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Challenges Finding Employment: An Investigation Of Implicit Vs. Explicit Attitudes Towards Autistic Adults

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ABSTRACT

Despite the pervasiveness of autism (1 in 54), implicit and explicit attitudes towards people with ASD are mainly adverse (Cage et al., 2018). Although in recent years, more research has been conducted to investigate implicit attitudes towards other mental illnesses (Teachman, Wilson, & Komorovskaya, 2006) and physical disabilities (Nosek et al. 2007), few studies have assessed implicit and explicit attitudes toward adults with autism. The main goal of the study was to investigate Non-ASD individuals' implicit and explicit attitudes toward autistic individuals. We hypothesized that participants would have negative implicit attitudes but report positive explicit attitudes towards autistic individuals, participants would be more likely to hire Non-ASD individuals than ASD individuals, employers would prefer Non-ASD individuals for social positions, but there would not be a significant difference for the non-social position, and negative implicit attitudes would predict hiring decisions towards ASD individuals. A two-way mixed modeled ANOVA was used to analyze the data to determine if there were interactions between (ASD x Non-ASD) and (Social Job x Non-Social Job). Correlational analyses were conducted between the implicit and explicit measures and the ASD variables. The Implicit Association Test was also used in this study to examine implicit attitudes towards autistic individuals. We found participants' had negative implicit attitudes but reported positive explicit attitudes towards autistic individuals, participants' IAT scores were significantly different from 0, and contact with autistic individuals is a good indicator of one's attitudes and stigma.

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Introduction

Despite the prevalence of autism in the United States (1 in 54), implicit and explicit attitudes towards people with Autistic Spectrum Disorder (ASD) are mainly adverse (Cage et al., 2018; Maenner et al., 2020). Even though in recent years, more research has been conducted to investigate implicit attitudes towards other mental illnesses (Teachman et al., 2006) and physical disabilities (Kopera et al., 2014), few studies have evaluated implicit and explicit attitudes towards adults who are autistic. Of those studies, most have concentrated on attitudes towards autistic children rather than adult populations (Kelly & Barnes-Holmes, 2013). Although studying autistic children gives researchers a wealth of knowledge pertaining to autism, there are gaps in the literature when it comes to autistic adults. For example, researchers have not examined perceivers' attitudes towards autistic adults in the workplace. Little research has been conducted examining implicit and explicit attitudes towards autistic individuals and how these attitudes may bias employers' hiring decisions. This topic is essential to study, as researchers have found that more than half of ASD individuals are unemployed despite their desire or capability to work (Hendricks, 2010; Roux et al., 2013; Taylor & Seltzer, 2010). Our study aims to examine implicit and explicit attitudes toward autistic individuals who are seeking employment.

Overview of ASD

Autism spectrum disorders (ASD) are a group of neurodevelopmental disorders characterized by impairments in social interaction and communication, as well as repetitive behaviors and restricted interests (Hodges et al., 2020). ASD includes

childhood disintegrative disorder, Asperger's disorder, pervasive developmental disorder, and autism into one disorder in the DSM-V, which were separate disorders in the DSM-IV (King et al., 2014). The ASD spectrum encompasses a wide range of severity, skills, and symptoms of the disorder (American Psychiatric Association & Copeland, 2018). Individuals who have ASD can fall anywhere on the spectrum; symptoms can range from mild to severe (Silverberg, 2014).

Signs and Symptoms of ASD

Everyone is unique in their own way, and this statement is no less true for individuals with ASD. However, there are core characteristics that are commonly expressed in autistic individuals. For example, research shows that autistic individuals have difficulties in social communication as well as repetitive and restricted behaviors, regardless of race, culture, ethnicity, and socioeconomic status (Khan et al., 2012). The signs and symptoms of autism can sometimes be very apparent or go unnoticed due to the spectrum nature of the disorder (Takara & Kondo, 2015). Some infants may exhibit early indicators of autism, whereas others may not show signs until later, according to their developmental stages, up until 15 to 30 months. Though ASD typically develops during infancy (Shen & Piven, 2017), children who are on the spectrum may be misinterpreted as being well-behaved, because they do not cry as often, they are independent, or undemanding (Smith et al., 2019).

Some common signs and symptoms of autism are rocking, spinning, repeated movements, avoiding eye contact, avoiding physical contact, delayed speech development, repetition of words, inability to cope with changes, and reduced to no

contact with peers (Grzadzinski et al., 2013). Individuals on the spectrum may also show symptoms typical of Obsessive-compulsive disorder (OCD) (Jacob et al., 2009). For example, they have to organize their toys, clothes, and items a certain way in order to move onto the next task of the day. Individuals with ASD may also have physical difficulties with poor coordination while walking or running, poor hand control, and poor sleeping (Ament et al., 2014; Devnai & Hegde, 2015). Additionally, ASD is often linked with comorbidities; some people with ASD develop seizures and anxiety (Besag, 2017; Spain et al., 2018; Tye et al., 2019; Vasa & Mazurek, 2015). In addition, autism can be misdiagnosed as attention deficit hyperactivity disorder (ADHD) (Kentrou et al., 2018). Some adults with autism who are "high functioning" may have only mild symptoms, and their symptoms could be mistaken for ADHD. Those with more severe symptoms may be misdiagnosed as another disability.

Causes and Risks Factors of ASD

Scientists are unclear about the etiology of autism. However, they know that ASD is a neurobiological disorder influenced by genetic and environmental elements affecting the developing brain (Hodges et al., 2020). Studies have found siblings of individuals diagnosed with ASD have an increased risk of diagnosis compared to siblings who do not have a familial history (Sandin et al., 2014). There is also a higher likelihood of concordance of autism diagnosis in monozygotic twins (Risch et al., 2014). Genetic risk factors may be influenced by prenatal, perinatal, and postnatal environmental factors in some ASD individuals (Wang et al., 2017). Croen et al. (2007) found older parental age has shown to increase the risk of having a child diagnosed with ASD. Malkova et al. (2012) found that the mother's medical history of autoimmune

diseases (i.e., diabetes, thyroid disease, or psoriasis) may be a possible risk factor for ASD. Researchers also found pregnancy length (too short or too long), premature infants, low birth weight, uterine bleeding, and low Apgar scores were all associated with autism (Agrawal et al., 2018; Schieve et al., 2017). Furthermore, despite popular movements surrounding anti-vaccination, there is no statistically significant research with sound evidence that supports the hypothesis that vaccines cause ASD (Hviid et al., 2019; Taylor et al., 2014; Uno et al., 2015).

Diagnosing ASD

Autism does not discriminate; people from every socioeconomic, sex, religion, racial, and ethnic group can be diagnosed with ASD. Early diagnosis of ASD is essential for this disorder in order to improve the quality of life for the person and their family (Dawson, 2008). Studies have found that ASD may occur because of early modified brain development and neural restructuring (Bauman & Kemper, 2005; O'Reilly et al., 2017). However, due to there being no reliable biomarkers, the diagnosis of ASD must be made on the basis of the individual's behavior (Lord et al., 2018).

According to the National Institute of Mental Health (NIMH), in 2020, the diagnosis of ASD in young children is typically a two-stage procedure. During stage 1, children usually go through their well-child checkups and are screened for developmental delays. These checkups happen around ages 9-18 and 24-30 month well-child visits. Children who are at high risk are advised to be screened during these times because ASD can be detected as early as 18 months of age (Noyes-Grosser et al., 2018; Ozonoff et al., 2015). High-risk individuals include those who were born to

"geriatric" mothers (over the age of 35), who have a family member who has ASD, has a genetic disorder, who were born premature, or who were born very low birth weight (National Institute of Environmental Health Sciences, 2019; Sandin et al., 2012). According to the NIMH, during the screening, the doctor asks the parents questions about the child's behavior as a combination of the screen tools. Those who show developmental delays during the process are referred to as stage 2. Stage 2 entails a second evaluation with a team of professionals (pediatrician, child psychologist, neurologist, and speech and language pathologist). The evaluation assesses the individual's cognitive abilities, language abilities, and developmental skills. There may also be a blood and hearing test administered. The results of the evaluations determine the need for a diagnosis and recommendations for treatments.

Unfortunately, ASD diagnosing techniques for adults are not as clear cut as they are in children. As stated previously, some symptoms of other diseases coincide with ASD, such as ADHD. If an adult notices they may have symptoms of ASD, they should speak with or ask for a referral to a doctor (Psychiatrist, Neurologist, or Psychologist) for an evaluation (National Institute of Mental Health, 2020). This is the only way to be diagnosed with ASD properly. The health professional will ask the individual about their social interaction and communication challenges, sensory issues, repetitive behaviors, and restricted interests (National Institute of Mental Health, 2020).

Treatments for ASD

Researchers at the National Institute of Mental Health (2020) found that even though ASD is a permanent disorder, treatments can improve an individual's symptoms

and ability to operate. Once a diagnosis for ASD has been made, treatment should start immediately. Studies have found that early treatment reduces the severity of symptoms and leads to positive outcomes (Elder et al., 2017; Fernell et al., 2013; Rogers & Vismara, 2008). Research has shown that an early diagnosis helps individuals better integrate into society (Ben Itzchak & Zachor, 2011; Ben-Itzchak & Zachor, 2007; Hume et al., 2009). Although, there is no one treatment fits all for those diagnosed with ASD. It is still recommended that individuals diagnosed with ASD work closely with their health care team to develop tailored treatment plans. Some treatments that commonly used to treat ASD are medication and therapy (e.g., behavioral, psychological, and educational) (LeClerc & Easley, 2015; Kumar et al., 2012; Tebartz van Elst et al., 2013; Tiura et al., 2017; Wood et al., 2015). Doctors use medication to help alleviate some struggles ASD people deal with, such as ADHD, repetitive behavior, behavioral issues, aggression, irritability, attention issues, and mental health problems (anxiety or depression) (LeClerc & Easley, 2015). Therapy, usually Applied Behavior Analysis (ABA), has shown to help ASD individuals cope with change, learning life-skills (how to cook, clean, live on their own), reduce negative behaviors, increase motor skills, learn how to communicate effectively in social situations, and increase strengths (Makrygianni et al., 2018).

Implicit Attitudes and ASD

Psychologists have long pondered the idea of human attitudes, specifically, implicit attitudes towards individuals with developmental and intellectual disabilities (Kelly & Barnes-Holmes, 2013). Implicit attitudes are one's unconscious beliefs about a person (Greenwald & Krieger, 2006). Greenwald & Banaji (1995) described implicit attitudes as "introspectively unidentified (or inaccurately identified) traces of experience

that mediate favorable or unfavorable feelings toward an attitude object." This definition can be summarized as our past experiences dictate our attitudes towards people, places, and things.

Researchers have since made countless attempts to measure one's implicit attitudes towards another human being (e.g., Akrami et al., 2006; Greenwald et al., 1998; Kurdi et al., 2019). Unfortunately, there are not many studies that focus on individuals who have ASD. If the articles focus on ASD and implicit attitudes, it will typically only center around children diagnosed with ASD. However, based on the literature acquired, researchers are stressing the importance of continued work and research on this particular research area (Kelly & Barnes-Holmes, 2013). Studying implicit attitudes towards people on the spectrum is essential because these attitudes inform behaviors. Implicitly measured attitudes typically are more predictive of automatic behavior. This aligns with an earlier study conducted by researcher Wright (1988) that discovered that implicit attitudes towards individuals with disabilities might be correlated with how they were treated in society (research, education, medicine). For example, in the medical field, there is a lot of outdated information about ASD, causing individuals to have negative attitudes towards autistic individuals (Hurley-Hanson et al., 2019). However, with new medical information and the spread of awareness of ASD, this has caused the betterment of treatment of autistic individuals by medical professionals (Cascio, 2012). It has also created an increase in medical treatments, better medical diagnoses, and a decrease in the stigma of autism (Bishop-Fitzpatrick et al., 2014; Nicolaidis et al., 2014; Obeid et al., 2015).

Things are still not perfect; researchers have uncovered a negative implicit attitude towards autistic individuals (Barnes-Holmes et al., 2006; Dickter et al., 2020). In the study conducted by Barnes-Holmes et al., professionals with differing degrees of familiarity with individuals diagnosed with ASD were given the Implicit Relational Assessment Procedure (IRAP), which was designed to assess a professional's implicit attitudes towards ASD. It is similar to the Implicit Attitudes Test (IAT). The IAT measures implicit attitudes by assessing underlying automatic evaluation (Greenwald et al., 1998). The IRAP in this study was used to measure implicit attitudes towards autistic individuals. Participants were shown words stereotypically linked with autism (e.g., sad, bad, difficult, etc.), and words stereotypically linked with Non-ASD individuals (e.g., good, easy, calm, etc.). They hypothesized that participants with and without their experience of autism would have implicit attitudes on the IRAP, which was supported by their results. This finding may indicate a possible negative implicit attitude towards autistic individuals.

Implicit attitudes are also generally correlated with non-verbal behavior (Dovidio et al., 2002). Scientists believe that implicit attitudes influence an individual's warmth, facial expression, and other non-verbal behaviors; these behaviors are typically subtly expressed (Sabin et al., 2009). They also believe implicit attitudes are a better predictor of prejudice and discrimination than explicit behaviors. These attitudes influence how the individual truly thinks and behaves without the influence of social desirability.

Explicit Attitudes and ASD

While there has been an increase in awareness of autism in our society, there is still more work that needs to be done on understanding explicit attitudes towards autistic people. Explicit attitudes are conscious beliefs towards a group of people (Hahn et al., 2014). Unlike implicit attitudes, these are attitudes an individual is aware of and expresses through their behavior (Smith & Haslam, 2012). Explicit and implicit attitudes are distinctive constructs of cognition, and it is not uncommon for a person's explicit and implicit attitudes to diverge (Greenwald & Banaji, 1995; Hofmann et al., 2005). For example, a Non-ASD individual saying hello to an ASD individual or making fun of the ASD individual would be examples of the result of positive or negative explicit attitudes, respectively, toward individuals with ASD. Explicitly the first is saying they like ASD individuals, while the latter is saying they do not. Generally, researchers have found the former for explicit attitudes and the latter for implicit attitudes (Dickter et al., 2020; Kelly & Barnes-Holmes, 2013). The Dickter et al., article measured implicit and explicit attitudes toward autistic adults. They used the Societal Attitudes Towards Autism Scale (SATA) and the Autism Quotient for the explicit measures. The SATA assesses social distance, academic integration, private rights, and knowledge of behavior and causes (Flood et al., 2012). The Autism Quotient assesses the degree to which an individual possesses characteristics typical of a person on the autism spectrum (Allison et al., 2012). The researchers found positive explicit attitudes but negative implicit attitudes towards autistic adults. This finding may illuminate that Non-ASD adults discriminate against ASD adults. Kelly & Barnes-Holmes assessed explicit attitudes towards ASD individuals versus Non-ASD individuals. Their participants were both Applied Behavior

Analysis (ABA) tutors and regular teachers. They found the ABA tutors rated both the ASD and the Non-ASD students higher than the regular teachers, and both had positive explicit and negative implicit attitudes towards ASD individuals. However, there was not a significant difference between how the children were rated.

The majority of research conducted on explicit attitudes towards ASD focuses on children. According to Stevenson and Mowad (2019), approximately 80% of adults are aware of ASD, and they believe increased awareness usually leads to an increase in knowledge of ASD. However, they found that some ASD advocates wanted to make known that even though awareness has increased, this is not the same as acceptance. Their study examined explicit and implicit attitudes towards ASD and individuals diagnosed with other disabilities. They hypothesized the participants in their research would associate ASD individuals with more negative characteristics than Non-ASD individuals. Once again, they used the IAT to measure implicit attitudes and questionnaires similar to the other studies to measure explicit attitudes. They discovered associations of "a person on the autism spectrum" were rated as the second most negative in the general population sample. Sadly, this finding indicates how far as a science and society, we need to go to combat negative explicit attitudes towards autistic individuals. Despite pervasive awareness, increased research, enhanced understanding of ASD, as a society, we have not created an inclusive environment for autistic individuals (Franz et al., 2017; Murphy et al., 2016; Neggers, 2014).

Some studies have also found that the labeling of autism and less stereotypical autistic behaviors (repetitive behaviors, rocking, lack of eye contact, pacing back and forth, etc.) increased positive explicit attitudes of Non-ASD individuals towards ASD

individuals (Lipson et al., 2020; Morrison et al., 2019). In the Lipson et al., study, they were assessing the Non-ASD perceptions of and behavior toward university students confederates who they thought were on the spectrum or not. The confederates were labeled as belonging to an ASD student organization, and their behaviors were stereotypical of ASD, both, or not stereotypical. Participants' explicit and implicit attitudes, both verbal and non-verbal, were measured. They found positive explicit attitudes and negative implicit attitudes. However, their findings did show participants had negative perceptions of a peer who exhibited stereotypical autistic characteristics. Morrison et al. assessed first impressions made by autistic individuals to Non-ASD individuals. The researchers hypothesized that Non-ASD rated ASD individuals better if they knew they label beforehand. They found knowledge of an ASD individual's label helped with perception and favorable rating of the person. However, they still found biases against ASD individuals, which may demonstrate there is still a significant need to reduce stigmas surrounding the ASD diagnoses.

Cage et al. (2018) found some Non-ASD people dehumanized ASD individuals. In their study, this was due to openness towards autism. This finding may indicate the less open to autism one was, the more they dehumanized ASD, and the more they had negative attitudes towards ASD. On the other hand, the more open they were to ASD, the more positive attitudes they had towards ASD.

Contact and ASD

More than 3.5 million Americans live with ASD in the United States, which is approximately 1% of the U.S. population (Buescher et al., 2014). Current research

indicates that about 80% of adults have reported being conscious of autism (Dillenburger et al., 2013; Durand-Zaleski et al., 2012). Yet, as aforementioned, studies have found a negative implicit and explicit bias towards ASD individuals by Non-ASD. As previously stated, autistic individuals struggle with social interactions (Hotton & Coles, 2015; Orsmond et al., 2013). Some autistic individuals struggle to form meaningful connections with others, and unfortunately, sometimes, this can have a negative impact on their lives (Bertilsdotter Rosqvist et al., 2015). Researchers believe that having meaningful connections is an essential part of life. It helps developmentally in areas such as psychosocial adjustment, educational adjustment, and navigating negative experiences like peer pressures and antisocial behavior (Bauminger et al., 2007; Berndt, 2002; McLeod et al., 2008). Non-ASD people sometimes do not understand ASD adults' mannerisms and do not know how to interact with ASD individuals (DeBrabander et al., 2019; Gillespie-Lynch et al., 2015). Implicit and explicit attitudes may play a role in these situations. One can believe and say they have no negative biases; however, their behavior expressed says something else (Briñol et al., 2006). They are explicitly saying they have no preferences; but, their negative implicit attitudes are being expressed explicitly (Rydell et al., 2008). Researchers have found relationships between positive contact and positive attitudes towards ASD individuals (Gardiner & Iarocci, 2014; Nevill & White, 2011). In both articles, they found the more participants were exposed to ASD individuals, the more likely they were to have positive attitudes towards them. In the Nevill & White article, they touched upon the isolation of ASD individuals from their peers. They stressed the importance of bridging the gap

between ASD and Non-ASD individuals, which could lead to more positive attitudes towards ASD individuals because of increased interaction and awareness of ASD.

Barriers of Employment in ASD Individuals

In the United States, adults with autism face high-levels of underemployment and unemployment as opposed to adults with other disabilities and the Non-ASD population (Lorenz et al., 2016; Shattuck et al., 2012). In spite of this, there is still little research analyzing ASD individuals' experiences with finding employment, employment experiences, or the predictors of employment status. Due to the lack of research, there are varying reports of the unemployment rates of ASD individuals. Some studies report approximately 50%, while others provide evidence that it is closer to 70% (Hendricks, 2010; Sarrett, 2017; Shattuck et al., 2012). These estimates are significantly higher than the national rates of unemployment. However, researchers have found that these rates are lower than those with intellectual and learning disabilities, and speech impairments (Ohl et al., 2017; Shattuck et al., 2012). In a study conducted by Holwerda et al. (2012), they found the only significant predictor to hinder employment was limited cognitive ability, which was from the employer's perspective. They also found factors such as the severity of the disorder, comorbidity with psychiatric disorders, epilepsy, delayed speech and language abilities, maladaptive behaviors, social impairments, lack of empathy, and prior hospitalization impacted employment.

In another study, ASD individuals found certain parts of the job application process difficult. The participants in the study struggled to find a job, network, and follow-up once they made contact (Müller et al., 2003). They also struggled with creating

a resume because they lacked experience, did not know how to format the resume properly, and what information to place on the resume. The participants also mentioned how they struggled when it came to navigating an interview. They often found it challenging to know what to say, make eye contact, and keep up the conversation. Another study found that autistic individuals found it hard to explain many job terminations and long periods of unemployment between jobs (Hurlbutt & Chalmers, 2004). Hurlbutt and Chalmers reported a number of their participants credited their job obstacles to the social pressures of the work atmosphere rather than the position itself. The participants said they were told they were too blunt, obsessed over things their co-workers said and struggled with questions to ask when they needed clarification from their boss. Underemployment is an additional problem common with ASD individuals. Studies have found adults diagnosed with ASD are usually employed part-time, although they do not know if this is due to the individual or employer (Baldwin et al., 2014; Migliore et al., 2012; Schaller & Yang, 2005). However, researchers are not sure if ASD individuals are part-time because they want to be or if it is due to discrimination. The participants were not asked this question in the study to verify if they were part-time by choice.

Disclosure of disability was also reported as a possible barrier in employment (Ohl et al., 2017). They believe reporting one's disability status prevents them from being hired. As previously mentioned, one of the markers of Autism is difficulty with social interactions. Disclosing their disability status may negatively impact the chances of getting hired because the employer could have negative implicit attitudes by the time

of the interview (Hensel, 2017). Scientists have found that disclosure of diagnosis may negatively impact hiring decisions.

Additionally, studies have found that employers who did not hire ASD individuals focused on the person's ability to behave in a particular way versus their ability to perform well at their job (Hull et al., 2017; Lorenz et al., 2016). Disclosure may also cause a great deal of fear for many ASD individuals, which may impact their performance at work because they are anxious about everyone judging their performance (Neely & Hunter, 2014). However, researchers have also found, labeling one's self as Autistic can be beneficial because they can receive job accommodations under the Americans with Disabilities Act (Krieger et al., 2012). Employers can get a better explanation of the candidate, for example, gaps in employment, behaviors during the interview, how to accommodate the individual (Hensel, 2017). Studies have shown that employers appreciate honesty because it helps them prepare and accommodate the ASD individual (De Schipper et al., 2016; Hagner & Cooney, 2005; Hillier et al., 2007). More research is still needed to examine the perceptions of ASD individuals in the workforce.

Research Aims and Hypotheses

There are four aims and hypotheses for the current study. The first aim is to replicate a previous study conducted in our lab, which found that individuals had negative implicit attitudes, but reported positive explicit attitudes towards autistic individuals (Lipson, Taylor, Dickter, & Burk, 2019). The first study hypothesis is participants will have negative implicit attitudes but report positive explicit attitudes

towards autistic individuals. The second aim is to explore the differences in hiring decisions towards ASD vs. Non-ASD individuals. The second hypothesis is participants will be more likely to employ Non-ASD individuals than ASD individuals. The third aim is to examine if the type of job (social vs. nonsocial) influences the employer's preference for hiring an ASD vs. Non-ASD individual. Social jobs are ones where employees regularly interact with customers, clients, co-workers (e.g., cashiers, nurses, teachers, bankers). Nonsocial jobs are positions where employees do not typically interact with customers (e.g., stockers, truck drivers, data scientists, graphic designers). The third hypothesis is employers will prefer Non-ASD individuals for social positions, but there will not be a significant difference for the non-social position. The fourth aim is to examine how implicit attitudes predict hiring decisions towards ASD individuals. The fourth hypothesis is negative implicit attitudes will predict hiring decisions towards ASD individuals.

Method

Participants

The participants for this study were 120 adults from the United States of America. They were recruited using Amazon Mechanical Turk (MTurk). MTurk is a popular online crowdsourcing marketplace that enables access to substantial and diverse participant populations (Stewart et al., 2017). Researchers have found that MTurk can yield reliable, valid, and similar results to lab studies (Buhrmester et al., 2011; Holden et al., 2013; Shank, 2015). To be a part of the study, participants had to be at least 18 years old. They were compensated for their time, through MTurk. Procedures completed in

this study, which were involving human participants, were in accordance with the ethical standards of William & Mary's institutional Protection of Human Subjects Committee. It is also in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all of the participants in the study.

Measures

Social Contact Scale. This measure was adapted from researchers Walker, Silvert, Hewstone, and Nobre (2007). The scale was intended to measure the amount a participant has contact with people of different races. However, it was adapted for our study to measure the amount a participant has contact with an autistic individual. There are three items (e.g., "I often hang out with Autistic people"). Participants were asked to respond to these items on a 5-point Likert scale ranging from 1 (strong disagree) to 5 (strongly agree). The item scores were summed, and a higher score indicated that the participant had more social contact with autistic individuals.

Societal Attitudes Towards Autism Scale (SATA). Created by researchers Flood, Bulgrin, and Morgan (2013), this scale was intended to measure explicit attitudes towards ASD individuals. The original questionnaire has 45 items, but the scale used in this study consists of 16 items, such as "I would be afraid to be around a person with autism and a person with autism is an emotional burden to his/her family." Flood, Bulgrin, and Morgan found in their study that the 16 items scale was proven to be a reliable and valid measure of societal attitudes towards autism. Participants were asked to respond to these items on a 4-point Likert scale ranging from 1 (strong disagree) to 4 (strongly agree). The item scores were summed, and a higher score indicated a more

positive explicit attitude. The SATA-16 has shown to have good internal consistency and construct validity. The reliability of the SATA-16 for our sample was acceptable (α = .92).

Autism Spectrum Quotient (AQ-10). Developed by Allison, Auyeung, and Baron-Cohen (2012), the purpose of the measure is to assess the degree to which an individual possesses characteristics typical of a person on the autism spectrum. The AQ-10 is the ten-item condensed version of the AQ, a 50 item measure (e.g., "I often notice small sounds when others do not"). Participants are asked to rate how much each item relates to them on a 4-point Likert scale ranging from 1 (Definitely Agree) to 4 (Definitely Disagree). The results were coded using the AQ-10 scoring, which was provided by the authors. Higher scores indicated more autistic traits.

Feelings Thermometer. The thermometer assesses how favorable or unfavorable participants feel towards each group (non-autistic and autistic individuals). Participants pick a number between 0 and 100, utilizing a slider to rate how they feel towards ASD and Non-ASD individuals, separately. Participants were told that the larger the number they chose, the more they like the people in that group. The instructions informed participants that "ratings between 0 and 50 mean that you feel unfavorable toward the people in that group, and ratings between 50 and 100 indicate that you feel favorable toward the people towards that group".

Implicit Association Test (IAT). To measure participants' implicit associations with individuals with ASD, this study utilized a modified version of the IAT, created by Greenwald, McGhee, and Schwartz in 1998. The current IAT was administered using Inquisit software (www.millisecond.com), revised by Dickter, Burk, Zeman, and Taylor

(2020). The autism IAT is a reaction time (RT) task that prompts participants to categorize stimulus words into superordinate categories in different blocks. For the first two blocks, the participants classified autistic (different, challenged, special, dependent, impaired, disabled) and neurotypical words (normal, extroverted, functional, typical, independent, social) with one response key on a keyboard, and "good" and "bad" words with another key. “Good” and “bad” words are used to signify traits/characteristics associated with neurotypical (good) or autistic (bad) individuals. These blocks consisted of 20 trials each.

All stimulus words were displayed in the middle of the computer or phone screen with the category words presented in the top right and top left sections of the screen. During the third and fourth blocks, participants grouped all words (i.e., good, bad, autistic, neurotypical) into one of two categories. For example, they were prompted to use the response key elected for each: 50% of the participants were randomly assigned to have "good/neurotypical" and "bad/autistic" and 50% were randomly ascribed to use "bad/neurotypical" and "good/autistic" as the response options. Block 3 and 4 had 20 and 40 trials, respectively.

In Block 5, the "bad" and "good" response keys were reversed, and participants completed 40 trials. For the final two-blocks, the participants grouped all words into the other pairing categories; Block 6 had 20 trials, and Block 7 had 40 trials. Throughout each trial, the terms stayed on the screen until participants responded. If the participant responded inaccurately, a red "X" appeared on the screen until they correctly made the correct response. Once they made the correct response, there was a 250 ms intertrial interval. The order in which the blocks were presented was counterbalanced across

participants. IAT scores closer to zero signaled neutral associations with autism, while a higher positive score signaled more implicit bias towards autistic individuals.

Resume. Tailored from Agerstrom and Rooth (2011), each resume for the candidates was displayed with a similar background, work experience, and skills information. For one candidate, however, under a section listing extracurricular activities completed in college, the club "Autistic Student Association" was shown on their resume. The other candidate's resume did not have the "Autistic Student Association" listed. The purpose of this was to lead participants to believe that one of the candidates was autistic; we successfully used this procedure in a previous study (Dickter et al., 2020). This was counterbalanced across participants, which means the same resume was not always used as the ASD individual. See Appendix.

Explicit Attitudes. The resumes were used to assess explicit attitudes towards ASD individuals; they were asked to make hiring decisions based on the resumes. For example, the participants were asked "Which person would you choose to hire for retail and works at the front of the store?", "Which person would you choose to hire for stocking at the back of the store?", "How weak or strong of a job candidate do you think Jacob Smith is for this position?", "How weak or strong of a job candidate do you think William Johnson is for this position?" and "Provide some reasons why you would hire this person." These questions allowed us to analyze and get additional insight into why the participant chose the particular candidate for the position (i.e., cashier vs. stocker or Social vs. Non-social job). The participants were asked to make a series of judgments about each candidate, which were from the trait ratings of Abrams, Swift, & Drury (2016) (e.g., intelligent, perform well at tasks, are resourceful, motivated, experienced, etc.).

Participants were then asked to rate how important each trait would be for employers to make a hiring decision and how appropriate each trait would be to ask employers about job candidates. Afterward, the participants were asked to choose between the two candidates and rate the employability of each candidate.

Procedures

Participants were recruited through MTurk and completed all measures online. They filled out an informed consent using Qualtrics software before beginning the survey. There were three parts to the study. During the first part, participants were asked to imagine that they were an employer looking at applications from two different people applying for the same job, adapted from Abrams, Swift, & Drury (2016). Participants were randomly assigned to either evaluate candidates for a job as a stocker in the back of the store or a cashier in the front of the store. Next, they were presented with a resume from each candidate. The stock vs. cashier condition was the between-subjects variable, and the traits were the within-subjects variable.

Then, participants completed a version of the Implicit Association Test (Greenwald, McGhee, & Shwartz, 1998) designed to measure implicit bias towards adults diagnosed with an Autism Spectrum Disorder. Then participants completed the AQ-10, the SATA, the Feelings Thermometer, which all measure their explicit attitudes towards ASD individuals. After completing these questionnaires, participants answered demographic questions ("What is your age?", "What is your gender?", "What is your ethnicity/race?"). Finally, the participants were prompted with a debriefing statement, which alerted them about the nature of the study, and gave them a code to use to get paid for participating in the study.

Results

Participants

In total, 120 participants were recruited for the study. Data from 99 (male = 58, female = 41, M_{age} = 39.98, SD = 13.46) were featured in the analyses underneath. Those excluded from the study either failed all of the manipulation checks (*n* = 7) or scored below 70 percent on the IAT (*n* = 14). See table 1 for the demographic variables.

Table 1

Demographic Variables

	n	*%*
Gender		
Male	58	58.6
Female	41	41.4
Age		
18-25	10	10.1
26-30	20	20.2
31-40	33	33.3
41-50	14	14.1
51-60	12	12.1
61-73	10	10.1
Race/Ethnicity		
White	74	74.7
Hispanic or Latino	8	8.1
Black or African American	12	12.1
Asian	3	3.0
Multiracial	2	2.0

Manipulation Checks

Manipulation checks is an assessment used to evaluate the effectiveness of the manipulation in an experimental design. Researchers integrate manipulation checks into surveys to make sure participants are correctly comprehending and reacting as expected to the checks. The mean for the sociology question check was 0.84 (SD = 0.37). Sixteen participants did not get it correct, and 83 got it correct. The mean for the GPA question check was 0.79 (SD = 0.41); n = 21 (did not get it correct) and n = 78 (got it correct). The mean for the ASD manipulation check was 0.62 (SD = 0.49)); n = 38 (did not get it correct) and n = 61 (got it correct). The mean for the sociology question NON-ASD manipulation check was 0.80 (SD = 0.40)); n = 20 (did not get it correct) and n = 79 (got it correct).

Table 2

Manipulation Checks

	n	*%*	*SD*
Sociology Manipulation Check	83	84	0.37
GPA Manipulation Check	78	79	0.41
ASD Manipulation Check	61	62	0.49
NON-ASD Manipulation Check	79	80	0.40

Note: n represents the number of participants that got the manipulation check correct.

Descriptive Statistics for Explicit and Implicit Attitude Measures

Contact. Of the ninety-nine participants, (*n* = 49) had little to no contact with an autistic individual, (*n* = 22) was employed somewhere where an ASD person also worked, (*n* = 16) have an autistic friend, (*n* = 22) have a family member on the autism spectrum, (*n* = 4) volunteered with an autistic individual, (*n* = 7) is the primary caregiver for a person who is autistic, and (*n* = 11) have taken a class with someone who is autistic. There were (*n* = 6) who answered “other” or chose to respond using text.

SATA-16. The mean for SATA-16 was 52.00, and the standard deviation was 8.77. Cronbach’s alpha is 0.92.

AQ-10. The mean for SATA-16 was 2.79, and the standard deviation was 1.80. Eight participants scored a six or above on the AQ-10, which may indicate the individuals are on the autism spectrum. Further specialist diagnostic assessment is needed to make a diagnosis.

IAT. The calculations of the scores used in this study for the IAT were based on Greenwald, Nosek, and Banaji’s (2003) revised technique. The mean IAT score was 0.44 (SD = 0.44, range -0.97 – 1.36). These scores significantly differed from 0, $t(98) = 9.94$, $p<.001$, which suggests that participants exhibited an implicit preference for non-autistic compared to autistic individuals.

Table 3

Contact

	n	*M*
Had little to no contact with an autistic individual	49	0.49
Employed somewhere where an ASD person also worked	22	0.22
Had an autistic friend	16	0.16
Had a family member on the autism spectrum	22	0.22
Volunteered with an autistic individual	4	0.04
Primary caregiver for a person who is autistic	7	0.07
Had taken a class with someone who is autistic	11	0.11
Answered other or chose to respond using text	6	0.06

Note: n represents the number of participants that had contact with an autistic individual in the scenario.

Table 4

SATA-16

	M	*SD*
SUM SATA-16	52.00	8.77

Table 5

AQ-10

	M	*SD*
SUM AQ-10	2.79	1.80

Table 6

Implicit Measure

Measure	t	df	p
IAT	9.94	98	0.001

ASD and NON-ASD ANOVAs

A mixed-model ANOVA was used to investigate the implicit and explicit attitudes on perceptions of ASD compared to non-ASD individuals. The social vs. non-social conditions (stocking vs. cashier) were the between-subjects factors, and the ASD and Non-ASD conditions with the resumes were the within-subjects variables.

Table 7

Social vs. Non-social Conditions

Measure	df	F	p	η^2
Natural Leader				
Interaction	1	0.088	0.767	0.001
Main Effect	1	0.133	0.716	0.001
Strong Communicator				
Interaction	1	0.014	0.905	0.000
Main Effect	1	0.235	0.629	0.002
Strong Attention to Detail				
Interaction	1	0.467	0.496	0.005
Main Effect	1	0.247	0.620	0.003

Correlations

ASD Correlations. As shown in Table 8, correlational analyses were conducted between the implicit and explicit measures and the ASD variables. The analyses revealed that there was a small negative correlation between SATA and the contact scores ($r(99) = -.28$, $p<.01$). There was also a marginal correlation between the strong communicator variable in ASD candidates and contact scores. These results suggest that the more contact participants had with ASD individuals, the more positive their explicit attitudes were towards ASD individuals.

Table 8
ASD Correlations

Variables	1	2	3	4	5	6
1. Expression_d	1					
2. SUM_SATA	-.13	1				
3. Contact	-.14	-.28**	1			
4. Natural Leader	-.002	-.03	.04	1		
5. Strong Communicator	.05	-.03	.18	.59**	1	
6. Strong Attention to Detail	-.02	-.02	.04	.48**	.54**	1

*Note: *p <.05, **p <.01, ***p <.001, two-tailed.*

NON-ASD Correlations. As displayed in Table 9, correlational analyses were conducted between the implicit and explicit measures and the Non-ASD variables (Natural Leader, Strong Communicator, and Strong Attention to Detail). The analyses showed that there was a small negative correlation between SATA and the contact scores ($r(99) = -.28$, $p<.01$). There was also marginal correlations between the natural leader and strong communicator variable in NON-ASD candidates and contact scores.

Table 9

NON-ASD Correlations

Variables	1	2	3	4	5	6
1. Expression_d	1					
2. SUM_SATA	-.13	1				
3. Contact	-.14	-.28**	1			
4. Natural Leader	.05	-.13	.19	1		
5. Strong Communicator	.03	-.03	.20	.72**	1	
6. Strong Attention to Detail	.01	.05	.10	.45**	.43**	1

*Note: *p <.05, **p <.01, ***p <.001, two-tailed.*

Discussion

The current study sought to expand on the literature on implicit and explicit attitudes toward autistic individuals who are seeking employment. The researchers wanted to fill a gap in the literature by evaluating explicit and implicit attitudes towards autistic adults using a general population sample. This replicated an earlier study conducted in the lab, which found that individuals had negative implicit attitudes, but reported positive explicit attitudes towards autistic individuals (Lipson, Taylor, Dickter, & Burk, 2019). We also wanted to investigate the discrepancies in hiring decisions towards ASD vs. Non-ASD individuals, if the type of job (social vs. non-social) influences the employer's preference for hiring an ASD vs. Non-ASD individuals, and how implicit attitudes predict hiring decisions towards ASD individuals.

There are four hypotheses for this study. The first hypothesis for the study was participants will have negative implicit attitudes but report positive explicit attitudes towards autistic individuals. The reasoning for choosing this hypothesis is because we wanted to replicate a study conducted in our lab and add to the literature (Allison et al., 2012; Dickter et al., 2020; Kelly & Barnes-Holmes, 2013). The second hypothesis was participants would be more likely to hire Non-ASD individuals than ASD individuals. The third hypothesis was employers will prefer Non-ASD individuals for social positions, but there will not be a significant difference for the non-social job. The fourth hypothesis was negative implicit attitudes will predict hiring decisions towards ASD individuals. The reasoning behind choosing these hypotheses was due to the barriers associated with employment and ASD individuals. Adults on the spectrum are more likely to be unemployed and underemployed than their Non-ASD counterparts (Lorenz et al., 2016). However, there are few studies conducted on the specific topic of employment and ASD. The studies that examine the relationship between the two found employers had negative attitudes towards ASD individuals (Chen et al., 2014; Giarelli et al., 2013; Hendricks, 2010; Vornholt et al., 2013; Wilczynski et al., 2013).

For the first hypothesis, there was a significant correlation between the contact scores and ASD and Non-ASD characteristics. Those results had small negative correlations. This finding may imply that the more contact you have with an autistic person, the more negative explicit attitudes you have towards autistic people, and you would be less likely to hire them. These results are backed up by the literature. Contact is known to be a good indicator of attitudes and stigma (Wilson & Scior, 2015). Contact scores are also commonly assessed using explicit measures, which may explain the

correlation between the contact scores and the explicit measures (Nevill & White, 2011). Researchers have also found the more one interacts with ASD individuals; the more open they are to continue interacting with them (Cage et al., 2018; Gardiner & Iarocci, 2014). We also found that participants had IAT scores that were significantly different from 0, which is consistent with previous research. Both of these results further validate the last study we were replicating and researched on this topic. They also allude to the fact that Non-ASD individuals may have negative implicit attitudes towards ASD individuals, even though they explicitly say they do not or demonstrate positive explicit attitudes. This finding of the negative implicit attitudes may also indicate why their high rate of unemployment/underemployment amongst ASD individuals (Shattuck et al., 2012).

Future Research and Limitations

Future research is needed to continue examining implicit and explicit attitudes towards ASD individuals and how these attitudes affect their life. For one, gender differences should be observed. Most research conducted on autism focuses primarily on males. Females are typically left out of the discussion when it comes to autism or an afterthought. Also, there are many stereotypes associated with autism, one of them being that females are not autistic. So it would be interesting to see the results of this study on just female ASD adults. Racial/ethnic differences could also be explored. Most studies in psychology are not racially diverse. They typically have a majority white sample. So, replicating a study similar to this one with a more racially diverse and exploring to see if there are added biases towards the candidates based on their racial/ethnic backgrounds. This would spark further discussion and research on

unemployment rates, racial discrimination, and awareness towards racial/ethnic minority ASD individuals.

Another future study idea is examining why there are differences between autistic and non-autistic individuals during the hiring process, how can we fix these differences and close the gap, and are ASD individuals more likely to get hired by non-social or social jobs? ASD adults have stated they have difficulties with social interactions and are anxious about their bosses using this against them (Hull et al., 2017). Knowing the type of jobs or developing aids/tools to help autistic adults during the job interview could help with unemployment and underemployment. Researchers have found that employer and Non-ASD employee training aids in smooth transitioning of the autistic adult into the workplace, decrease adverse incidences such as outbursts, and increases positive implicit and explicit attitudes (Hendricks, 2010). Hendricks also recommends training and instruction to learn job tasks and other skills related to employment. These tools also help the ASD individual smoothly transition into his or her place of employment and provides them with any helpful tips or instructions niche to the environment (break time, interacting with the boss and coworkers, how to work the appliances, the layout of the work environment). This research could inform colleges, businesses, and career counselors around the nation on how to implement our findings to integrate autistic individuals into different employment spaces better.

Although there were strengths of the study (e.g., diverse sample, pilot-tested resumes, and a reliable research pool), our study was not without limitations. One of the study's limitations was the resumes were fake. We did not ask if the participants were employers, so real-world judgments may be different. Explicit attitudes could have been

influenced by social desirability bias. Social desirability bias is when research participants give answers they believe is politically correct, or the researcher wants to hear, instead of their actual feelings (Grimm, 2010). The social climate influences this. Additionally, 21 participants failed the manipulation checks. This could explain why the results did not support three of our four hypotheses because of the loss of those participants.

Conclusion

Although the results did not support our hypotheses, there are still findings in the literature that suggests people have negative implicit attitudes but report positive explicit attitudes towards autistic individuals. The high unemployment and underemployment rates suggest employers are more likely to hire Non-ASD individuals than ASD individuals. The reporting from ASD adults shows that employers will prefer Non-ASD individuals for social positions, and negative implicit attitudes will predict hiring decisions towards ASD individuals. However, based on the mixed findings of results from articles on implicit and explicit biases, there is still not a clear consensus there will not be a significant difference for the non-social position.

Appendix

William Johnson

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EDUCATION

Psychological Sciences

August 2016 - May 2020

GPA: 3.33

EXPERIENCE

Smith & Son Moving Company— *Moving Assistant*

March 2018 - PRESENT

Drives the truck, carry boxes, and operates a forklift

Joe's Seafood Restaurant— *Clean Up Crew Member*

October 2017 - February 2018

Stayed after hours to sweep and mop restaurant

Research Assistant

August 2017 - October 2017

Helped conduct studies with rodents, handled animals responsibly

SKILLS

- Microsoft Word, Microsoft Excel, Powerpoint, Java, SPSS
- CPR Training, First Aid Training, Project Management Certification

EXTRACURRICULAR ACTIVITIES

- Rotary International
- Relay For Life
- Autistic Student Association

William Johnson

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EDUCATION

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EXTRACURRICULAR ACTIVITIES

- Rotary International
- Relay For Life

Jacob Smith

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EDUCATION

***Sociology*, August 2016 - May 2020**

GPA: 3.38

EXPERIENCE

Jackson Storage— *Part-Time Worker*

- February 2018- Present
- Able to lift up to 75 pounds
- Reviews video footage from the security camera

Belle's Eatery— *DishWasher*

- November 2017- January 2018
- Flexible worker, willing to cover co-worker's shifts
- Worked in the kitchen and mopped tables

Research Assistant

- September 2017 - November 2017
- Skilled at using online databases to locate journal articles
- Experienced in summarizing research articles in a clear and concise manner

SKILLS

- Microsoft Office, R, Java, Python
- CPR Training, First Aid Training, Project Management Training

EXTRACURRICULAR INVOLVEMENT

- Qualcomm Thinkabit Lab Volunteer
- American Red Cross Volunteer
- Intramural Squash

Jacob Smith

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- Experienced at summarizing research articles in a clear and concise manner

SKILLS

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- CPR Training, First Aid Training, Project Management Training

EXTRACURRICULAR INVOLVEMENT

- Qualcomm Thinkabit Lab Volunteer
- American Red Cross Volunteer
- Autistic Student Association

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