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DIFFERENCES IN ATTITUDES TOWARDS PEOPLE WITH DISABILITIES:  
EXAMINING THE EFFECT OF THE PRESENCE OF AN ASSISTANCE DOG

A thesis submitted in partial fulfillment of the requirements for the  
degree of Master of Science at Virginia Commonwealth  
University

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## **Abstract**

### **DIFFERENCES IN ATTITUDES TOWARDS PEOPLE WITH DISABILITIES: EXAMINING THE EFFECT OF THE PRESENCE OF AN ASSISTANCE DOG**

By: Jennifer A. Coleman, M.A.

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science  
at Virginia Commonwealth University

Virginia Commonwealth University, 2013

Major Director: Kathleen M. Ingram, J.D., Ph.D.  
Associate Professor, Assistant Dean for Academic Affairs  
Department of Psychology

Individuals with disabilities face various types of social stigma. Research suggests that the presence of an assistance dog leads to an increase in social interactions. The purpose of this study was to determine whether people's attitudes toward individuals with disabilities differ when pairing that person with an assistance dog. Undergraduate students ( $N = 244$ ) were randomly assigned to view an individual with a disability either alone or with an assistance dog. Participants rated their attitudes toward the individual, completed a newly developed Implicit Association Test, and answered behavioral intention questions. Results of a hierarchical multiple regression analysis indicated that individuals with more positive attitudes toward dogs had significantly more positive social attitudes toward the individual with a disability paired with a dog, after accounting for gender and dog ownership history. Additionally, individuals had an implicit bias toward an individual with a disability paired with an assistance dog over the individual alone.



## Differences in Attitudes Towards People with Disabilities: Examining the Effects of the Presence of an Assistance Dog

Human-animal interactions have been studied for many years. However, initial studies on human-animal interactions were predominately descriptive, with only six experimental studies conducted by 1984 (Beck & Katcher, 1984). Since then, numerous studies have been published on human-animal interactions, animal-assisted activities, and animal-assisted therapy. Pet Partners, formerly known as the Delta Society, is one of the leading organizations that promote human-animal interactions through education, promoting standards in the field, and empowering individuals with disabilities. The organization defines *animal assisted activities* as “opportunities for motivational, educational, recreational, and/or therapeutic benefits to enhance quality of life” (Pet Partners, 2012). In contrast, Pet Partners defines *animal-assisted therapy* as “a goal-directed intervention in which an animal that meets specific criteria is an integral part of the treatment process” (Pet Partners, 2012). *Human-animal interactions* refer to a much broader category of activities and include any interaction that occurs between a human and any animal.

One of the better-known studies that examined the health benefits of human-animal interactions is Friedmann, Katcher, Lynch, and Thomas’ (1980) study of survival rates of 96 individuals from a coronary care unit. Friedmann et al. found that at a 1-year follow-up, 28% of the participants without a pet had died compared to only 6% of pet-owning participants who had died. Recent literature reviews suggest that studies on human-animal interactions have been improving in rigor and include larger sample sizes and more nationally representative samples (Barker & Wolen, 2008). Although a great deal of the human-animal interaction literature has methodological limitations, research suggests that pet ownership serves as a buffer against stress and is associated with health benefits such as increases in physical activity (Barker & Wolen).

In addition to animal assisted activities and animal assisted therapies, animals are also used to assist individuals with disabilities. Dogs are one of many animals trained to complete tasks to aid people with disabilities. As early as 1929, dogs were trained to assist individuals who were blind. Dorothy Harrison Eustis learned about seeing-eye dogs through watching guide dogs who were paired with veterans with blindness. She then went on to establish The Seeing Eye guide dog school in Switzerland. Morris Frank, an American who was blind, contacted Ms. Eustis and went on to establish the first guide dog school in the United States (Wenthold & Savage, 2007). In 1975, Bonnie Bergin founded Canine Companions for Independence, which trains dogs for individuals' with disabilities. In 1987, Assistance Dogs International, Inc. was founded, which is another well-established organization that promotes acquisition of and education on assistance dogs. Since then, numerous organizations have been created to train dogs for individuals with various disabilities including individuals who are blind, deaf, physically disabled, and have mental illness.

The Americans with Disabilities Act (ADA) is a set of laws that outline various equal opportunity rights for people with disabilities. According to the ADA, an individual with a disability is defined as:

A person who has a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record of such an impairment, or a person who is perceived by others as having such an impairment. (U.S. Department of Justice, 2009).

The ADA specifies that individuals with disabilities have the legal right to bring a service animal with them into public establishments. Originally the ADA did not define the term “service

animal” but recent amendments were made to the definition on March 15, 2011. The exact definition of a service animal according to the ADA is as follows:

Service animals are animals that are individually trained to perform tasks for people with disabilities such as guiding people who are blind, alerting people who are deaf, pulling wheelchairs, alerting and protecting a person who is having a seizure, or performing other special tasks. Service animals are working animals, not pets. (U.S. Department of Justice, 2009).

The amendment specifies that “service animals” are dogs and in certain cases miniature horses, either of which must be trained to complete a task that mitigate the individual’s disability. Before the ADA was amended, dogs used as “emotional support” (dogs not trained to complete specific tasks) could be considered service animals. The recent amendment also clarifies that individuals with mental disabilities are granted all protections provided by the ADA. This clarification was important because disabilities may be visible (e.g., physical disabilities) or invisible (e.g., mental illness) and often individuals with service dogs may not feel comfortable disclosing their disability. In addition to the ADA, the Fair Housing Amendments Act (1988) mandates equal housing opportunities for people with disabilities, such that individuals with service dogs are allowed exceptions to residencies with “no pet” policies (U.S. Department of Justice, 2009).

Many terms are used in human-animal interactions literature. The term *companion animal* is used to reference a pet. The terms assistance dog and service dog are frequently used interchangeably despite having different meanings. Human-animal interaction researchers often cite Assistance Dogs International, Inc. when defining these two terms or use terminology consistent with Assistance Dogs International’s definitions (Sachs-Ericsson, Hansen, & Fitzgerald, 2002; Winkle, Crowe & Hendrix, 2012). According to Assistance Dogs International,

an *assistance dog* is a broader category pertaining to guide dogs, hearing dogs, and service dogs. Guide dogs specifically aid individuals with vision impairments and hearing dogs aid individuals with hearing impairments. *Service dogs* are generally trained to retrieve objects and enhance an individual's mobility and are trained to aide individuals with physical disabilities, seizures, autism spectrum disorders, diabetes, and psychiatric disabilities (Sachs-Ericsson et al.; Winkle et al.). Individuals who have service dogs may have a number of different physical disabilities, a few of which include spinal cord injuries, muscular dystrophy, cerebral palsy, or brain injuries. For the purpose of this paper, the research study will use the previously stated terminology (i.e., assistance dog) and definitions. However, the literature review will use the terminology that the authors of each study used to be consistent with their language.

Prior research has examined the benefits of receiving an assistance dog as well as differences in social interactions for individuals when paired with their assistance dog. However, no research has assessed differences in attitudes toward people with disabilities when an assistance dog is present. The current study aims to examine the relationship between attitudes toward people with disabilities and the presence of an assistance dog. To do this, participants' attitudes toward a photo of a person with a disability were measured and two behavior intentions were assessed. Participants were randomly assigned to one of two conditions: a photo of a person in a wheelchair or a photo of a person in a wheelchair paired with an assistance dog.

The primary aim of the study was to assess whether people's attitudes toward individuals with disabilities differ simply by pairing a person with a disability with an assistance dog. It was hypothesized that attitudes toward an individual with a disability who were paired with an assistance dog would be more positive. The second aim of the study was to assess whether attitudes towards dogs influenced attitudes toward an individual with a disability who was paired

with an assistance dog. It was hypothesized that among individuals who see a person with a disability paired with an assistance dog, those with more positive attitudes towards dogs would view the person with a disability more positively. Aim three of the study was to evaluate whether there was an association between participants' attitudes toward individuals with disabilities paired with assistance dogs on implicit measures and on explicit measures. The hypothesis was that among participants in the condition with the dog present, those with an implicit bias toward an individual with a disability paired with an assistance dog would rate the individual in the photo more positively. The fourth aim of the study was to explore if participants had an implicit bias toward individuals with disabilities paired with assistance dogs compared to viewing the same individual alone. It was hypothesized that participants would have an implicit bias toward the individual with a disability paired with an assistance dog. Aim five of the study was to examine whether the presence of an assistance dog with an individual with a disability predicted a participant's likelihood to agree to volunteer for a university club related to disabilities. The hypothesis was that participants in the dog present condition would be more likely to agree to volunteer on this behavioral intention measure. The sixth, and final aim of the current study was to explore whether the presence of an assistance dog with an individual with a disability predicted a participant's likelihood to e-mail the individual they saw in the photograph to answer questions regarding the university. It was hypothesized that participants in the dog present condition would be more likely to email the man they saw in the photograph.

### **Literature Review**

The human-animal interaction literature focuses on a variety of benefits for humans including improvements in physiological health, emotional well-being, and social interactions.

The following literature review focuses specifically on how animals alter attitudes toward the humans with whom they are paired and the ways in which animals affect social interactions. In particular, research has shown that assistance dogs paired with people with disabilities increase community participation and facilitate social interactions with the public. The theoretical justification for differences in attitudes and social interactions comes from the social psychology literature on interpersonal attraction, an evolutionary theory known as the biophilia hypothesis, theories of attitude structure, learning theories, and the theory of planned behavior.

### **Attitudes Toward Others**

Attitudes are a form of evaluation, either positive or negative, toward a target object (Fazio, 2007; Fiske, 2010; Olson & Fazio, 2001). Attitudes are conceptualized as having three components: cognitive, affective, and behavioral (Berscheid & Walster, 1978; Jones, 1984; Katz & Stotland, 1959). Thoughts comprise the cognitive aspect of attitudes, and emotions comprise the affective aspect. Many measures have been developed to assess attitudes towards others. Measures assessing attitudes are either explicit or implicit. Implicit measures, such as the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998), assess attitudes without directly asking an individual, whereas explicit measures directly ask an individual about his/her attitudes (Fazio & Olson, 2003b). In studying attitudes toward individuals who are stigmatized, the correlation between explicit and implicit measures can be very low (Fazio & Olson, 2003b; Pruett & Chan, 2006). The low correlation is likely because participants who are asked about their attitudes toward stigmatized individuals (e.g., individuals with disabilities) often provide socially desirable responses instead of stating how they really feel (Pruett & Chan, 2006).

## **Influence of Animals on Attitudes**

Many factors influence humans' attitudes or humans' mental images of stimuli. One area of research focuses on how animals alter humans' attitudes toward strangers. Rossbach and Wilson (1992) explored whether the presence of a dog would affect perceptions of an individual. They conducted two related studies with 34 and 45 participants respectively who viewed a series of photographs. There were four photographs: an individual alone, an individual with a dog, an individual holding flowers, and a nature scene. Participants were asked to rate photographs according to approachability, happiness, and how relaxed the person appeared (if applicable). Participants were also asked which scene they preferred to gaze at and liked best. Last, they were asked which scene made them feel most comfortable and made them feel more relaxed. The researchers used *t* tests to assess questions at an item level. Rossbach and Wilson found that the individual with a dog was rated as significantly safer, happier and more relaxed, and that those photos were preferred. Participants also reported a preference to be in the scene with an individual walking a dog as opposed to the scene with an individual alone.

Specifically looking at how animals affect likability of individuals, Geries-Johnson and Kennedy (1995) explored the presence of a bird, a cat, and a dog paired with an individual in a photograph. The researchers used an analysis of variance to compare the four conditions. They found that individuals were rated as significantly more likable when pictured with a dog as compared to being pictured with either of the other two animals or when pictured alone. Similarly, Wells and Perrine (2001) looked at how the presence of an animal influenced students' perceptions of a faculty member's office. Students were asked to assess how comfortable, welcoming, inviting, personal, relaxed, and pleasant the office appeared. In addition, students were asked whether they would look forward to spending time in the office

and to rate the friendliness of the professor. Students viewed the office as significantly more comfortable and they rated the professor as friendlier when a dog was present as opposed to an empty office or one with a cat. A multivariate analysis of variance was performed with gender as an independent variable, and there was no main effect or interaction effect (i.e., for gender and office condition).

Two Canadian researchers, Schneider and Harley (2006), investigated perceptions of four therapists with and without a dog present. A total of 85 students viewed one of four videos: a male therapist alone, a male therapist with a dog, a female therapist alone, or a female therapist with a dog. After viewing the video, participants completed a counselor rating scale, disclosure to therapist scale, and pet attitude scale. The researchers used *t* tests to compare ratings of therapist characteristics across the dog present and dog absent conditions. Overall scores on the counselor rating scale were significantly higher for therapists with a dog. Therapists were rated as significantly more trustworthy and attractive when a dog was present. Additionally, students were significantly more likely to report a willingness to disclose to a therapist when the therapist was accompanied by a dog. Analysis of variance results indicated that there were no interactions based on gender, age, or pet owning history of participants.

Although only a small body of research, the literature suggests that animals, and dogs in particular, alter our attitudes toward people. Even with little other personality information, humans are more likely to rate a stranger as friendlier, more trustworthy, more attractive, happier and more relaxed when the individual is paired with a dog (Geries-Johnson & Kennedy, 1995; Rossbach & Wilson, 1992; Schneider & Harley, 2006; Wells & Perrine, 2001). Although these are analog studies, they are a starting point for research on social perceptions with animals present. Additional research could examine how different types of dogs alter attitudes. Also,



researchers could focus specifically on different groups of target individuals (e.g., individuals with mental illness or physical disabilities) and how different animals alter attitudes. For example, does the presence of an animal alter the attitudes of all individuals or only the attitudes of certain groups of people? Does the presence of a dog alter attitudes toward an individual as much as the presence of a cat or a rabbit? Future research could explore how other traits besides friendliness or happiness are altered by the presence of an animal.

### **Influence of Animals on Social Interactions**

In addition to influencing how individuals perceive other people, animals also influence interpersonal interactions. Both experimental and non-experimental studies have found positive influences on interpersonal interactions with an animal present.

#### ***Experimental Studies***

Hunt, Hart and Gomulkiewicz (1992) assessed approach behaviors of strangers toward a confederate sitting in a grassy park. The confederate was accompanied by a rabbit, a turtle, a small portable television (turned on), or a bottle of bubbles and wand with which to blow the bubbles. Results showed a significant increase in approach behaviors from adults and children when the confederate was with a rabbit or turtle as opposed to sitting with a television. These findings indicated that the presence of an animal can lead to an increase in willingness of strangers to approach an unfamiliar individual.

McNicholas and Collis (2000) conducted two studies in Britain to test whether or not a dog could serve as a catalyst for social interactions. The first study involved an experimenter going about daily routines over the course of 10 days, both with and without a dog. The experimenter recorded all social interactions she experienced. Out of a total of 206 social encounters (e.g., with strangers, acquaintances, and friends), 156 of them occurred on days that

the dog was present. A log-linear statistical analysis indicated that significantly more interactions with strangers occurred when the dog was present. There was also a carry-over effect such that individuals asked about the dog when the dog was no longer with the individual.

In the second part of the study, McNicholas and Collis (2000) manipulated the appearance of an individual and a dog to determine whether varying appearance affected approach behaviors. The researchers created six different conditions, two of which contained no dog and four of which contained the same dog. Of these six conditions, the four with the dog included a “scruffy person” or a “smart person,” and a “pet dog” or a “rough dog.” In the two conditions with the man alone (no dog/scruffy person and no dog/smart person), the man’s looks were manipulated. A two-way between-groups analysis of variance was conducted to assess how dog presence and the person condition affected the number of social interactions. There was a significant main effect of the dog’s presence, such that there were significantly more social interactions when the dog was present. Similar to the first study, social interactions increased significantly with the presence of a dog. Regardless of the dress of the man, there were 57 interactions that occurred without a dog present compared to 539 and 574 social interactions when the pet dog or rough dog was present, respectively. The results indicated that even with a less appealing appearance of the confederate and dog, the social catalyst effect remained strong.

Studies have also demonstrated that the presence of a dog can increase pro-social behaviors. Guéguen and Ciccotti (2008) performed four different field experiments in France involving a confederate with and without a dog. The studies occurred in a public mall, on a street, and in a bus shelter. A chi-square test and *t* tests indicated that strangers were significantly more likely to provide bus fare to a confederate (male or female) when a dog was present and that significantly more money was given when a dog was present. In the second experiment, a

chi-square test indicated that strangers were significantly more likely to help an individual when he dropped coins when a dog was present. In the last experiment, a male confederate approached women who were walking down the street. Again, the presence of a dog was manipulated. The confederate approached a woman, said hello, introduced himself, complemented the woman's appearance, asked if she was interested in getting together later in the day for a drink and solicited her phone number. The chi-square test indicated that women were significantly more likely to give out their phone numbers when requested by a male confederate paired with a dog than by the same male confederate without a dog.

### ***Non-Experimental Studies***

A longitudinal study by Canadian researchers Raina, Waltner-Toews, Bonnett, Woodward, and Abernathy (1999) assessed changes in social networks and health for older adults with companion animals. The sample consisted of 1,054 adults over 65 years of age living in Canada. Researchers used a family and non-family social support scale to measure individuals' social network activity over the course of a year. Results of a multiple regression analysis showed that owning a pet buffered the relationship between availability of support during a crisis and psychological well-being. The authors concluded that among participants who had lower social support during a crisis, those with pets were less likely to have lower levels of psychological well-being when compared to individuals who did not own pets. Thus, pets may serve as a form of social support during times of crisis for some individuals and help maintain psychological well-being.

Gillum and Obisesan (2010) used data from a longitudinal nationwide cohort health study of 11,394 Americans to examine the association between companion animals and leisure time physical activity. Researchers conducted home interviews of individuals over age 40 and

collected the data from 1988-1994 over an average of 8.5 years. Although the data were collected for a larger study, one of the measurements included self-report information on companion animals in the household. The results of a bivariate analysis showed a significant association between companion animals in the home and leisure time physical activity. Leisure time physical activities included bicycling, swimming, and running. Data indicated that individuals with dogs fell into the highest activity group, and these individuals were less likely to be in the no activity group. The results suggested that from a large national sample, companion animal ownership may lead to an increase in physical activity. It is noteworthy that physical activities such as running or biking often happen outdoors, increasing opportunities for social interactions.

Both experimental and non-experimental research findings suggest that animals can serve as social catalysts or a social lubricant between strangers. Dogs in particular help to increase pro-social behaviors and alter attitudes toward the people with whom they are paired. More research is needed to understand contextual factors. These contextual factors include aspects that influence individuals' attitudes, such as one's pet owning history and one's attitude toward animals. Contextual factors also should be examined pertaining to which groups of people experience these social catalyst effects when paired with an animal. For example, are single men with dogs more likely to be approached by strangers than are single women? Characteristics of the individuals who initiate approach behaviors could also be studied. For instance, are pet owners more likely to approach a stranger who has a dog than non-pet owners?

### **Stigma Toward People with Disabilities**

The World Health Organization (2011) defines disability as a broad term covering "impairments, activity limitations and participation restrictions, referring to the negative aspect

of the interaction between an individual...and that individual's contextual factors" (p. 28). It has become almost common knowledge that stigma and prejudice affect how certain groups are perceived. Erving Goffman (1963), in his seminal book on stigma, explained that the Greeks originated the term stigma in reference to a sign on one's body that denoted something bad or unusual about one's moral status. Goffman wrote that humans attribute "social identities" to individuals and when an individual differs in an unattractive way, we attribute stigma to the individual. Likewise, prejudice is the act of preconceiving a judgment or opinion about an individual. Often, the opinion reflects an unfavorable attitude toward that individual. Stigma and prejudice have an effect not only on attitudes but also on behaviors. One of many groups that have been studied in this realm, are people with disabilities.

Research on people with disabilities began as early as the 1960s. In 1961, Richardson, Goodman, Hastorf, and Dornbusch examined how various ethnic groups of children perceived people with disabilities. Richardson et al. assessed attitudes of 640 children aged 10 to 11 who identified as Black, White, or Puerto Rican. The sample was comprised of children with and without physical disabilities. The children were asked to rank in order of preference six different pictures. The pictures included one child with no physical disability, three different pictures of children with various physical disabilities, one picture of a child with a facial deformity, and one picture of an obese child. Richardson et al. found that children showed a significant preference for "able bodied" individuals, and this remained true for participants with and without physical disabilities. Thus, even the children with physical disabilities preferred the photos of able bodied children.

Worthington (1974) explored whether possible stigma toward people with disabilities influenced approach behaviors. Using an experimental design, Worthington had a man wait in an

airport and appear lost, asking strangers for directions. In the experimental condition the man was in a wheelchair, and in the control condition he appeared in the same clothing but was not in a wheelchair. An observer measured approach distances for each individual who the man asked for directions. Results showed a significant difference in approach distance for individuals, in that strangers kept more distance from the man in the wheelchair. Thus, Worthington concluded that the stigma of being in a wheelchair influenced other people's behaviors, as measured with approach distances.

Assessing differences in gaze behaviors, Thompson (1982) explored reactions to confederates both with and without disabilities while they were at a shopping mall and in a restaurant. Analyses showed that in situations where the confederates with disabilities were served in restaurants they waited twice as long as those in the control condition for a server to come to the table. In contrast, individuals without disabilities received more interactions from servers while being waited on in a restaurant. Additionally, Thompson found that when the confederates with disabilities were in a shopping mall they received longer gaze behaviors from strangers compared to the confederates without disabilities. Confederates with disabilities who sat in a restaurant received less eye contact during conversations with the server compared to the confederates without disabilities. Thus, the researchers concluded that during more personal encounters (including conversations), people with disabilities attracted fewer gaze behaviors, yet during public encounters (without conversations) people with disabilities received an increase in gaze behaviors.

Although this is a very brief summary of a vast body of literature on disabilities, it exemplifies the variety of types of stigma that exists and some examples of prejudicial behaviors toward people with disabilities. According to the World Health Organization (2011), there are

over 650 million adults living with various disabilities around the world today. The World Health Organization states that “raising awareness and challenging negative attitudes are often first steps towards creating more accessible environments for persons with disabilities” (p. 30). Forming prejudicial attitudes toward people with disabilities affects not only the individual holding the prejudice, but it also significantly affects the individual with the disability. Stigma toward disabilities can create barriers to adjustment and social integration for people with disabilities (Olkin & Howson, 1994). Individuals with disabilities may feel that they are labeled and face stereotypes based on their disabilities, in addition to facing a loss in status and discrimination based on power differentials (Green, Davis, Karshmer, Marsh, & Straight, 2005). These effects of stigma lead to negative social and emotional outcomes for people with disabilities (Green et al., 2005).

### **Social Interactions for People with Disabilities and Assistance Dogs**

Numerous studies have surveyed recipients of assistance dogs to assess perceived changes in social interactions for people with disabilities. The terms *assistance dog* and *service dog* are often used interchangeably although they do not mean the same thing. A service dog aids individuals with physical disabilities, seizures, autism spectrum disorders, diabetes, and psychiatric disabilities (Sachs-Ericsson et al., 2002; Winkle et al., 2012). Assistance dogs, on the other hand, are a broader category referring to guide dogs for the blind, hearing dogs for the deaf, and service dogs.

People with disabilities report many changes upon receiving an assistance dog, including changes in approaches and smiles from others (Camp, 2001; Eddy, Hart, & Boltz, 1988; Fairman & Huebner, 2000; Hart, Hart, & Bergin, 1987; Mader, Hart, & Bergin, 1989; Valentine, Kiddoo, & LaFleur, 1993). People with disabilities receiving assistance dogs also report significantly

more social interactions when out in public (Hart, Zasloff, & Benfatto, 1996; Lane, McNicholas, & Collis, 1998). Additionally, significant differences have been reported in self-esteem, psychological well-being, and community integration for individuals after they receive assistance dogs (Allen & Blascovich, 1996; Guest, Collis, & McNicholas, 2006).

Two major literature reviews were conducted on the benefits of assistance dogs (Sachs-Ericsson et al., 2002; Winkle et al., 2012). Modlin (2000) conducted a third, less extensive, literature review. Sachs-Ericsson et al. assessed benefits of assistance dogs, and found seven major themes in the literature. The seven themes the researchers discussed were: effects of physical functioning, effects of individual's performance or activity level, participation in the community, internal contextual factors, external contextual factors (e.g., social interactions and social attention), and disadvantages of assistance dogs. Winkle et al. assessed the benefits of service dogs specifically and found three major themes in the literature. The three themes were: socialization and community participation (e.g., increased social interactions and social attention), functional effects, and psychological effects. Thus, both of the literature reviews discussed community participation, social interactions, and social attention (Sachs-Ericsson et al.; Winkle et al.). Modlin discussed the themes of companionship, social facilitation, and service dogs as family/friends, and also mentioned social acknowledgement.

Reviewing the literature myself, I found two additional themes relating to social functioning: increased independence and changes in social identity. The findings regarding increased independence were discussed in Winkle et al.'s review, but not categorized as a major theme. The topic of social identity was derived from three articles that were not cited in either literature review, most likely due to the specific populations that were studied (e.g., blind, pediatric, and autistic participants). Therefore, a total of five major themes emerged from the



analysis of the literature specifically pertaining to social situations for people with disabilities and assistance dogs: feelings of independence, community participation, observed social interactions, social identity, and social attention.

### ***Feelings of Independence***

According to the Convention on the Rights of Persons with Disabilities, the “independence of persons” falls under the first principle for human rights (World Health Organization, 2011). Although increased feelings of independence for people with disabilities may not always lead to increases in social interactions, increases in independence can lead to the possibility of an increase in social activities (Lane et al., 1998). Studies assessing feelings of independence have primarily used either questionnaires or qualitative interviews to collect data.

Researchers have found that people with disabilities seek assistance dogs for the purpose of attaining greater independence. Lane et al. (1998) examined benefits for individuals after obtaining dogs from the organization Dogs for the Disabled in Britain. A retrospective questionnaire was created to assess five aspects: social integration, affectionate relationship, supportive relationship, self-perceived health, and general satisfaction with the dog. The participants were 57 individuals, all of whom had various physical disabilities affecting mobility. The study did not state whether these individuals used wheelchairs for mobility improvement. When asked about the reasoning for obtaining a dog, 70% of participants stated it was to help increase independence and 23% wanted more opportunities to socialize. Although the questionnaire did not assess whether participants felt that their independence increased after receiving their assistance dogs, it is still important to understand that gaining a greater sense of independence was valuable to them. These individuals with mobility impairments felt that assistance dogs could help them achieve that independence.

Valentine et al. (1993) also conducted research on assessing independence after receiving an assistance dog. The researchers asked individuals with mobility impairments how their experiences changed since they received assistance dogs, including feelings of independence. A total of 24 individuals with hearing impairments or mobility impairments participated in the research. The participants completed retrospective questionnaires either by phone or with a mailed survey. The only data reported were frequencies. Of the individuals who received assistance dogs for mobility impairments, 90% reported feeling more independent once they were paired with their dogs. Of the individuals who received hearing dogs, 79% reported feeling more independent. Additionally, 70% of the individuals who received assistance dogs and 64% of the individuals who received hearing dogs reported being more physically active after getting their dogs. Thus, for individuals with and without mobility impairments, having an assistance dog appears to increase one's sense of independence.

Research with children who have assistance dogs also indicates benefits regarding independence. Ng, James, and McDonald (2000) evaluated the level of independence and quality of life of children with spinal cord injury at the Shriners Hospital for Children in Northern California who received dogs from Loving Paws Assistance Dogs. Five children, three boys and two girls, ages 11 to 17 participated in the study. Ng and colleagues created a self-report measure which the children completed both prior to receiving a dog and again, between one and four years after receiving the dog. The self-assessment questionnaire covered topics of school needs, mobility and physical needs, home and self-care needs, community and store (e.g., carry item to counter; open door at store or mall), and psychological and social needs. No statistical analyses of scores on the questionnaire were conducted. All post-test scores either stayed consistent or improved for four of the five children, and all of the four children reported improvements on at

least four of the five domains of independence. The fifth child's disability worsened over time, making it difficult to assess benefits of the assistance dog. The authors determined that the assistance dogs increased the four children's independence as evidenced by increases on the self-report measure.

Studies that assessed perceived changes in independence for individuals with hearing impairments also show increases in independence after receiving assistance dogs. Rintala, Sachs-Ericsson, and Hart (2002) interviewed 22 applicants with physical disabilities who were on a wait list for the Texas Hearing and Service Dogs program. Rintala et al. investigated the participants' experiences with obtaining service dogs. Participants completed questionnaires to assess the benefits of their service dog placement. The data were collected prior to participants' receiving service dogs and 6-24 months after receiving service dogs. A total of 14 participants provided data at Time 2 (6 months after dog placement), 16 participants provided data at Time 3 (12 months after dog placement), and 12 participants provided data at Time 4 (24 months after dog placement). Participants were asked at Time 1 how independent they expected to feel after acquiring their service dogs, and then at Time 3 how independent they felt after receiving their service dogs. Similarly they were also asked whether or not they expected to go out in public more and how safe they would feel. All of the paired *t* tests were nonsignificant, indicating that service dogs matched the participants' expectations. Participants stated that after receiving their service dogs they felt more independent, expected to go out in public more, and felt safer when out in public.

Rintala, Matamoros and Seitz (2008) examined the effects of assistance dogs for 40 adults with hearing and mobility impairments using pre- and post- questionnaires. The individuals were recruited for the study from waitlists from two different organizations. One group of individuals

who had not yet received assistance dogs served as a control group. The other group of participants who received assistance dogs were contacted prior to receiving their dogs, and after receiving their dogs regarding their experience with the placement. Both groups completed an initial questionnaire followed by a second questionnaire 6 months later. Participants completed measures assessing health information, functional independence, and satisfaction with life.

Because service dogs and hearing dogs have very different roles, the two groups of participants were analyzed separately. Repeated measures ANOVA did not show significant differences in physical independence or satisfaction with life from pre- to post- tests. Rintala et al. (2008) suggested that it is possible that the results were due to the small sample size or due to the possibility that post-test questionnaires may have been administered too soon. When individuals acquire service dogs, it can take some time to adjust to the new lifestyle and for the partnership to gain some routine. Thus, there may be a lag time for certain benefits to become apparent in an individual's life.

Other countries have initiated laws to benefit individuals with disabilities who have assistance dogs. In 2002, in Japan, the Service Dogs Access Law was created to help advance independence and social participation for individuals with disabilities. Shintani and colleagues (2010) sought to compare the quality of life of individuals with disabilities who did and did not have service dogs. Ten individuals with disabilities (half of whom were women) with service dogs and a control group of 28 additional individuals with disabilities participated in the study. The mean age was 53 ( $SD = 13.7$ ) for individuals with disabilities, and 47 ( $SD = 14.2$ ) for the control group. The mean length of service dog ownership was 21 months ( $SD = 8.8$ ). Quality of life was assessed using the Japanese version of the Short-Form 36 Item Health Survey (SF-26v2; Fukuhara & Suzukamo, 2004). There were no significant differences between groups based on

age, functional independence, or Barthel Index (Mahoney & Barthel, 1965) scores that measure activities of daily living. The authors conducted *t* tests to determine whether there were differences between groups in health-related quality of life. Individuals with service dogs scored significantly better on the SF-26v2 domains of physical functioning and role limitations due to emotional problems. The authors concluded that individuals with service dogs had fewer issues with their daily activities and fewer mental difficulties compared to the control group, as indicated by the significantly higher scores on domains of physical functioning and role limitations due to emotional problems.

In addition to using questionnaires to collect data, researchers have used qualitative methods to assess independence for individuals with disabilities. In 2001, Camp conducted a qualitative study of five service dog owners with physical disabilities who were interviewed and observed while out in the community. Although the study did not specify whether all participants were in wheelchairs, excerpts from the interviews include references from some individuals about being in a wheelchair. Ethnographic interview techniques with open-ended questions were matched with videotapes of the participants and their service dogs to triangulate data. Participants were asked about the benefits of owning service dogs. One of the themes that emerged was increased independence from obtaining service dogs. Individuals stated that their service dogs helped them open doors at school or get medication, and that the greater sense of independence allowed them to participate in activities more easily. One individual stated that with her/his service dog, s/he felt like “an able-bodied person” (Camp, p. 515).

Research has also been conducted on individuals with visual impairments and how assistance dogs help them achieve greater independence. Miner (2001) conducted a phenomenological study using qualitative interviews to assess how having a guide dog changed

mobility and what that experience was like for individuals with visual impairments. Participant selection used convenience sampling of guide dog owners from around the country. Sample size and demographic information were not reported. The guide dog owners reported increased confidence and increased independence. One individual who was interviewed stated, “the guide dog gives me the sense that I can go wherever I want to go whenever I want to go” (Miner, p. 187). Researchers have studied individuals partnered with guide dogs in countries besides the United States. Wiggett-Barnard and Steel (2008) investigated the experience of owning guide dogs for legally blind adults in South Africa. Among the various themes that emerged, individuals reported feelings of enhanced independence after acquiring their assistance dogs.

These nine studies support the conclusion that assistance dogs can lead to a greater sense of independence for individuals with various disabilities. Individuals in these studies explained that feeling more independent can lead to a greater likelihood that they will be involved with the community. The studies assessed benefits using only questionnaires and qualitative methodology. One main limitation to the research is that most of the studies were conducted retrospectively asking about perceived changes, instead of using a pre-post research design to determine actual changes. Only three of the studies used pre- and post- measures to assess actual benefits of receiving an assistance dog (Ng, James, & McDonald, 2000; Rintala et al., 2002; Rintala et al., 2008).

### ***Community Participation***

Another human right discussed by the Convention on the Rights of Persons with Disabilities is “full and effective participation and inclusion in society” (World Health Organization, 2011, p. 33). Greater involvement in the community can lead to an increase in feelings of social inclusion. Winkle et al. (2012) conducted a systematic literature review

investigating the benefits that service dogs provided for people with physical disabilities.

Articles were retrieved from 2008-2010 using ten different databases. A total of 432 papers were initially found, 23 of which were focused on service dogs for individuals with ambulatory disabilities. Twelve of the studies met inclusion criteria for the researchers' review (criteria were not explained in detail in the review). Winkle et al. found that studies indicated a positive influence on both community participation and socialization for individuals with service dogs in numerous environments. The results were consistent for both children and adults with physical disabilities, in that service dogs appeared to improve social interactions.

Researchers have also studied social integration for individuals with hearing impairments. Hart et al. (1996) interviewed 38 individuals with hearing loss, using retrospective reports, about their relationship with their hearing dogs. A comparison group of 15 additional individuals who were on a wait list for hearing dogs were also asked to participate in the study. Both groups completed questionnaires asking about interactions with the hearing community, the deaf community, families, neighbors, and the local community. The researchers assessed self-reported changes in social interactions for individuals after they received their assistance dogs. Participants were asked whether a hearing dog had changed or would change (for those in the comparison group) interactions between themselves and their families, as well as their interactions between themselves and the deaf community. The results from two-tailed *t* tests about social interactions with both of these group were nonsignificant. However, 75-77% of participants who received assistance dogs reported changes in relations with the hearing community, specifically with neighbors and members of their local community. Individuals who had not yet received assistance dogs did not anticipate these changes with the hearing community either (28-34%). Although retrospective in nature and prone to reporting error, these data suggest

that individuals waiting to receive assistance dogs may not anticipate the social benefits assistance dogs provide. Furthermore, the social benefits may be more pronounced for interactions between people with disabilities and people without disabilities, suggesting that assistance dogs may provide a social bridge between people with disabilities and the public.

Guest et al. (2006) conducted longitudinal research in Britain with 51 individuals with significant hearing loss who applied for hearing dogs from Hearing Dogs for Deaf People. Participants completed a questionnaire to assess whether their hearing dog placement led to changes in mood, psychological well-being, and other experiences related specifically to having a hearing impairment. The study had five points of data collection spanning from prior to receiving hearing dogs to 14 months after receipt of the dog. Paired-sample *t* tests were used for statistical analysis using the Bonferroni criterion for significance. One question specifically addressed social integration, "Are you fearful of leaving your home?" Participants reported feeling significantly safer and less afraid, and having significantly less fear of leaving their home after acquiring their hearing dogs. Guest et al. concluded that hearing dogs act as social catalyst, based on participants' reports of decreases in avoiding interactions and decreases in experiences of social isolation after receiving their dogs.

A qualitative study in Ireland assessed the experiences of seven parents of children ages 5 to 12 who had autism and owned an assistance dog (Smyth & Slevin, 2010). Five mothers and two fathers participated in the study. Semi-structured interviews were held at the parent's house or work to determine both benefits and disadvantages of having an assistance dog, and themes were extracted later using a phenomenological analysis. All seven parents stated that having an assistance dog was beneficial. Parents noted that it was easier for them and their children to integrate into everyday life and for their children to socialize with others. They also said that



their children's communication was enhanced and that their children felt increased freedom with the presence of their assistance dogs. In particular, parents explained that the assistance dogs improved the safety of their children in public, making it less stressful to take trips. One parent explained that social outings were often unpredictable because of their child's behavior, but the assistance dog helped to stabilize the behavior and thus made social outings less challenging. However, these findings should be interpreted with caution because the authors did not clearly explain the methodology or the results. Despite the methodological weaknesses, this article does support the theme of assistance dogs providing increased community integration.

Not all research has concluded that assistance dogs increase social integration. In 2006, Collins et al. carried out a cross-sectional study assessing psychosocial well-being and community participation of 152 individuals who used wheelchairs or scooters for daily mobility. Half of the individuals had service dogs and half did not have service dogs. Participants with service dogs were mainly recruited from Paws with a Cause and Canine Companions for Independence. Participants in the comparison group were recruited from newsletters and websites of organizations for individuals with disabilities. All participants were mailed questionnaires. A multiple stepwise regression was conducted to assess social integration scores. In contrast to most of the previous research, Collins et al.'s findings indicated that having a service dog did not significantly predict higher social integration scores. Additionally, there continued to be no significant correlations once length of service dog partnership was taken into account. Collins et al. suggested the possibility that for this sample, having a service dog did not significantly change how the individuals interacted with the community. These results could be because the individuals already had a high level of social integration with the community, or due to differences in the participants recruited due to nonrandom sample selection.

Literature reviews confirm that assistance dogs are associated with increased community participation for individuals with disabilities (Sachs-Ericsson et al., 2002; Winkle et al., 2012). Community participation is important for all individuals, with or without disabilities, to establish a sense of well-being. However, simply being out in society does not equate to interacting with others. Thus, it is important to understand how interactions differ for individuals with assistance dogs once they are out in the community.

### ***Observed Social Interactions***

Two experimental studies investigated observations toward individuals with disabilities with and without service dogs present. Eddy et al. (1988) studied adults with visible disabilities who used wheelchairs. The researchers used an experimental design in which 10 people with disabilities with service dogs elicited responses from people passing by. The observations were made in shopping malls, stores, and on a university campus. Similarly, a control condition included 10 people with disabilities without service dogs present, who also elicited responses from people passing by. Both groups of participants were followed by an observer from a distance of 15-30 feet who recorded behaviors of the people passing by. Some of the behaviors that were recorded included: smiles, conversations, gaze aversions, and path avoidance. Results of a Mann-Whitney one-tailed *U*-test indicated that individuals with service dogs received significantly more smiles and conversations. Consistent with these findings, participants from the study also stated that having a service dog often helped them feel less invisible and avoided when out in public.

Mader et al. (1989) conducted a second experimental study investigating observations toward people with disabilities with the manipulation of the presence of a service dog. Five physically disabled children who used wheelchairs and had service dogs were in the

experimental group. The children were matched on age, race, and degree of disability to create a control group of participants who were not paired with service dogs. Two series of observations occurred -- one set took place in school and one set took place in a local California shopping mall. Both groups of children were unaware that the observations were being recorded. Observations were between 36-62 minutes in length and the numbers of passersby (within 5 feet) were recorded. Smiles, gazes, and conversations were observed, along with length of each interaction. A Mann-Whitney one-tailed *U*-test of data from the school setting indicated that children paired with service dogs received significantly more looks and conversations from people passing by. Children with service dogs in the public setting received significantly more glances and longer conversations than children without service dogs. Looks occurred significantly more often in the public setting than at school for children with service dogs. The results indicated that for children with disabilities, service dogs can help promote an increase in social interactions, especially in public settings.

Combined, these two studies suggest that observed public behaviors and interactions differ based on the presence of a service dog for an individual with disabilities. Observed behaviors from others are important to measure in understanding the social catalyst effect of service dogs because the data are not subject to reporting bias. Observed data combined with self-report measures from the individuals themselves may provide even greater insight into what is occurring when a service dog is present.

### ***Social Identity***

Data from self-report measures from individuals with disabilities who acquire assistance dogs suggest that one's social identity changes when an assistance dog is present. For example, in a literature review of individuals with disabilities receiving assistance dogs, results indicated

that some individuals explained that discussions with strangers often changed from being focused on their disability to being focused on the positive aspect of being a competent dog handler (Winkle et al., 2012).

Sanders (2000) investigated the personal, collective, and social identity of individuals with visual impairments who owned guide dogs. Sanders was interested in how having a disability could create additional social stress for individuals. Observational data were combined with semi-structured interviews with guide dog owners and guide dog trainers. Participants stated that having a guide dog provided them with more confidence and decreased feelings of helplessness. However, they also reported that having a guide dog increased public awareness of one's disability. Participants suggested that owning a guide dog positively increased how others perceived them; in particular, others viewed them as being more competent and less of a person to pity. A conclusion from the research was that living with a guide dog may transform a person with a disability's image and thus alter his/her social identity. It is also plausible that owning an assistance dog increases one's self-confidence, which then leads to increases in social interactions.

The social identity of children has been shown to change upon receiving an assistance dog. Davis, Nattrass, O'Brien, Patronek and MacCollin (2004) interviewed 17 parents and their children who received assistance dogs from the National Education for Assistance Dogs Services (NEADS). The children in the study ranged from 5 to 17 years of age. The researchers used semi-structured face-to-face interviews following a questionnaire to assess both positive and negative aspects of having an assistance dog, including questions focused on social interactions. Children explained one main benefit was that the dogs allowed for social interactions to focus on something other than their disability. These children felt that their social identities were no

longer simply those of disabled people. Family members also stated that they believed the children were seen more positively in the public when out with their dogs.

Service dogs have been paired with individuals with a variety of disabilities. Burrows, Adams, and Spiers (2008) studied 10 families from Canada each with a service dog for their child with autism. The children ranged from 4 to 14 years of age. Five home visits were conducted with semi-structured interviews that took place over the course of a year. One of the themes that emerged from data analysis was that service dogs enhanced the family's social status. This enhancement was described as siblings of the autistic children being able to focus on their sibling's strengths instead of weaknesses while out in public. Overall, the service dog allowed for the focus during public interactions to be shifted away from the negative aspects of the child's disability.

Similar to social identity, cultural acceptance of assistance dogs is important for individuals with disabilities when they want to interact with the public. Matsunaka and Koda (2008) assessed guide dog partnerships in Japan. According to the Japanese Research Committee on Dog Guides in 1998, guide dog owners go out in public and relate to the community more often after receiving a guide dog. In 2002 the Law Concerning Assistance Dogs was passed in Japan. The goal of this legislation was to help individuals with disabilities gain more independence and increase their social integration. In Matsunaka and Koda's investigation of how the legislation affected the acceptance of guide dogs, there was a low participation rate, with 30 out of 110 invited guide dog users agreeing to participate in the study. An additional 51 individuals with visual impairments who did not have guide dogs also participated. Individuals with guide dogs stated that while in restaurants, taxis and ryokans (Japanese hotels) they experienced the lowest acceptance of their guide dogs.

Matsunaka and Koda (2008) used a stress checklist for individuals with visual impairments and a Mann Whitney *U*-test was conducted to distinguish between the groups with and without visual impairments. Mobility stressors were found to be significantly higher for guide dog users than nonusers. The research suggested that although guide dogs may be highly beneficial for people with disabilities, public acceptance of assistance dogs is very important. The majority of participants stated there was a need for public education regarding guide dogs. Thus, although Matsunaka and Koda predicted lower levels of mobility stress for individuals with guide dogs, the difficulties with public acceptance may have canceled out any social benefits.

Both social integration and community acceptance of assistance dogs have been found to be highly valuable for people with disabilities. Like able-bodied individuals, people with disabilities need to feel that they are not limited in accessing their communities. Once individuals with disabilities feel greater independence and social integration, the next piece of the puzzle is to understand how social attention changes when an assistance dog is present.

### ***Social Attention***

Although social attention may be best understood by collecting observational data, self-reports from individuals with disabilities on how social attention changes with an assistance dog present are also important. Some examples of social attention included social acknowledgements (e.g., making eye contact), greetings, questions about the assistance dog, and initiating conversations. In one study, 88% of child participants reported social benefits when receiving an assistance dog; this benefit was the most often cited advantage of owning an assistance dog (Davis et al., 2004). Longitudinal research in Britain by Guest et al. (2006) indicated that individuals with hearing impairments were less likely to avoid social interactions after acquiring

an assistance dog. Studies of assistance dog partnerships indicated that participants reported an increase in social contact, more positive attention, an increased number of friends, changes in public interactions, and that strangers were more likely to make eye contact or initiate conversations when they had their dogs with them in public (Burrows et al., 2008; Camp, 2001; Miner, 2001; Rintala et al., 2002).

Hart et al. (1987) were some of the first researchers to examine the social attention received with service dogs. Nineteen people with various disabilities were asked about their outings during a typical week with and without a service dog present. All of the participants were in wheelchairs and were partnered with service dogs. Data on the length of time individuals had their service dogs were not presented. The study included nine additional participants who served as a comparison group, all of whom had similar disabilities but who were not paired with service dogs. Both groups completed questionnaires about their social interactions in public. Participants with service dogs reported significantly more social approaches when their service dogs were present than when the dogs were not present. Additionally, these individuals reported significantly more approaches from children when their service dogs were present. When people with disabilities were asked about social interactions when they went out without their dogs, they reported a decrease in social interactions compared to before acquiring service dogs. Two of the major limitations of the study were the small sample size and the retrospective research design, which is highly prone to reporting error.

In research done by Valentine et al. (1993), 80% of individuals with mobility impairments and 50% of individuals with hearing impairments reported an increase in friendliness from strangers after receiving their assistance dogs. Additionally, 60% of individuals with mobility impairments reported an increase in contact from friends and improved family

relationships after receiving their assistance dogs. Lane et al. (1998) found that 92% of individuals stated that they were approached in public when out with their dogs, 75% stated they made new friends since acquiring their dogs and more than one third reported a better social life after receiving their dogs. An analysis of variance indicated a main effect of gender on the assessment of a better social life, such that men reported a better social life compared to women after obtaining their dogs. Participants stated that social interactions were different when they were out with their dog, and that having a dog decreased feelings of avoidance or exclusion.

In 2000, Fairman and Huebner conducted retrospective research looking at the social benefits individuals received from their service dogs. Participants had obtained service dogs for a variety of reasons including physical disabilities, emotional support services, and hearing disabilities. A total of 202 individuals who received service dogs from the organization Canine Companions for Independence completed the survey. The social functions of the service dogs were assessed using seven questions. One hundred percent of participants stated that they were approached more in public after receiving their service dog. The results were reported as frequency statistics. Eighty-seven percent reported an increase in social interactions, 77% reported a greater ease in leaving their houses, 72% reported a greater ease in using community resources, 59% reported an increase in number of friends, and 55% reported developing a social network of pet-owning friends.

Smyth and Slevin (2010) named social acknowledgement as a theme from their interviews with parents of children with autism who have assistance dogs. One parent noted, “he is happy now to have people visit. This animal has made our lives a thousand times better than I can express in words” (p. 15). Another parent said the assistance dog “is an icebreaker and a drawer of people and that, when you have a child with autism, is huge. The dog has helped with



socialization and inclusion beyond doubt” (p. 16). Smyth and Slevin also discussed some of the disadvantages for parents of having an assistance dog. For example, one child had a hard time understanding the difference between pet dogs and assistance dogs, and thus the child believed that all dogs were friendly and safe.

Although social attention is often positive, studies have also found that some individuals report negative social attention when out with their assistance dogs. Individuals with disabilities have reported unwanted public attention when going out, such as having difficulties bringing assistance dogs into restaurants (Rintala et al., 2008). Another theme that is discussed in the literature is an invasion of public space from others, when going out in public with assistance dogs (Miner, 2001). Burrows and Adams (2008) carried out qualitative interviews to assess the challenges that families of autistic children with service dogs faced. Although positive social interactions were a result of having a service dog, families also stated that the social interactions could become tiresome and outings could become extended due to increased attention toward the dog. Wiggett-Barnard and Steel (2008) found that guide dogs improved mobility, provided companionship, were social magnets, and were a source of pride for their owners. Participants stated that their guide dogs worked to attract people and provide social facilitation. However, participants mentioned that one consequence of owning a guide dog was that some individuals in public were scared off by the presence of the dog.

Literature reviews support the robust finding of an increase in social interactions for individuals with disabilities when they are out with their assistance dogs (Sachs-Ericsson et al., 2002). Children with disabilities explain that having an assistance dog has “made it easier... to interact with others” and that it can be a “great way to meet girls” (Ng et al., 2000, p. 103). One child with a disability stated that, “many people seem to find it easier to approach someone who

has a dog than someone who is in a wheelchair” (Ng et al., p. 103). Results indicated that assistance dogs often increased feelings of safety for individuals with disabilities and parents of children with disabilities, which led to an increase in social outings. However, literature reviews of human animal interaction studies also state that there are various limitations in research methodology (Barker & Wolen, 2008; Modlin, 2000; Winkle et al., 2012).

### **Limitations of Previous Research**

Although prior research has investigated feelings of independence, social integration, observed social interactions, social identity, and social attention, no research has focused on attitudes of others toward the person with a disability who has an assistance dog. The research so far has focused on the viewpoint of an individual with a disability, as opposed to how others view the individual who has an assistance dog. However, social interactions occur between two people. Thus, it is important to understand these interactions from both individuals’ perspectives. Future research is needed to better understand attitudes toward individuals with disabilities who have assistance dogs.

Although previous research strongly supports the socializing role of assistance dogs for people with disabilities, there are many methodological limitations to the studies that have been conducted. Many of the studies were retrospective in design, and thus allow a great deal of reporting bias to influence findings. Sample sizes were often small, which limits statistical power. Some studies included a heterogeneous group of participants (e.g., in age, disability status, type of assistance dog), and thus make generalizability to a larger population difficult. The broader literature on human-animal interactions lacks standardized measures, which affects reliability and validity. Analyses are often conducted at an item level rather than using multiple measures that have good psychometric data. Researchers fail to study physiological variables or

health variables as outcome measures, and often are not consistent with proper terminology (Modlin, 2000).

Disabilities cannot be randomly assigned, thus the variable of “disability” cannot be manipulated. Researchers often select participants using convenience sampling instead of using a broader, random sample of individuals. Ideally, more longitudinal designs would be used to assess actual instead of perceived changes in social interactions for people with disabilities as measured prior to receiving assistance dogs and measured for a few years following receipt of the assistance dog. Future directions could include the study of how individuals with disabilities cope with the retirement, decline, or death of an assistance dog. Additional research could also focus on the benefits and difficulties associated with being paired with an assistance dog for an individual’s psychological functioning, physical health and social interactions.

## **Theory**

Interpersonal attraction theory, the biophilia theory, theories of attitude structure, learning theories, and the theory of planned behavior provide insight on the literature regarding perceiver’s attitudes toward individuals with disabilities and the changes in social interactions for people with disabilities who have assistance dogs.

### ***Interpersonal Attraction Theory***

A natural part of how humans respond to novel stimuli is to form an appraisal or a judgment. Interpersonal attraction theory explains how individuals appraise each other. Although there are many factors that affect how we appraise others, physical attraction plays an important role. When forming interpersonal appraisals, people are likely to form either positive, negative, or a mixture of positive and negative attitudes toward a target individual (Berscheid & Walster, 1978). Because physical attraction is so salient and often one of the most accessible traits we can

gather from a stranger, attraction becomes an easy way to judge others (Hogg & Cooper, 2003). Physical beauty is often attributed positively, with people placing preferential treatment upon individuals who are very physically attractive (Patzner, 1985). The phrase, “what is beautiful is good” has been widely cited and is supported by many studies as a strong phenomenon (Eagly, Ashmore, Makhijani, & Longo, 1991).

Understanding that beauty influences attitudes toward an individual, it makes sense that beauty also influences social interactions and behaviors. Physically attractive people are perceived to be more sociable than less physically attractive individuals (Patzner, 1985). Physical attraction has been found to increase ratings of social attractiveness and physical attractiveness, and affects ratings of strangers’ personalities (Smits & Cherhoniak, 1976). Research has demonstrated that men who are told they are speaking with physically attractive women behave differently than men who are told they are speaking with physically unattractive women (Snyder, Tanke, & Berscheid, 1977). The women in this study who were unknowingly perceived as more physically attractive by the men were rated as behaving in a more friendly, likable, and social manner, compared to the women who were perceived as unattractive (Snyder et al., 1977).

These differences in social interactions based on physical attractiveness are important for people with disabilities. Individuals with disabilities in particular are subject to harsh perceptions of attractiveness in addition to prejudicial views. Research shows that people with disabilities, compared to able-bodied individuals, are viewed as less enjoyable to be around, less likable, less popular, less physically attractive, less intelligent, less trust worthy, lacking interactive skills, more dependent, and less confident (Weinberg, 1976). Moreover, individuals in wheelchairs are viewed as less physically attractive than individuals with visual or hearing impairments (Weinberg). Thus, interpersonal attraction theory can explain why people with disabilities

experience differences in public social interactions compared to individuals without disabilities.

Numerous studies have been conducted examining a variety of aspects of interpersonal attractiveness. It is well known that waist-hip ratios are linked with physical beauty for women whereas shoulder-trunk ratios are linked with physical beauty for men (Horvath, 1979). A different way of examining attraction is by looking at how individuals relate to cute or baby-like stimuli. Cunningham (1986) conducted research examining men's attractiveness ratings of "baby-like" facial features of women. The results indicated that women with larger eyes, smaller noses, and smaller chins (baby-like facial features) were rated as more attractive by men. Glocker et al. (2009) examined baby-like facial features and measures of cuteness in actual infants. Glocker et al. found that infants in the "high baby schema" paradigm were indeed rated as cuter. Miesler, Leder, and Herrmann (2011) took the "cute effect" a step further when they examined whether changing the look of a car, to appear more "baby-like" would influence affective responses of individuals. Indeed, when the headlights were enlarged to look like larger eyes, the grilles were decreased to look like smaller noses, and the overall size was altered to match small baby mouths, these cars were rated as cuter than the original versions (Miesler et al.).

Although lacking empirical backing, it is plausible that some animals may exhibit a "cute effect" or "baby-like" facial features that could explain the social catalyst effect they have in public. Just as highly attractive people may stimulate positive attitudes and alter social interactions, so too might animals that are found to have baby-like facial features. Limited research exists on humans' perceptions of animals' facial features, especially relating to dogs' facial features. A study conducted by Halberstadt and Rhodes (2000), although not directly studying attractiveness of animals, found that both dogs and birds were rated on average as more

attractive than a neutral stimulus (watches). More research is needed to understand whether interpersonal attraction theory can be applied to humans who are paired with animals and, if so, which species of animals produce a “cute effect.”

### ***Biophilia Theory***

Edward O. Wilson, a Harvard biologist, is credited with the term “biophilia.” Kellert (1997) describes biophilia as an “inherent human affinity for life and lifelike process...a biologically based attraction for nature and life” (p. 1). This theory explains why many humans have a tendency to put great worth and importance on the natural world, including nonhuman animals. Humans are suggested to have a strong connection to animals as things to be feared (e.g., snakes, bears), as competition (e.g., for food and resources), as tools (e.g., assisting with hunting), and also recently as human companions. In accordance with this theory, Mormann et al. (2011) recently found that part of the human amygdala is activated specifically on visual information regarding animals, whether predator or prey.

Currently, human-animal interaction research does not have a solid theoretical framework that researchers agree upon to explain the benefits humans receive from companion animals. The biophilia theory is, however, one of a few theories that human-animal interaction researchers cite. In his 2010 *Handbook on Animal-Assisted Therapy*, Dr. Aubrey Fine listed a few studies that support the biophilia hypothesis. For example, research done by Beck and Katcher (1996) suggests that watching fish swimming in an aquarium can have a hypnotic effect and reduce anxiety for patients about to have dental surgery. In a study examining children’s blood pressure and heart rates, researchers found lower blood pressure levels when children sat next to a friendly dog than compared to when sitting alone (Friedmann, Katcher, Thomas, Lynch, & Messent, 1983). Children who had a simulated medical exam showed less behavioral distress

with a friendly dog present (Nagergost, Baun, Megel, & Leibowitz, 1997). Furthermore, psychiatric patients who spent 15 minutes with a therapy dog reported decreased levels of fear prior to electroconvulsive therapy (Barker, Pandurangi, & Best, 2003). Individuals who bring their dogs to work report lower levels of stress at the end of the day, compared to reports of increased stress for individuals who have dogs but do not bring them to work (Barker, Knisely, Barker, Cobb, & Schubert, 2012).

The argument is that if animals change our physiology (e.g., lowering blood pressure), this supports that on an evolutionary level humans have a connection to nonhuman animals. Perhaps the reason why the presence of dogs influences our social behaviors and increases our social interactions in public is because humans may be innately drawn to friendly animals. If our physiology is positively altered when a dog is present, why would humans not seek out these furry friends? More studies investigating the biological benefits of human-animal interactions would make an important contribution to the existing literature. However, for now it is a plausible hypothesis that biophilia can help explain the social catalyst effect of assistance dogs for people with disabilities. If people feel drawn to interacting with dogs because they experience a physiological calming effect, it is possible that this effect can counter the stigma placed on people with disabilities.

### ***Theories of Attitude Structure***

An attitude is a positive or negative judgment about an object (Fazio, 2007; Fiske, 2010; Olson & Fazio, 2001). The most well-known theory of attitude structure is the tripartite or three-component model (Berscheid & Walster, 1978; Jones, 1984; Katz & Stotland, 1959). This three-component model suggests that attitudes are comprised of thoughts, feelings, and behaviors. Although theorists initially thought all three components were required to form an attitude, other

theorists have argued that attitudes form from only one or two of the components (Fazio & Olson, 2003a). To best understand attitudes, researchers often explore individuals' thoughts, feelings, and behaviors in regards to the specific topic to determine which of the three components impact individuals' attitudes.

The three components of the tripartite model have been used in the development of scales measuring attitudes toward individuals with disabilities (Findler, Vilchinsky, & Werner, 2007), as well as attitudes regarding white privilege (Pinterits, Poteat, & Spanierman, 2009), and attitudes of homophobia (Van de Ven, Bornholt, & Bailey, 1996). Breckler conducted research in 1984 that was fundamental in supporting the tripartite model. Despite Breckler's findings that each of the three components of attitudes were distinct, other studies have yielded mixed results (Eagly & Chaiken, 1993). Regardless of the lack of research strongly supporting the tripartite model, Eagly and Chaiken explained, "a formal three-component model will probably be rejected for many perhaps even most attitudes. Nonetheless, the tripartite distinction provides an important conceptual framework" (p. 14).

The three components of attitudes were assessed in the present study in relation to attitudes toward individuals with disabilities. A feeling thermometer measured an individual's affective responses using terms such as "warm" or "cold" in regards to the target individual (Haddock, Zanna, & Esses, 1993). Behaviors were examined with a behavioral intention question asking participants to e-mail an individual with a disability. Last, the cognitive component of the tripartite model was assessed with a semantic differential measure, an interpersonal attraction scale, and an Implicit Association Test.

### ***Learning Theories***

There are many learning theories that explain human behavior, one of which is classical



conditioning or Pavlovian conditioning. Ivan Pavlov is credited for discovering classical conditioning, and is well known for the work he accomplished training a dog to salivate in anticipation of being fed (Leahey, & Harris, 2004). In classical conditioning an unconditioned stimulus (US) such as food is given to a dog, the result is a biologically elicited reflex or an unconditioned response (UR) such as salivating. Though repeated pairing of a neutral stimulus (NS) such as a bell with both the US and the UR, a dog will learn that a bell equates to food and the dog will salivate simply upon hearing the bell, which is now a conditioned stimulus (CS). With time and reinforcement, the food (US) can be taken away and the dog will learn to salivate, a conditioned response (CR), when simply hearing a bell (CS).

John Watson also used learning theories in his work to shape behaviors (Leahey, & Harris, 2004). One experiment for which he is famous, involved classical conditioning of an 11-month-old boy named Albert. Watson showed Albert a white rat (NS) while ringing a loud, startling noise (US), thus scaring Albert. After only 7 pairings of the white rat and the loud noise, Albert learned to fear (CR) white rats (CS) and eventually to fear even a white rabbit. Thus, Albert learned through repeated conditioning to fear white animals. Another example might be if a child touches a hot stove (US) and burns his hand (UR), only one pairing may lead to a fear (CR) of touching the stove (CS).

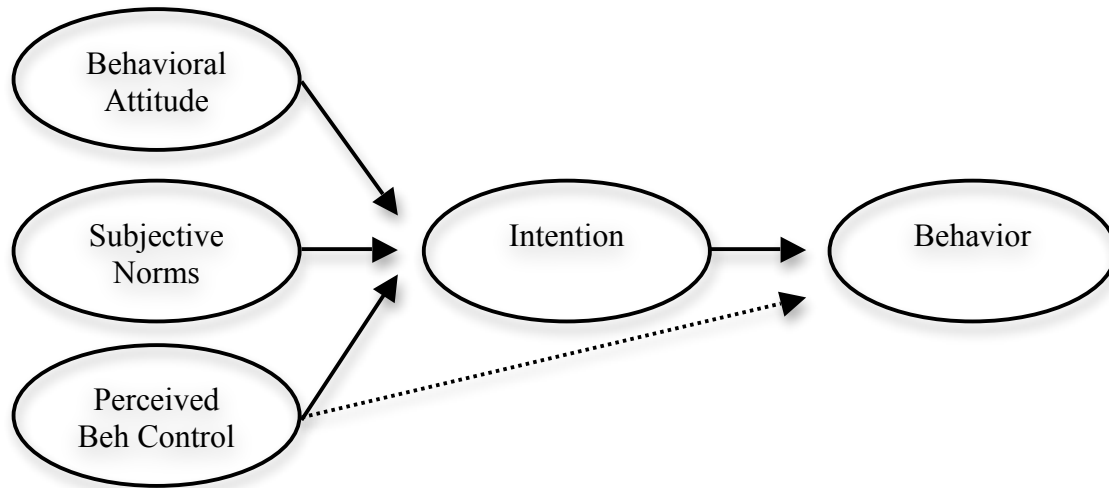
Classical conditioning can provide an explanation for why some people hold positive or negative attitudes towards animals such as dogs. If a dog bites an individual, the fear that person experiences (CR) can lead to a global avoidance of all dogs (CS). Similarly, if an individual has many positive experiences with dogs, that individual will learn that dogs make them feel good and will continue to interact with them. At the extreme, classical conditioning can explain why some individuals develop a phobia, or an irrational fear, of specific animals.

### ***Theory of Planned Behavior***

One of the most extensively studied theories used to explain determinants of behavior is the theory of planned behavior (TPB; Ajzen, 1991). TPB was derived from the theory of reasoned action created by Ajzen and Fishbein (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The model of TPB includes the components of attitudes, subjective norms, and perceived behavioral control which all impact an individual's intentions, which then influence an individual's behaviors (see Figure 1; Ajzen, 1991). A behavioral attitude is simply an individual's attitude regarding the behavior of interest and subjective norms are the perceived social pressures for an individual to carry out the behavior. TPB differs from the theory of reasoned action in that perceived behavioral control was added to the model. Ajzen defined perceived behavioral control as a person's "perception of the ease or difficulty of performing the behavior of interest" (p. 183). Intention is defined as motivational factors or the effort an individual will put into performing the specific behavior (Ajzen). Ajzen clarified that this model explains behaviors that must be in the individual's volitional control.

Figure 1.

*Theory of Planned Behavior*



*Figure 1.* Perceived Beh Control = perceived behavioral control. Adapted from “The theory of planned behavior,” by I. Ajzen, 1991, *Organizational Behavior and Human Decision Processes*, 50, p. 182.

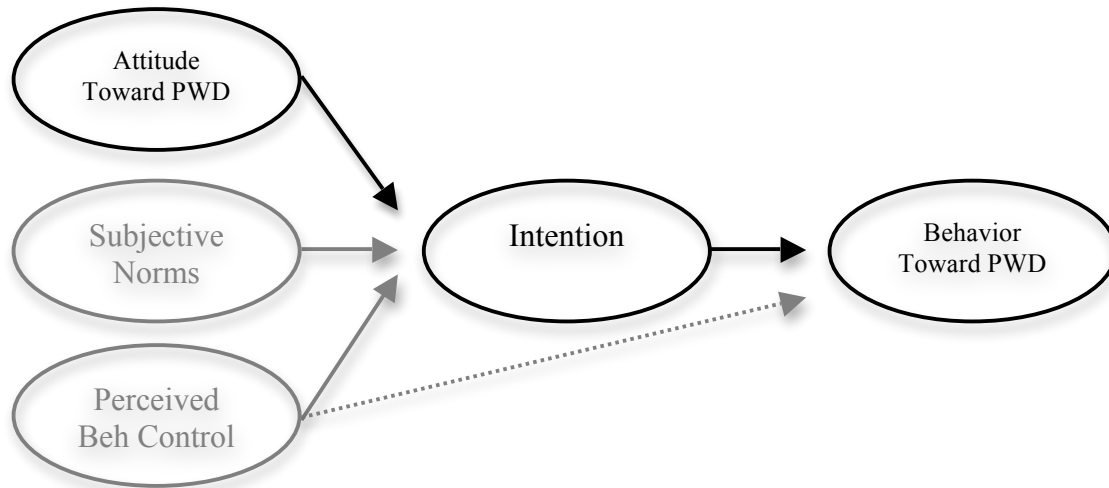
Meta-analyses support the efficacy of TPB in predicting an individual’s intentions and behaviors (Armitage & Conner, 2001; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997). For example, an individual’s attitude is strongly associated with the intention to exercise (Hausenblas, Carron, & Mack, 1997), and attitudes significantly predict intention to provide social support to a person who is grieving (Bath, 2009). Attitudes, subjective norms, and perceived behavioral control have been found to be unique significant predictors of intention to engage in leisure time physical activities for individuals with spinal cord injury, and those intentions significantly predicted behaviors (Latimer & Martin Ginis, 2005). The components of TPB have also predicted volunteering behavior (Warburton & Terry, 2000). Kraus (1995) conducted a meta-analysis of 88 attitude-behaviors studies and found that attitudes significantly

predict future behaviors.

TPB can be used to explain the rationale behind the current study. Previous research indicates that perceivers view individuals positively when the individuals are paired with animals (Geries-Johnson & Kennedy, 1995; Rossbach & Wilson, 1992; Schneider & Harley, 2006; Wells & Perrine, 2001). Additionally, pairing an individual with an animal leads that person to experience more social interactions (Guéguen & Ciccotti, 2008; Hunt, Hart & Gomulkiewicz, 1992; McNicholas & Collis, 2000). Similarly, the research has shown that strangers engage in social interactions with an individual with a disability when that individual has an assistance dog present (Sachs-Ericsson et al., 2002; Winkle et al., 2012). TPB provides one possible explanation for the research findings, that positive attitudes toward people with animals explain those social interaction behaviors. TPB proposed that behavioral attitudes lead to intentions, and these intentions lead to behaviors. Thus, to understand a behavior (e.g., interacting with an individual with a disability paired with a dog), one component to examine is attitudes toward that behavior (i.e., attitudes toward approaching an individual with a disability who has an assistance dog, Figure 2) and intentions to engage in that behavior. The present study examined attitudes towards individuals with disabilities, behavioral intentions and behaviors toward individuals with disabilities, in an attempt to explain the social interactions that occur when an assistance dog is present.

Figure 2.

*Theory of Planned Behavior in Reference to the Current Study*



*Figure 2.* PWD = person with a disability; Perceived Beh Control = perceived behavioral control. Adapted from “The theory of planned behavior,” by I. Ajzen, 1991, *Organizational Behavior and Human Decision Processes*, 50, p. 182.

### **Statement of the Problem**

The literature provides evidence for the existence of stigma and negative social behaviors towards persons with disabilities. Human-animal interaction literature also strongly supports the idea that an individual who is paired with an animal will be perceived differently than when the individual is alone. Researchers argue that dogs have a social lubricant or social catalyst effect, increasing social interactions when an individual is paired with a dog. Even though people with disabilities report an increase in social interactions when out with their assistance dogs, the reasons for these changes are not clear. One likely possibility is that attitudes toward people with disabilities are altered when these individuals are paired with assistance dogs, thus changing social behaviors and attitudes from the public.

The current study sought to establish whether people's attitudes toward individuals with disabilities differ simply by pairing a person with a disability with an assistance dog. The following hypotheses were tested:

1. Individuals would report more positive attitudes toward a person with a disability when an assistance dog is present.
2. Among individuals who saw a person with a disability paired with an assistance dog, those with more positive attitudes towards dogs would view the person with a disability more positively.
3. Among individuals in the dog present condition, those who had a positive implicit bias toward individuals with disabilities paired with an assistance dog would rate an individual with a disability more positively on explicit measures.
4. Individuals would have a positive implicit bias toward an individual with a disability paired with an assistance dog over the individual alone.
5. Compared to individuals in the dog absent condition, individuals in the dog present condition would be more likely to agree to volunteer for a university club related to individuals with disabilities.
6. Compared to individuals in the dog absent condition, individuals in the dog present condition would be more likely to e-mail an individual with a disability to answer questions regarding the university.

## Method

### Participants

Participants were recruited from undergraduate introduction to psychology courses at a mid-Atlantic university. The participants were offered course credit for their participation in the study or were given an alternate class assignment if they did not wish to participate. The goal for the sample was to enroll a group of participants who demographically reflected the undergraduate student population enrolled in introductory to psychology classes. The only specific criterion for participation was the ability to read English and enrollment in the introductory psychology class. The exclusionary criterion was not being able to read English.

Participant demographic information is presented in Table 1. A total of 259 individuals completed the study. After screening for incomplete data, failure of the manipulation check, or other possible issues, a total of 244 individuals were included in all analyses. The average age was 19.45 ( $SD = 2.48$ ), with a range of 18 to 34 years of age. The majority of participants were female ( $n = 167$ , 68%). Participants were Caucasian ( $n = 95$ , 39%), Black/African American ( $n = 61$ , 25%), Asian/Asian American ( $n = 47$ , 19%), Mixed ( $n = 18$ , 7%), Hispanic/Latino ( $n = 12$ , 5%), Other ( $n = 8$ , 3%), and Native Hawaiian/Other Pacific Islander ( $n = 3$ , 1%). No participants identified as American Indian/Alaska Native. The majority of the participants reported a history of dog ownership ( $n = 159$ , 65%).

Table 1.

*Participant Demographics*

Characteristic	<i>n</i>	(%)
Gender		
Female	167	(68.40)
Male	77	(31.60)
Race/Ethnicity		
American Indian/Alaska Native	0	(0.00)
Asian/Asian American	47	(19.30)
Black or African American	61	(25.00)
Hispanic or Latino	12	(4.90)
Native Hawaiian or Other Pacific Islander	3	(1.20)
White or Caucasian	95	(38.90)
Other	8	(3.30)
Mixed	18	(7.40)
Dog Ownership		
Yes	159	(65.20)
No	85	(34.80)

## Measures

**Demographics.** Participants were asked to indicate their gender, age, and race.

**Photo Elicitation Semantic Differential Scale.** The Photo Elicitation Semantic Differential Scale (PESD Scale) created by Fellinghauer, Roth, Bugari, and Reinhardt (2011) was one of four measures used to assess attitudes towards people with disabilities (see Appendix A). The measure is a combination of two commonly used social psychology techniques: photo elicitation methods (Clark-Ibáñez, 2004) and semantic differential scales (Osgood, 1953). Semantic differential scales are frequently used in social psychology research to assess an individual's attitudes toward others. Charles Osgood (1953, 1957) has been credited with creating the semantic differentiation scale, which is a general technique that uses adjective pairs



(e.g., *good-bad*, *pleasant-unpleasant*) to assess attitudes toward objects (Salkind, 2007).

Semantic differential scales generally use between 4 and 10 item pairs (Salkind).

The PESD Scale uses two different photos, so that one photo can serve as a control condition and a second photo can serve as the experimental condition. In the original PESD Scale, one group of participants viewed a photo of an individual in a wheelchair and the other group of participants viewed a photo of the same individual in a chair. The PESD Scale uses six adjective pairs to evaluate the attitudes toward the target photo (e.g., *competent-incompetent*, *attractive-unattractive*). The PESD Scale has a response scale with six ranks from - - - (*worst*) to + + + (*best*) and no neutral response option in the middle. The six attitude pairs comprise six dimensions: competence, communicativeness, attractiveness, popularity, industriousness, and intelligence. Each of the six dimensions (e.g., industriousness) is scored separately on a scale from 1 (e.g., *lazy*) to 6 (e.g., *industrious*). The PESD Scale was modified for the current study, using two different photos for the experimental and control groups. The first photo was of an individual in a wheelchair, and the second photo was the same photo with the addition of an assistance dog.

Fellinghauer et al. (2001) used a principal components analysis to examine the factor structure of the PESD Scale. The principal components analysis resulted in a two-factor solution at the time of measurement one, and a one-factor solution at the time of measurement two. The two factors were soft skills (communicativeness, popularity, and attractiveness) and hard skills (intelligence, competence, and industriousness). Internal consistency estimates were calculated at two different time points and indicated that Cronbach's alphas for the two factors ranged from .79 to .80 (hard skills) and from .72 to .80 (soft skills). Fellinghauer et al. deemed the test to have good internal consistency. For the purpose of the current study, the three attitude pairs that

comprise the soft skills factor were combined to create one score. Only the Soft Skills score was analyzed in this study because it theoretically addressed interpersonal dimensions, as opposed to the Hard Skills score, which addressed intrapersonal dimensions.

**Interpersonal Attraction Scale.** The Interpersonal Attraction Scale (IAS) was created by McCroskey and McCain (1974) for the purpose of assessing interpersonal attraction (see Appendix B). The instructions for the scale are as follows, “Please indicate the degree to which you agree or disagree with the following statements as they apply to \_\_\_\_\_. Use the following scale and write one number before each statement to indicate your feelings” (Rubin, Palmgreen, & Sypher, 1994). In the present study, the instructions were modified slightly to indicate that participants needed to respond to the individual in the photograph provided. For the purpose of this study, the IAS was paired with the target stimuli photos. Participants were asked to respond to the instructions and photo stimuli using a 7-point Likert scale (1 = *strongly disagree*, 4 = *undecided*, and 7 = *strongly agree*). Eight of the items are reverse coded for scoring and a total score is calculated by summing all of the values. Scores for each of the three domains of attraction on the IAS can range from 4 to 20, and scores for total interpersonal attraction can range from 15 to 60.

Factor analysis supported that the IAS measures three different dimensions of interpersonal attraction: liking or social attraction, physical attraction, and task attraction (McCroskey & McCain, 1974). Initially 30 items were created for the scale but after the factor analysis was conducted the measure was reduced to 15 items. The first five items address social attraction (e.g., “I think he [she] could be a friend of mine” and “He [she] just wouldn’t fit into my circle of friends”). The next five items address physical attraction (e.g., “I think he [she] is quite handsome [pretty]” and “I don’t like the way he [she] looks”). The last five items address

task attraction (e.g., “I have confidence in his [her] ability to get the job done” and “He [she] would be a poor problem solver”). The aim of the current study is to examine social and physical attraction and not task attraction. Therefore, the task attraction questions on the IAS were not used in this study. Task attraction is the last part of the measure; therefore, omitting the task attraction items should not have affected the validity of the social and physical attraction subscales. Previous research has been conducted using only one or two dimensions of the scale (e.g., Lee & Gudykunst, 2001; Martin & Anderson, 1995).

McCroskey and McCain (1974) reported strong internal consistency reliability for each dimension of the IAS: Social, .84; Physical, .86; and Task, .81. Glasser et al. (1994) stated that the IAS is considered a reliable and valid measure of interpersonal attraction based on multiple studies that have used the scale.

**Feeling Thermometer.** The final explicit measure that was paired with the photo stimuli was a Feeling Thermometer (Campbell, 1971; see Appendix C). Feeling Thermometers measure affective responses by assessing an individual’s evaluation of a target group (Haddock, Zanna, & Esses, 1993). Participants in the study saw the same photo as they received previously (i.e., the individual in the wheelchair either with or without the assistance dog) and were asked to “provide a number between 0 and 100 to indicate your overall evaluation of the individual in the photograph” (Haddock et al., p. 1108). Participants marked the location on a scale that looked like a thermometer to indicate their feelings toward the target photograph. The scale was labeled every 10 points with numbers along the interval from 0-100. The following three sets of descriptors were labeled next to the Thermometer: “*cold*” and “*extremely unfavorable*” (at the zero point), “*neutral*” (at the 50 point), and “*warm*” or “*extremely favorable*” (at the 100 point) (Haddock et al.). Thus, the Feeling Thermometer yielded one number for scoring.

In previous studies, the Feeling Thermometer has been referred to with a variety of names, such as the “evaluation thermometer” to evaluate different concepts. Cranney et al. (2001) used the Feeling Thermometer to assess health for individuals with osteoporosis. The researchers found that the Feeling Thermometer had a test-retest reliability coefficient of .83 for current health. For ratings of current health, scores on the Feeling Thermometer were significantly correlated with a variety of subscales on the Medical Outcomes Survey (SF-36). Karpinski (2004) used a Feeling Thermometer and the Rosenberg Self-Esteem Scale to assess self-esteem in college students and statistical analysis indicated that the two measures were significantly correlated ( $r = .68$ ). The scale has been used in numerous social psychology studies, especially to measure intergroup attitudes (Cairns, Kenworthy, Campbell, & Hewstone, 2006; Haddock et al., 1993; Wilcox, Sigelman, & Cook, 1989).

**Disabilities and assistance dog Implicit Association Test.** To assess with an implicit measure attitudes toward individuals with disabilities compared to individuals with disabilities who have assistance dogs, an Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) was used. The Implicit Association Test is a computer-based task that measures the speed with which respondents differentially associate pictures or words (a “target-concept”) and an “attribute dimension” (Greenwald et al.). Project Implicit, a website developed by Tony Greenwald, Mahzarin Banaji, and Brian Nosek, includes a version of the IAT that measures attitudes toward individuals with disabilities (<https://implicit.harvard.edu/implicit/>). Greenwald and colleagues offer free downloading of all stimuli material as well as use of the IAT for research purposes. Pruett and Chan (2006) created the Disability Attitude Implicit Association Test (DA-IAT) which is similar to that found on Project Implicit’s website; however, the DA-IAT is a paper and pencil based task.

In the current study, stimuli for the disabilities and assistance dog IAT included one stimuli from Project Implicit's website as well as four newly created images (Nosek, Smyth et al., 2007). Instead of presenting the photos that represent able-bodied persons from Project Implicit's website, four new photos were used that included individuals with disabilities paired with assistance dogs. These four photos with the assistance dogs were exact replicas of the four other photos of individuals with disabilities, but with the addition of the assistance dog. Thus, for this new IAT, two new categories were created. One category contained four pictures illustrating "*disabilities*" and the second category contained four pictures illustrating "*individuals with disabilities and assistance dogs*." See Appendix D for the stimuli.

The stimuli included a target attitude object (*disability*), a comparison attitude object (*assistance dog*), positive words (*good*), and negative words (*bad*; Nosek, Smyth et al., 2007). Each object concept (*disability/assistance dog*) has four matching photos and each word concept (*good/bad*) has four matching adjectives. Two examples of the four photos include a photo of a wheelchair and a photo of a woman who is visually impaired with a cane for the attitude object of a "*disability*." The four photos used for the attitude object of "*assistance dog*" included the same pictures of individuals with disabilities but paired with assistance dogs. The target concept of "*good*" included the words *joy*, *wonderful*, *pleasure*, and *excellent*. The target concept of "*bad*" includes the words *evil*, *terrible*, *rotten*, and *nasty*.

The IAT is one of the most popular techniques to measure implicit cognitions and works by evaluating underlying automatic evaluations of the target concept (Greenwald et al., 1998; Pruett & Chan, 2006). The reasoning behind the IAT is that participants should be quicker at sorting two concepts that share a response option that are more strongly associated compared to two concepts that are weakly associated (Nosek, Greenwald, & Banaji, 2007). Beginning

directions inform the participant that s/he will need to “sort words and pictures into categories as quickly as possible” (<https://implicit.harvard.edu/implicit/>). The IAT is made up of seven distinct blocks, three of which are used for practice and four of which are used for deriving scores (Nosek, Greenwald et al., 2007). Blocks 1, 2, and 5 serve as practice and Blocks 3, 4, 6, and 7 are used to determine response times. See Table 2 for the sequence of blocks used in this IAT.

In Block 1, participants view a series (20 trials) of photos (e.g., *a wheelchair*) that flash on the computer screen from among the eight possible photos, and participants must press one of two keys to select which attitude object the photo is paired with (e.g., disability with “i” key and assistance dog with “e” key). Block 2 consists of 20 Trials with words that flash on the computer screen (e.g., *evil*) and the participant must match the word with one of the two target concepts (e.g., *good/bad*). Block 3 consists of 20 Trials with both photos and words that flash on the computer screen alternating between attitude object and target concept (e.g., *disabled* and *bad* with “i” key and *assistance dog* and *good* with “e” key). Block 4 is a repeat of Block 3, but with 40 Trials (Nosek, Greenwald et al., 2007).

Block 5 is another practice set with 20 Trials and is the same as Block 1, except the key response options are reversed (e.g., *assistance dog* with “i” key and *disability* with “e” key). Block 6 is the same as Block 3 but the attitude object and target concepts shown together are reversed (e.g., *assistance dog* and *bad* with “i” key and *disability* and *good* with “e” key). Again, using one of two keys to respond, participants must match either the photo (e.g., *a wheelchair*) or the word (e.g., *joy*) that flashes on the screen with the attitude object (e.g., *disability/assistance dog*) or with the target concept (e.g., *good/bad*). Block 7 is the same as Block 6 but with 40 Trials. As recommended by the creators of the IAT, Blocks 1, 3, and 4 were counterbalanced with Blocks 5, 6, and 7 across participants (Nosek, Greenwald et al., 2007). The computer

records the length of time it takes participants to categorize the photos or words that appear on the screen.

Table 2.

*Sequence of Blocks in the Implicit Association Test Measuring Attitudes to Individuals with Disabilities with Assistance Dogs*

Block	No. of trials	Items assigned to left-key response	Items assigned to right-key response
B1	20	Images of disabilities	Images of assistance dogs
B2	20	Pleasant words	Unpleasant words
B3	20	Images of disabilities + Pleasant words	Images of assistance dogs + Unpleasant words
B4	40	Images of disabilities + Pleasant words	Images of assistance dogs + Unpleasant words
B5	40	Images of assistance dogs	Images of disabilities
B6	20	Images of assistance dogs + Pleasant words	Images of disabilities + Unpleasant words
B7	40	Images of assistance dogs + Pleasant words	Images of disabilities + Unpleasant words

*Note.* IAT = Implicit Association Test. The IAT for this study was counterbalanced, such that for half of the participants, the assigned left and right response keys for B1, B3 and B4 were switched with those for B5, B6, and B7.

Trial scores are calculated from the time a stimulus is presented until the time the stimulus is correctly categorized. When an error is made participants must correct the error before moving on to the next trial. Scoring for the IAT begins with collecting the data from Blocks 3, 4, 6, and 7 for each participant. Trials longer than 10,000 ms are discarded, and scores for participants with more than 10% of their trials under 300 ms are discarded (Nosek, Greenwald et al., 2007). Final scores were calculated using the D score algorithm (Greenwald, Nosek, & Banaji, 2003). The final IAT D score is an averaged latency between the two different conditions, creating a “relative association strength between the concepts and attributes” (Nosek, Greenwald et al., p. 271). Additionally, an “IAT effect” was calculated using a one-sample *t* test

to determine if the D score was significantly different from zero (Carlsson & Bjorklund, 2010). Greenwald and colleagues (1998) define an IAT effect as “the difference in mean latency between... two conditions (noncompatible minus compatible)” (p. 1468).

The internal consistency of the IAT is reported as being satisfactory, ranging from .7 to .9. Across various studies, the test-retest reliability (with intervals ranging from 1 month to 1 year) is reported as stable with a median  $r = .56$  (Nosek, Greenwald et al., 2007). Because it was likely that participants may have responded to the explicit measures of attitudes with socially desirable responses, including an implicit measure of attitudes strengthened the current study.

**Attitudes of Adults to Dogs.** To measure attitudes toward dogs, this study used the Attitudes of Adults to Dogs questionnaire (Lakestani, Donaldson, Verga, & Waran, 2011; see Appendix E). The questionnaire consists of 12 items and 4 response options (0 = *I don't know*, 1 = *never*, 2 = *sometimes*, 3 = *mostly*). Seven of the questions indicate positive attitudes, and five questions require reverse scoring because they indicate negative attitudes. Scores for the scale are calculated by averaging across the items; scores can range from 1 to 3, with 3 indicating a more positive attitude toward dogs. Questions include, “*Dogs are dirty*,” “*I love my dog/I would love to have a dog*,” and “*I think that dogs are more loyal than people*.” Lakestani et al. used seven of the items from Miura, Bradshaw and Tanida’s (2000) inventory, which assessed five different factors relating to attitudes toward dogs. An additional five items were created for the Attitudes of Adults to Dogs scale. Lakestani et al. reported that the Attitudes of Adults to Dogs scale has a Cronbach’s alpha coefficient of .74, suggesting that the scale has acceptable internal consistency reliability. Due to the recent creation of the scale, evidence of the measure’s psychometric properties is limited. However, in support of the scale’s validity, Lakestani et al. found that the scale was positively correlated with pet ownership. Specifically, individuals who



owned pets scored higher on the Attitude of Adults to Dogs scale, indicating that higher scores on the scale reflect more positive attitudes toward dogs.

There are a few commonly used measures in the human-animal interaction literature that assess attitudes toward pets. For example, the Pet Attitude Scale, measures attitudes towards pets in general, rather than dogs specifically (Templer, Salter, Dickey, Baldwin, & Veleber, 1981). Because the construct of interest in the current study was attitudes toward dogs, it was decided that the Pet Attitude Scale measured too broad of a concept. The Lexington Attachment to Pets Scale is another commonly used measure (Johnson, Garrity & Stallones, 1992). However, the Lexington Attachment to Pets Scale measures attachment, not attitudes, towards pets in general. Although the Attitudes of Adults to Dogs scale is fairly new to the human-animal interaction field, it was used for the current study because the scale specifically examines attitudes towards dogs.

**Dog owning history.** Dog ownership history was assessed with one question to measure current and previous dog owning history. Participants were asked, “Have you ever owned a dog?” with a *yes/no* response option. Human-animal interaction research currently lacks a brief scale to measure pet ownership history or the history of an individual’s contact with specific animals. Most human-animal interaction studies assess pet ownership with one or two questions that ask whether or not the individual currently owns a pet (or has in the past) with a *yes* or *no* response option. Friedmann, Thomas, and Son (2011) assessed pet ownership with one question by asking participants, “Do you currently have any pets?” Schneider and Harley (2006) asked about current and past pet ownership, but did not specify how they phrased their question. Siegel (1990) also used one question to ask whether or not there was a pet in the household, and if so

what type. Raina et al. (1999) asked participants whether they currently owned a pet, if so what kind, and for how long.

**Manipulation check.** Because of the experimental nature of the study, a short manipulation check was incorporated, asking participants whether or not they saw a dog in the target photo stimuli. To assess the fidelity of the experimental manipulation an analyses was conducted to determine how many participants responded correctly to the manipulation check item (i.e., how many participants in the dog present condition reported that they saw a dog; how many participants in the dog absent condition reported that they did not see a dog).

**Behavioral intention measures.** To assess whether the condition (i.e., dog present/dog absent) predicted behaviors, two behavioral intention questions were included. A research assistant verbally posed the behavioral intention questions to each participant individually. Research assistants first asked participants if they were willing to donate 1 hour of their time (at a later date) to volunteer for a club helping individuals with disabilities on the campus. Research assistants read from the following script:

The faculty member in charge of this experiment gave me permission to ask you about a volunteer opportunity with a club that I'm involved in. I was wondering if you would be willing to volunteer one hour for the Partnership for People with Disabilities? The activities will take place on the VCU Monroe Park Campus sometime this semester. Are you interested?

Responses were recorded as yes or no. The second behavioral intention measure assessed whether participants were willing to contact the man they saw in the target photo by e-mail to provide him with information about attending the university. Research assistants gave each participant a small sheet of paper with the following information:

Thank you again for participating today. The gentleman you viewed in the study has applied for admission to Virginia Commonwealth University and is hoping to talk to a current student about their experience at VCU. His name is Alex Jordan and his e-mail is: alex88jordan@gmail.com. If you would be willing to speak with him about your experiences, simply write “VCU psychology student” in the subject so he knows the context of the e-mail.

Next, research assistants asked each participant to read the paper and asked whether s/he had any questions.

### **Procedure**

The current study was initially pilot tested with a small group of students to determine how long the study would take to be completed. Pilot data were used to assess whether or not any changes should be made to the measures (i.e., whether the IAT should be substituted with the brief IAT). Students were recruited from Introduction to Psychology classes through SONA Systems Ltd., which is a human subject pool management system. Introductory psychology students receive extra credit or course activity points for participating in research studies through SONA. To ensure voluntary enrollment in research, students who do not wish to participate have alternative options for class credit. After IRB approval was obtained, the study was activated online on SONA for students to sign up for specific times and dates to come into the computer lab to participate. On the selected date, students came to a specified classroom containing computers. All explicit measures were set up online through a survey software program (Qualtrics). The IAT was completed on the computer program DirectRT. Research assistants were present during the study to provide basic instructions and to address any technical issues.

Before beginning the study all students were asked to complete an informed consent form. The informed consent listed possible risks and benefits of participation; only the students who agreed and signed the consent form were allowed to participate. Participants were then asked to complete the demographic questionnaire. Participants were randomly assigned to conditions (dog present or dog absent; see Appendix F) by Qualtrics and the photo was matched with the PESD Scale Soft Skills, the IAS Social, the IAS Physical, and the Feeling Thermometer. After finishing these measures, participants completed the Attitudes of Adults to Dogs scale, a manipulation check, and the disabilities and assistance dog IAT.

After completing the computer-based tasks, each participant was taken aside and asked individually by one of the research assistants if they were willing to donate 1 hour of their time to volunteer for a VCU club helping individuals with disabilities. Participants' responses were coded as yes or no, unless they refused to provide a definitive answer in which case their response was coded as maybe. Lastly, participants were given a sheet of paper with contact information for the man they saw in the target photograph, so that participants could e-mail him to provide him with information about attending the university. All participants were given the sheet of paper to take with them at the end of the study session with a fake name and fake e-mail address for the man in the target photo. At a later point, the research assistants responded to messages received at that e-mail address and any participants who sent an e-mail to that address were debriefed. After the second behavioral intention question, all participants were thanked for their participation and debriefed broadly about the study excluding the information regarding the photo manipulation. Information about the manipulation of the dog present/dog absent condition was kept confidential to avoid diffusion of treatment. The study had no foreseeable risks to participants.

## Results

### Preliminary Data Screening

Prior to running statistical analyses, the data were checked for errors, missing values, and univariate outliers. Additionally, a manipulation check was conducted.

**Missing data.** Based on criteria from Tabachnick and Fidell (2007), participants who had more than 20% of their responses missing on a scale were excluded from analyses using that scale. If a participant had missing data, but it was less than 20% of the items on a scale, then a scale score was derived by computing a mean score for the completed items on that scale.

**Data entry errors.** Data entry errors were assessed with descriptive statistics. The means, standard deviations, and ranges for all of the scales and variables were reviewed. Upon reviewing the descriptive statistics, all scores were found to be in the expected ranges and there were no errors found in the data.

**Outliers.** Univariate outliers were examined by converting each variable into a standard score and comparing it to a critical value two standard deviations away from the sample mean (Tabachnick & Fidell, 2007). Less than 5% of participants answered with  $z$  scores over the established critical values (1.96) on any of the scales. To check for multivariate outliers, the Mahalanobis distance was calculated for each variable and compared against a critical value (Tabachnick & Fidell, 2007). No multivariate outliers were found. The assumptions of normality, linearity, and multicollinearity were also checked. Normality was determined by values of skewness and kurtosis for all variables, using the cut-off of -1 and 1 (Tabachnick & Fidell, 2007). The Attitudes of Adults Toward Dogs scale was the only problematic variable, with a slight negative skew (-1.06) and positive kurtosis value (1.64). However, due to theory suggesting that individuals tend to have a positive attitude toward dogs, the variable was not expected to be normally distributed. Therefore, the Attitudes of Adults Toward Dogs variable

was not transformed. Linearity was evaluated with boxplots for each set of combination of variable scores, none of which indicated a curvilinear relationship. Multicollinearity was evaluated with Tolerance and VIF values as part of the collinearity statistics. All of the values of Tolerance were above .10 and the values for VIF were less than 10, suggesting that there were no issues with multicollinearity (Fields, 2009).

**Manipulation check.** Participants were randomly assigned to one of two conditions (i.e., dog present and dog absent). At the end of the study, individuals were asked if they saw a dog in the photo that they viewed. Any participant whose response to the manipulation check did not match their assigned condition was excluded from the analyses, based on the assumption that they were not paying attention during the study. Seven individuals (4%) were excluded based on the manipulation check.

### **Preliminary Analyses**

**Descriptive statistics.** The descriptive statistics for all measures are presented in Table 3. Means, standard deviations and ranges for scales are presented per condition (i.e., dog condition and no dog condition) and for the overall sample. Internal consistency reliability estimates for all scales are presented in Table 4. The Attitudes of Adults to Dogs Scale has been used in only one study previously and the mean scores, ranging from 2.20 to 2.30 (no standard deviations were reported), similar to scores in the current study (Lakestani et al., 2011). The similarity of mean scores suggests that attitudes toward dogs in the present sample are similar to those in European samples. It is interesting to note that all of the mean scores on scales used in this study (i.e., IAS Social, IAS Physical, Feeling Thermometer, and PESD Scale Soft Skills) indicate relatively positive attitudes toward the individual with a disability.

The two behavioral intention measures were: offering to volunteer for a University club related to disabilities and e-mailing the individual whom participants saw in the photograph to answer questions regarding the university. The behavioral intention measures had a rate of endorsement that was either very high or very low. The majority (83.6%) of participants agreed to volunteer, two (0.8%) answered maybe, and 37 (15.2%) said no. The percentage of participants who agreed did not vary by the condition with a dog (85.5%) and without a dog (81.7%). In contrast, only a minority of individuals e-mailed (2.5%) whereas 238 (97.5%) individuals did not e-mail the individual. The percentage of participants who chose not to e-mail did not vary by the condition with a dog (96%) and without a dog (99.2%).

Table 3

*Means, Standard Deviations, and Ranges of Scales*

	Dog Condition		No Dog Condition		Total Sample			
	Mean	SD	Mean	SD	Mean	SD	Sample Range	Possible Range
Attitudes of Adults to Dogs Scale	2.29	.34	2.25	.36	2.27	.35	.83-2.92	0-3.00
IAT D Score	-.10	.48	-.13	.52	-.12	.50	-1.40-1.15	-2.00-2.00
IAS Social	26.75	4.75	27.89	5.08	27.32	4.94	15.00-35.00	5.00-35.00
IAS Physical	21.48	4.92	20.91	5.82	21.20	5.38	7.00-35.00	5-35.00
Feeling Thermometer	66.58	18.01	67.63	15.88	67.10	16.96	3.00-99.00	0-100.00
PESD Scale Soft Skills	12.20	2.63	11.88	2.57	12.04	2.60	5.00-18.00	3.00-18.00

*Note.* IAT = Implicit Association Test; IAS = Interpersonal Attraction Scale; PESD Scale Soft Skills = Photo Elicitation Semantic Differential Scale Soft Skills.

Table 4

*Internal Consistency Reliability Estimates for Scales and Subscales*

Instrument	Alpha
Attitudes of Adults to Dogs Scale	.78
IAS Social	.75
IAS Physical	.81
PESD Scale Soft Skills	.66

*Note.* IAS = Interpersonal Attraction Scale; PESD Scale Soft Skills = Photo Elicitation Semantic Differential Scale Soft Skills.

**Correlations.** Pearson correlations were calculated to examine the relationships among the scales used in the regression analyses. The Attitudes of Adults to Dogs Scale was significantly correlated with the IAS Social  $r(242) = .22, p = .001$ , indicating that individuals who reported positive attitudes toward dogs also indicated more positive attitudes on a social domain towards the individual with a disability. The Attitudes of Adults to Dogs scale was also significantly correlated with the IAT D scores  $r(241) = -.13, p = .04$ . However, the significance of this correlation may simply be due to the large sample size. Thus, the associations should not be assumed to be clinically significant so should be interpreted with caution. A negative IAT D Score indicates a positive bias toward the presence of an assistance dogs; thus, a negative correlation with the Attitudes of Adults to Dogs Scale implies that individuals with more positive attitudes toward the presence of assistance dogs also had significantly more positive attitudes toward dogs. The IAT D Scores were significantly correlated with only the Attitudes of Adults to Dogs Scale. The IAS Social, IAS Physical, Feeling Thermometer, and the PESD Scale Soft Skills were all significantly correlated between .42 and .47 at  $p < .01$ . The correlations among scales are presented in Table 5.



Table 5

<i>Correlations Among Scales</i>						
Instrument	1	2	3	4	5	6
1. Attitudes of Adults to Dogs Scale	--					
2. IAT D Score	-.13*	--				
3. IAS Social	.22**	.00	--			
4. IAS Physical	.08	.07	.45**	--		
5. Feeling Thermometer	.10	.00	.47**	.42**	--	
6. PESD Scale Soft Skills	.07	.09	.42**	.45**	.47**	--

\* $p < .05$ . \*\* $p < .01$ .  
*Note.* IAT = Implicit Association Test; IAS = Interpersonal Attraction Scale; PESD Scale Soft Skills = Photo Elicitation Semantic Differential Scale Soft Skills.

**Covariates.** A series of  $t$  tests were conducted to determine whether there were any significant differences in the dependent variables (IAS Social, IAS Physical, Feeling Thermometer, and PESD Scale Soft Skills) based on the potential covariates in this study. The two potential covariates were gender and dog ownership history. The  $p$  value was not adjusted, as it is best to be conservative for covariate testing.

There were no significant differences between females ( $M = 27.42$ ,  $SD = 4.82$ ) and males ( $M = 27.09$ ,  $SD = 5.23$ ) on the IAS Social  $t(240) = -.48$ ,  $p = .63$ ; between females ( $M = 21.53$ ,  $SD = 5.55$ ) and males ( $M = 20.48$ ,  $SD = 4.94$ ) on the IAS Physical  $t(166) = -1.48$ ,  $p = .14$ ; between females ( $M = 67.08$ ,  $SD = 17.44$ ) and males ( $M = 67.13$ ,  $SD = 16.00$ ) on the Feeling Thermometer  $t(240) = .02$ ,  $p = .98$ ; or between females ( $M = 12.17$ ,  $SD = 2.64$ ) and males ( $M = 11.77$ ,  $SD = 2.51$ ) on the PESD Scale Soft Skills  $t(241) = -1.12$ ,  $p = .26$ . (Note: Degrees of freedom varied for the  $t$  tests because Levene's test was significant for IAS Physical and equal

variances were not assumed for females and males on that variable.) Thus, there were no significant gender differences for ratings of the photo on the IAS Social, IAS Physical, Feeling Thermometer, and PESD Scale Soft Skills.

Chi-square tests were used for categorical variables to investigate significant differences for both behavioral intention measures based on gender. There were significant differences based on gender for the behavioral intention of volunteering  $\chi^2(1, N = 241) = 10.27, p = .002$ . Females were more likely to agree to volunteer compared to males. There were no significant differences based on gender for the behavioral intention of e-mailing  $\chi^2(1, N = 244) = .01, p = 1.00$ .

There were no significant differences between dog owners ( $M = 27.37, SD = 5.01$ ) and non-dog owners ( $M = 27.23, SD = 4.83$ ) on the IAS Social  $t(240) = .21, p = .83$ ; between dog owners ( $M = 21.23, SD = 5.50$ ) and non-dog owners ( $M = 21.14, SD = 5.18$ ) on the IAS Physical  $t(240) = .12, p = .90$ ; or between dog owners ( $M = 66.50, SD = 16.55$ ) and non-dog owners ( $M = 68.20, SD = 17.74$ ) on the Feeling Thermometer  $t(240) = -.74, p = .46$ ; or between dog owners ( $M = 12.05, SD = 2.65$ ) and non-dog owners ( $M = 12.02, SD = 2.51$ ) on the PESD Scale Soft Skills  $t(241) = .08, p = .94$ . Therefore, there were no significant differences based on dog ownership history for ratings of the photo on any of the dependent variables.

Chi-square tests were used for categorical variables to determine whether there were any significant differences based on dog ownership for the behavioral intention measures. There were no significant differences based on dog ownership for the behavioral intention of volunteering  $\chi^2(1, N = 241) = 1.36, p = .26$ ., or for the behavioral intention of e-mailing  $\chi^2(1, N = 244) = .62, p = .43$ .

In summary, the only covariate that was found to be significant was gender for the behavioral intention of volunteering, with females being more likely to agree to volunteer.

Although there was only one significant difference based on the covariates, the decision was made to include the covariates in all of the regression analyses. The rationale for keeping the covariates in the analyses was so that any significant results could be attributed to independent variables above effects of the covariates. Additionally, limited research has examined gender and dog ownership history in the context of attitudes toward individuals with disabilities.

### **Hypothesis Testing**

Hypotheses 1, 2, 3, 5 and 6 were tested using separate regression analyses. Hypotheses 1, 2, and 3 each included a set of four hierarchical multiple regression analyses. Hypotheses 5 and 6 each included two sequential logistic regression analyses. Although both analysis of covariance and regression are based on the general linear model, regression analyses were used instead of an analysis of covariance to better understand the relationship between the independent and dependent variables. Specifically, regression analyses tested how much variance in the dependent variable was accounted for by the independent variables after controlling for covariates, instead of testing whether the two groups' means differed significantly (Tabachnick & Fidell, 2007). The analysis used for Hypothesis 4 was a paired sample  $t$  test. Due to the number of analyses, an adjusted significance level of  $p = .01$  was used to reduce Type I error. Each hypothesis with multiple analyses was treated as a family of tests. Tabachnick and Fidell recommend calculating an adjusted  $p$  value by dividing the family-wise error rate (e.g., .05) by the number of dependent variables (e.g., 4). Thus, dividing .05 by 4 resulted in .0125, which, when rounded down, yielded the .01  $p$  value that was used.

**Hypothesis 1.** Individuals will report more positive attitudes toward a person with a disability when an assistance dog is present. The analysis evaluated whether the condition (dog

present/dog absent) predicted attitudes toward people with disabilities. Gender and dog ownership history served as covariates.

**Analysis of Hypothesis 1.** Four separate hierarchical multiple linear regression analyses were conducted to determine whether the presence of a dog predicts attitudes toward people with disabilities, while accounting for the covariates of gender and dog ownership history. In Step One, the covariates were entered into the model. The condition (dog present/dog absent) was entered into the second step of the model. Separate regression analyses were conducted for each of the dependent variables: IAS Social, IAS Physical, Feeling Thermometer, and the PESD Scale Soft Skills score. The results for Hypothesis 1 are reported in Tables 6-9.

In the first regression analysis for Hypothesis 1, the covariates were not found to be significant predictors of the IAS Social,  $\Delta F(2, 239) = .13, p = .88 (\Delta R^2 = .00)$  when entered in the first step of the regression. Additionally, the condition (dog present/dog absent) was not found to be a significant predictor of the IAS Social,  $\Delta F(1, 238) = 3.25, p = .07 (\Delta R^2 = .01)$  after accounting for gender and dog ownership history. Therefore, the presence of a dog was not found to significantly predict attitudes on the IAS Social. The results are reported in Table 6.

Table 6

*Hierarchical Multiple Linear Regression Model for the Prediction of IAS Social Scores Based on Condition*

Step and variable	<i>df</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 239)	.00	.00	.13				
Gender					.32	.69	.03	.47
Dog Ownership					-.12	.67	-.01	-.18
2. Condition	(1, 238)	.02	.01	3.25	1.15	.64	.12	1.8

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.” IAS = Interpersonal Attraction Scale.

In the second regression analysis for Hypothesis 1, the covariates were not significant predictors of IAS Physical Scores,  $\Delta F(2, 239) = 1.01, p = .37 (\Delta R^2 = .01)$ . In addition, the Condition was not found to be a significant predictor of IAS Physical Scores,  $\Delta F(1, 238) = .77, p = .38 (\Delta R^2 = .00)$ . Therefore, the presence of a dog was not found to be a significant predictor of attitudes on the IAS Physical. The results are reported in Table 7.

Table 7

*Hierarchical Multiple Linear Regression Model for the Prediction of IAS Physical Scores Based on Condition*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 239)	.01	.01	1.01				
Gender					1.05	.74	.09	1.41
Dog Ownership					-.01	.73	.01	-.02
2. Condition	(1, 238)	.01	.00	.77	-.61	.69	-.06	-.88

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.” IAS = Interpersonal Attraction Scale.

In the third regression analysis for Hypothesis 1, the covariates did not predict a significant amount of the variance of the Feeling Thermometer,  $\Delta F(2, 239) = .28, p = .76 (\Delta R^2 = .00)$ . The addition of condition did not contribute significantly to the model,  $\Delta F(1, 238) = .18, p = .67 (\Delta R^2 = .00)$ . Therefore, the presence of a dog did not predict attitudes on the Feeling Thermometer scale. The results values are reported in Table 8.

Table 8

*Hierarchical Multiple Linear Regression Model for the Prediction of Feeling Thermometer Scores Based on Condition*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 239)	.00	.00	.28				
Gender					.09	2.36	.00	.04
Dog Ownership					1.70	2.30	.05	.74
2. Condition	(1, 238)	.00	.00	.18	.94	2.20	.03	.43

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.”

In the fourth regression analysis for Hypothesis 1, the covariates were not significant predictors of the PESD Scale Soft Skills,  $\Delta F(2, 240) = .63, p = .53$  ( $\Delta R^2 = .01$ ). In the second step, the condition did not significantly contribute to the prediction of scores on the PESD Scale Soft Skills,  $\Delta F(1, 239) = .96, p = .33$  ( $\Delta R^2 = .00$ ). Thus, the presence of a dog did not predict attitudes on the PESD Scale Soft Skills. The results are reported in Table 9.

Table 9

*Hierarchical Multiple Linear Regression Model for the Prediction of PESD Scale Soft Skills Scores Based on Condition*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 240)	.01	.01	.63				
Gender					.40	.36	.07	1.12
Dog Ownership					.00	.35	.00	.01
2. Condition	(1, 239)	.01	.00	.96	-.33	.34	-.06	-.98

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.” PESD Scale Soft Skills = Photo Elicitation Semantic Differential Scale Soft Skills.

**Hypothesis 2.** Among individuals in the condition with the dog present, those with more positive attitudes towards dogs will rate the individual in the photo more positively. The analysis evaluated whether attitudes toward dogs predicted attitudes toward people with disabilities who had assistance dogs.

**Analysis of Hypothesis 2.** Four separate hierarchical multiple linear regression analyses were conducted to determine whether attitudes toward dogs accounted for a significant amount of the variance in attitudes toward people with disabilities for participants in the dog present condition. Gender and dog ownership history served as covariates for the analysis and were entered in the first step. The independent variable, scores on the Attitudes of Adults to Dogs scale, was entered in the second step. Separate regression analyses were conducted for each of the dependent variables: IAS Social, IAS Physical, score on the Feeling Thermometer, and the PESD Scale Soft Skills score. The results for Hypothesis 2 are reported in Tables 10-13.

In the first regression analysis for Hypothesis 2, the covariates were not found to be significant predictors of the IAS Social,  $\Delta F(2, 119) = .69, p = .50$  ( $\Delta R^2 = .01$ ) when entered in the first step of the regression. However, attitudes towards dogs were found to be a significant predictor of scores on the IAS Social,  $\Delta F(1, 118) = 14.14, p < .001$  ( $\Delta R^2 = .11$ ) after accounting for gender and dog ownership history. The beta weight for attitudes toward dogs ( $\beta = .35$ ) indicates a positive relationship with social attitudes, such that individuals with more positive attitudes toward dogs had more positive social attitudes toward the individual with a disability. The results are reported in Table 10. In summary, among individuals who saw a person with a disability paired with a dog, attitudes towards dogs predicted attitudes on the social attraction scale. Positive attitudes towards dogs accounted for 11% of the variance in IAS Social scores.

Table 10

*Hierarchical Multiple Linear Regression Model for the Prediction of IAS Social Scores Based on the Attitudes of Adults to Dogs Scale*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 119)	.01	.01	.69				
Gender					.48	.93	.05	.52
Dog Ownership					-.92	.94	-.09	-.97
2. Attitudes of Adults to Dogs Scale	(1, 118)	.12	.11	14.14***	4.84	1.29	.35	3.76***

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.” IAS = Interpersonal Attraction Scale. \*\*\* $p < .001$ .

In the second regression analysis for Hypothesis 2, the covariates were not found to be significant predictors of the IAS Physical,  $\Delta F(2, 120) = 1.06, p = .35$  ( $\Delta R^2 = .02$ ). After controlling for gender and dog ownership history, attitudes towards dogs were not found to be a significant predictor of scores on the IAS Physical,  $\Delta F(1, 119) = 1.51, p = .22$  ( $\Delta R^2 = .01$ ). Therefore, attitudes towards dogs did not predict attitudes of physical attraction. The results are reported in Table 11.

Table 11

*Hierarchical Multiple Linear Regression Model for the Prediction of IAS Physical Scores Based on the Attitudes of Adults to Dogs Scale*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 120)	.02	.02	1.06				
Gender					.35	.95	.03	.37
Dog Ownership					-1.29	.96	-.12	-1.34
2. Attitudes of Adults to Dogs Scale	(1, 119)	.03	.01	1.51	1.72	1.40	.12	1.23

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.” IAS = Interpersonal Attraction Scale.



In the third regression analysis for Hypothesis 2, the covariates did not predict a significant amount of the variance in the Feeling Thermometer,  $\Delta F(2, 119) = .04, p = .97$  ( $\Delta R^2 = .00$ ) when entered in the first step of the regression. In the second step of the regression, the scores on the Attitudes of Adults to Dogs Scale was not found to be a significant predictor of the Feeling Thermometer,  $\Delta F(1, 118) = 4.04, p = .05$  ( $\Delta R^2 = .03$ ). Therefore, attitudes towards dogs did not predict attitudes on the Feeling Thermometer. The results are reported in Table 12.

Table 12

*Hierarchical Multiple Linear Regression Model for the Prediction of Feeling Thermometer Scores Based on the Attitudes of Adults to Dogs Scale*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 119)	.00	.00	.04				
Gender					.62	3.55	.02	.18
Dog Ownership					-.61	3.57	-.02	-.17
2. Attitudes of Adults to Dogs Scale	(1, 118)	.03	.03	4.04	10.26	5.12	.20	2.01

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.”

In the fourth regression analysis for Hypothesis 2, the covariates were not found to be significant predictors of the PESD Scale Soft Skills,  $\Delta F(2, 120) = .60, p = .55$  ( $\Delta R^2 = .01$ ) when entered in the first step of the regression. The results indicated that the Attitudes of Adults to Dogs Scale was a not significant predictor of scores on the PESD Scale Soft Skills,  $\Delta F(1, 119) = 2.26, p = .14$  ( $\Delta R^2 = .02$ ) after accounting for gender and dog ownership history. Thus, attitudes toward dogs did not predict attitudes on the PESD Scale Soft Skills. The results are reported in Table 13.

Table 13

*Hierarchical Multiple Linear Regression Model for the Prediction of PESD Scale Soft Skills Scores Based on the Attitudes of Adults to Dogs Scale*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 120)	.01	.01	.60				
Gender					.39	.51	.07	.76
Dog Ownership					-.34	.52	-.06	-.66
2. Attitudes of Adults to Dogs Scale	(1, 119)	.03	.02	2.26	1.12	.75	.15	1.5

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.” PESD Scale Soft Skills = Photo Elicitation Semantic Differential Scale Soft Skills.

**Hypothesis 3.** Among individuals in the condition with the dog present, those with a positive implicit bias toward assistance dogs will rate the individual in the photo more positively. The analysis evaluated whether the IAT D Scores predicted attitudes toward people with disabilities.

**Analysis of Hypothesis 3.** A hierarchical multiple linear regression analysis was conducted to determine whether IAT D Scores accounted for a significant amount of the variance in attitudes toward people with disabilities for participants in the dog present condition. Gender and dog ownership history served as covariates for the analysis and were entered in the first step. The independent variable, IAT D score, was entered in the second step. Separate regression analyses were conducted for each of the dependent variables: IAS Social, IAS Physical, Feeling Thermometer, and the PESD Scale Soft Skills score. The results for Hypothesis 3 are reported in Tables 14-17.

In the first regression analysis for Hypothesis 3, the covariates were not significant predictors of IAS Social scores,  $\Delta F(2, 117) = .80, p = .45 (\Delta R^2 = .01)$  when entered in the first step of the regression. The IAT D Scores were not found to be significant predictors of IAS Social scores,  $\Delta F(1, 116) = 1.50, p = .22 (\Delta R^2 = .01)$ , after accounting for gender and dog ownership history. The results are reported in Table 14.

Table 14

*Hierarchical Multiple Linear Regression Model for the Prediction of IAS Social Scores Based on IAT D Scores*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 117)	.01	.01	.80				
Gender					.68	.93	.07	.73
Dog Ownership					-.89	.96	-.09	-.93
2. IAS Score	(1, 116)	.03	.01	1.50	-1.13	.93	-.11	-1.22

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.” IAS = Interpersonal Attraction Scale; IAT = Implicit Association Test.

In the second regression analysis for Hypothesis 3, the covariates were not found to be significant predictors of IAS Physical scores,  $\Delta F(2, 118) = 1.10, p = .34 (\Delta R^2 = .02)$  when entered in the first step of the regression. The IAT D Scores were not a significant predictor of IAS Physical scores,  $\Delta F(1, 117) = .10, p = .76 (\Delta R^2 = .00)$ , after accounting for gender and dog ownership history. The results are reported in Table 15.

Table 15

*Hierarchical Multiple Linear Regression Model for the Prediction of IAS Physical Scores Based on IAT D Scores*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 118)	.02	.02	1.10				
Gender					.47	.97	.05	.49
Dog Ownership					-1.30	.99	-.12	-1.31
2. IAT D Score	(1, 117)	.02	.00	.10	.30	.96	.03	.31

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.” IAS = Interpersonal Attraction Scale; IAT = Implicit Association Test.

In the third regression analysis for Hypothesis 3, the covariates were not significant predictors of Feeling Thermometer scores,  $\Delta F(2, 117) = .11, p = .90$  ( $\Delta R^2 = .00$ ) when entered in the first step of the regression. The IAT D Scores were not found to be a significant predictor of Feeling Thermometer scores,  $\Delta F(1, 116) = .18, p = .67$  ( $\Delta R^2 = .00$ ), after accounting for gender and dog ownership history. The results are reported in Table 16.

Table 16

*Hierarchical Multiple Linear Regression Model for the Prediction of Feeling Thermometer Scores Based on IAT D Scores*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 117)	.00	.00	.11				
Gender					1.22	3.59	.03	.34
Dog Ownership					-.94	3.64	-.02	-.26
2. IAT D Score	(1, 116)	.00	.00	.18	-1.49	3.49	-.04	-.43

*Note.* Gender is coded in data with 1 indicating “male” and 2 indicating “female.” IAT = Implicit Association Test.

In the fourth regression analysis for Hypothesis 3, the covariates were not found to be significant predictors of the PESD Scale Soft Skills scores,  $\Delta F(2, 118) = .82, p = .44 (\Delta R^2 = .01)$  when entered in the first step of the regression. The IAT D scores were not a significant predictors of PESD Scale Soft Skill scores,  $\Delta F(1, 117) = .01, p = .91 (\Delta R^2 = .00)$ , after accounting for gender and dog ownership history. The results are reported in Table 17.

Table 17

*Hierarchical Multiple Linear Regression Model for the Prediction of PESD Scale Soft Skills Scores on IAT D Scores*

Step and variable	<i>df</i>	$R^2$	$\Delta R^2$	$\Delta F$	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>
1. Covariates	(2, 118)	.01	.01	.82				
Gender					.56	.50	.10	1.11
Dog Ownership					-.24	.52	-.04	-.47
2. IAT D Score	(1, 117)	.01	.00	.01	.06	.50	.01	.11

*Note.* Gender was coded with 1 indicating “male” and 2 indicating “female.” Dog ownership was coded with 1 indicating “yes” and 2 indicating “no.” Condition was coded with 1 indicating “dog present” and 2 indicating “dog absent.” PESD Scale Soft Skills = Photo Elicitation Semantic Differential Scale Soft Skills.

**Hypothesis 4.** Individuals will have a positive implicit bias toward an individual with a disability paired with an assistance dog over the individual alone. The analysis evaluated whether there was an “IAT effect,” in other words, that individuals responded with faster latency times for compatible conditions (i.e., *assistance dog* and *good*; *disability* and *bad*) compared with incompatible conditions (i.e., *assistance dog* and *bad*; *disability* and *good*).

**Analysis of Hypothesis 4.** A one-sample *t* test was performed to assess whether IAT D scores were significantly different from zero. There was a significant IAT effect,  $t(241) = -3.62, p < .001$ . Figure 3 shows the latencies for the compatible and incompatible blocks of the IAT.

Figure 3.

*Latencies in ms for Compatible and Incompatible Blocks of the Implicit Association Test*

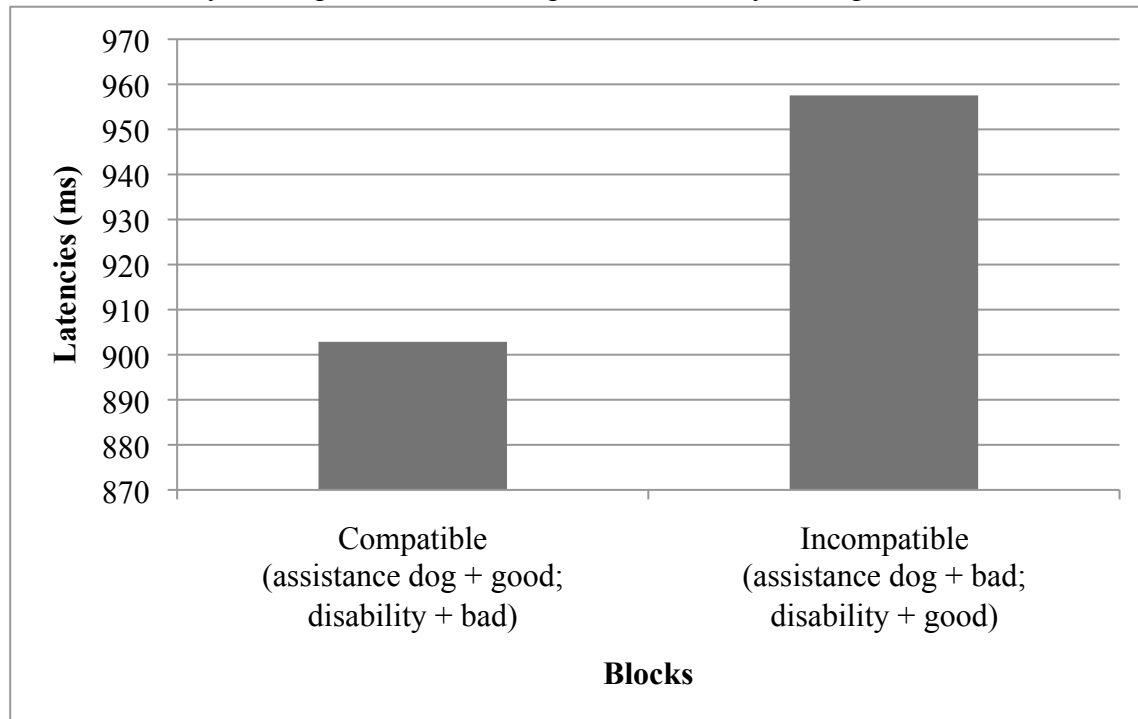


Figure 3. Latencies in ms for compatible and incompatible blocks of the Implicit Association Test.

**Hypothesis 5.** Compared to individuals in the dog absent condition, individuals in the dog present condition will be more likely to agree to volunteer for a University club related to disabilities. The analysis evaluated whether condition (dog present/dog absent) predicted the behavioral intention of volunteering.

**Analysis of Hypothesis 5.** A sequential logistic regression analysis was performed to assess prediction of the behavioral intention of volunteering in the future with a University club related to disabilities, based on gender, dog ownership history, and condition (dog present/dog absent). Gender and dog ownership history served as covariates for the analysis and were entered in the first step. The independent variable, condition, was entered in the second step.

There was a good model fit based on gender and dog ownership history alone ( $\chi^2 = 10.42$ ,  $df = 2$ ,  $N = 241$ ,  $p = .005$ ) and after the addition of condition ( $\chi^2 = 12.33$ ,  $df = 3$ ,  $N = 241$ ,  $p < .006$ ). Comparison of log-likelihood ratios for models with and without condition did not show significantly greater improvement ( $p = .17$ ). The prediction model accurately classified 84.6% of individuals. Gender was a significant predictor of volunteering (Wald = 9.57,  $p = .002$ ,  $OR = 3.14$ ,  $CI = 1.52 - 6.47$ ), indicating that women were 3.14 times more likely to volunteer than men. Dog ownership history (Wald = .71,  $p = .40$ ,  $OR = 1.37$ ,  $CI = .66 - 2.85$ ) and condition (Wald = 1.87,  $p = .17$ ,  $OR = 1.67$ ,  $CI = .80 - 3.47$ ) were not significant predictors of volunteering. Therefore, gender was the only factor that predicted volunteering, and women were more likely than men to agree to volunteer. Full results are reported in Table 18.

Table 18

<i>Results of Logistic Regression Analysis Predicting Behavioral Intention of Volunteering</i>							
	Predictor	<i>B</i>	<i>SE B</i>	Wald's $\chi^2$	<i>df</i>	Odds ratio	95% CI
Step 1	Constant	.84	.33	6.32	1	2.31	
	Gender	1.11	.37	9.14**	1	3.03	1.48 – 6.22
	Dog	.34	.37	.82	1	1.40	.68 – 2.91
	Ownership History						
Step 2	Constant	.59	.38	2.51	1	1.81	
	Gender	1.14	.37	9.57**	1	3.14	1.52 – 6.47
	Dog	.32	.37	.71	1	1.37	.66 – 2.85
	Ownership History						
	Condition	.51	.37	1.87	1	1.67	.80 – 3.47

*Note.* Gender was coded with 0 indicating “male” and 1 indicating “female.” Dog ownership was coded with 0 indicating “no” and 1 indicating “yes.” Condition was coded with 0 indicating “dog absent” and 1 indicating “dog present.” CI = confidence interval.

\*\* $p < .01$ .

**Hypothesis 6.** Compared to individuals in the dog absent condition, individuals in the dog present condition will be more likely to e-mail the individual they saw in the photograph to answer questions regarding the university. The analysis evaluated whether condition predicted the behavioral intention of e-mailing.

**Analysis of Hypothesis 6.** A sequential logistic regression analysis was performed to assess prediction of the behavioral intention (yes/no) of e-mailing an individual with a disability to provide information about the university, based on gender, dog ownership history, and condition (dog present/dog absent). Gender and dog ownership history served as covariates for the analysis and were entered in the first step. The independent variable, condition, was entered in the second step.

There was a not a good model fit based on gender and dog ownership history alone ( $\chi^2 = .60$ ,  $df = 2$ ,  $N = 244$ ,  $p = .743$ ) or after the addition of condition ( $\chi^2 = 3.66$ ,  $df = 3$ ,  $N = 244$ ,  $p = .301$ ). Comparison of log-likelihood ratios for models with and without condition did not show significantly greater improvement ( $p = .08$ ). Therefore, gender, dog ownership history and condition did not significantly predict whether participants e-mailed the individual they saw in the photograph. Full results are reported in Table 19.



Table 19

*Results of Logistic Regression Analysis Predicting Behavioral Intention of E-mailing*

	Predictor	<i>B</i>	<i>SE B</i>	Wald's $\chi^2$	<i>df</i>	Odds ratio	95% CI
Step 1	Constant	-3.29	.81	16.58	1	.04	
	Gender	-.03	.88	.00	1	.97	.17 – 5.46
	Dog Ownership History	-.64	.83	.60	1	.53	.10 – 2.68
Step 2	Constant	-4.43	1.22	13.19	1	.01	
	Gender	.07	.89	.01	1	1.07	.19 – 6.17
	Dog Ownership History	-.77	.84	.83	1	.47	.09 – 2.42
	Condition	1.68	1.11	2.28	1	5.34	.61 – 46.86

*Note.* Gender was coded with 0 indicating “male” and 1 indicating “female.” Dog ownership was coded with 0 indicating “no” and 1 indicating “yes.” Condition was coded with 0 indicating “dog absent” and 1 indicating “dog present.” CI = confidence interval.

## Discussion

The purpose of the current study was to examine whether the presence of an assistance dog influences attitudes and behavioral intentions toward people with disabilities. In this chapter, the study results will be discussed and compared to previous research. Strengths and limitations, implications, and suggestions for future research will also be discussed.

## Summary of Findings

Hypothesis 1 proposed that individuals would report more positive attitudes toward a person with a disability when an assistance dog was present. The presence of an assistance dog was not found to predict more positive attitudes towards a person with a disability, after taking gender and dog ownership history into account. Four separate measures were used to assess attitudes (IAS Social, IAS Physical, Feeling Thermometer, and PESD Soft Skills), and none of the regression analyses were significant. These results are contrary to other research that has

shown that pairing an individual with an animal leads to more positive attitude ratings (Geris-Johnson & Kennedy, 1995; Rossbach & Wilson, 1992; Schneider & Harley, 2006; Wells & Perrine, 2001).

There are several possible explanations for why the results of Hypothesis 1 were not found to be significant. Researchers and theorists of interpersonal attraction suggest that physical attraction influences social behaviors; however, this study did not vary the physical attractiveness of the man in the photograph (Eagly et al., 1991; Hogg & Cooper, 2003; Patzer, 1985). It is possible that his physical characteristics compensated for stigma he might receive as an individual with a disability. Thus, participants in the study may have rated him fairly positively, with or without a dog, given his personal characteristics or attractiveness level. A final possibility is that the null hypothesis is true; that attitudes for perceivers do not differ based on whether an individual with a disability is paired with an assistance dog. However, given that this is the first study to examine attitudes toward individuals with disabilities paired with an assistance dog, more research should be conducted before settling on this conclusion. Additionally, results from Hypothesis 2, which will be discussed later, suggest that the null hypothesis is not true, and instead there is another factor involved in understanding how attitudes are affected.

Another possible explanation is that the measures used in the present study were not sensitive to attitudes affected by a dog's presence. In the current study, the IAS assessed physical and social attraction, the feeling thermometer measured warm or favorable feelings, and the PESD soft skills measured communication, popularity, and attractiveness. It is plausible that perceivers' attitudes differ when a dog is introduced, but that those specific attitudes were not assessed in this study. Previous research that has found differences in attitudes with the addition

of an animal have assessed approachability, happiness, relaxation, likability, or how welcoming an individual appeared (Geries-Johnson & Kennedy, 1995; Rossbach & Wilson, 1992, Wells & Perrine, 2001). The current study examined attitudes such as those regarding friendless, physical attractiveness, and popularity. Future researchers may consider examining attitudes such as happiness or approachability, which have been found to be significantly higher when an animal was present.

Previous research strongly illustrates that there are increased social interactions for individuals with disabilities when an assistance dog is present compared to when the dog is absent (Burrows et al., 2008; Camp, 2001; Davis et al., 2004; Fairman & Huebner, 2000; Hart et al., 1987; Lane et al., 1998; Miner, 2001; Rintala et al., 2002; Sachs-Ericsson et al., 2002; Valentine et al., 1993). Although cognition, affect, and behavior are all components of attitudes (Eagly & Chaiken, 1993), some theorists suggest that not all three of the components are necessary to form an attitude (Zanna & Rempel, 1988). Thus, it is possible that perceivers engage in the behavioral component regarding seeing an assistance dog, but perceivers do not have different cognitions or feelings toward the individual with a disability, which would explain the non-significant findings for Hypothesis 1 in this study.

The Theory of Planned Behavior (Ajzen, 1991) suggests that behavior is impacted by more than just attitudes. Ajzen proposed that attitudes, subjective norms, and perceived behavioral control all impact intentions, which impact behaviors. Applying this theory, it is possible that attitudes do not differ based on whether an individual has an assistance dog, but subjective norms are what impact the behaviors. For example, the subjective norm may be that strangers do not approach other strangers with or without a disability. One exception to that norm may be that it is acceptable to approach a stranger with a dog. Perhaps a study could be

conducted, similar to the current study, using measures that assess subjective norms, additional social behaviors, or more extensive social attitudes toward an individual with a disability either paired with an assistance dog or alone.

A final possibility for the lack of significant results in Hypothesis 1 is that characteristics about the dog in the study impacted participants' attitudes. Due to using a trained assistance dog in the photograph in this study, the dog did not appear very affectionate or connected to the man in the photograph. The dog was also black, which may have made her face harder to see. Two studies that indicated that perceivers' attitudes were different when a dog was present, compared to absent, used a Golden Retriever (Rossbach & Wilson, 1992; Wells & Perrine, 2001). One study used a Labrador Retriever but no color was specified (Geries-Johnson & Kennedy, 1995), and one study used two different dogs, a Golden Retriever and a black Collie/Labrador cross (Schneider & Harley, 2006). Schneider and Harley noted that the features of the black dog may have been harder to see due to the coloring. Thus, it is important to take the color and personality of the dog into account when the presence of the dog is the independent variable. The characteristics, specifically the color and demeanor, of the assistance dog in the current study could have led to the non-significant results for Hypothesis 1. Researchers should consider the characteristics of dogs, when dogs are used in future studies.

Hypothesis 2 proposed that among individuals in the dog present condition, those with more positive attitudes towards dogs would rate the individual in the photo more positively (based on the IAS Social, IAS Physical, Feeling Thermometer, and the PESD Scale Soft Skills). The results indicated that in the dog present condition, perceivers who had more positive attitudes towards dogs rated the individual more positively on the IAS Social, taking gender and dog ownership history into account. None of the three other measures assessing different

attitudes about the individual with a disability were significant predictors based on the respondents' attitudes toward dogs. Thus, positive attitudes toward dogs predicted more positive social attitudes toward an individual with a disability, but only when a dog was paired with the individual.

The results of Hypothesis 2 indicated that among individuals who saw a person with a disability paired with a dog, attitudes towards dogs predicted attitudes on the social attraction scale. The significant results of Hypothesis 2 provide additional information that may explain why the results of Hypothesis 1 were non-significant. Hypothesis 1 stated that attitudes would differ simply by pairing an assistance dog with an individual with a disability. However, results from Hypothesis 2 suggest that it is specifically social attitudes that differ and that those attitudes also depend on how the perceiver views dogs. The first two hypotheses were based on previous studies that showed that more social interactions occurred for individuals with a disability when paired with an assistance dog. Thus, it is not surprising that the only results that were significant in Hypothesis 2 were based on the IAS social (e.g., "I think he could be a friend of mine").

Previous research does not suggest that individuals paired with dogs become more popular or make more friends. Studies of individuals with disabilities who have service dogs have simply found that those individuals have more social interactions, which is consistent with the results of Hypothesis 2 of the current study.

Another possibility is that, compared to perceivers with less positive attitudes toward dogs, those with more positive attitudes liked the person with a dog more because there was a sense of similarity or relatedness. For example, because perceivers who like dogs may own or have owned a dog, when they see someone with a dog, they may feel they have something in common with that individual. Previous research supports that humans are attracted to those who

hold similar attitudes (Byrne & Griffitt, 1966; Stroebe, Insko, Thompson, & Layton, 1971). Integrating prior research with the current results, participants with positive attitudes toward dogs may have thought that the individual with a disability who was paired with a dog held similar attitudes as them. This perceived similarity, may, in turn, have led participants to hold more positive attitudes toward the individual with a disability.

Furthermore, it is possible that individuals who were in the dog present condition were primed by the presence of the dog. Priming occurs when a stimuli influences a perceivers' impression of a target object, such as a specific target individual (Decoster & Claypool, 2004). In this study, the dog may have served as a prime for perceivers who liked dogs, and positive feelings toward the dog may have been misattributed and/or generalized to the individual with a disability. Research supports that stimuli with a positive valence can lead to priming effects in individuals' ratings of photos (Payne et al., 2005). As a result, the perceivers who liked dogs more may simply have been primed to like the individual with a disability more, when in fact they were misattributing their positive feelings from the dog. However, if an individual approaches a stranger with a dog, it may not matter whether or not the perceiver has misattributed their positive feelings from the dog to the person. It is also possible that participants provided ratings based on their attitudes toward the dog and not the person.

Hypothesis 3 suggested that among individuals in the condition with the dog present, those with a positive implicit bias toward assistance dogs (i.e., higher scores on the IAT) would rate the individual in the photo more positively. IAT scores were not found to significantly predict any of the four explicit domains of attitudes assessed (IAS Social, IAS Physical, Feeling Thermometer, and the PESD Scale Soft Skills). These results were not surprising, given the disputes in the literature regarding correlations between implicit and explicit measures. In

particular, researchers have found that correlations between implicit and explicit measures of socially sensitive topics (i.e., those involving prejudice and stereotypes) tend to be quite low (Fazio & Olson, 2003). The current study assessed the socially sensitive topic of individuals with disabilities, which may explain the low correlation between implicit and explicit measures. Research supports that implicit and explicit measures are related, but distinct constructs (Rudolph, Schroder-Abe, Riketta, & Schutz, 2010; Summerville, Hsieh, & Harrington, 2010.) In a study comparing implicit and explicit attitudes across various concepts, the developers of the IAT found that although all of the correlations were positive, there was a large range in association, from .11 to .69 (Greenwald et al., 2003). Hofmann, Gawronski, Gschwendner, Le, and Schmitt (2005) found a mean correlation of .24 between implicit and explicit measures across 126 studies.

Hypothesis 4 stated that participants would have a positive implicit bias toward an individual with a disability paired with an assistance dog compared to the individual alone. Participants took longer to match incompatible blocks (assistance dog + bad and disability + good) compared to compatible blocks (assistance dog + good and disability + bad) on the IAT. The results indicated that there was an IAT effect, and that participants had a positive implicit bias toward an individual with a disability when paired with an assistance dog. For this study, a new IAT was created to assess how attitudes toward an individual with a disability would differ based on the presence of an assistance dog. One strength of this study was that participants completed the IAT in a research lab; thus, the researcher had more control over extraneous variables than would have been possible if the study had been conducted outside of the lab. To the author's knowledge, this is the first IAT to examine attitudes toward humans with the manipulation of an animal's presence. The significant IAT effect found in this study supports

Biophilia Theory (Kellert, 1997), that individuals have an instinctive bond toward animals and thus have positive attitudes toward animals.

Hypothesis 5 proposed that individuals in the dog present condition compared to the dog absent condition would be more likely to agree to volunteer for a university club related to disabilities. The results of the logistic regression indicated that individuals in the dog present condition were not more likely than those in the dog absent condition to agree to volunteer for the university club. The majority of participants agreed to participate in the volunteering opportunity (83.6%). Agreement to volunteer did not differ significantly based on the presence of a dog (85.5%) or absence of the dog (81.7%). There are a number of reasons why participants may have been so willing to volunteer. First, the question posed to students asked if they would be willing to receive an e-mail about this future volunteer opportunity. Although the goal of the question was to assess whether students would volunteer, the way the question was worded assessed whether participants were willing to simply receive an e-mail about the volunteer opportunity. Second, the timeframe of the question may have affected the responses. Because participants were asked to commit to volunteering at some point in the future, they may not have felt as immediately tied to the commitment. Ideally, the study would have measured actual behaviors and not simply behavioral intentions.

Hypothesis 6 proposed that participants in the dog present condition compared to individuals in the dog absent condition would be more likely to e-mail the individual they saw in the photograph to answer questions regarding the university. The results indicated that participants in the dog present condition were not more likely to e-mail the individual they saw in the photograph. In response to this behavioral intention measure, 2.5% of participants sent an e-mail. The percentage of participants who did not send an e-mail did not differ significantly



based on the presence of a dog (96%) or the absence of a dog (99.2%). Again, there are a number of factors that may have affected the results. After the first behavior intention question, the research assistant handed a small piece of paper with the contact e-mail to participants. If participants subsequently lost or misplaced the sheet of paper, they would have no way to e-mail the individual. In addition, given that participants completed the study in groups, they may have assumed that some other student would send an e-mail and consequently could have felt that they did not need to do so. Last, participants may have presumed that the man in the photo was not actually someone applying to the university, but that the behavioral intention was simply part of the study.

### **Strengths and Limitations**

There were several strengths in the research design of the current study. First, the study was conducted in a psychology computer lab; thus, participants may have had fewer distractions compared to if they had been able to complete the study at home. Given that the IAT was completed in a lab and not online, there were no issues with losing internet connection and disrupting reaction times. Another strength was that the photo used in each condition was exactly the same with the exception of the assistance dog. Thus, any differences in scores on measures of attitudes toward the individual in the picture were not due to differences in the photos. This study also included a manipulation check, which asked participants if they remembered seeing a dog in the photo. Including the manipulation check allowed the researcher to exclude from the analyses any participants who failed the manipulation check and presumably were not paying attention during the study.

The failure to obtain the expected results in four of the six hypotheses could be due to a number of factors. First, this study assessed attitudes toward one specific individual paired with

one specific dog in one photo. There are many characteristics about a person that can influence attitudes, including gender, race, body weight, attractiveness, or visible disability. Additionally, there are characteristics about an assistance dog that could affect attitudes, such as breed, color, size, cleanliness, or apparent friendliness. For this initial study, one photograph was used; thus, it was not possible to manipulate these other variables. Perhaps, with a different person or a different dog in the photo, there would have been different results. The current study could have benefitted from rearranging the order of some of the measures and adding additional demographic questions. It may have been better if the Attitudes of Adults to Dogs scale was completed after the IAT, to avoid priming participants. Furthermore, assessing participants' life experience with individuals with disabilities may have provided additional information in regards to the valence of their attitudes towards individuals with disabilities. According to learning theories, repeated exposure to a stimulus over time decreases arousal. In addition, previous research supports that having social contact with stigmatized groups improves inter-group relationships (Allport, 1954; Williams, 1947). Thus, participants' life experience with individuals with disabilities may have influenced their attitudes toward the man in the photo.

It is possible that the condition did not predict different attitudes because the manipulation was not strong enough. During the time that participants rated the photo using each measure, they were still able to see the photo. Thus, the length of viewing the photo was not likely to contribute to the non-significant results. To strengthen the manipulation, a video of the individual or more detailed characteristic information could have been used. However, previous research has indicated that a photo with an animal has been a strong enough manipulation to result in different attitudes (Gries-Johnson & Kennedy, 1995; Rossbach & Wilson, 1992; Wells & Perrine, 2001). Additionally, research supports that viewing a photo for as little as 75 ms has

lasting priming effects that impact attitudes (Payne, Cheng, Govorun, & Stewart, 2005). The current study differs from the previous research using a photo of an animal, because this is the first study to use an assistance dog paired with an individual with a disability.

The current study has some limitations regarding the measures used. Although the IAS Physical (.81), the Attitudes of Adults to Dogs Scale (.78) and the IAS Social (.75) had adequate internal consistency reliability estimates, the PESD Scale Soft Skills (.66) internal consistency reliability estimate was sub-par. Although the Attitudes of Adults to Dogs Scale had adequate internal consistency, the authors did not provide information about how items were developed and did not conduct a factor analysis (Lakestani et al., 2011). The only validity evidence that Lakestani et al. provided for the Attitudes of Adults to Dogs Scale was that pet owners score higher compared to non-pet owners. Ideally, a more psychometrically sound scale measuring attitudes toward dogs would be developed for use in future studies. In addition, the IAT in this study was newly created. As a result, there was no prior evidence for reliability and validity of this new IAT.

There are a number of limitations in regards to the behavioral intention hypotheses. Because the goal of the study was to measure whether attitudes predicted behavior, it would have been ideal to measure participants' actual behavior and not simply their behavioral intentions. If all participants had come to the study individually and had waited in a waiting room, there could have been a confederate in a wheelchair in the waiting room and participants' behaviors could have been recorded. Although behavioral intentions inform researchers somewhat about future behaviors, actual and intended behavior often differ (Baumeister, Vohs, & Funder, 2007). Thus, measuring actual behaviors is the best technique to understand how individuals will react in a

given situation. However, due to limitations of time, resources and money, it was not feasible to measure actual behaviors in the current study.

Another possible issue for the behavioral intention measures could be the amount of time the participants viewed the photograph. The fifth and sixth hypotheses assessed whether future behavioral intentions would differ between groups (dog present and dog absent); however, the participants may not have viewed the photographs long enough to have a lasting impression to impact their decisions. Perhaps adding more character information about the individual or simply increasing the amount of time participants spent viewing the photos could have influenced the results differently for the last two hypotheses. A video or real life encounter may have helped participants feel more connected to the individual with a disability, and strengthened the behavioral intentions assessed in this study.

Characteristics of the participant sample may limit the generalizability of results from the current study. The current study did use a convenient sample, so results may not generalize to populations that differ from the current sample in educational status, age, generation, or region of residence.

## **Implications**

This study has implications for both the human-animal interaction field and the rehabilitation psychology field. As mentioned previously, individuals with disabilities often experience various types of stigma that may then affect their lives and social interactions. There are numerous forms of assistance that individuals with disabilities may employ, one of which is an assistance dog. This study sought to understand why social interactions differ when an assistance dog is present compared to when an individual with a disability is alone. The results imply that individuals who like dogs more compared to those who like dogs less, form more

positive social attitudes toward an individual with a disability simply due to the presence of an assistance dog. This study also found that participants had more positive implicit attitudes toward an individual with a disability when a dog was present compared to absent, based on a novel IAT.

Understanding more about why social interactions differ in certain situations when an animal is present is important, be it for individuals with disabilities or other groups of individuals. Research has demonstrated the health benefits of social support, social ties, and social interactions. Researchers have found that social support significantly increases life expectancy (Spiegel, Bloom, Kraemer, & Gottheil, 1989). Berkman and Syme (1979) assessed death records and amount of social support and found that the lower the social integration, the higher the mortality rate. In other words, having more friends and having more social support is linked to longevity. More social ties have been associated with less susceptibility to the common cold (Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997). In addition, higher social integration has been found to be a protective factor against depression (Seeman, 1996). Results such as these emphasize the importance of social support and social interactions for not only one's mental health but also for physical health. If the presence of an animal can increase social interactions, then there may be significant health benefits as well.

Pairing an individual with a dog can lead to increased social interactions, and potentially increased health benefits, particularly for stigmatized groups. Rehabilitation psychologists should consider the possible social benefits for individuals with disabilities of having an assistance dog. The results of this study imply that others who like dogs will view an individual with a disability more positively in a social domain when a dog is present, and the literature supports that more social interactions occur when a dog is present compared to when the same

individual is without the dog. It is important to note, however, that the author is not suggesting that individuals with disabilities *need* to have an animal present to engage in social interactions, but simply that an animal could serve as a social lubricant in specific situations. For example, a child with a newly acquired disability may experience teasing or bullying from peers, and an assistance dog could provide a buffer for the negative social interactions.

### **Future Directions**

Additional research is needed to gain a better understanding of how animals affect individuals' attitudes toward others. Future studies could include samples from populations other than university students to allow for more generalizable results. Additional research could use the same measures as this study to attempt to replicate the results. Supplemental attitude measures might be added to better understand how attitudes differ when an animal is paired with an individual. As mentioned previously, additional measures of social attitudes or attitudes of approach behaviors could be used to better understand behaviors and behavioral intentions. The use of various photographs, videos, vignettes, or scenarios would contribute more to understanding how attitudes differ toward an individual with and without a dog. Different situations would also provide information about ways in which the presence of animals might affect attitudes. Other methods of data collection can be employed for future studies, such as observational and field studies in real life settings. If behavioral intention measures are to be used, it may be a good idea to pilot test the questions to ensure that they are assessing the proper constructs. Behavioral intention measures may also provide more information if they are not worded with dichotomous (e.g., yes or no) choices.

Future studies might manipulate the characteristics of the individual being assessed and the animal paired with the individual. For example, would the presence of a dog lead to positive

attitudes for other stigmatized groups (e.g., those with invisible disabilities or obesity)? Would other animals such as a cat or a rabbit also lead to more favorable attitudes? Different IATs could be developed with photographs of other animals and other individuals to better understand how implicit attitudes are affected. Additional implicit measures, like the Affect Misattribution Task (Payne et al., 2005) could be used to determine how implicit attitudes are impacted with other animals. Finally, it would be beneficial to conduct cross-cultural research to see if attitudes are the same or different across racial and ethnic groups, religious groups, and countries.

Scholars of human-animal interactions should continue to explore how attitudes differ when a dog is paired with individuals of different groups. If an assistance dog can buffer the stigma of a disability, could a dog buffer stigma due to race, sexual orientation, body size, or other characteristics? In addition, what is it about a dog that affects people's attitudes? Do dog lovers relate more to and identify easier with a stranger who is with a dog compared to seeing that stranger alone? There are many questions that still need to be answered about this newly emerging body of literature.

## **Conclusion**

This study assessed whether attitudes and behavioral intentions toward an individual with a disability differ with the presence of an assistance dog. The study failed to show that attitudes are more positive toward an individual with a disability who has an assistance dog compared to the same individual without an assistance dog. The study also failed to show any difference in behavioral intention toward the individual with a disability based on the presence of a dog. However, among participants who felt more positively toward dogs, social attitudes were more positive toward an individual with a disability when an assistance dog was present. The study also found that participants had more positive implicit attitudes toward an individual with a

disability when paired with an assistance dog instead of pictured alone. Overall, this study provides some explanation for previous research findings that social interactions are different for individuals with disabilities who are with assistance dogs compared to those individuals alone. The difference in both implicit measures of attitudes and explicit measures of social attitudes toward an individual with a disability paired with a dog help explain the differences in social behaviors found in previous research.



## **List of References**

## List of References

- Allen, K., & Blascovich, J. (1996). The value of service dogs for people with severe ambulatory disabilities. *The Journal of the American Medical Association*, 275, 1001-1006. doi: 10.1001/jama.275.13.1001
- Allport, G. (1947). *The nature of prejudice*. Oxford, England: Addison-Wesley.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211. doi: 10.1016/0749-5978(91)90020-T
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Americans with Disabilities Act of 1990, 42 U.S.C. § 35.136 et seq.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology*, 40, 471-499. doi: 10.1348/014466601164939
- Barker, R. T., Knisely, J. S., Barker, S. B., Cobb, R. K., & Schubert, C. M. (2012). Preliminary investigation of employee's dog presence on stress and organizational perceptions. *International Journal of Workplace Health Management*, 5, 15-30. doi: 10.1108/17538351211215366
- Barker, S. B., Pandurangi, A. K., & Best, A. M. (2003). Effects of animal-assisted therapy on patients' anxiety, fear, and depression before ECT. *The Journal of ECT*, 19, 38-44. doi: 10.1097/00124509-200303000-00008
- Barker, S. B., & Wolen, A. R. (2008). The benefits of human-companion animal interaction: A review. *Journal of Veterinary Medical Education*, 35, 487-495.
- Bath, D. M. (2009). Predicting social support for grieving persons: A theory of planned behavior perspective. *Death Studies*, 33, 869-889. doi: 10.1080/07481180903251547
- Baumeister, R. F., Vohs, K. D., & Funder, D. C. (2007). Psychology as the science of self-reports and finger movements: Whatever happened to actual behavior? *Perspectives on Psychological Science*, 2, 396-403. doi: 10.1111/j.1745-6916.2007.00051.x
- Beck, A. M., & Katcher, A. H. (1984). A new look at pet-facilitated therapy. *Journal of the American Veterinary Medical Association*, 58, 414-421.
- Beck, A. M., & Katcher, A. H. (1996). *Between pets and people: The importance of animal*

- companionship* (revised edition). West Lafayette, IN: Perdue University Press.
- Berkman, L. F., & Syme, L. (1979). Social networks, host resistance, and mortality: A nine-year follow-up study of Alameda county residents. *American Journal of Epidemiology*, 109, 186-204.
- Berscheid, E., & Walster, E. H. (1978). *Interpersonal Attraction* (2nd Ed.). Reading, MA: Addison-Wesley Publishing Company.
- Breckler, S. J. (1984) Empirical validation of affect, behavior, and cognition as distinct components of attitude. *Journal of Personality and Social Psychology*, 47, 1191-1205. doi: 10.1037/0022-3514.47.6.1191
- Burrows, K. E., & Adams, C. L. (2008). Challenges of service-dog ownership for families with autistic children: Lessons for veterinary practitioners. *Journal of Veterinary Medical Education*, 35, 559-566.
- Burrows, K. E., Adams, C. L., & Spiers, J. (2008). Sentinels of safety: Service dogs ensure safety and enhance freedom and well-being for families with autistic children. *Qualitative Health Research*, 18, 1642-1649.
- Byrne, D., & Griffitt, W. (1966). A developmental investigation of the law of attraction. *Journal of Personality and Social Psychology*, 4, 699-702. doi:10.1037/h0023993
- Cairns, E., Kenworthy, J., Campbell, A., & Hewstone, M. (2006). The role of in-group identification, religious group membership and intergroup conflict in moderating in-group and out-group affect. *British Journal of Social Psychology*, 45, 701-716. doi: 10.1348/014466605X69850
- Camp, M. M. (2001). The use of service dogs as an adaptive strategy: A qualitative study. *The American Journal of Occupational Therapy*, 55, 509-517.
- Campbell, D. T. (1971). *White attitudes toward Black people*. Ann Arbor, MI: Institute for Social Research.
- Carlsson, R., & Bjorklund, F. (2010). Implicit stereotype content: Mixed stereotypes can be measured with the Implicit Association Test. *Social Psychology*, 41, 213-222. doi: 10.1027/1864-9335/a000029
- Clark-Ibáñez, M. (2004). Framing the social world with photo-elicitation interviews. *The American Behavior Scientist*, 47, 1507-1527. doi: 10.1177/0002764204266236
- Cohen, S., Doyle, W. J., Skoner, D. P., Rabin, B. S., & Gwaltney, J. M., Jr. (1997). Social ties and susceptibility to the common cold. *The Journal of the American Medical Association*, 25, 1940-1944.

- Collins, D. M., Fitzgerald, S. G., Sachs-Ericsson, N., Scherer, M., Cooper, R. A., & Boninger, M. L. (2006). Psychosocial well-being and community participation of service dog partners. *Disability and Rehabilitation: Assistive Technology, 1*, 41-48. doi: 10.1080/09638280500167183
- Cranney, A., Coyle, D., Pham, B., Tetroe, J., Wells, G., Jolly, E., & Tugwell, P. (2001). The psychometric properties of patient preferences in osteoporosis. *The Journal of Rheumatology, 28*, 132-137.
- Cunningham, M. R. (1986). Measuring the physical in physical attractiveness: Quasi-experiments on the sociobiology of female facial beauty. *Journal of Personality and Social Psychology, 50*, 925-935. doi: 10.1037/0022-3514.50.5.925
- Davis, B. W., Natrass, K., O'Brien, S., Patronek, G., & MacCollin, M. (2004). Assistance dog placement in the pediatric population: Benefits, risks, and recommendations for future application. *Anthrozoös, 17*, 130-145. doi: 10.2752/089279304786991765
- DeCoster, J., & Claypool, H. M. (2004). A meta-analysis of priming effects on impression formation supporting a general model of informational biases. *Personality and Social Psychology Review, 8*, 2-27. doi: 10.1207/S15327957PSPR0801\_1
- Eagly, A. H., & Chaiken, S. (1993) *The psychology of attitudes*. Orlando, FL: Harcourt Brace Jovanovich College Publishers.
- Eagly, A. H., Ashmore, R. D., Makhijani, M. G., & Longo, L. C. (1991). What is beautiful is good, but...: A meta-analytic review of research on the physical attractiveness stereotype. *Psychological Bulletin, 110*, 109-128. doi: 10.1037/0033-2909.110.1.109
- Eddy, J., Hart, L. A., & Boltz, R. P. (1988). The effects of service dogs on social acknowledgements of people in wheelchairs. *The Journal of Psychology, 122*, 39-45.
- Esteves, S. W. & Stokes, T. (2008). Social effects of a dog's presence on children with disabilities. *Anthrozoös, 21*, 5-15. doi: 10.2752/089279308X274029
- Fair Housing Amendments Act of 1988, 42 U.S.C. §§ 3601 et seq.
- Fairman, S. K., & Huebner, R. A. (2000). Service dogs: A compensatory resource to improve function. *Occupational Therapy in Health Care, 13*, 41-52.
- Fazio, R. H. (2007). Attitudes as object-evaluation associations of varying strength. *Social Cognition, 25*, 603-637. doi: 10.1521/soco.2007.25.5.603
- Fazio, R. H., & Olson, M. A. (2003a). Attitudes: Foundations, functions, and consequences. In M. A. Hogg & J. Cooper (Eds.), *The Sage handbook of social psychology* (139-155). London: Sage.

- Fazio, R. H., & Olson, M. A. (2003b). Implicit measures in social cognition research: Their meaning and use. *Annual Review of Psychology*, 54, 297-327. doi: 10.1146/annurev.psych.54.101601.145225
- Fellinghauer, B. A. G., Roth, A., Bugari, K., & Reinhardt, J. D. (2011). Construct validity, test-retest reliability, and internal consistency of the Photo Elicitation Semantic Differential Scale (PESD) in disability studies. *Journal of Developmental and Physical Disabilities*, 23, 257-265. doi: 10.1007/s10882-010-9224-y
- Fields, A. (2009). *Discovering statistics using SPSS, 3e*. Sage.
- Findler, L., Vilchinsky, N., & Werner, S. (2007). The multidimensional attitude scale toward persons with disabilities (MAS): Construction and validation. *Rehabilitation Counseling Bulletin*, 50, 166-176. doi: 10.1177/00343552070500030401
- Fine, A. H. (2010). *Handbook on animal-assisted therapy: Theoretical foundations and guidelines for practice* (3rd ed.). San Diego, CA: Elsevier Inc.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Fiske, S.T. (2010). *Social beings: Core motives in social psychology* (5<sup>th</sup> ed.). Hoboken, NJ: Wiley.
- Friedmann, E., Katcher, A. H., Lynch, J. J., & Thomas, S. A. (1980). Animal companions and one-year survival of patients after discharge from a coronary care unit. *Public Health Reports*, 95, 307-312.
- Friedmann, E., Katcher, A., Thomas, S., Lynch, J., & Messent, P. (1983). Social interaction and blood pressure: Influence of animal companions. *Journal of Nervous and Mental Disease*, 171, 461-465. doi: 10.1097/00005053-198308000-00002
- Friedmann, E., Thomas, S. A., & Son, H. (2011). Pets, depression and long-term survival in community living patients following myocardial infarction. *Anthrozoös*, 24, 273-285. doi: 10.2752/175303711X13045914865268
- Fukuhara, S., & Suzukamo, Y. (2004). Manual of SF-36v2 Japanese version. Institute for Health Outcomes & Process Evaluation Research, Kyoto, 2004.
- Geries-Johnson, B., & Kennedy, J. H. (1995). Influence of animals on perceived likability of people. *Perception and Motor Skills*, 80, 432-434.
- Gillum, R. F., & Obisesan, T. O. (2010). Living with companion animals, physical activity and mortality in a U.S. national cohort. *International Journal of Environmental Research and Public Health*, 7, 2452-2459.

- Glocker, M. L., Langleben, D. D., Ruparel, K., Loughead, J. W., Gur, R. C., & Sachser, N. (2009). Baby schema in infant faces induces cuteness perception and motivation for caretaking in adults. *Ethology*, *115*, 257-263. doi: 10.1111/j.1439-0310.2008.01603.x
- Green, S., Davis, C., Karshmer, E., Marsh, P., & Straight, B. (2005). Living stigma: The impact of labeling, stereotyping, separation, status loss, and discrimination in the lives of individuals with disabilities and their families. *Sociological Inquiry*, *75*, 197-215. doi: 10.1111/j.1475-682X.2005.00119.x
- Greenwald, A. G., McGhee, D. E., Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, *74*, 1464-1480. doi: 10.1037/0022-3514.74.6.1464
- Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, *85*, 197-216. doi: 10.1037/0022-3514.85.2.197
- Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion*, *11*, 87-98. doi: 10.4278/0890-1171-11.2.87
- Goffman, E. (1963). *Stigma: Notes on the management of spoiled identity*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Guéguen, N., & Ciccotti, S. (2008). Domestic dogs as facilitators in social interactions: An evaluation of helping and courtship behaviors. *Anthrozoös*, *21*, 339-349. doi: 10.2752/175303708X371564
- Guest, C. M., Collis, G. M., & McNicholas, J. (2006). Hearing dogs: A longitudinal study of social and psychological effects on deaf and hard-of-hearing recipients. *Journal of Deaf Studies and Deaf Education*, *11*, 252-261. doi: 10.1093/deafed/enj028
- Haddock, G., Zanna, M. P., & Esses, V. M. (1993). Assessing the structure of prejudicial attitudes: The case of attitudes toward homosexuals. *Journal of Personality and Social Psychology*, *65*, 1105-1118. doi: 10.1037/0022-3514.65.6.1105
- Halberstadt, J., & Rhodes, G. (2000). The attractiveness of nonface averages: Implications for an evolutionary explanation of the attractiveness of average faces. *Psychological Science*, *11*, 285-289. doi: 10.1111/1467-9280.00257
- Hart, L. A., Hart, B. L., & Bergin, B. (1987). Socializing effects of service dogs for people with disabilities. *Anthrozoös*, *1*, 41-44. doi: 10.2752/089279388787058696
- Hart, L. A., Zasloff, R. L., & Benfatto, A. M. (1996). The socializing role of hearing dogs. *Applied Animal Behaviour Science*, *47*, 7-15. doi: 10.1016/0168-1591(95)01006-8

- Hausenblas, H. A., Carron, A. V., & Mack, D. E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport and Exercise Psychology*, 19, 36–51.
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine*, 7, e1000316-e1000316. doi: 10.1371/journal.pmed.1000316
- Hofmann, W., Gawronski, B., Gschwendner, T., Le, H., & Schmitt, M. (2005). A meta-analysis on the correlation between the implicit association test and explicit self-report measures. *Personality and Social Psychology Bulletin*, 31, 1369-1385. doi: 10.1177/0146167205275613
- Hogg, M. A., & Cooper, J. (Eds). (2003). *The sage handbook of social psychology*. London: SAGE Publications.
- Horvath, T. (1979). Correlates of physical beauty in men and women. *Social Behavior and Personality*, 7, 145-151.
- Hunt, S. J., Hart, L. A., & Gomulkiewicz, R. (1992). Role of small animals in social interactions between strangers. *The Journal of Social Psychology*, 132, 245-256.
- Johnson, T. P., Garrity, T. F., Stallones, L. (1992). Psychometric evaluation of the Lexington Attachment to Pets Scale (LAPS). *Anthrozoös*, 5, 160-175. doi: 10.2752/089279392787011395
- Jones, R. L. (Ed). (1984). *Attitudes and attitude change in special education: Theory and Practice*. Reston, VA: Council for Exceptional Children.
- Karpinski, A. (2004). Measuring self-esteem using the Implicit Association Test: The role of the other. *Personality and Social Psychology Bulletin*, 30, 22-34. doi: 10.1177/0146167203258835
- Katz, I., & Stotland, E. (1959). A preliminary statement to a theory of attitude structure and change. In S. Koch (Eds.), *Psychology: A study of a science* (Vol. 3, pp. 423-475). New York: McGraw-Hill.
- Kellert, S. R. (1997). *Kinship to mastery: Biophilia in human evolution and development*. Washington D.C.: Shearwater Books.
- Lakestani, N., Donaldson, M. L., Verga, M., & Waran, N. (2011). Attitudes of children and adults to dogs in Italy, Spain, and the United Kingdom. *Journal of Veterinary Behavior*, 6, 121-129. doi: 10.1016/j.jveb.2010.11.002
- Lane, D. R., McNicholas, J., & Collis, G. M. (1998). Dogs for the disabled: Benefits to recipients

- and welfare of the dog. *Applied Animal Behaviour Science*, 59, 49-60. doi: 10.1016/S0168-1591(98)00120-8
- Latimer, A. E., & Martin Ginis, K. A. (2005). The theory of planned behavior in prediction of leisure time physical activity among individuals with spinal cord injury. *Rehabilitation Psychology*, 50, 389-396. doi: 10.1037/0090-5550.50.4.389
- Lee, C. M., & Gudykunst, W. B. (2001). Attraction in initial interethnic interactions. *International Journal of Intercultural Relations*, 25, 373-387. doi: 10.1016/S0147-1767(01)00011-6
- Leahey, T. H. & Harris, R. J. (2004). *Learning and cognition* (5th ed.). Upper Saddle River, NJ: Prentice-Hall
- Mader, B., Hart, L. A., & Bergin, B. (1989). Social acknowledgements for children with disabilities: Effects of service dogs. *Child Development*, 60, 1529-1534.
- Mahoney, F. I., & Barthel, D. W. (1965). Functional evaluation: The Barthel Index: A simple index of independence useful in scoring improvement in the rehabilitation of the chronically ill. *Maryland State Medical Journal*, 14, 61-65.
- Martin, M. M., & Anderson, C. M. (1995). Roommate similarity: Are roommates who are similar in their communication traits more satisfied? *Communication Research Reports*, 12, 46-52.
- Matsunaka, K., & Koda, N. (2008). Acceptance of dog guides and daily stress levels of dog guide users and nonusers. *Journal of Visual Impairment & Blindness*, 102, 295-304.
- McCroskey, J. C., & McCain, T. A. (1974). The measurement of interpersonal attraction. *Speech Monographs*, 41, 261-266. doi: 10.1080/03637757409375845
- McNicholas, J., & Collis, G. M. (2000). Dogs as catalysts for social interactions: Robustness of the effect. *British Journal of Psychology*, 91, 61-70. doi: 10.1348/000712600161673
- Miesler, L., Leder, H., & Herrmann, A. (2011). Isn't it cute: An evolutionary perspective of baby-schema effects in visual product designs. *International Journal of Design*, 5, 17-30.
- Miner, R. J. (2001). The experience of living with and using a dog guide. *RE:view*, 32, 183-190.
- Miura, A., Bradshaw, J. W. S., & Tanida, H. (2000). Attitudes toward dogs: A study of university students in Japan and the UK. *Anthrozoös*, 13, 80-88. doi: 10.2752/089279300786999860
- Modlin, S. (2000). Service dogs as interventions: State of the science. *Rehabilitation Nursing*, 25, 212-219. doi: 10.1002/j.2048-7940.2000.tb01914x



- Mormann, F., Dubois, J., Kornblith, S., Milosavljevic, M., Cerf, M., Ison, M., Tsuchiya, N., Kraskov, A., Quiroga, R. Q., Adolphs, R., Fried, I., & Koch, C. (2011). A category-specific response to animals in the right human amygdala. *Nature Neuroscience*, *14*, 1247-1249. doi: 10.1038/nn.2899
- Nagergost, S. L., Baun, M. M., Megel, M., & Leibowitz, J. M. (1997). The effects of the presence of a companion animal on physiologic arousal and behavioral distress in children during a physical examination. *Journal of Pediatric Nursing*, *12*, 323-330.
- Ng, P. W., James, M. A., & McDonald, C. (2000). Service dogs for disabled children: Effects on level of independence and quality of life. *Topics in Spinal Cord Injury Rehabilitation*, *6*, 96-104. doi: 10.1310/F5QJ-7JHQ-X3XA-494W
- Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2007). The Implicit Association Test at age 7: A methodological and conceptual review. In J. A. Bargh (Ed.), *Automatic processes in social thinking and behavior* (pp. 265-292). New York, NY: Psychology Press.
- Nosek, B. A., Smyth, F. L., Hansen, J. J., Devos, T., Lindner, N. M., Ratliff (Ranganath), K. A., Smith, C. T., Olson, K. R., Chugh, D., Greenwald, A. G., & Banaji, M. R. (2007). Pervasiveness and correlates of implicit attitudes and stereotypes. *European Review of Social Psychology*, *18*, 36-88. doi: 10.1080/10463280701489053
- O'Haire, M. (2010). Companion animals and human health: Benefits, challenges, and the road ahead. *Journal of Veterinary Behavior*, *5*, 226-234. doi: 10.1016/j.jveb.2010.02.002
- Olkin, R., & Howson, L. J. (1994). Attitudes toward and images of physical disability. *Journal of Social Behavior and Personality*, *9*, 81-96.
- Olson, M. A., & Fazio, R. H. (2001). Implicit attitude formation through classical conditioning. *Psychological Science*, *12*, 413-417. doi: 10.1111/1467-9280.00376
- Osgood, C. E. (1953). *Method and theory in experimental psychology*. New York, NY: Oxford University Press.
- Osgood, C. E., Suci, G. J., & Tannenbaum, P. H. (1957). *The measurement of meaning*. Oxford, England: University Illinois Press.
- Patzer, G. L. (1985). *The physical attractiveness phenomena*. New York, NY: Plenum Press.
- Payne, B. K., Cheng, C. M., Govorun, O., & Steward, B. D. (2005). An inkblot for attitudes: Affect misattribution as implicit measures. *Journal of Personality and Social Psychology*, *89*, 277-293. doi: 10.1037/0022-3514.89.3.277
- Pet Partners. (2012, March 12). Retrieved from <http://www.deltasociety.org>
- Pinterits, E. J., Poteat, V. P., & Spanierman, L. B. (2009). The White Privilege Attitude Scale:

- Development and initial validation. *Journal of Counseling Psychology*, 56, 417-429. doi: 10.1037/a0016274
- Pruett, S. R., & Chan, F. (2006). The development and psychometric validation of the Disability Attitude Implicit Association Test. *Rehabilitation Psychology*, 51, 202-213. doi: 10.1037/0090-5550.51.3.202
- Raina, P., Waltner-Toews, D., Bonnett, B., Woodward, C., & Abernathy, T. (1999). Influence of companion animals on the physical and psychological health of older people: An analysis of a one-year longitudinal study. *Journal of the American Geriatrics Society*, 47, 323-329.
- Richardson, S. A., Goodman, N., Hastorf, A. H., & Dornbusch, S. M. (1961). Cultural uniformity in reaction to physical disabilities. *American Sociological Review*, 26, 241-247. doi: 10.2307/2089861
- Rintala, D. H., Matamoros, R., & Seitz, L. L. (2008). Effects of assistance dogs on persons with mobility or hearing impairments: A pilot study. *Journal of Rehabilitation Research & Development*, 45, 489-504.
- Rintala, D. H., Sachs-Ericsson, N., & Hart, K. A. (2002). The effects of service dogs in the lives of persons with mobility impairments: A pre-post study design. *SCI Psychosocial Process*, 15, 70-82.
- Rossbach, K. A., & Wilson, J. P. (1992). Does a dog's presence make a person appear more likable? Two studies. *Anthrozoös*, 5, 40-51. doi: 10.2752/089279392787011593
- Rubin, R. B., Palmgreen, P., & Sypher, H. W. (Eds.). (1994). *Communication research measures: A sourcebook*. New York, NY: The Guilford Press.
- Rudolph, A., Schröder-Abé M., Riketta, M., & Schütz, A. (2010). Easier when done than said! Implicit self-esteem predicts observed or spontaneous behavior, but not self-reported or controlled behavior. *Journal of Psychology*, 218, 12-19. doi: 10.1027/0044-3409/a000003
- Sachs-Ericsson, N., Hansen, N. K., & Fitzgerald, S. (2002). Benefits of assistance dogs: A review. *Rehabilitation Psychology*, 47, 251-277. doi: 10.1037/0090-5550.47.3.251
- Salkind, N. J. (Ed.). (2007). *Encyclopedia of measurement and statistics* (Vols. 1 & 3). Thousand Oaks, CA: Sage Publications, Inc.
- Sanders, C. R. (2000). The impact of guide dogs on the identity of people with visual impairments. *Anthrozoös*, 13, 131-139. doi: 10.2752/089279300786999815
- Schneider, M. S., & Harley, L. P. (2006). How dogs influence the evaluation of psychotherapists. *Anthrozoös*, 19, 128-142. doi: 10.2752/089279306785593784

- Seeman, T. E. (1996). Social ties and health: The benefits of social integration. *Annals of Epidemiology*, 6, 442-451.
- Shintani, M., Senda, M., Takayanagi, T., Katayama, Y., Furusawa, K., Okutani, T.,...Ozaki, T. (2010). The effect of service dogs on the improvement of health-related quality of life. *Acta Medica Okayama*, 64, 109-113.
- Siegel, J. M. (1990). Stressful life events and use of physician services among the elderly: The moderating role of pet ownership. *Journal of Personality and Social Psychology*, 58, 1081-1086. doi: 10.1037/0022-3514.58.6.1081
- Smits, G. J. & Cherhoniak, I. M. (1976). Physical attractiveness and friendliness in interpersonal attraction. *Psychological Reports*, 39, 171-174.
- Smyth, C., & Slevin, E. (2010). Experiences of family life with an autism assistance dog. *Learning Disability Practice*, 13, 12-17.
- Snyder, M., Tanke, E. D., & Berscheid, E. (1977). Social perception and interpersonal behavior: On the self-fulfilling nature of social stereotypes. *Journal of Personality and Social Psychology*, 35, 656-666. doi: 10.1037/0022-3514.35.9.656
- Spiegel, D., Bloom, J. R., Kraemer, H. C., & Gottheil, E. (1989). Effects of psychosocial treatment on survival of patients with metastatic breast cancer. *The Lancet*, 334, 898-900.
- Stroebe, W., Insko, C. A., Thompson, V. D., & Layton, B. D. (1971). Effects of physical attractiveness, attitude similarity, and sex on various aspects of interpersonal attraction. *Journal of Personality and Social Psychology*, 18, 79-91.
- Summerville, A., Hsieh, B., & Harrington, N. (2010). The divergence of implicit and explicit consumer evaluations: A multimeasure investigation. *Journal of Psychology*, 218, 28-35. doi: 10.1027/0044-3409/a000005
- Tabachnick, B. G. & Fidell, L. S. (2007). *Using multivariate statistics (5th ed.)*. Boston, MA: Pearson Education.
- Templer, D. I., Salter, C. A., Dickey, S., Baldwin, R., & Veleber, D. M. (1981). The construction of a Pet Attitude Scale. *The Psychological Record*, 31, 343-348.
- Thompson, T. L. (1982). Gaze toward and avoidance of the handicapped: A field experiment. *Journal of Nonverbal Behaviors*, 6, 188-196. doi: 10.1007/BF00987067
- Valentine, D. P., Kiddoo, M., & LaFleur, B. (1993). Psychosocial implications of service dog ownership for people who have mobility or hearing impairments. *Social Work in Health Care*, 19, 109-125. doi: 10.1300/J010v19n01\_07

- Van de Ven, P., Bornholt, L., & Bailey, M. (1996). Measuring cognitive, affective, and behavioral components of homophobic reaction. *Archives of Sexual Behavior*, 25, 155-179. doi: 10.1007/BF02437934
- Warburton, J., & Terry, D. J. (2000). Volunteer decision making by older people: A test of a revised theory of planned behavior. *Basic and Applied Social Psychology*, 22, 245-257.
- Weinberg, N. (1976). Social stereotyping of the physically handicapped. *Rehabilitation Psychology*, 23, 115-124. doi: 10.1037/h0090911
- Wells, M., & Perrine, R. (2001). Pets go to college: The influence of pets on students' perceptions of faculty and their offices. *Anthrozoös*, 14, 161-168. doi: 10.2752/089279301786999472
- Wenthold, N., & Savage, T. A. (2007). Ethical issues with service animals. *Topic in Stroke Rehabilitation*, 14, 68-74. doi: 10.1310/tsr1402-68
- Wiggett-Barnard, C., & Steel, H. (2008). The experience of owning a guide dog. *Disability and Rehabilitation*, 30, 1014-1026. doi: 10.1080/09638280701466517
- Wilcox, C., Sigelman, L., & Cook, E. (1989). Some like it hot: Individual differences in response to group feeling thermometers. *Public Opinion Quarterly*, 53, 246-257.
- Williams, R. M., Jr. (1947). *The reduction of intergroup tensions*. New York, NY: Social Science Research Council.
- Winkle, M., Crowe, T. K., & Hendrix, I. (2012). Service dogs and people with physical disabilities partnerships: A systematic review. *Occupational Therapy International*, 19, 54-66. doi: 10.1002/oti.323
- World Health Organization. (2011). *World report on disability*. Geneva, Switzerland: World Health Organization.
- Worthington, M. E. (1974). Personal space as a function of the stigma effect. *Environment and Behavior*, 6, 289- 294. doi: 10.1177/001391657400600302
- Zanna, M. P., & Rempel, J. K. (1988). Attitudes: A new look at an old concept. In D. Bar-Tal & A. W. Kruglanski (Eds.), *The social psychology of knowledge* (315-334). Cambridge: Cambridge University Press.

## Appendix A

### *Photo Elicitation Semantic Differential scale (PESD)*

*Instructions:* Please indicate your impression of the man in the photo using the following scale

competent	+++	++	+	-	--	---	incompetent
communicative	+++	++	+	-	--	---	uncommunicative
attractive	+++	++	+	-	--	---	unattractive
popular	+++	++	+	-	--	---	unpopular
industrious	+++	++	+	-	--	---	lazy
intelligent	+++	++	+	-	--	---	unintelligent

## Appendix B

### *Interpersonal Attraction Scale*

*Instructions:* Please indicate the degree to which you agree or disagree with the following statements as they apply to the individual in the photo. Use the following scale and write one number before each statement to indicate your feelings.

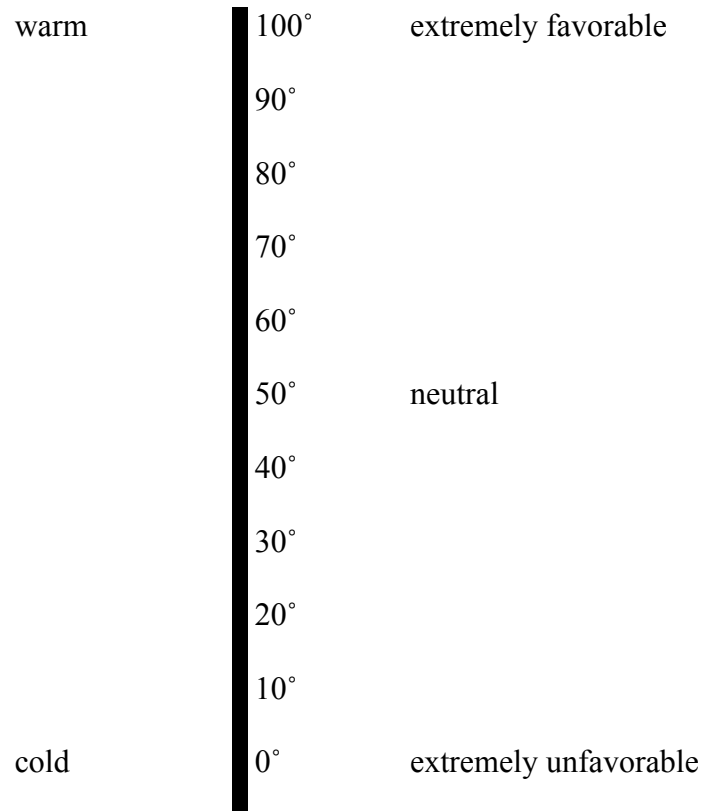
- 7 = Strongly agree
- 6 = Moderately agree
- 5 = Slightly agree
- 4 = Undecided
- 3 = Slightly disagree
- 2 = Moderately disagree
- 1 = Strongly disagree

- \_\_\_\_\_ 1. I think he (she) could be a friend of mine
- \_\_\_\_\_ 2. It would be difficult to meet and talk with him (her)
- \_\_\_\_\_ 3. He (she) just wouldn't fit into my circle of friends
- \_\_\_\_\_ 4. We could never establish a personal friendship with each other
- \_\_\_\_\_ 5. I would like to have a friendly chat with him (her)
- \_\_\_\_\_ 6. I think he (she) is quite handsome (pretty)
- \_\_\_\_\_ 7. He (she) is very sexy looking
- \_\_\_\_\_ 8. I find him (her) attractive physically
- \_\_\_\_\_ 9. I don't like the way he (she) looks
- \_\_\_\_\_ 10. He (she) is somewhat ugly

## Appendix C

### *Feeling Thermometer*

*Instructions:* Provide a number between 0 and 100 to indicate your overall evaluation of the individual in the photograph.



## Appendix D

### *Disabilities and assistance dog Implicit Association Test*

“Assistance dog” stimuli



“Disability” stimuli





## Appendix E

### *Attitudes of Adults to Dogs*

Type    Items

- 1. Dogs are dirty
- +        2. I think that a dog is “man’s best friend”
- 3. Dogs are smelly
- +        4. I love my dog/I would like to have a dog
- 5. I am scared of dogs
- +        6. Dogs are fun
- 7. Dogs are dangerous
- 8. Dogs bite
- +        9. I think that dogs should be allowed indoors
- +        10. I think that dogs have personalities like humans
- +        11. I think that owners should keep their dogs (rather than get rid of them) even if the dog has attacked people
- +        12. I think that dogs are more loyal than people

Response options: 0 = *I don’t know*, 1 = *never*, 2 = *sometimes*, 3 = *mostly*

Key to item types

- +, Positive items (agreement indicates positive attitude).
- , Negative item (agreement indicates negative attitudes).

## Appendix F

Stimuli photo of individual with disability



Stimuli photo of individual with disability paired with an assistance dog



## Vita

Jennifer Anne Coleman was born on December 30, 1982, in Madison, Wisconsin. She graduated from Madison West High School in Madison, Wisconsin in 2001. She received her Bachelor of Arts in Psychology and Social Behavior from the University of California, Irvine in June 2006. She worked as a research assistant and lab manager for the Aging, Culture, and Cognition lab at Brandeis University in Waltham, Massachusetts from August 2008 until August 2009. Subsequently she received her Master's of Arts in Mental Health Counseling from Boston College in Chestnut Hill, Massachusetts in May 2011. While studying at Boston College she worked as a research assistant for City Connects from September 2009 until June 2011. In 2011 she began studying at Virginia Commonwealth University in the counseling psychology doctoral program.