE VIABILITY OF THE IMPLICIT ASSOCIATION TEST APPLIED TO ATTITUDES TOWARD INDIVIDUALS WITH DISABILITIES AND MEASUREMENT OF COWORKER ATTITUDES TOWARD INDIVIDUALS WITH A DISABILITY

A Thesis
Presented to
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of the Requirements for the Degree
Master of Arts

by
Andrea Leigh Doyle

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THE VIABILITY OF THE IMPLICIT ASSOCIATION TEST APPLIED TO ATTITUDES TOWARD INDIVIDUALS WITH DISABILITIES AND MEASUREMENT OF COWORKER ATTITUDES TOWARD INDIVIDUALS WITH A DISABILITY

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Director of Thesis

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Dean, Graduate Studies and Research Date
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>v</td>
</tr>
<tr>
<td>Introduction and Review of Literature</td>
<td>1</td>
</tr>
<tr>
<td>Method</td>
<td>24</td>
</tr>
<tr>
<td>Results</td>
<td>30</td>
</tr>
<tr>
<td>Discussion</td>
<td>42</td>
</tr>
<tr>
<td>References</td>
<td>55</td>
</tr>
<tr>
<td>Appendices</td>
<td>59</td>
</tr>
<tr>
<td>Appendix A: Pilot Study Informed Consent Form</td>
<td>59</td>
</tr>
<tr>
<td>Appendix B: Pilot Study Materials</td>
<td>61</td>
</tr>
<tr>
<td>Appendix C: Informed Consent Form</td>
<td>65</td>
</tr>
<tr>
<td>Appendix D: Vignettes</td>
<td>66</td>
</tr>
<tr>
<td>Appendix E: Dependent Measures for Vignette Study</td>
<td>74</td>
</tr>
<tr>
<td>Appendix F: Biographical Information Form</td>
<td>75</td>
</tr>
<tr>
<td>Appendix G: Categories and Stimulus Item Lists for Implicit Association Test Administration</td>
<td>76</td>
</tr>
</tbody>
</table>
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Means Standard Deviations, and Intercorrelations for IAT Scores and Overall IAT Score</td>
<td>31</td>
</tr>
<tr>
<td>2</td>
<td>Descriptives of IAT Tests by Gender and Race</td>
<td>34</td>
</tr>
<tr>
<td>3</td>
<td>Descriptives and Intercorrelations for Vignette Dependent Variables</td>
<td>35</td>
</tr>
<tr>
<td>4</td>
<td>Combined ANOVA Results for the Response Dimension</td>
<td>36</td>
</tr>
<tr>
<td>5</td>
<td>Combined ANOVA Results for the Risk Dimension</td>
<td>37</td>
</tr>
<tr>
<td>6</td>
<td>Intercorrelations for All Dependent Variables</td>
<td>39</td>
</tr>
</tbody>
</table>
Attitudes toward individuals with disabilities were examined using two different methods: (a) the Implicit Association Test assessing general implicit attitudes and (b) a vignette study assessing coworker attitudes. The Implicit Association Test was used in an attempt to replicate Tringo’s Hierarchy of Preference using five exemplar disabilities: (a) Cancer, (b) Paraplegic, (c) Mental Illness, (d) Alcoholic, and (e) HIV Positive. The results did not support a replication of the Hierarchy of Preference. Three dimensions of disabilities were manipulated for the vignette study. These dimensions were the overtness of the disability, the level of risk associated with the disability, and response of the individual with the disability to their environment. The participants rated the individual in the vignette on perceived competence of the individual, potential tolerance of the individual, and potential befriending of the individual by coworkers. The response dimension and the risk dimension influenced ratings on the dependent variables while the overtness dimension did not. Furthermore, no relationship was found between scores on the five IAT tests and ratings on competence, tolerance, and befriending. Taken together, the results of the current study indicate that further studies are warranted to determine if the IAT is a valid measure of attitudes toward individuals with disabilities.
Introduction and Review of Literature

In 1990, the Americans with Disabilities Act (ADA) was passed to assist individuals with disabilities in securing jobs and to improve the treatment of job incumbents by employers and employees. After the ADA went into effect in 1992, the United States Census Bureau reported in 1994-1995 that individuals with disabilities were less likely to be employed and that earnings were likely to be lower than earnings by individuals without disabilities. In 1994-1995, 23% of individuals with a work disability and 73% of individuals with a severe work disability (21 to 64 years old) were not in the labor force (U.S. Census Bureau, 1995). Although the ADA was enacted 10 years ago, the employment of individuals with disabilities has not increased in the last few years. According to the 2000 U.S. Census, 74% of working age (16 to 76 years old) individuals with a work disability were not in the labor force. Furthermore, for the same age range, 91% of individuals with a severe work disability were not in the labor force. For those with a work disability that do find employment, evidence indicates that they may not be treated equitably in the workplace. For example, the mean earnings of individuals with a work disability was only $19,745 in 1999 compared to a mean earning of $32,000 for individuals with no work disability (U.S. Census Bureau, 2000a, 2000b).

Overview of Attitudes Toward Individuals with Disabilities

Individuals with disabilities face at least two key problems in the workforce: (a) access to jobs and (b) treatment as a job incumbent. In reference to access to jobs, individuals with a disability may have physical obstacles that prevent entry into the workforce. Additionally, recruitment practices and selection procedures may unfairly eliminate individuals with disabilities from jobs for which they are qualified (Drehmer &
As a job incumbent, individuals with disabilities may receive lower pay and benefits, fewer opportunities for training, and biased performance appraisals. Also, this group may have lower promotion rates, less job tenure, a lack of relevant role models, and out-group membership status. Furthermore, stigmatization associated with their disability may lead individuals with disabilities to feel self-conscious about how they are perceived and about their behaviors in social situations, which may in turn lead them to avoid social relationships. By isolating themselves, individuals with disabilities may experience depression and anxiety. Individuals with disabilities may have higher rates of attrition than individuals with no disability. Taken together, these various difficulties create consequences for the individuals with disabilities, for organizations, and for society (Bordieri & Drehmer, 1987; Bordieri, Drehmer, & Taylor; 1997; Colella, 2001; Rusch, Johnson, & Hughes, 1990; Stone et al., 1992).

**Employer Attitudes Toward Individuals with Disabilities**

The difficulties confronted by individuals with disabilities in the work environment may be primarily attributed to the negative attitudes that employers have toward individuals with disabilities (Satcher & Dooley-Dickey, 1992). In a review of 37 studies about employer attitudes toward individuals with disabilities, Hernandez (2000) found that employers usually express positive global attitudes about individuals with disabilities, but when asked about specific attitudes negative attitudes are expressed more frequently. For example, employers may express a willingness to hire applicants with
disabilities, but this willingness to hire applicants with disabilities is not reflected in the actual hiring.

However, the bias from employers may not be based solely on the fact that an individual has a disability, but based on the specific disability the individual has. Studies have found that applicants with physical disabilities are selected for employment at a higher rate than are applicants with a cognitive or emotional disability (Bordieri et al., 1997). Drehmer and Bordieri (1985) studied how the type of disability and social contact required in the job affected hiring decisions made by managers and supervisors. In that study, the participants were asked to make hiring decisions from an applicant resume. Three different resumes were used in which the applicant had no history of mental illness, the applicant had a history of mental illness, or the applicant was paraplegic. Participants were asked to determine if the applicant should be hired and if the applicant was qualified for the position. The results indicated that there was a bias in recommending the hiring of applicants, and the type of disability condition had a role in the recommendation. Furthermore, when the perceived qualifications, objective qualifications, and work history were equal among the applicants, the type of disability had an influence on whether a hiring recommendation was offered.

Bordieri et al. (1997) investigated the influence of an individual’s type of disability on perceived organizational value and recommendation for promotion. Each participant was presented with one of eight candidates for promotion; the candidates differed only on the type of disability. The participants were then asked questions about the qualification of the candidate for promotion, whether he or she should be selected for promotion, what the candidate’s starting salary would be compared to others, and the
perceived productivity, acceptance by subordinates, reaction to criticism, dependability, and self-confidence of the candidate. Those with amputation, low vision, colon cancer, diabetes, and facial burns and those without a disability had equivalent ratings for recommendation to promote, perceived qualifications, comparable salary, productivity, subordinate acceptance, reaction to criticism, dependability, and confidence. However, those with depression and obesity had lower ratings on the same variables. These results suggest that employers may have biases beyond initial entry into the organization.

Satcher and Dooley-Dickey (1992) used the Attitudes toward Disabled Persons scale (ATDP) to measure the global attitudes of human resources management students, who would likely be responsible for hiring employees within one to two years of the study. These researchers studied whether the students’ attitudes differed in terms of gender, race, previous contact with an individual with a disability, anticipated type of occupation, and the anticipated size of the occupational setting. The results showed a significant interaction between race and gender, but no significant results were found for the other variables (i.e., previous contact, anticipated type of occupation, and anticipated size of the occupational setting). Satcher and Dooley-Dickey found that Caucasian students \( M = 80.0 \) had significantly more positive attitudes toward individuals with disabilities than did African-American students \( M = 72.3 \). Caucasian females \( M = 82.2 \) were most positive in their attitudes while African-American females \( M = 78.0 \) were the least positive. Caucasian males \( M = 78.0 \) had more positive attitudes than African-American males \( M = 74.8 \) and African-American females.
Coworker Attitudes toward Individuals with Disabilities

Although the attitudes of employers toward individuals with disabilities are very important considerations when examining job success, the attitudes of coworkers are also important because they are a noteworthy source of support to the individual with a disability, as well as contributing to the socialization process. Rusch et al. (1990) examined coworker attitudes and involvement with supported employees. Supported employees in this study were individuals with a disability who were provided with ongoing support in order to perform in a competitive work environment. The purpose of the study was to examine coworker involvement in terms of the level of disability and how the individuals with disabilities are placed in the work environment. The supported employees were placed in the workplace in three different ways: (a) an individual was placed in the workplace without the presence of other supported employees, (b) two or more supported employees were placed with a single employer and performed similar job functions, and (c) several supported employees were placed together and worked together.

Rusch et al. (1990) found that coworkers with no disabilities associated with a majority of the supported employees regardless of their disability. However, coworkers with no disabilities befriended fewer than 50% of all the supported employees. The act of advocating was affected by disability and placement type in that as the severity of the disability increased, the likelihood that coworkers without a disability would act as an advocate decreased. Furthermore, coworkers with no disability associated with supported employees but seldom invited them to participate in activities outside the workplace. Rusch et al. concluded that if coworkers with no disabilities do not befriend employees
with disabilities, job tenure and job separation might be increased for individuals with disabilities.

Bordieri and Drehmer (1987) studied the social acceptance of individuals with disabilities in the workplace by examining the attribution of responsibility for different disabilities. Participants were asked questions about coworker acceptance of an individual with a disability in terms of the cause of the disability. Bordieri and Drehmer's results showed that attribution of responsibility for the disability significantly influenced perceived social acceptance. The more a disability was attributed to personal responsibility, the lower the participants rated coworker acceptance. However, the disability type did not influence ratings of attribution of responsibility for the disability or coworker acceptance.

Colella (2001) hypothesized a model of coworker distributive fairness perceptions of workplace accommodations for employees with disabilities. Accommodating an employee with a disability involves giving differential treatment to the employee. Other employees' reactions to the accommodations may be influenced by their perception of the fairness of the accommodations. The role of coworkers in accommodation can be very important because coworkers can affect successful implementation, coworker reactions can impact the employee with the disability, supervisors may look to the reaction of coworkers when deciding on accommodations, and coworkers can affect general policy. Colella offered several propositions to explain her model. One proposition is that an actual judgment of fairness is more likely to occur if the disability is visible and the accommodation will directly impact the coworkers' lives. Coworkers are less likely to judge the accommodation as fair if the accommodation is perceived as making the
accommodated employee’s job easier or the coworkers’ jobs more difficult and if the accommodation is perceived as a reward or will use scarce resources. Also, if the disability is invisible, socially undesirable, or self-caused or if the accommodation is perceived to be inappropriate for the disability, the perception of fairness will be lower. However, if the employee is valued by the organization and is integrated into the workplace, accommodation will more likely be perceived as fair.

In summary, research shows that employers and coworkers have biased attitudes toward individuals with disabilities. These biased attitudes may be influenced by the actual type of disability (Bordieri & Drehmer, 1987; Bordieri et al., 1997; Colella, 2001; Drehmer & Bordieri, 1985; Gilbride, 2000; Jones & Stone, 1995; Lyons & Hayes, 1993; Rusch et al., 1990; Satcher & Dooley-Dickey, 1992; Stone et al., 1992). For example, a physical disability may be viewed in a less prejudiced manner than drug addiction or alcoholism. These biased attitudes lead to discriminatory behaviors by employers and coworkers, such as lack of access to jobs, biased performance appraisals, negative treatment from supervisors and coworkers, and social isolation. Because these biased attitudes and behaviors can negatively affect the work experience for individuals with disabilities, it is important to accurately measure and identify biased attitudes in order to develop better awareness of disabilities and potentially biased attitudes.

Measurement of Attitudes

The measurement of attitudes toward individuals with disabilities has interested researchers for many years. Psychologists have been measuring attitudes toward disabilities since the 1940’s (Antonak & Livneh, 1988). An attitude is an underlying psychological process that remains inactive until evoked by a specific concept (Yuker,
1988). Attitudes are developed or acquired through personal life experience and are a representation of the socialization process. Therefore, studying attitudes can help understand the socialization process that leads to certain attitudes. Also, studying attitudes can create a better understanding of how prejudice develops, can predict future behavior, and can change attitudes once the underlying development and structure is established. Through this process the attitudes that lead to such discrimination in the workplace can be reduced (Antonak & Livneh, 1988).

Attitudes are measured in order to transform an observation of an individual's behavior into an indicator that represents the underlying attitude. Generally speaking, attitudes can be measured by two different methods: (a) direct responses and (b) indirect responses. When attitudes are measured directly, the research participants are aware that their attitudes are being measured. When attitudes are measured indirectly, research participants may not know their attitudes are being measured, may be unaware of the purpose of measurement, or may be intentionally deceived about the purpose of the measurement (Antonak & Livneh, 1995; Antonak & Livneh, 2000; Yuker, 1988).

Direct Responses. There are several methods to measure attitudes directly: opinion surveys, interviews, rankings, Q methodology, sociometrics, adjective checklists, paired comparisons, semantic differential scales, and probabilistic rating scales. Opinion surveys measure attitudes that are expressed by participants' responses to questions. Opinion surveys can be structured, participants are given a set of responses to choose from for each question, or unstructured, participants must provide an answer to the question or an explanation for their answer. In interviewing, the researcher interacts directly and verbally with the participant. The interviews can be in-person or over the
phone and can be conducted personally by the researcher or by trained field assistants. A structured interview is conducted using a fixed set of questions in a fixed sequence, whereas an unstructured interview is conducted using any number of questions allowing the researcher to ask follow up questions based on participants’ responses.

The ranking method requires that participants arrange a number of statements or referents in order according to some criterion. Q-methodology involves arranging a set of attitude statements into groups according to a specified criterion (e.g., favorability). Sociometrics is a method to determine an individual’s behavior or behavioral intention toward a referent when given choices of behavior. The important part of this method is that participants believe that their choice may have consequences for the referent. For example, elementary children may be asked to choose from their class roll who they would most want to sit with at lunch (Antonak & Livneh, 2000; Yuker, 1988).

An adjective checklist is a list of adjectives about a particular object or topic. Participants are asked to choose the adjectives that describe that particular object or topic. In the paired comparison method, participants are given all possible pairs of items that need to be scaled. The participant is asked to choose the item in each pair that ranks higher according to some criterion. When using a semantic differential scale, one concept is investigated. Bipolar adjectives are presented connected by a number of intervals (e.g., five or seven intervals). The participants are asked to choose at which interval they feel the concept is best represented. Probabilistic rating scales measure strength of agreement or disagreement with a number of items about a particular concept. Deterministic rating scales are used based on the assumption that responses on scale
items are determined by underlying attitudes of participants (Antonak & Livneh, 2000; Yuker, 1988).

Several instruments using direct responses have been developed specifically to measure attitudes toward disabilities. The Attitudes Toward Disabled Persons Scale (ATDP), developed by Yuker, Block, & Campbell in 1960, has been one of the most widely used and studied scales (Antonak & Livneh, 1988). Other scales to measure attitudes toward individuals with disabilities are the Disability Factor Scales (DFS), the Scale of Attitudes toward Disabled People (SADP), and the Interaction with Disabled Persons Scale (IDP) (Antonak, 1982; Gething, 1994; Siller, Ferguson, Vann, & Holland, 1967).

Although direct response methods have been the most frequently used methods to measure attitudes towards individuals with disabilities, there are many threats to the validity of these methods and instruments. There are a number of biases or effects that may be exhibited by participants in response to direct methods. One threat to validity, known as the experimenter demand effect, occurs when participants attempt to confirm the researcher’s hypothesis. When participants try to give an open-minded impression, the evaluation apprehension effect occurs. Another threat to validity is the generosity effect; more specifically, when asked about a referent or concept, the participants may give the benefit of the doubt to the referent or concept. Participants may also exhibit a social desirability bias by giving answers they think are acceptable by society. A refusal bias occurs when the participants refuse to provide answers fearing that they may reveal controversial beliefs. Other threats to validity are participants who acquiesce by giving
either all yes answers or all no answers and participants who choose the extreme response alternatives (Antonak & Livneh, 1995; Antonak & Livneh, 2000).

Validity threats to the ATDP have been found in terms of participants’ ability to fake good answers. Cannon and Szuhay (1986) found that rehabilitation counseling students when asked to fake the ATDP had significantly higher scores than those asked to respond honestly. In addition, Yuker (1986) concluded that some people in certain conditions, such as when individuals have a motive to provide socially desirable answers, can fake the ATDP. It is important to note that these limitations regarding the direct responses are not limited to the ATDP. Thomas (2001) and Gething (1994) have found other commonly used scales, such as the IDP and the SADP, are susceptible to the same validity issues.

**Indirect Responses.** Because participants are aware of the attitude measurement, direct methods have threats to validity of the measurement instrument. Indirect response methods provide a way to reduce and potentially eliminate these threats to validity. Indirect methods are those in which the participants (a) are unaware they are being measured, (b) are aware of the measurement but unaware of the purpose, (c) are intentionally deceived of the true purpose of the measurement, or (d) are aware of the measurement but are inactive participants in measurement process. Examples of indirect response methods are projective techniques, disguised measures, behavioral observations, physiological methods, and randomized response technique. Projective techniques assume that participants will reveal underlying feelings when presented with an unstructured task or stimuli and given brief instructions. Disguised measures do not reveal the true purpose of the research or provide alternative purposes. An example of
this method is presentation of a vignette and then asking participants to recall details that may not have been present in the original vignette. Behavioral observations can be done in natural settings and are a direct operationalization of the participants' attitudes. Physiological methods measure autonomic bodily functions that are not within the control of the participant. The randomized response technique allows participants to answer questions confidentially because the researcher cannot connect a participant with any specific answer in the data set (Antonak & Livneh, 1995; Antonak & Livneh, 2000; Yuker, 1988).

Overview of Implicit Association Test

Another possible indirect method of measuring attitudes toward individuals with disabilities is the Implicit Association Test (IAT) (Greenwald, McGhee, & Schwartz, 1998), which measures implicit attitudes of bias. Implicit attitudes as defined by Greenwald et al. (1998) are automatic evaluations activated without the individual’s awareness. These automatic evaluations are evidenced in actions and judgments. The IAT attempts to assess the increased cognitive processing time that occurs when non-compatible concepts are placed together (e.g., HIV Positive and pleasant versus HIV Negative and unpleasant). This increased cognitive processing time may be due to the underlying bias the individual has toward people who are HIV Positive. Thus, the IAT measures these automatic evaluations by measuring the difference in the time it takes for an individual to categorize stimulus words into a set of compatible groups (e.g., HIV Positive and unpleasant versus HIV Negative and pleasant) compared to the time it takes to categorize stimulus words into a set of non-compatible groups (e.g., HIV Negative and unpleasant versus HIV Positive and pleasant). This difference in response time for the
compatible and non-compatible groups is referred to as the IAT effect (Greenwald et al., 1998).

The IAT administration consists of five major steps in which participants are presented with the discrimination category of interest (e.g., for a test of bias toward a disability condition, HIV Positive and HIV Negative), an attribute dimension not related to the discrimination category (e.g., pleasant and unpleasant), or a combination of both. The participant uses a computer to assign stimulus items into one of the categories by pressing appropriate keys with his/her forefinger. Both sides of the discrimination category (e.g., HIV Positive and HIV Negative) are shown on opposite sides of the screen. The stimulus items that need to be categorized are presented in the middle of the screen. The participants are given hand response assignments in order to categorize the stimulus items (Greenwald et al., 1998).

The first step in the IAT administration introduces the discrimination category, (e.g., HIV Positive and HIV Negative). The participants will place words related to HIV Positive into that category with their left hand and use their right hand to place words related to HIV Negative into that category. The next step is the introduction of the attribute dimension (e.g., pleasant and unpleasant). Participants will assign items to the two categories in the same manner as with the discrimination category. Third, the discrimination category and attribute dimension are combined into a compatible formation (e.g., HIV Positive and unpleasant versus HIV Negative and pleasant), and the stimulus items for both groups are presented. The participants place the stimulus items into the correct categories. Fourth, the participant learns the reversal of response assignments for the discrimination category (i.e., the previous hand assignments for HIV
Positive and HIV Negative are switched). Finally, the attribute dimension, which has no change in hand response assignments, is combined with the reversed discrimination category into a non-compatible formation (i.e., HIV Negative and unpleasant versus HIV Positive and pleasant) (Greenwald et al., 1998).

Evidence for the validity of the IAT in measuring attitudes toward gender, race, and other groups has been found by several researchers. Greenwald et al. (1998) found results indicating the usefulness of using the IAT to measure implicit attitudes, but these results did not establish usefulness beyond doubt. However, they concluded that the IAT is probably more resistant than explicit measures to validity threats associated with explicit measures (e.g., social desirability bias, evaluation apprehension effect). Greenwald et al. also found evidence for convergent and divergent validity of the IAT. Cunningham, Preacher, and Banaji (2001) demonstrated convergent validity for the IAT. They used a confirmatory factor analysis with three implicit attitude measures, including the IAT, to demonstrate convergent validity. Not only did Cunningham et al. find that the implicit attitude measures correlated with each other they also found that the implicit attitude measures formed a single latent construct.

In addition, other researchers have found divergent validity evidence for the IAT in measuring attitudes toward gender, race, and other groups. Rudman, Greenwald, Mellott, and Schwartz (1999) found evidence of divergent validity because the IAT measures and self-report measures in their study were not related to each other. This evidence of divergent validity demonstrated that the IAT and self-report measures were assessing independent constructs. Greenwald and Farnham (2000) demonstrated the stability of the IAT in measures of self-concept and self-esteem. They found evidence
for construct validity in the form of known groups validity and divergent validity. Evidence of known groups validity was found because the IAT had high sensitivity to known differences between genders in self-concept of masculinity and femininity. There were low correlations between the IAT measures and explicit measures that indicated evidence of divergent validity. However, one study by McConnell and Leibold (2001) did find a relationship between the IAT measure of racial bias and explicit measures of prejudice. Overall, the validity of the IAT has been demonstrated in its correlation with other implicit measures of attitudes and its lack of relationship with explicit measures of attitudes.

In summary, using the IAT may reveal attitudes and other automatic associations that individuals would prefer not to express and probably would not express on a direct measure. The IAT has been used to assess implicit bias for racial attitudes, gender attitudes, self-esteem, self-concept, religious ethnicity, age, nationality, and smoking behavior (Greenwald et al., 1998; Greenwald & Farnham, 2000; Ottaway, Hayden, & Oakes, 2001; Ruggerio, Mitchell, Krieger, Marx, & Lorenzo, 2000; Swanson, Rudman, & Greenwald, 2001). However, the IAT, to date, has not been used to examine the possible implicit biases toward individuals with disabilities.

Overview of Hierarchy of Preference

The direct response approach to measuring attitudes toward individuals with disabilities has been found to be suspect. Direct response measures are susceptible to the experimenter demand effect, open-minded impressions, the evaluation apprehension effect, the generosity effect, the social desirability bias, the refusal bias, and participants’ acquiescence (Antonak & Livneh, 1995; Antonak & Livneh, 2000). The IAT
methodology provides an indirect approach to measure these attitudes and appears to be free from these same concerns. The current study will assess the potential of using the IAT to measure attitudes toward individuals with disabilities.

One approach to test the validity of the IAT is to attempt to replicate Tringo’s Hierarchy of Preference for disabilities (1970). Although other direct response measures of attitudes toward individuals with disabilities (e.g., ATDP, IDP) have questions about their validity, Tringo’s Hierarchy of Preference has remained stable for 30 years. The research on employer and coworker attitudes toward individuals suggests that the type of disability influences attitudes and potential employment decisions. In 1970, Tringo identified that attitudes toward individuals with disabilities vary by the type of disability. Tringo established the existence of a hierarchy of preference for different disabilities by measuring participants’ preference of the closest relationship with someone with a specified disability. Tringo measured preferences using a Disability Social Distance Scale. The Disability Social Distance Scale asked participants to choose the closest relationship they would want with an individual with a specified disability on an anchored nine-point scale. Examples of the anchors are 1 = Would Marry, 5 = Would accept as a fellow employee, and 9 = Would put to death. Tringo concluded that the Hierarchy of Preference existed because the placement of disability conditions was consistent for different participant groups. The order of preference found was first physical disabilities (i.e., physical disabilities were the most preferred), next sensory disabilities, third brain injuries, and last alcoholism and mental illnesses (i.e., these disability conditions were the least preferred). The significance of Tringo’s study is that a consistent hierarchy was found without asking participants to rank the disability groups.
Tringo concluded that the hierarchy indicates that different degrees of prejudice exist
toward different disabilities.

Schmelkin (1984) reanalyzed the Hierarchy of Preference toward disabilities. Schmelkin found three dimensions of attitudes toward disabilities. The first dimension contrasted the visible disability and non-visible disability conditions. More positively rated disabilities were arthritis, ulcer, asthma, and diabetes, which are less visible; whereas more visible disabilities such as dwarf, hunchback, and paraplegia were rated negatively. The second dimension contrasted physical and societal disabilities. In this dimension, amputee, cancer, cerebral palsy were rated positively while alcoholism and ex-convict were rated negatively. The third dimension was not fully interpreted by Schmelkin. However, tuberculosis, stroke, paraplegia, and cancer were rated more positively, and alcoholism, ex-convict, hunchback, and dwarf were rated negatively. Schmelkin's interpretation of the third dimension was that individuals with disabilities of the negative side are ostracized by society more than individuals with other disabilities and that it may be more socially desirable to express tolerant attitudes toward disabilities at the positive side.

In another study by Jones and Stone (1995), participants rated a number of disabilities in terms of what their comfort level would be if they worked closely with an individual who had the particular disability. The results revealed that individuals felt more comfortable working with persons with some types of disabilities over others. The hierarchy found by Jones and Stone was very similar to the one established by Tringo (1970) in that the disabilities were placed in very similar positions on the hierarchy. For example, mental illness and alcoholism were the least preferred in the hierarchy; diabetes,
heart disease, and asthma were higher in preference; and physical disabilities such as paraplegia, blindness, and deafness were in the middle of the hierarchy.

Lyons and Hayes (1993) studied the attitudes of occupational therapy students and business students toward different disabilities using a social distance scale. The results produced a hierarchy of preference very similar to Tringo's Hierarchy (1970) where asthma, diabetes, heart disease, and ulcer were most preferred by the students and hunchback, mental illness, alcoholism, and criminal record were least preferred by the students.

In 2000, Thomas reevaluated Tringo's Hierarchy of Preference (1970). The results found that the hierarchy still exists 30 years later even though there have been many efforts to remove biases toward individuals with disabilities. Furthermore, the hierarchy has remained stable in terms of relative position of disabilities on the hierarchy. Thomas found that cancer was the only disability that changed relative position in the hierarchy. Cancer was found to be more acceptable than in previous studies. Thus, the research on the Hierarchy of Preference for disabilities has consistently demonstrated that with various methodologies and throughout time, a clear and distinct hierarchy exists for specific disabilities (Jones & Stone, 1995; Lyons & Hayes, 1993; Schmelkin, 1984; Thomas, 2000; Tringo, 1970).

**Measurement of Attitudes Toward Individuals with Disabilities**

A second objective of the current research is to investigate the dimensions that may affect coworker attitudes toward individuals with disabilities. In the research on attitudes toward individuals with a disability, there has been a debate of whether these attitudes are uni-dimensional or multidimensional. Many scales for measuring attitudes
toward individuals with disabilities (e.g., ATDP, IDP) assess only the dimension of
genral affect. If general affect is the only dimension examined, the assumption is that
people have a general bias for all disabilities regardless of the type. Individuals with
disabilities are a heterogeneous group, and varying perceptions about individuals in the
group are expected (Thomas, 2001). In addition, in a literature review, Jones, Farina,
Hastorf, Markus, Miller, and Scott (1984) identified that as many as six dimensions may
underlie bias toward individuals with disabilities. These six dimensions were
concealability, course, disruptiveness, aesthetic qualities, origin, and peril.

Thomas (2001) also found more than one dimension in attitudes toward
disabilities. Thomas investigated the dimensions underlying perceptions of individuals
with disabilities and whether these dimensions could predict criterion measures
independent of affect. Sixteen concerns about disabilities were identified through
extensive pilot work and a review of the literature. Participants were then asked to what
extent the sixteen concerns were associated with 15 separate disabilities. From this
experiment, three dimensions were identified: (a) overtness, (b) risk, and (c) response.
Overtness refers to the visibility of the disability and potential accommodations required
by the disability. Risk refers to the degree of uncertainty associated with a disability.
Response refers to the individual’s response to his/her environment in terms of his/her
expectations for accommodations or special treatment. Thomas also examined dependent
measures of workgroup relationships, hiring decisions, promotability, tardiness or
absenteeism problems, willingness to work with, willingness to work for, trainability,
work motivation, and predicted productivity. The results showed that overtness predicted
eight of the nine (i.e., working relationship, hiring, promotability, tardiness/absenteeism,
as coworker, as boss, trainability, work motivation, and productivity) dependent measures. Risk predicted all the criteria except for working relationship, hiring decision, and productivity. Response was the most important predictor, as it predicted all nine of the criteria. When overtness, risk, and response were entered into the hierarchical regression together, they predicted all nine of the criteria. The variance accounted for ranged from .23 for hiring decisions to .36 for trainability.

In summary, attitudes toward individuals with disabilities can have profound influence in the workplace. Individuals with disabilities may experience biased attitudes and behaviors from both their employers and coworkers (Bordieri et al., 1997; Colella, 2001; Drehmer & Bordieri, 1985; Hernandez, 2000; Satcher & Dooley-Dickey, 1992; Stone et al., 1992). These biased attitudes can have negative consequences in areas of securing and maintaining jobs, performance appraisals, job performance, socialization into the workplace, and job tenure. Accurate measurement and identification of these attitudes is important in order to develop a method (e.g., training of supervisors to help decrease intentional and unintentional discriminatory behaviors) of reducing biased attitudes and discriminatory behavior in the workplace. Attitudes toward individuals with disabilities have traditionally been measured using direct response methods (e.g., opinion surveys, interviews), but these direct measures have many threats to validity. Therefore, the IAT is an alternative to direct measures because it indirectly assesses implicit attitudes that individuals would not normally admit to having. The IAT will be administered for five disabilities in an attempt to replicate the Hierarchy of Preference and to examine the validity of the IAT. The Hierarchy has remained stable over time and through methodology; thus the IAT results should produce a similar Hierarchy (Tringo,
In addition, the comparison of IAT results to dimensions of attitudes toward individuals with disabilities is important. Thomas (2001) identified three dimensions (i.e., overtness, risk, and response) of attitudes toward individuals with disabilities. An objective of the present research is to examine how differing levels of these dimensions affect coworker attitudes toward individuals with disabilities in terms of competence of the coworker, tolerating the coworker, and befriending the coworker. An additional question that will be examined is how the coworker attitudes assessed by a manipulation of the three dimensions identified by Thomas compare with the overall affect found by the IAT.

**Present Study**

Because the IAT has not been used to assess bias toward disabilities, this test was administered for five disabilities. Five disabilities (i.e., Cancer, Paraplegic, Mental Illness, Alcoholic, and HIV Positive) were chosen in an attempt to replicate the Tringo’s Hierarchy of Preference (1970). The IAT was presumed to assess implicit attitudes or automatic associations that individuals would not likely demonstrate if asked explicitly. Because the Hierarchy of Preference has been established and found to be stable over time by several researchers (Jones & Stone, 1995; Lyons & Hayes, 1993; Schmelkin, 1984; Thomas, 2000; Tringo, 1970), it was hypothesized that the IAT would replicate this Hierarchy of Preference if it truly measures the implicit attitudes toward individuals with disabilities. The IAT effect was anticipated to be smaller for those disability conditions that are most preferred and larger for those disability conditions that are least preferred.

**Hypothesis One:** The IAT administration of the five disabilities will produce a hierarchy of the disabilities similar to Tringo's Hierarchy of Preference.
Previous disability literature has found that race and gender have an effect on the attitudes toward individuals with disabilities. Satcher and Dooley-Dickey (1992) found a significant interaction between race and gender for attitudes toward individuals with disabilities. Caucasian students were found to have more positive attitudes than African-American students did, and Caucasian females had the most positive attitudes toward individuals with disabilities. If the IAT is valid, then IAT scores should produce similar results regarding gender and race.

Hypothesis Two (A): Females will have smaller IAT effects for the five disabilities than males for the five disabilities.

Hypothesis Two (B): Caucasian participants will have smaller IAT effects for the five disabilities than non-Caucasian participants for the five disabilities.

In the present study, coworker attitudes toward individuals with disabilities were examined using vignettes that manipulate the three factors of overtness, risk, and response as identified by Thomas (2001). Thomas found that overtness was important in predicting eight out of nine employment outcomes, such as working relationships, promotion, and trainability. The dimension of risk predicted all but three of the employment outcomes. Furthermore, response predicted all nine of the employment outcomes. The results found by Thomas indicated that overtness, risk, and response are important in how attitudes are formed about individuals with disabilities, and the results indicate that the three dimensions are important when employment decisions are being made. Therefore, coworker attitudes toward individuals with disabilities may also be affected by the level of overtness, risk, and response attributed to the individual with a disability. The present study examined the influence of the level of overtness, risk, and
response on three dependent variables of coworker attitudes: (a) competence, (b) tolerance, and (c) befriending. Competence refers to the perceived ability of the individual with a disability to adequately perform their job. Tolerance refers to the coworkers' behavior of accepting, at the minimum level, the individual with a disability into the workplace. Befriending refers to the coworkers' anticipated behavior of frequent social interaction with the individual with a disability.

Hypothesis Three: The high overtness, risk, and response conditions will have greater negative coworker attitudes than the low overtness, risk, and response conditions on each of the three dependent variables (i.e., competence, tolerance, and befriending).

An important question in the present study is how coworker attitudes assessed by a manipulation of the three dimensions of overtness, risk, and response compare with the overall affect assessed by the IAT. In combining the vignette study with the IAT study, it was anticipated that the general affect measured by the IAT will be related to the dependent variables of competence, tolerance, and befriending in the vignette study.

Hypothesis Four: Scores on the five IAT tests will be related to scores on the dependent variables of competence, tolerance, and befriending.

Hypothesis Five: The level of overtness, risk, and response will add incremental variance beyond the overall IAT score on the dependent variables of competence, tolerance, and befriending.
Method

Pilot Study

A pilot study was conducted to develop word distractors for the disabilities to be used for the administration of the Implicit Association Test. Students enrolled in psychology courses at Western Kentucky University were given a list of six disability conditions and six non-disability conditions. They were instructed to generate one-word adjectives or descriptors about the particular disability or non-disability condition. Several studies of the Hierarchy of Preference were considered when choosing which disabilities to include in the list of twelve disability and non-disability conditions (Janicki, 1970; Jones & Stone, 1995; Lyons & Hayes, 1993; Schmelkin, 1984; Thomas, 2000; Tringo, 1970). Disability conditions were chosen from the top, middle, and bottom of the hierarchy for adequate representation of the hierarchy. Twelve disability conditions were included in the pilot study in order to achieve sufficient word generation for at least five disability conditions. The twelve disability conditions included were asthma, heart disease, blind, drug addiction, mental illness, amputee, alcoholic, cancer, deaf, paralyzed, HIV positive, and learning disabled. The twelve non-disability conditions included were no asthma, healthy heart, non-blind, drug free, mental health, non-amputee, non-alcoholic, cancer free, non-deaf, non-paralyzed, HIV negative, and non-learning disabled. Forty-four undergraduate and graduate students completed the pilot study, and each participant completed materials for six disability conditions and six non-disability conditions. The words were tallied for each disability and non-disability condition. Three people (i.e., two I/O Psychology graduate students and an I/O Psychologist) reviewed the words in order to determine which disabilities had adequate
word generation. Five disabilities, which represented different types of disabilities and represented all levels of the Hierarchy of Preference, were selected to use in the IAT administration. The disability conditions chosen were Cancer, Paraplegic, Mental Illness, Alcoholic, and HIV Positive. The informed consent form for the pilot study is located in Appendix A, and the materials for the pilot study are located in Appendix B.

Participants

Participants were 122 undergraduate and graduate students at Western Kentucky University enrolled in psychology classes that voluntarily participated in this study. The sample consisted of 48 (39.3%) males and 74 (60.7%) females. The mean age of participants was 20.2 years ($SD = 3.0$). One hundred and three (84.4%) of the participants were Caucasian, while 19 (15.6%) of the participants were non-Caucasian. Of the non-Caucasian participants, 10 were African-American, three were Hispanic/Latino, two were Native-American, two were Asian-American, and two identified themselves as Other.

Materials

The materials given to participants included an informed consent, one vignette that was randomly selected out of eight vignettes, a questionnaire about the vignette, and a biographical data form.

Informed Consent Form. The informed consent form explained the major purpose for and the key steps in the experiment. Participants were informed of any potential risks and benefits associated with the experiment. The informed consent form also informed participants that they could refuse to participate or withdraw from the study at any time. The informed consent form is located in Appendix C.
Vignettes. For the scenario study portion of the thesis, vignettes were developed to manipulate the three independent variables. The three independent variables were risk, response, and overtness, and they were manipulated as high and low thus producing eight different scenarios. The eight vignettes are located in Appendix D.

Manipulation Check. The participants were asked three questions about the vignettes to determine if the manipulation of the independent variables (i.e., level of overtness, risk, and response) was effective. The manipulation checks were presented before the dependent measures for the vignettes. The manipulation checks are the first three statements on the questionnaire for the dependent measures in Appendix E.

Biographical Data. The biographical data that was collected were gender, race, age, and the extent of experience, the level of closeness of relationship, and amount of one-on-one contact with individuals with disabilities. Participants were asked to complete the biographical information after completing the dependent measure for the vignettes. The biographical data form is located in Appendix F.

Dependent Measures

Dependent measures were taken from the vignette portion of the study and each of the five IAT administrations. A total of nine dependent variables resulted from the vignette study and the IAT administrations.

Vignette Study. The dependent measure for the vignette task included 15 items related to attitudes toward the coworker who was described in the vignette. The dependent measure assessed three dimensions of coworker attitudes: competence, tolerance, and befriending. For each dimension, the participant was asked five questions. The thesis author developed the fifteen items for the three dependent variables. A total
score was calculated for the three dimensions by summing the ratings on the corresponding questions. Three questions that were written negatively were reverse coded before calculating the total score. The dependent measures for the vignette study are located in Appendix E.

*IAT.* The dependent measures for the IAT administration were the participant’s response time difference for each of the five separate IAT tests and a mean of the five separate IAT tests, which produced an overall IAT score. The response time difference was calculated for all five IAT tasks by subtracting the mean response time to categorize the stimulus items into a set of compatible groups (e.g., HIV Positive and Unpleasant versus HIV Negative and Pleasant) from the mean response time to categorize the stimulus items into a set of non-compatible groups (e.g., HIV Positive and Pleasant versus HIV Negative and Unpleasant). For all five IAT tasks (i.e., HIV Positive, Cancer, Mental Illness, Paraplegic, and Alcoholism), participants received a response time difference score. Each disability category was paired with a category of pleasant-unpleasant stimulus items. Stimulus items for the pleasant-unpleasant category were taken from previous studies on the IAT using this category (Cunningham et al., 2001; Greenwald et al., 1998; Rudman et al., 1999). Each participant received six different IAT scores. Five scores correspond to the IAT means for each of the five individual tests: (a) Cancer, (b) Paraplegic, (c) Mental Illness, (d) Alcoholic, and (e) HIV Positive. The sixth score was simply the mean of the five individual scores. The disability and non-disability conditions and stimulus item lists as well as the list of stimulus items for the pleasant and unpleasant category are located in Appendix G.
Procedure

First, the general purpose and procedure of the study were explained to the participants; they were then asked to read and sign an informed consent form. Participants were then given one vignette that was randomly selected out of eight vignettes. They were asked to read the scenario and then respond to 18 questions about the vignette, which included the three manipulation check questions. Next, the participants completed the biographical information form. After finishing the written materials, the participants completed the five IAT measures of disability conditions on a computer. All participants completed the materials in the same order because completing the IAT first might have influenced responses on the vignette portion of the study.

Informed Consent. Before starting either the scenario administration or the IAT administration, the participants were asked to read the informed consent form. The potential risks and benefits were explained to the participant, and the right to refuse to participate and to withdraw was explained to the participant. After reading the informed consent form, the participant was asked to sign it in presence of the researcher.

Vignette Administration. The participants were instructed to carefully read one vignette and then respond to the eighteen statements relating to the description of the individual in the vignette. The vignette was on one page with the statements following on the next page. After completing the vignette portion, the participants were asked to complete the biographical information form.

IAT Administration. The five IAT tasks were administered using a desktop computer individually to each participant. The participants were seated at the computer and then given verbal instructions on how to complete the IAT task. The researcher
started the first IAT test for each participant. At the beginning of the IAT, two categories appeared on opposite sides of the computer screen, and a series of stimulus items randomly appeared in the middle of the screen. The participant was instructed to use the ‘A’ key for left-handed response and the ‘5’ key on the number pad for right-handed responses. The participant was instructed to push the ‘A’ key if the stimulus item belonged in the category on the left side of the screen and the ‘5’ key if the stimulus item belonged in the category on the right side of the screen. If the participant attempted to place the word in the wrong category, a red X appeared at the bottom of the screen. Each IAT test consisted of seven trials. Four of these trials were practice to allow participants to learn the stimulus items associated with each category. Two of the trials were real, and responses were recorded for these. The two real trials were the compatible combination of categories (e.g., HIV Positive and Unpleasant and HIV Negative and Pleasant) and the incompatible combination of categories (e.g., HIV Positive and Pleasant and HIV Negative and Unpleasant). After the participant completed each IAT test, the researcher started the next IAT test for them. The participants completed a total of five different IAT tests for HIV Positive, Cancer, Mental Illness, Paraplegic, and Alcoholism.
Results

Manipulation Checks

Participants were asked to respond to statements about the individual in the vignette in an effort to verify the successful manipulation of overtness, risk, and response. They were asked to respond using a scale of Strongly Disagree to Strongly Agree to the following three statements: (a) Chris will require special equipment to do the job, (b) the disability Chris is afflicted with is contagious and may negatively affect job performance, and (c) Chris expects special treatment from ABC Corporation. Fourteen participants did not respond correctly to the first statement. Sixty participants did not respond correctly to the second statement. Thirty-two participants did not respond correctly to the third statement. Twenty-one participants did not respond correctly to at least two of the statements, and 84 did not respond correctly to all three statements.

Although some participants did not respond correctly to all three manipulation checks, all participants were included in the analyses of the data. Three one-way ANOVAs were conducted to check the manipulation of the independent variables of overtness, risk, and response. All three manipulations were found to be significant. The ANOVA results were for overtness, $F(1,120) = 340.2, p < .01$; for risk, $F(1,120) = 17.1, p < .01$; and for response, $F(1,120) = 96.7, p < .01$.

Descriptives and Correlations of the IAT Adminstrations

For each of the five IAT tests (i.e., Cancer, Paraplegic, Mental Illness, Alcoholic, and HIV Positive), each participant received a difference score. A correlational analysis was conducted to determine the bivariate relationships between the five IAT administrations for the five disabilities. Means, standard deviations, and correlations
among the disabilities are provided in Table 1. As seen in Table 1, scores for HIV Positive, Paraplegic, and Alcoholic were significantly correlated with each other. Scores for Cancer were significantly correlated with scores on Paraplegic, Alcoholic, and Mental Illness, but not significantly correlated with HIV Positive. Mental Illness was significantly correlated with Paraplegic, Alcoholic, and Cancer, but not significantly correlated with HIV Positive. All five IAT scores were significantly correlated with the overall IAT score.

Table 1

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>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cancer</td>
<td>327.2</td>
<td>240.0</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Paraplegic</td>
<td>368.1</td>
<td>212.9</td>
<td>.29**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Mental Illness</td>
<td>249.6</td>
<td>208.8</td>
<td>.41**</td>
<td>.29**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Alcoholic</td>
<td>301.8</td>
<td>209.0</td>
<td>.32**</td>
<td>.28**</td>
<td>.41**</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. HIV Positive</td>
<td>642.5</td>
<td>299.6</td>
<td>.05</td>
<td>.23*</td>
<td>.05</td>
<td>.24**</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>6. Overall IAT Score</td>
<td>377.8</td>
<td>147.2</td>
<td>.64**</td>
<td>.64**</td>
<td>.64**</td>
<td>.68**</td>
<td>.57**</td>
<td>--</td>
</tr>
</tbody>
</table>

Note. N = 122.

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

Analyses of the IAT Administrations

Hypothesis One of the present study stated that the IAT administration of the five disabilities would result in a replication of the Hierarchy of Preference. A mean score was calculated for each of the five IAT tests. Then, the five IAT administrations were
assigned two different ranks, one according to a hypothesized ranking based on the Hierarchy of Preference (Tringo, 1970) and one according to the actual ranking based on the mean scores found after administrations of the five IAT tests. The hypothesized ranking from most preferred disability to least preferred disability was Cancer, Paraplegic, Mental Illness, Alcoholic, and HIV Positive. The ranking according to actual means found from smallest IAT effect to largest IAT effect was Mental Illness ($M = 249.6, SD = 208.8$), Alcoholic ($M = 301.8, SD = 209.0$), Cancer ($M = 327.2, SD = 240.0$), Paraplegic ($M = 368.1, SD = 212.9$), and HIV Positive ($M = 642.4, SD = 299.6$). A Spearman Rank Order Correlation was conducted to determine if participants in the current study ranked the five disabilities in the same order as Tringo’s Hierarchy of Preference. This correlation found was nonsignificant ($r_s = .20, p > .05$), and therefore, Hypothesis One was not supported.

*Analysis of the Differences in the Five IAT Scores*

Even though Hypothesis One was not supported, a Repeated Measures ANOVA was conducted to assess if there were differences between the five IAT scores. A significant $F(4, 484) = 67.3, p < .001$ indicated a difference between the scores on the five IAT tests. Although post hoc tests were not conducted, it appears upon visual inspection of the five IAT mean scores that the mean of HIV Positive caused the main effect. The mean for HIV Positive is much larger than the means for the other four disabilities. The means for Cancer, Paraplegic, Mental Illness, and Alcoholic are very close and not likely to be significantly different from one another.
Analyses for Gender and Race Effects on IAT

Hypothesis Two (A) stated that females would have smaller IAT effects for the five disabilities than would males. Hypothesis Two (B) stated that non-Caucasians would have smaller IAT effects than Caucasians. To test this hypothesis, a Repeated Measures ANOVA was conducted for gender and race. The five IAT scores (i.e., Cancer, Paraplegic, Mental Illness, Alcoholic, and HIV Positive) were the within-subjects factors. Gender and race were the between-subjects factors. In the analysis of the effect of race, the sample was examined using Caucasian versus non-Caucasian participants due to the low number of participants in each of the non-Caucasian race groups. The means for the five individual IAT tests and the mean for the overall IAT score by gender and race are presented in Table 2. The Repeated Measures ANOVA indicated that there was no effect due to gender, $F(1,118) = 1.4, p > .05$. Also, there was no effect due to race, $F(1,118) = 1.1, p > .05$. Furthermore, no significant interactions were found between gender and race, $F(1,118) = 2.4, p > .05$. The interactions between gender and disability, $F(4,472) = 1.3, p > .05$, and between race and disability, $F(4,472) = 1.0, p > .05$, were likewise found to be nonsignificant. The interaction between gender, race, and disability was also found to be nonsignificant, $F(4,472) = 1.0, p > .05$. These results indicated that neither gender nor race produced any effect on scores of the five individual IAT tests. Thus, Hypotheses Two (A) and Two (B) were not supported.

Descriptives and Correlations for the Vignette Study

The dependent variables for the vignette study were total scores on the ratings of three dimensions (i.e., competence, tolerance, and befriending). A correlational analysis
Table 2

*Descriptives of IAT Tests by Gender and Race*

<table>
<thead>
<tr>
<th>IAT Test</th>
<th>Caucasian</th>
<th></th>
<th>Non-Caucasian</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male(^a)</td>
<td>Female(^b)</td>
<td>Male(^c)</td>
<td>Female(^d)</td>
</tr>
<tr>
<td>Cancer Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>301.1</td>
<td>347.5</td>
<td>259.9</td>
<td>355.0</td>
</tr>
<tr>
<td>(SD)</td>
<td>269.1</td>
<td>220.5</td>
<td>219.7</td>
<td>273.0</td>
</tr>
<tr>
<td>Paraplegic Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>381.3</td>
<td>353.9</td>
<td>422.8</td>
<td>361.9</td>
</tr>
<tr>
<td>(SD)</td>
<td>173.1</td>
<td>220.7</td>
<td>373.5</td>
<td>166.9</td>
</tr>
<tr>
<td>Mental Illness Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>261.3</td>
<td>220.6</td>
<td>252.4</td>
<td>370.6</td>
</tr>
<tr>
<td>(SD)</td>
<td>217.0</td>
<td>199.8</td>
<td>163.0</td>
<td>235.5</td>
</tr>
<tr>
<td>Alcoholic Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>338.3</td>
<td>264.5</td>
<td>266.5</td>
<td>408.6</td>
</tr>
<tr>
<td>(SD)</td>
<td>196.7</td>
<td>183.8</td>
<td>224.4</td>
<td>324.7</td>
</tr>
<tr>
<td>HIV Positive Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>637.8</td>
<td>659.1</td>
<td>473.4</td>
<td>687.3</td>
</tr>
<tr>
<td>(SD)</td>
<td>304.2</td>
<td>260.0</td>
<td>473.3</td>
<td>349.8</td>
</tr>
<tr>
<td>Overall IAT Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>383.9</td>
<td>369.1</td>
<td>334.0</td>
<td>436.7</td>
</tr>
<tr>
<td>(SD)</td>
<td>146.7</td>
<td>147.3</td>
<td>112.2</td>
<td>170.5</td>
</tr>
</tbody>
</table>

\(^a\)\(^n\) = 40. \(^b\)\(^n\) = 63. \(^c\)\(^n\) = 8. \(^d\)\(^n\) = 11.

was used to determine the bivariate relationships between the dependent variables for the vignette study. Means, standard deviations, reliabilities, and correlations among the
dependent variables are provided in Table 3. All three of the dependent variables from the vignette study were significantly intercorrelated.

Table 3

Descriptives and Intercorrelations for Vignette Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>α</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Competence</td>
<td>17.3</td>
<td>3.0</td>
<td>.81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Tolerance</td>
<td>20.7</td>
<td>2.7</td>
<td>.77</td>
<td>.56**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Befriending</td>
<td>18.1</td>
<td>3.0</td>
<td>.75</td>
<td>.51**</td>
<td>.70**</td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 122.

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

Analyses for Overtness, Risk, and Response

Hypothesis Three stated that participants in the high overtness, risk, and response conditions would have greater negative coworker attitudes than participants in the low overtness, risk, and response conditions. Due to the intercorrelation of the competence, tolerance, and befriending variables, a 2 (high versus low overtness of the disability) X 2 (high versus low risk of the disability to the individual and the environment) X 2 (high versus low response of the individual with a disability to their environment) MANOVA was used to determine the effects of the three independent variables (i.e., overtness, risk, and response). Risk had a significant multivariate effect, Wilk’s Lambda $F(1,112) = 6.38, p < .01$. Response also had a significant multivariate effect, Wilk’s Lambda $F(1,112) = 3.3, p < .05$. Overtness did not have a significant multivariate effect, Wilk’s Lambda $F(1,112) = 1.5, p > .05$. No significant interactions of the second or third order were present.
Subsequent to the significant MANOVA, three Univariate ANOVAs were used to examine the effects of risk and response on ratings of competence, tolerance, and befriending. Table 4 presents the combined results for the response variable across the three Univariate ANOVAs. As can be seen in Table 4, response produced a main effect \((F = 8.3, p < .01)\) for ratings of competence, but not for ratings of tolerance or befriending. Participants in the high response group had significantly less favorable ratings for competence \((M = 16.6, SD = 3.2)\) than did participants in the low response group \((M = 18.0, SD = 2.6)\).

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>df</th>
<th>(F)</th>
<th>(Eta^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>1</td>
<td>8.3**</td>
<td>.07</td>
</tr>
<tr>
<td>Tolerance</td>
<td>1</td>
<td>.2</td>
<td>.00</td>
</tr>
<tr>
<td>Befriending</td>
<td>1</td>
<td>.6</td>
<td>.00</td>
</tr>
<tr>
<td>Error(^a)</td>
<td>114</td>
<td>(7.3)</td>
<td></td>
</tr>
<tr>
<td>Error(^b)</td>
<td>114</td>
<td>(7.4)</td>
<td></td>
</tr>
<tr>
<td>Error(^c)</td>
<td>114</td>
<td>(9.1)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Value enclosed in parentheses represents mean square error. All nonsignificant interactions were omitted.

\(^a\)Error for competence score. \(^b\)Error for tolerance score. \(^c\)Error for befriending score.

\(*p < .05. **p < .01.*
Table 5 presents the combined results for the risk variable across the same three Univariate ANOVAs. Risk produced significant main effects for ratings of competence, tolerance, and befriending. Those in the high risk group had significantly less favorable ratings on competence ($M = 16.2, SD = 3.0$), tolerance ($M = 20.2, SD = 2.9$), and befriending ($M = 17.5, SD = 3.3$) than the ratings of the low risk group on competence ($M = 18.4, SD = 2.6$), tolerance ($M = 21.3, SD = 2.5$), and befriending ($M = 18.7, SD = 2.6$).

**Table 5**

*Combined ANOVA Results for the Risk Dimension*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>$df$</th>
<th>$F$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>1</td>
<td>19.1**</td>
<td>.14</td>
</tr>
<tr>
<td>Tolerance</td>
<td>1</td>
<td>4.8*</td>
<td>.04</td>
</tr>
<tr>
<td>Befriending</td>
<td>1</td>
<td>4.8*</td>
<td>.04</td>
</tr>
<tr>
<td>Error$^a$</td>
<td>114</td>
<td>(7.3)</td>
<td></td>
</tr>
<tr>
<td>Error$^b$</td>
<td>114</td>
<td>(7.4)</td>
<td></td>
</tr>
<tr>
<td>Error$^c$</td>
<td>114</td>
<td>(9.1)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Value enclosed in parentheses represents mean square error. All nonsignificant interactions were omitted.

$^a$Error for competence score.  $^b$Error for tolerance score.  $^c$Error for befriending score.

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

The results for response and risk partially support Hypothesis 3 in that those in the high response group and high risk group were hypothesized to give less favorable ratings on the dependent variables. Response had a main effect on competence while risk had a main effect on competence, tolerance, and befriending. However, overtness did not
produce any significant main effects, and no interactions were found between the three independent variables.

*Analyses of Relationship Between Overall IAT Score and Vignette Results*

Hypothesis Four stated that the vignette dependent variables would be related to the scores on the five IAT tests. Bivariate correlations were used to examine the relationship between all dependent variables (i.e., competence score, tolerance score, befriending score, Cancer score, Paraplegic score, Mental Illness score, Alcoholic score, HIV Positive score, and overall IAT score). The results of the correlations are illustrated in Table 6. It was already established in the analyses of Hypothesis Three that scores on competence, tolerance, and befriending are intercorrelated (see Table 3). The intercorrelations among the five individual IAT tests were presented in Table 1. The correlations between the five individual IAT tests and competence, tolerance, and befriending scores were all nonsignificant. Furthermore, the correlations among overall IAT score and competence, tolerance, and befriending scores were also nonsignificant. The results of the correlations indicate that there is no relationship between the five individual IAT tests and scores on competence, tolerance, and befriending. Thus, no support was found for Hypothesis Four.

*Analyses for Association Between Vignette Study and IAT Study*

Finally, it was hypothesized that overtness, risk, and response would add incremental variance beyond the overall IAT score for competence, tolerance, and befriending scores. To test this hypothesis, a hierarchical regression analysis was conducted for each dependent variable (i.e., competence, tolerance, and befriending). For each dependent variable, two separate blocks were entered into the regression analysis.
The overall IAT score was entered as the first block of the regression analysis. The first block of the regression analysis tested if the overall IAT score would predict scores on the dependent variables. The independent variables of overtness, risk, and response were entered as the second block of the regression analysis. The second block of the regression analysis assessed to what degree the level of overtness, risk, and response helped predict the dependent variable once the overall IAT score is known. In these analyses, overall IAT score functioned as an independent variable in order to evaluate the effect of an individual’s general attitude on the vignette study’s dependent variables.

### Table 6

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Competence Score</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Tolerance Score</td>
<td>.56**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>3. Befriending Score</td>
<td>.51**</td>
<td>.70**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Cancer Score</td>
<td>.08</td>
<td>.03</td>
<td>.03</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Paraplegic Score</td>
<td>.07</td>
<td>.04</td>
<td>.08</td>
<td>.29**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Mental Illness Score</td>
<td>.01</td>
<td>.01</td>
<td>.00</td>
<td>.41**</td>
<td>.29**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Alcoholic Score</td>
<td>.10</td>
<td>.03</td>
<td>.10</td>
<td>.32**</td>
<td>.28**</td>
<td>.41**</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. HIV Positive Score</td>
<td>.10</td>
<td>.08</td>
<td>.07</td>
<td>.05</td>
<td>.23*</td>
<td>.05</td>
<td>.24**</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>9. Overall IAT Score</td>
<td>.02</td>
<td>.00</td>
<td>.03</td>
<td>.64**</td>
<td>.64**</td>
<td>.64**</td>
<td>.68**</td>
<td>.57**</td>
<td>--</td>
</tr>
</tbody>
</table>

*Note. N = 122.*

*p < .05  **p < .01.*
Results of Regression Analysis for Competence Ratings. For the dependent variable of competence, the two blocks were entered into the hierarchical regression analysis. Analysis of Block One indicated that the overall IAT score was not a significant predictor of competence, $R^2 = .02, p > .05$. Analysis of Block Two indicated a significant change in $R^2$, $\Delta R^2 = .20, p < .05$. Thus, the regression analysis indicated that knowing the level of overtness, risk, and response helped predict scores on competence after knowing the overall IAT score.

Results of Regression Analysis for Tolerance Ratings. For the dependent variable of tolerance, the two blocks were entered into the hierarchical regression analysis. Analysis of Block One indicated that overall IAT score was not a significant predictor of tolerance, $R^2 = .00, p > .05$. Analysis of Block Two indicated a nonsignificant change in $R^2$, $\Delta R^2 = .04, p > .05$. Thus, the regression analysis indicated that knowing the level of overtness, risk, and response did not help predict scores on tolerance after knowing the overall IAT score.

Results of Regression Analysis for Befriending Ratings. For the dependent variable of befriending, the two blocks were entered into the hierarchical regression analysis. Analysis of Block One indicated that the overall IAT score was not a significant predictor of befriending, $R^2 = .03, p > .05$. Analysis of Block Two indicated a nonsignificant change in $R^2$, $\Delta R^2 = .05, p > .05$. Thus, the regression analysis indicated that knowing the level of overtness, risk, and response did not help predict scores on befriending after knowing the overall IAT score.

Given the results of the three hierarchical regression analyses, Hypothesis Five is only partially supported. Overtness, risk, and response added incremental variance
beyond the overall IAT score but only for the dependent variable of competence. For the
dependent variables of tolerance and befriending, overtness, risk, and response did not
add incremental variance beyond the overall IAT score.
Discussion

The disability research suggests that biased attitudes can negatively impact the socialization of individuals with disabilities into the workplace and their perceived ability and competence once in the workplace. These biased attitudes can manifest themselves in the form of out-group membership status, a lack of role models, biased job performance, and less job tenure (Bordieri & Drehmer, 1987; Bordieri, Drehmer, & Taylor; 1997; Colella, 2001; Rusch, Johnson, & Hughes, 1990; Stone et al., 1992). The U.S. Census data indicates that individuals with disabilities have much higher unemployment rates and much lower salaries than individuals without disabilities (U.S. Census Bureau, 2000a; 2000b). Research has also shown that employers exhibit biased attitudes in hiring, ratings of performance, and other employment decisions (Bordieri et al., 1997; Drehmer & Bordieri, 1985; Hernandez, 2000; Satcher & Dooley-Dickey, 1992). Coworkers’ biased attitudes can have a significant impact on the individual with a disability as well. Coworkers are an important part of an individual’s socialization into the workplace as well as other workplace functions, such as on-the-job training. Thus, if coworkers are not accepting of the individual with a disability, then that individual may become isolated, lack social support and eventually quit due to a negative work environment (Bordieri & Drehmer, 1987; Colella, 2001; Rusch et al., 1990).

Furthermore, research has shown that different disabilities are differentially preferred. This differential preference for disabilities was demonstrated by Tringo (1970) with the establishment of the Hierarchy of Preference. The Hierarchy of Preference has been replicated numerous times and has remained stable over time and through various methodologies (Jones & Stone, 1995; Lyons & Hayes, 1993; Schmelkin, 1984; Thomas,
2000). The IAT was used as an indirect method to assess attitudes toward specific disabilities in the current study. The IAT is a method that has been used to examine implicit biased attitudes regarding such topics as race, religious ethnicity, gender differences, nationality, self-concept, and smoking (Greenwald et al., 1998; Greenwald & Farnham, 2000; Ottaway, Hayden, & Oakes, 2001; Ruggerio, Mitchell, Krieger, Marx, & Lorenzo, 2000; Swanson, Rudman, & Greenwald, 2001).

It was first hypothesized that administering the IAT for five specific disabilities would replicate the Hierarchy of Preference. Using five disabilities from differing points on the Hierarchy of Preference, the IAT was administered for Cancer, Paraplegic, Mental Illness, Alcoholic, and HIV Positive. The results indicated that the Hierarchy was not replicated with the IAT methodology. However, there was a significant main effect for the five IAT tests. Given the results for this hypothesis, the IAT’s validity remains questionable. Attitudes toward specific disabilities have been assessed in the past using various measures and numerous methodologies, and those multiple approaches have consistently produced the same Hierarchy of Preference.

The second hypothesis stated that both gender and race would have an effect on the scores on the five individual IAT tests. According to the disability literature, race and gender have been found to have an effect on explicit measures of attitudes about disabilities. Research has shown that women and minorities have more positive attitudes toward individuals with disabilities (Satcher and Dooley-Dickey, 1992). Therefore, it was hypothesized that females and non-Caucasians would have smaller IAT effects, meaning more favorable attitudes toward the disability. However, the analyses indicated that gender did not affect scores on the IAT tests. Also, there was no interaction between
gender and the disability. Likewise, race did not affect scores on the IAT tests. Additionally, there was no interaction between race and the disability. There was no interaction between race and gender. Finally, there were no interactions between race and gender, gender and disability, or race and disability. These results indicate that the gender and race of participants is not a significant factor in IAT performance. Again, because the IAT failed to produce results consistent with the majority of previous research, the validity of the IAT as a measure of implicit attitudes toward individuals with disabilities remains questionable. However, these results should be interpreted with caution because African-Americans were combined with other non-Caucasians for these analyses and because the sample size of the non-Caucasian participants ($N = 19$) was small.

Hypothesis Three related to coworker attitudes toward individuals with disabilities. Eight vignettes were written to manipulate two levels of each of the dimensions of overtness, risk, and response formulated by Thomas (2001). It was hypothesized that the high overtness, risk, and response conditions would generate more negative ratings on perceived competence of the individual, potential tolerance of the individual, and potential befriending of the individual. Partial support was found for this hypothesis. Overtness did not produce any significant effects on coworker attitudes. Response significantly influenced the ratings on perceived competence while risk significantly affected the ratings on perceived competence, potential tolerance, and potential befriending. The nonsignificant result for overtness may indicate that people are more accepting of individuals with disabilities. This result may reflect the
conditioning that society has placed on the general population to accept individuals with disabilities as having equal value and rights.

The high response condition describes the individual as expecting supervisors and employees to accommodate problems the disability has on job performance, such as allowing extra time to complete job tasks. Participants may have inferred that the individual had a lack of ability to actually perform the job, given that extra time or a special accommodation was required to fulfill job responsibilities. Actually giving an employee a special accommodation is differential treatment, and other employees may react negatively if they perceive the accommodation to be unfair (Colella, 2001). Colella hypothesized that other employees may consider the accommodation as unfair if the accommodation is perceived as a method to make the job easier for the individual with a disability. Furthermore, if the accommodation is perceived as a reward or uses limited resources, employees may perceive the accommodation as unfair. However, Colella also stated that if the employee with the disability is integrated into the workplace and is valued by the organization, any accommodation is more likely to be perceived as fair. In the present study, the individual in the vignettes was a newly hired employee, and thus would not yet be integrated into the workplace. This factor may explain why high response conditions produced more negative ratings on competence. The individual described in the high response conditions was not integrated into or valued by the organization, and the need for accommodation may have been perceived as a lack of ability to perform the job duties.

The high risk conditions describe the individual as likely to have negative impact to his/her health and job performance due to the disability. Participants most likely
perceived that the disability would affect the individual's competence to perform the job. Thus, high risk conditions received lower ratings on competence. Participants also gave lower ratings for tolerance and befriending for the high risk conditions. Given that the disability is expected to negatively impact the individual’s health in the high risk conditions, participants may have interpreted this negative as a threat to their own health. Also, participants may not be as likely to befriend an individual who is perceived to be sick and limited in the ability to participate in social activities outside the workplace. Rusch et al. (1990) examined the act of advocating for coworkers with disabilities by other coworkers. They found that as the severity of the disability increased, the likelihood of advocating for the coworker with a disability decreased. Rusch et al. also found that coworkers without disabilities befriended fewer than 50% of their coworkers with disabilities. Coworkers with no disabilities associated with a majority of the coworkers with disabilities regardless of the disability. However, coworkers with no disability rarely invited coworkers with disabilities to participate in activities outside the workplace. The results of the current study appear to be similar to those found by Rusch et al. For the high risk conditions, the ratings for tolerance and befriending were lower. The nonsignificant results for overtness may indicate that the visibility of a disability is not as important to coworkers as level of threat associated with the disability and the attitude that the individual with a disability has toward his/her employer and coworkers.

The fourth hypothesis stated that ratings on competence, tolerance, and befriending would be related to the scores on the five individual IAT tests (i.e., Cancer, Paraplegic, Mental Illness, Alcoholic, and HIV Positive). The analysis indicated no support for this hypothesis as none of the individual IAT tests were significantly
correlated with any of the vignette dependent variables of competence, tolerance, or befriending. Furthermore, the overall IAT score did not significantly correlate with competence, tolerance, or befriending. Although this hypothesis was not supported, it may not be surprising to find this result. These results, along with the results for Hypotheses Two (A) and Two (B), seem to indicate that the IAT is not accurately measuring attitudes toward individuals with disabilities. The results for Hypotheses Two (A) and Two (B) and Hypothesis Four appear to question the viability of the IAT as a valid method to assess general attitudes toward individuals with disabilities.

The fifth hypothesis stated that overtness, risk, and response would add incremental variance beyond the overall IAT score on prediction of the dependent variables of competence, tolerance, and befriending. It is important to note that because Hypothesis Four failed to find a relationship between the IAT and the dependent variables, Hypothesis Five now essentially tests the ability of overtness, risk, and response to predict competence, tolerance, and befriending. Partial support was found for this revised hypothesis. For the dependent variable of competence, the overall IAT score was not a significant predictor. However, overtness, risk, and response added incremental variance beyond the overall IAT score. Therefore, knowing the level of overtness, risk, and response would help predict scores on competence after knowing the overall IAT score. For the dependent variable of tolerance, the overall IAT score was not a significant predictor. Overtness, risk, and response added significant incremental variance beyond the overall IAT score. For the dependent variable of befriending, the overall IAT score was not a significant predictor. Overtness, risk, and response added significant incremental variance beyond the overall IAT score. These results indicate that
knowing the level of overtness, risk, and response helps predict scores for competence after knowing the overall IAT score. However, the level of overtness, risk, and response did not help predict scores for tolerance or befriending beyond the overall IAT score. An important note is that competence is a more relevant workplace variable than either tolerance or befriending. Perceived competence can become an Equal Employment Opportunity issue if an individual with a disability is treated differentially.

**Implications**

An implication for the IAT is that it may not have the same capability to assess attitudes toward individuals with disabilities as it has for race, gender, and other groups (Cunningham et al., 2001; Greenwald et al., 1998; Greenwald & Farnham, 2000; McConnell & Leibold, 2001; Rudman et al., 1999). The IAT may not have the same capability because the administration of the IAT for the five disabilities failed to replicate Tringo’s Hierarchy of Preference (1970) that has been established and replicated several times. However, the IAT administrations did differentiate the disabilities, indicating that some disabilities may have greater automatic association with unpleasant ideas than other disabilities. An important implication for practitioners is that different disabilities may elicit different reactions from individuals. Unfortunately, the etiology of this difference in disabilities in the current study is unclear.

An implication of the vignette study is that the level of risk and response of an individual with a disability may negatively impact that person’s socialization into the workplace and perceived competence by coworkers. The level of response exhibited by an individual with a disability to his/her environment may negatively influence coworker’s perceived competence of that individual. An individual with a high level of
response may be more likely to request reasonable accommodation from the employer. The request for accommodation may appear to coworkers that the individual with a disability may need this accommodation because of lack of skill and not because of some limitation caused by the disability. Furthermore, the level of risk associated with an individual with disability may also negatively influence perceived competence by supervisors and employers. The level of risk may also negatively influence the socialization of an individual with a disability into the workplace because coworkers may be less tolerant of and less likely to befriend the individual. Employers should recognize that the level of risk and response might negatively affect individuals with disabilities in the workplace. Organizations could consider programs to train supervisors in recognizing biased attitudes and misperceptions about individuals with disabilities. With training to recognize these issues, biased attitudes that lead to negative consequences (i.e., biased performance appraisals, out-group membership status, social isolation, high attrition) for individuals with disabilities in the workplace may be reduced.

Given the results of this study, employers should recognize that different disabilities might be preferred over others by employees. Furthermore, employers should be able to identify and understand the probable negative impact of high levels of response and risk of an individual with a disability on coworker attitudes. High attrition of individuals with disabilities can have profound affects on organizations and society as a whole, in that individuals with disabilities, who have the necessary competencies and want to be a productive employee, may encounter difficulties in integrating themselves into the organization.
Conclusions

Attitudes toward individuals with disabilities in the workplace is a very critical issue for organizations. The 2000 U.S. Census indicated that 70% of individuals with a work disability were unemployed, and the salaries of individuals with disabilities were substantially lower (U.S. Census Bureau, 2000a; 2000b). Biased coworker attitudes can lead to workplace isolation of the individual with a disability, which can decrease self-esteem and enjoyment of their work. Decreased self-esteem and enjoyment of work can lead to greater attrition for individuals with disabilities (Bordieri & Drehmer, 1987; Bordieri, Drehmer, & Taylor; 1997; Colella, 2001; Rusch, Johnson, & Hughes, 1990; Stone et al., 1992). The current study investigated the validity of the IAT by attempting to replicate the Tringo's Hierarchy of Preference (1970) using five disability conditions. Additionally, this study examined three dimensions of disabilities (i.e., overtness, risk, and response) that may influence the attitudes of coworkers toward the individual with a disability.

First, the IAT was administered for five disabilities (i.e., Cancer, Paraplegic, Mental Illness, Alcoholic, and HIV Positive) to examine if a replication of the Hierarchy of Preference (Tringo, 1970) would result. The IAT did not replicate the Hierarchy of Preference. Furthermore, the hypothesis that gender and race would affect scores on the IAT was not supported. The question of the IAT's validity as an accurate measurement of general attitude remains given the results of the current study.

Second, a vignette study was administered that manipulated the independent variables of overtness, risk, and response as high and low. Then, ratings on perceived competence, potential tolerance, and potential befriending of the individual described in
the vignette were assessed. The results indicated that high levels of response and risk produce more negative ratings on perceived competence of the individual with a disability. If an individual is very vocal about his/her need for accommodation or expresses a sense of entitlement (i.e., high level of response), it may make the need for the accommodation more salient to coworkers. If the disability appears threatening to health or job performance (i.e., high level of risk), coworkers may presume that the individual’s ability to perform the job will be decreased.

A high level of risk also produced more negative ratings on potential tolerance and befriending of the individual with a disability. This result may indicate that threats to health and job performance may be perceived by coworkers as an inability to be as productive and active in the workplace as well as outside the workplace. Therefore, if an individual with a disability is perceived as less productive in the workplace, coworkers may have less tolerance for the individual because the individual is not able to “pull his/her own weight” in the workforce. If an individual with a disability is perceived as less active outside the workplace, coworkers may be more reluctant to befriend him/her.

The results of the IAT administrations and the vignette study were examined to determine if there was a significant relationship between the results. The five individual IAT scores were not significantly correlated to any of the three dependent variables (i.e., competence, tolerance, and befriending) from the vignette study. Finally, regression analyses were conducted to determine if the level of an individual’s overtness, risk, and response would help predict ratings on competence, tolerance, and befriending beyond knowing the overall IAT score. Overtness, risk, and response did help predict beyond the overall IAT score for competence ratings, but not tolerance or befriending ratings.
Limitations

There were some limitations of the IAT administration that contributed to the failure to reproduce the Hierarchy of Preference. One limitation was that not all disabilities in the original Hierarchy of Preference were tested. It was not practical due to time constraints to actually administer an IAT test for all disabilities in the original Hierarchy of Preference.

Another limitation may have been an order effect. The five IAT tests were administered in the same order to all participants because the IAT literature has offered evidence that the order in which tests are given does not affect scores (Greenwald et al., 1998). The order in which the IAT tests were administered was as follows: HIV Positive, Paraplegic, Alcoholic, Cancer, and Mental Illness. The mean score for HIV Positive was much greater than for the mean scores for the other four disabilities (see Table 1). The indication may be that after completing the IAT test for HIV Positive, they had acquired knowledge of how the test operated. In fact, even after the HIV Positive condition, IAT scores continued to decrease over the course of the four remaining administrations. Thus, in subsequent tests, the participants were able to further reduce the difference in their mean response times between the compatible and non-compatible trials.

Another possible limitation was the actual choice of disabilities to include in the IAT administrations. HIV Positive is the only disability stated in a negative direction, meaning that HIV Positive has negative associations and HIV Negative has positive associations. Thus, the IAT administration may have required more processing time for participants. This time frame may provide an explanation for why the mean score for
HIV Positive was much larger than the mean scores for Cancer, Mental Illness, Alcoholic, and Paraplegic.

Regarding the vignette study, one limitation was that students, not employees at an organization, were the participants. Furthermore, participants were asked to imagine that they were employees at a fictitious company. This setting may have influenced their responses, especially if they had never worked with an individual with a disability. Ratings for a fictional individual may differ greatly from actual decisions and behaviors that might occur in a real work setting.

*Future Directions*

In future research involving the IAT and disabilities, the IAT could be administered for other disabilities within the Hierarchy of Preference. This study investigated only five of those disabilities. If IAT tests were developed for more disabilities, a more accurate view of the IAT's ability to replicate the Hierarchy of Preference can be evaluated. Another suggestion for future research with the IAT is to counterbalance the administration of the IAT tests to eliminate any order effects. Also, a selection of disabilities that invoke differing attitudes should be used. For example, in the current study, HIV Positive was the only disability chosen that seems to still have a negative stigma associated with it by society in general. Other disabilities, such as Tuberculosis, might be included to examine differences in the IAT scores between two disabilities that affect public health.

A future direction for studying the affect of overtness, risk, and response on coworker attitudes is to replicate the vignette study within the context of an actual organization. Additionally, the dimensions of overtness, risk, and response could be
manipulated for a specific disability. For example, the affect of high versus low levels of overtness, risk, and response for HIV Positive on coworker attitudes could be studied. This process could be replicated for several disabilities because the disability literature has demonstrated that different disabilities are preferred over others (Jones & Stone, 1995; Lyons & Hayes, 1993; Schmelkin, 1984; Thomas, 2000; Tringo, 1970). Therefore, coworker attitudes on competence, tolerance, befriending, or some other attitude may differ according to the specific disability being studied. Another future direction for a replication of the vignette study is to manipulate the level of the employee’s integration into the workplace, their value to the organization or their performance level. Colella (2001) stated that accommodations given to individuals with disabilities are more likely to be perceived as fair if the individual is integrated into the workplace or is valued by the organization. Thus, an interesting research question is, if two employees are equal in their levels of overtness, risk, and response, does integration into the workplace or performance level generate different coworker attitudes.
References


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 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 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 given 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 participants 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 conditions, please list one-word adjectives/descriptors that are associated with the condition. You should write as many words as come to mind about the condition. 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 help employers, rehabilitation psychologists, and individuals with disabilities. Your participation in this activity is completely voluntary. You may choose to withdraw at any time.

ASTHMA

NO ASTHMA

HEART DISEASE

HEALTHY HEART

BLIND

NON-BLIND
DRUG ADDICTED           DRUG FREE

MENTAL ILLNESS           MENTAL HEALTH

AMPUTEE                  NON-AMPUTEE
INSTRUCTIONS

For the following conditions, please list one-word adjectives/descriptors that are associated with the condition. You should write as many words as come to mind about the condition. 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 help employers, rehabilitation psychologists, and individuals with disabilities. Your participation in this activity is completely voluntary. You may choose to withdraw at any time.

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: Measurement of Attitudes Toward Individuals with Disabilities

Investigator: Andrea Doyle, Psychology Department, 745-3820

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 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.

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

2. **Explanation of Procedures:** The researcher will explain instructions for the study. You will be given a scenario to read and then will be asked to answer questions about this scenario. Then, you will complete five computer tasks.

3. **Discomfort and Risks:** There are no anticipated risks to you.

4. **Benefits:** Your answers will help the investigators understand what factors affect attitudes toward individuals with disabilities in the workplace. Also, your completion of the computer task will provide more helpful information for employers and psychologists about different preferences for different disability conditions.

5. **Confidentiality:** All answers given by you 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.
Vignette One: Low Overtness, Low Risk, Low Response

Imagine that you are an employee at ABC Corporation, and a new employee, named Chris, has just been hired. Chris has a disability and is covered by the Americans with Disabilities Act. The Americans with Disabilities Act states that an employer may not discriminate against an individual with a disability in hiring a qualified person and that employers need to provide "reasonable accommodation" to individuals with disabilities. The fact that Chris has a disability should not be obvious when other employees or customers meet Chris for the first time. Chris will be able to perform the job using the same equipment as other employees. In addition, the disability is not contagious and is not life-threatening to Chris. The disability should not negatively impact Chris' health or job performance. Chris does not expect any special treatment from supervisors or other employees in performing the job.
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Vignette Three: Low Overtness, High Risk, Low Response

Imagine that you are an employee at ABC Corporation, and a new employee, named Chris, has just been hired. Chris has a disability and is covered by the Americans with Disabilities Act. The Americans with Disabilities Act states that an employer may not discriminate against an individual with a disability in hiring a qualified person and that employers need to provide "reasonable accommodation" to individuals with disabilities. The fact that Chris has a disability should not be obvious when other employees or customers meet Chris for the first time. Chris will be able to perform the job using the same equipment as other employees. In addition, it is very likely that the disability will negatively impact Chris' health and job performance in the months after starting the job. Chris does not expect any special treatment from supervisors or other employees in performing the job.
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Appendix E: Dependent Measures for Vignette Study

Based on the information presented about Chris, respond to the following statements as if you were an employee at ABC Corporation and would be working in the same department as Chris.

Please Respond to the Following Statements Using the Scale Below. Please Circle Your Answers.

SD: Strongly Disagree
D: Disagree
N: Neutral
A: Agree
SA: Strongly Agree

1. Chris will require special equipment to do the job.  
   SD, D, N, A, SA
2. The disability Chris is afflicted with is contagious and may negatively affect job performance.  
   SD, D, N, A, SA
3. Chris expects special treatment from ABC Corporation.  
   SD, D, N, A, SA
4. Chris will be successful employee at ABC Corporation.  
   SD, D, N, A, SA
5. I think other people will be willing to work with Chris on projects.  
   SD, D, N, A, SA
6. Chris will be able to easily handle problems that arise at work.  
   SD, D, N, A, SA
7. I will become a friend to Chris in the workplace.  
   SD, D, N, A, SA
8. Working with Chris on a team will be a productive experience.  
   SD, D, N, A, SA
9. I will invite Chris to activities outside work.  
   SD, D, N, A, SA
10. I would introduce Chris to my friends outside ABC Corporation.  
    SD, D, N, A, SA
11. I will speak to Chris only when it is necessary to complete a job task.  
    SD, D, N, A, SA
12. After a few weeks, Chris will be an excellent performer.  
    SD, D, N, A, SA
13. Chris will learn the job quicker than most other new employees.  
    SD, D, N, A, SA
14. I will associate with Chris in the workplace.  
    SD, D, N, A, SA
15. Working with Chris will be a good experience.  
    SD, D, N, A, SA
16. Chris will have trouble making friends at ABC Corporation.  
    SD, D, N, A, SA
17. Other employees will involve Chris in activities outside work.  
    SD, D, N, A, SA
18. Chris will hurt team performance.  
    SD, D, N, A, SA
Appendix F: Biographical 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  Average 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 an individual with a disability.

   Hourly       Daily       Weekly       Once a month  Once every three months  Less often
Appendix G: Categories and Stimulus Items Used for Implicit Association Test Administration

<table>
<thead>
<tr>
<th>Cancer</th>
<th>Cancer Free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak</td>
<td>Healthy</td>
</tr>
<tr>
<td>Frail</td>
<td>Happy</td>
</tr>
<tr>
<td>Sick</td>
<td>Strong</td>
</tr>
<tr>
<td>Survivor</td>
<td>Lucky</td>
</tr>
<tr>
<td>Unfortunate</td>
<td>Vibrant</td>
</tr>
<tr>
<td>Terminal</td>
<td>Fortunate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paraplegic</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Immobile</td>
<td>Mobile</td>
</tr>
<tr>
<td>Confined</td>
<td>Independent</td>
</tr>
<tr>
<td>Dependent</td>
<td>Lucky</td>
</tr>
<tr>
<td>Challenged</td>
<td>Capable</td>
</tr>
<tr>
<td>Impaired</td>
<td>Freedom</td>
</tr>
<tr>
<td>Restricted</td>
<td>Functional</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mental Illness</th>
<th>Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crazy</td>
<td>Strong</td>
</tr>
<tr>
<td>Incapable</td>
<td>Clarity</td>
</tr>
<tr>
<td>Troubled</td>
<td>Functional</td>
</tr>
<tr>
<td>Different</td>
<td>Capable</td>
</tr>
<tr>
<td>Confused</td>
<td>Stable</td>
</tr>
<tr>
<td>Isolated</td>
<td>Adjusted</td>
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</table>

<table>
<thead>
<tr>
<th>Alcoholic</th>
<th>Non-Alcoholic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak</td>
<td>Sober</td>
</tr>
<tr>
<td>Abusive</td>
<td>Stable</td>
</tr>
<tr>
<td>Addicted</td>
<td>Control</td>
</tr>
<tr>
<td>Careless</td>
<td>Dependable</td>
</tr>
<tr>
<td>Immature</td>
<td>Disciplined</td>
</tr>
<tr>
<td>Compulsive</td>
<td>Responsible</td>
</tr>
</tbody>
</table>
HIV Positive   HIV Negative
Irresponsible  Conscientious
Careless       Clean
Contagious     Careful
Unsafe         Cautious
Unlucky        Safe
Risky          Healthy

Pleasant       Unpleasant
Champion       Bomb
Diamond        Devil
Diploma        Hatred
Rainbow        Pollute
Sunrise        Slime
Vacation       Poison