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Disability Literacy and Attitudes Towards Autism Spectrum Disorders

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Cathryn T. Ryan
University of Connecticut
Honors Thesis

Thesis Advisor
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Abstract

This study aimed to measure disability literacy of autism spectrum disorder (ASD) and attitudes towards individuals with ASD. In particular, possible differences in attitudes based on the age of the individual with ASD were examined. Using an online survey, participants were divided into two groups and viewed a vignette describing a male (age 4 or 18) with symptoms of ASD. Survey questions addressed attitudes towards the individual in the vignette and multiple elements of disability literacy including recognition, causal beliefs, and information seeking. Although differences in attitudes based on the age of the male presented were not significant, previous contact, the age of the rater, and gender were significant. In terms of literacy, recognition of ASD was high (75.7%) and other beliefs were fairly consistent with current professional knowledge. However, ASD prevalence was largely overestimated and trends indicated that the most accurate sources of information about ASD are not always used, particularly for websites. A lack of significant attitudinal differences based on age and an overall high literacy level indicate that the outlook for inclusion of individuals with ASD may be more optimistic when compared to other disorders. Efforts aimed at improving literacy and attitudes should specifically address information seeking and emphasize the importance of contact with individuals with disabilities.

Introduction

Historically, individuals with disabilities have faced discrimination, ostracism, and segregation. Today, national policy mandates that individuals with disabilities be afforded equal access to education, vocation, and community living. Inclusion, the practice in which individuals with disabilities participate in community life along side their counterparts without disabilities, requires not only an accessible physical environment but also an inviting (or at least accepting) attitudinal context. Positive attitudes towards individuals with disabilities are critical for successful inclusion into all aspects of society. In addition, personal experiences, opinions, and attitudes can play a crucial role in the acceptance of individuals with disabilities (Jorm, 2000). Beliefs, whether accurate or inaccurate, are based on formal and informal sources of information such as personal experience or formal education (Jorm, 2000). False information can impede inclusion by contributing to misconceptions and can impact not only attitudes held towards individuals with disabilities but may also impact behavioral intentions (Fishbein & Azjen, 2005). As a result, attitudes can influence the meaningful inclusion of individuals with disabilities in society.

Inclusion is particularly important for individuals with autism spectrum disorder (ASD) due to the social deficits that are characteristic of the disorder. In addition to these social deficits, communication deficits and abnormal behavior are also seen in ASD (DSM-IV-TR, 2000). This disorder has shown a significant increase in prevalence in recent years, with 1 in 88 children being diagnosed, leading to an increased importance of inclusion (Centers for Disease Control and Prevention, 2012; Koyama, Tachimori, Sawamura, Koyama, Naganuma, Makino, & Takeshima, 2009). A number of factors make ASD particularly vulnerable to misconceptions including the unknown etiology of the disorder and the variable manifestation of symptoms

(Furnham & Buck, 2003). Inaccurate media representations have also contributed to misconceptions about ASD (Huws & Jones, 2010).

This study aimed to measure attitudes towards individuals with ASD and determine the general public's knowledge about the disorder. Attitudes are briefly discussed as well as factors that impact attitudes towards individuals with disabilities including perceived causality, gender, and age. How social desirability affects the measurement of attitudes is included. We also explore the impact of the age of the individual with a disability on attitudes. Secondly, knowledge about disabilities is addressed using the "mental health literacy" framework created by Jorm, Korten, Jacomb, Christensen, Rodgers, and Pollitt (1997). This includes a discussion of the importance of determining the public's knowledge specifically about ASD as well as information seeking about disabilities. Next, the ways in which attitudes and knowledge are impacted by previous contact with individuals with disabilities are reviewed. Finally, the possible relationship between literacy and attitudes is considered.

As demonstrated by the relationship between attitudes, behavioral intentions, and ultimately behaviors (Fishbein & Azjen, 2005), understanding attitudes is a critical part of inclusion. Although the definition of attitudes varies greatly, the following is a basic, widely accepted version that defines attitudes as: "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly & Chaiken, 1993). Fishbein and Azjen (2005) use the Reasoned Action Approach to explain the formation of attitudes. This approach cites individual, social, and informational factors that indirectly influence a person's beliefs (Fishbein & Azjen, 2005). This, in turn, leads to the formation of an attitude. Importantly for this study, attitudes, such as those formed towards individuals with disabilities can impact the intentions as well as the behavior of a person (Fishbein & Azjen,

2005). Overall, the relationship between general attitudes and general patterns of behavior has the potential to play a significant role in interactions between individuals with disabilities and the general public.

There are a number of factors that impact attitudes towards individuals with disabilities. One of these factors is the perceived causality of the disability. Weiner's Theory of Perceived Responsibility (1993) states the perceived causality of a disability or other issue impacts the perceived responsibility of the individual. This perceived responsibility plays a large role in the willingness of others to help an individual with a disability and can impact the level of sympathy and anger others may feel towards these individuals. As a result, these feelings can impact the attitudes that are formed (Fishbein & Azjen, 2005). This relationship is especially important for disorders like ASD where the causality is unknown; it makes the beliefs of others, whether accurate or not, pivotal with respect to perceived responsibility and attitude formation. A higher perceived responsibility has been shown to lead to more negative attitudes towards individuals with intellectual disabilities while disabilities viewed as less preventable led to more positive ratings (Panek & Jungers, 2008).

Gender is another factor related to attitudes. One consistent finding is that females have more positive attitudes towards individuals with disabilities (in general) when compared to males (Iobst, Nabors, Rosenzweig, Srivorakiat, Champlin, Campbell, & Segall, 2009; Panek & Jungers, 2008; Scior, 2011). However, males were found to be more open to a vignette about an individual with ASD (Nevill & White, 2011). Males were also found to be more optimistic when reporting the prognosis of an individual with ASD (Koyama et al., 2009). The gender of the individual with a disability has also been studied to some degree. In children, the results have been extremely varied, with some studies showing attitudinal differences while others show no

such difference (Nowicki & Sandieson, 2002). In general, attitudes towards females with disabilities have been shown to be more negative (Ahlborn, Panek & Jungers, 2006). In addition to gender, the age of the rater has also been shown to have effects on attitudes. Grandparents reported positive ratings of their grandchildren with disabilities but negative ratings of other children with disabilities (Katz & Kessel, 2002). Overall, attitudes held by younger individuals are generally more positive than when compared to older individuals (Scior, 2011).

Looking specifically at individuals with ASD, attitudes are generally more negative but are also affected by a wide range of factors. When compared to a typically developing child, attitudes are more negative towards children with ASD (Harnum, Duffy, & Ferguson, 2007). Interestingly, attitudes differed in one study by Nevill & White (2011) based on the personality of the rater. Among college students, those with math and science majors rated an individual with ASD as more similar to them but were more fearful while social science majors had lower levels of fear but also lower levels of perceived similarity. Attitudes also differed greatly depending on whether a diagnosis of ASD was revealed to participants or not (Chambres, Auxiette, Vansingle, & Gil, 2008). Those who were not aware of a diagnosis rated the behaviors of a child more severely when compared to those who were informed of a diagnosis. Attitudes held by children towards individuals with ASD have been shown to improve when receiving information from formal sources but show little improvement when information comes from informal sources (Morton & Campbell, 2008). This may have important implications for improving attitudes towards individuals with ASD.

One variable that may impact attitudes towards individuals with disabilities but that has been, for the most part, excluded from research is the impact of the age of the individual with a disability. As previously discussed, the impact of the age of the rater has been addressed while

this specific age variable appears in very few studies. One of two studies found to address this issue confirms this by acknowledging a lack of previous research from which to draw hypotheses (Ahlborn et al., 2006). This study examined the impact of age by presenting vignettes of three individuals with intellectual disabilities. These individuals were presented as being age 3, 12, or 20. It was hypothesized that attitudes would be most positive towards the individual presented as being 3 years old and this was supported on the activity dimension of the measure used. A second study, conducted by the same researchers, presented vignettes of individuals ages 8, 20, and 45 (Panek & Jungers, 2007). This study revealed no significant differences between attitudes towards different ages of individuals with intellectual disabilities. It was believed that attitudes would change over the course of the lifespan with more positive attitudes towards young children, more negative attitudes toward young adults, and finally more positive attitudes towards older adults (Panek & Jungers, 2007).

Although the results of the second study did not support this conclusion, it is possible that the almost identical methodology used by both studies did not effectively address the age variable. Multiple other variables, including gender and causality, were also included along with altering the age of the individual presented which may have distracted raters from this particular variable (Ahlborn et al., 2006; Panek & Jungers, 2007). Looking at research regarding disabilities across the lifespan, it remains plausible that attitudes become more negative during adolescence and young adulthood especially when compared to young children. Groce (2004) describes young adults with disabilities as an “invisible population” that often goes unrecognized by the general public and is not offered the same support that is offered to children and adults. Studies regarding stigma towards individuals with disabilities show that stigma is consistent or may worsen as an individual with a disability becomes older (Gray, 1993). From this

perspective, it is possible that attitudes towards young adults with disabilities differ from other age groups.

A final element that must be considered when measuring attitudes is social desirability. The concept of social desirability was created to address the tendency of individuals to alter responses to questions, such as those found in measures of personality or attitudes, in order to appear a certain way (Crowne & Marlowe, 1960). It attempts to account for the possible “faking good” or “faking bad” of participants. Social desirability scales rate an individual’s likelihood of answering in socially acceptable ways as opposed to what may be the natural response (Crowne & Marlowe, 1960). This tendency has important implications for measuring attitudes because individuals may alter their responses that are seen as undesirable and thus alter the results of attitude measures. In addition to this, the behaviors that are implied by the results of attitude measures are altered as well. Individuals who are less influenced by what may be socially appropriate are more likely to report their true attitudes (Crowne & Marlowe, 1960). These individuals are also more likely to follow through with behaviors that reflect these attitudes, regardless of whether they are deemed socially appropriate (Fishbein & Azjen, 2005).

Another factor related to the inclusion of individuals with disabilities in society, but is somewhat separate from attitudes, is the overall knowledge about disabilities held by the general public. Jorm et al. (1997) derived the term “mental health literacy” from the more general, widely used term “health literacy” in order to measure this overall knowledge. It was defined as the “knowledge and beliefs about mental disorders which aid their recognition, management, or prevention” (Jorm et al., 1997). Mental health literacy includes (a) the ability to recognize specific disorders, (b) knowledge of how to seek mental health information, (c) knowledge of

risk factors and causes, self-treatment, and available professional treatment, (d) attitudes that promote recognition and appropriate help seeking (Jorm et al., 1997).

The emergence of the term mental health literacy has provided a framework for addressing the overall knowledge of specific mental disorders including depression, schizophrenia, conduct disorders, intellectual disabilities, and others (Jorm et al, 1997; Furnham & Leno, 2012; Scior, 2011). These studies have also utilized a common methodology of presenting a vignette describing the characteristics of the disorder using a hypothetical person. After presenting the vignette, individuals are asked various questions including identifying the specific disorder, symptoms, treatments, prognosis, risk factors, and causality (Jorm et al., 1997). Questions may also include attitudes towards individuals with the disorder or possible previous experience with the disorder. Examining the results of mental health literacy studies for various disorders, the accuracy of recognizing the disorder is low but is positively correlated with higher levels of education (Furnham et al., 2012; Jorm, Barney, Christensen, Hight, Kelly, & Kitchener, 2006). The low levels of mental health literacy are significant for both those with mental health disorders as well as the general public because it may impact the willingness of individuals to seek appropriate treatment (Jorm et al., 2006). It may also play a role in the inclusion of these individuals in society.

This study utilized the concept of mental health literacy to define “disability literacy” and will be referred to as disability literacy from this point forward. Although it addresses identical aspects of literacy and beliefs, disability literacy encompasses a larger variety of disabilities as opposed to exclusively looking at mental disorders. While the number of studies regarding literacy is increasing, few have addressed autism spectrum disorders. Only two studies were found to specifically address literacy of ASD in the general public. The first of these studies

addressed two aspects of disability literacy: etiology and treatment (Furnham & Buck, 2003).

The results of this study indicated that biomedical causes of ASD were more commonly believed while the believed appropriate treatments were equally spread between biomedical and psychological approaches. As is consistent with other literacy studies, higher levels of education were correlated with more accurate beliefs (Furnham & Buck, 2003). The second study addressed additional aspects of disability literacy of ASD in the Japanese general population including asking participants to identify the disorder, possible causes, prognosis, coping strategies, the believed effectiveness of treatments, and prevalence. Results included 45.8% of participants correctly identifying the disorder as ASD, a higher accuracy among female participants, and differences in beliefs of appropriate treatments between age groups (Koyama et al., 2009).

Although there is limited information regarding the literacy of ASD in the general population, other studies have addressed similar questions within specific populations. For example, general physicians had more outdated beliefs when compared to specialists who worked specifically with individuals with ASD (Heidgerken, Geffken, Modi, & Frakey, 2005). Stone and Rosenbaum (1988) looked specifically at teachers and parents and revealed a number of misconceptions regarding believed symptoms, etiology, and prognosis. Lastly, a greater number of studies have looked at general perceptions of individuals with ASD including perceptions held by adults, children, and parents of children with the disorder (Harnum et al., 2007; Hines, Balandin, & Togher, 2012).

Despite a limited number of studies regarding the disability literacy of ASD, it is a disorder that could greatly benefit from such a study. There are a number of characteristics of the disorder that make it particularly important to understand the literacy of the general public. First,

the social deficits that are characteristic of ASD make inclusion in society an important part of interventions. Positive social interactions can enable individuals with ASD to seek further interaction. A critical piece of positive social interactions is the literacy of not only those who may work with these individuals on a daily basis but also members of the general public. Increased understanding and more positive attitudes towards individuals with ASD can contribute to more successful social experiences. Limiting misconceptions held by the public could also be an important part of inclusion.

A second characteristic of ASD that makes examining the disability literacy of the disorder important is the lifelong course of the disorder. ASD has been consistently shown to persist into adulthood (Howlin, Goode, Hutton, & Rutter, 2004). In most cases, symptoms continue with possible slight improvement while the majority of improvement is seen in childhood. A higher IQ has been shown to predict more positive outcomes but many behaviors characteristic of ASD remain (Howlin et al., 2004). When compared to other lifelong disabilities like Down syndrome, adulthood with ASD is more isolated and unpredictable making independence more difficult to achieve (Seltzer, Krauss, Orsmond, & Vestal, 2001). The lifelong nature of ASD combined with the increasing prevalence of the disorder in childhood points to a likely high number of adults with ASD in the near future. In order for these adults to be included in society, the general public must be knowledgeable of the disorder and identifying areas of need is important. Addressing possible negative attitudes and misconceptions could limit issues with the integration of both children and adults with ASD in society.

Lastly, the variable nature of ASD and the number of questions remaining about the disorder makes measuring the general public's understanding particularly important because of the potential for many misconceptions. However, this understanding is not just important for the

general public but is also important for individuals impacted by the disorder such as parents and immediate family members. The perceptions of ASD held by parents directly relates to the types of treatments that are used for their children (Al Anbar, Dardennes, Prado-Netto, Kaye, & Contejean, 2010). The unknown etiology of the disorder can also lead to differing believed causes. Parents who believe their personal attributes contributed to the disorder are less likely to seek support and information (Al Anbar et al., 2010). Unfortunately, not seeking further information has the potential to exacerbate existing misconceptions. It is therefore important to limit misconceptions not only for the general public but also individuals like parents of children with ASD. Understanding current knowledge and attitudes will allow for the identification of areas of need in order to limit these misconceptions.

This study specifically addressed the information seeking aspect of mental health literacy defined by Jorm et al. (1997). Information seeking includes both formal sources of information such as mental health professionals and informal sources such as family or friends. One of the largest sources of information in today's society is the media and Internet. This is especially true when looking specifically at autism spectrum disorders. Jordan (2010) discusses the coevolution of the Internet and ASD, which have grown simultaneously and substantially in recent years. The topic of ASD can be found across the Internet in forums, advocacy groups, awareness websites, and fundraising organizations (Jordan, 2010). Unfortunately, these sources of information include both accurate as well as inaccurate information. The extreme variability in the quality of information makes the likelihood of inaccurate beliefs and misconceptions high (Reichow, Halpern, Steinhoff, Letsinger, Naples, & Volkmar, 2012).

Information seeking has received little attention in previous studies yet may play a vital role in the formation of disability literacy. Participants have rarely been directly asked about

sources of information or the perceived accuracy of these sources. One study that somewhat addressed information seeking showed the impact of formal education on disability literacy. A higher level of formal education, which may have served as a source of information, was associated with more accurate beliefs (Furnham & Buck, 2003). Another study implicitly showed the impact of informal information seeking. The results of a study by Huws and Jones (2010) serve as a clear example of the impact of inaccurate media representations and websites. In this study, individuals with no prior experience with ASD reported many inaccurate beliefs based on media reports such as the MMR vaccination as the cause of ASD and beliefs of a high number of savants being found within the ASD population.

Previous contact and experience are important to consider for both the formation of attitudes towards individuals with disabilities and disability literacy. A number of studies have looked at the impact of previous experiences and contact with individuals with disabilities on attitudes. However, the findings from these studies are fairly varied. Multiple studies report contact, whether direct or indirect, impacted attitudes positively with specific professional experience having the greatest effect (Roth, Antony, Kerr, & Downie, 2000; Scior, 2011). However, Jorm et al. (1997) found that experience with an individual with a mental illness had no effect. Overall, it is possible that experience with individuals with disabilities can positively impact attitudes and beliefs while it may also have no impact. It is important to note that experience has not been shown to impact attitudes negatively.

In terms of disability literacy, contact with individuals with disabilities acts as a source of information that contributes to literacy. Furnham, Abajian, & McClelland (2011) reported that personal experience with a personality disorder increased the accuracy of identification although indirect experience did not have an effect. As discussed previously, Heidgerken et al. (2005)

compared the knowledge of ASD among general physicians to therapists who specifically worked with individuals with ASD. The results showed that general physicians had more outdated and inaccurate beliefs, which could indicate the significance of contact for disability literacy (Heidgerken et al., 2005). Individuals who reported higher levels of formal education in addition to direct experience with individuals with ASD had the most accurate beliefs (Heidgerken et al., 2005). A concerning finding by Huws and Jones (2010) is that participants reporting no experience with individuals with ASD were highly confident in their beliefs about the disorder despite their inaccuracy. The findings from these studies suggest that disability literacy is often improved by contact with individuals with disabilities or mental disorders.

Finally, attitudes and disability literacy are individually complex issues but may also be related in some way. It is possible that these two variables share a reciprocal relationship; disability literacy may impact attitudes towards individuals with disabilities while attitudes may impact disability literacy as well. The impact of knowledge on attitudes has received more attention because many believe increasing knowledge may improve attitudes and reduce stigma towards disabilities and mental illness (Jorm et al., 2006). Increasing disability literacy has been shown to slightly improve attitudes in some studies (Jorm et al., 2006). Studies regarding the impact of information on attitudes towards individuals with ASD have also shown more positive attitudes as a result of greater knowledge (Campbell, Ferguson, Herzinger, Jackson & Marino, 2004; Morton & Campbell, 2008). While there is support for the improvement of attitudes through increased knowledge, there are exceptions. Jorm et al. (2006) provides the example of mental health professionals who may have high mental health literacy but may hold stigmatizing attitudes. Attitudes may also impact disability literacy. Individuals that hold more positive attitudes towards disabilities may be more likely to seek additional information. These

individuals may also be less likely to believe everything they learn about disabilities but instead consider the accuracy of the source of information to a greater degree than those with more negative attitudes. In the end, both attitudes and disability literacy have the potential to impact each other.

Disability literacy is a fairly recent concept that has allowed for literacy of specific disabilities and disorders to be examined. One disorder that has received relatively little attention despite its high prevalence is autism spectrum disorder. The current study examined attitudes held towards individuals with ASD and particularly the impact of the age of the individual with ASD on these attitudes. Participants were presented with one of two vignettes that described a hypothetical male in a “real life” situation and responded to questions regarding their attitudes towards this individual. Although not explicitly stated, the description of the male (age 4 or 18) included multiple core symptoms of ASD. This study also addressed the literacy of ASD in the general public by determining the ability of the public to recognize the disorder as well as identify possible causes, effective treatments, prognosis, and prevalence. It looked at commonly used sources of information about ASD and whether the public used the most accurate available sources. Overall, this study hoped to address attitudes towards individuals with ASD, the lack of information regarding the impact of the age of an individual with ASD on attitudes, and the disability literacy of ASD in the United States general population.

Based on theory of attitude formation and existing research on attitudes toward disabilities, the current study had 4 hypotheses:

1. Attitudes towards the vignette describing a child would be more positive when compared to attitudes towards the vignette describing a young adult.

2. Individuals with previous contact with individuals with autism spectrum disorders would have overall higher literacy and more positive attitudes.
3. Individuals with higher levels of education would also have higher literacy and more positive attitudes.
4. A final research question was whether attitudes towards individuals with ASD are related to disability literacy.

Methods

Participants

This study included a total of 340 participants, of which 21.4% ($N= 73$) were male and 78.6% ($N= 267$) were female. Participants were required to be at least 18 years old. The average age of participants was 27.49, with an age range of 18 to 75 ($SD= 12.58$). Participants' education levels ranged from high school to having earned a professional degree (MD, JD, etc.) although the most prevalent level of education was having completed some college. Participants had a variety of occupations with the most common being the category of education, training and library occupations. There were a total of 209 full-time and 30 part-time students. A summary of all demographic characteristics is shown in Table 1. Recruitment materials included social media advertisements, emails, and flyers and incentive was offered to participants who voluntarily submitted an email address to be entered into a drawing for one of six gift cards. Participants were recruited using a snowball method, which included contacting acquaintances of the researchers and asking these individuals to contact possible additional participants.

Table 1 (N=340)

Demographic Characteristics of Participants

Demographic Characteristic	Percentage of Sample
Gender	
Male	21.2
Female	78.2
Age	
18 to 24 years	62.6
25 to 39 years	19.4
40 to 75 years	17.9
Education Level	
Below High School	0
High School	10.3
Some College	50.7
2-year degree (Associates)	3.8
4-year degree (BA or BS)	11.5
Master's Degree	14.7
Doctoral Degree	2.4
Professional Degree (MD, JD)	0.9
Employment Status	
Part-time student	8.8
Full-time student	61.5
Employed Part-time	5.9
Employed Full-time	21.2
Unemployed	2.9
Retired	1.5
Occupation (N=100)	
Management, Business, and Financial	16
Computer and Mathematical	7
Architecture and Engineering	2
Life, Physical, and Social Science	5
Community and Social Service	6
Legal	2
Education, Training, and Library	23
Arts, Design, Entertainment, Sports, and Media	2
Healthcare Practitioners and Technical	9
Healthcare Support	5
Protective Service	0
Food Preparation and Serving Related	3
Building, Grounds Cleaning, and Maintenance	0
Personal Care and Service	1

Demographic Characteristic	Percentage of Sample
Sales, Office, and Administrative Support	13
Farming, Fishing, and Forestry	1
Installation, Maintenance, Repair, Production, and Construction	3
Transportation and Material Moving	2

Design

This study utilized a mixed design with random assignment to experimental group (type of vignette: 4 year old or 18 year old subject depicted) and participant variables (gender, age, employment status, and occupation) serving as additional independent variables. Participants were randomly assigned to one of two versions of a vignette that differed in the age of the hypothetical male presented. The number of participants who viewed each versions was kept as equal as possible with 173 participants having viewed the child version of vignette and 167 participants having viewed the adult version. This served as the independent variable and the results from the Social Desirability Scale served as a covariate. The study consisted of an online survey created using Survey Monkey.

Procedure

This study was approved by the University of Connecticut Institutional Review Board and was granted a waiver of signed consent. After approval was received, participants were able to access the survey online where they viewed an information sheet including the requirements and benefits of the survey. The anonymity and confidentiality of participant's responses were also described as well as the opportunity to enter a drawing for an incentive. By continuing with the survey, participants consented to completing the survey but had the option of leaving the survey at any point without consequence. Participants who chose to complete the survey were first asked to answer the demographic portion of the survey. Following these questions,

participants completed the Social Desirability Scale. Next, participants were randomly assigned to one of the two vignettes by utilizing the random assignment feature of Survey Monkey. After viewing the vignette, participants completed the Autism Spectrum Disorder Literacy Scale, which measured attitudes, recognition, beliefs about ASD, and information seeking. This scale was comprised of multiple parts, as described below, which addressed these various aspects of disability literacy. Following the completion of the survey, participants were offered the opportunity to enter a drawing for one of six \$25 gift cards by submitting an email address.

Materials and Measures

The online survey was comprised of three sections: demographics, social desirability, and Autism Spectrum Disorder literacy. The first of the three sections included five questions regarding the demographic characteristics of the participants (see *Appendix A*). These demographic questions included the participant's gender, age, education level, and occupation. These questions were presented in a multiple-choice format except for the participant's age, which had to be filled in.

The second section of the survey was the Social Desirability Scale (see *Appendix B*). The scale used was a form of the original Marlow-Crowne Social Desirability Scale that was later shortened by Strahan and Gerbasi (1972) and was comprised of 10 questions. These questions required participants to respond to statements as either true or false as it applied to them personally. The reported reliability of this shortened form using the Kuder-Richardson formula 20 coefficient ranges from .59 to .70. The results of this section of the survey served as a covariate for other sections of the survey.

Following the completion of these first two sections, participants completed the Autism Spectrum Disorders Literacy Scale (see *Appendices C through F*). This scale was comprised of

multiple parts, which addressed the various components of disability literacy and included a vignette presenting an individual with ASD. Aspects of disability literacy addressed by this scale included attitudes towards the individual displaying symptoms of ASD presented in the vignette, recognition of the disorder, and beliefs about the disorder. Questions regarding information seeking and previous contact with individuals with disabilities were also included. The format of the questions included multiple-choice and ranking. The ranking questions included instructions such as ranking the top three most likely and ranking the choices given from most accurate to least accurate. It was compiled based on questions and answers used in previous studies on autism spectrum disorders (Furnham & Buck, 2003; Huws & Jones, 2010; Koyama et al., 2009; Reichow et al., 2012; Scior & Furnham, 2011). The majority of this survey was modeled after an autism questionnaire created by Koyama et al. (2009).

The following were included as part of the ASD Literacy Scale (see *Appendices C through F*):

Vignette. Participants were presented with one of two vignettes created by the researchers (see *Appendix C*). These vignettes were based on the vignette presented by Findler, Vilchinsky, and Werner (2007) as part of the Multidimensional Attitude Scale. The vignettes described a “real life” situation in which the participants were asked to imagine the scenario presented. The scenario included a mother and her son (age 4 or 18) entering a coffee shop and joining a group of friends for lunch. The son, named Jacob, exhibited symptoms of autism spectrum disorder. These symptoms were derived from the diagnostic criteria for the disorder, which included not speaking, rocking back and forth, and methodically lining up the food he was eating (DSM-TR IV, 2000). The researchers chose to present only a hypothetical male due to the greater prevalence (nearly 5 to 1) of ASD in males when compared to females (CDC, 2012). The

two versions of the vignette were identical other than a difference in the age of the male presented.

Attitudes toward ASD. The Multidimensional Attitude Scale Towards Persons with Disabilities (MAS) was used to measure attitudes towards the individual in the vignette. Findler et al. (2007) created the MAS in order to measure three dimensions of attitudes including affect, cognition, and behavior. The reliability of this original version of the scale for behaviors, cognitions, and affects were .83, .88, and .90 respectively. The modified version created by Vilchinsky, Werner, and Findler (2010) has reduced the number of questions from 34 to 22 (see *Appendix D*). The MAS questions used a likert-scale ranging from 1 (not at all) to 5 (very much) for each item. Higher scores in each section represented more negative attitudes and multiple items were reverse coded. Items included the likelihood of certain feelings occurring such as guilt or stress, the likelihood of having certain cognitions such as “He looks like an OK person” and the likelihood of behaving in a certain way such as moving to another table or finding an excuse to leave. The vignette used in the original version of this measure, which presented an individual using a wheelchair, was modified to present a hypothetical male portraying autism spectrum disorder.

Recognition. After reading the vignette, participants were asked “What, if anything, do you think is most likely wrong with Jacob?” This question utilized a multiple-choice format and offered participants choices including typically developing, anxiety disorder, autism, and others. Participants were also asked to rate their confidence in their recognition, from not confident to extremely confident (see *Appendix E*).

Causal, Intervention, and Prognostic Beliefs. Participants were asked six questions addressing various beliefs about ASD. Questions regarding believed causes and appropriate

intervention asked participants to rate their top three choices. Two questions addressed the believed prognosis of the individual presented given ideal help or no help. These multiple-choice questions included choices ranging from recover fully without any problem to get worse. Participants were also asked what they believed is the prevalence of ASD in the general United States population (see *Appendix E*).

Information Seeking. Sources of information and the perceived accuracy of these sources were addressed by the next five questions (see *Appendix E*). The first three questions asked participants to rank a total of six sources of information. The first two of these questions asked participants to rank the sources of information based on the likelihood they would use them to learn about ASD in general or after learning a relative had been diagnosed. The third question asked participants to rank the same six sources of information by perceived accuracy. The final two questions addressing information seeking focused on websites. Participants viewed a list of websites related to ASD that was derived from a larger group of websites previously reviewed for quality (Reichow et al., 2012). This list included websites with a variety of domains and of variable quality. Participants were asked to select the website they were likely to look at first after using a search engine. Lastly, using the same list, participants ranked the top five websites that were believed to offer the most accurate information.

Contact. Previous contact with individuals with disabilities in general and specifically with individuals with ASD was measured using two questions. The context in which the contact occurred and the amount of contact were also included. Participants who reported previous contact with individuals with disabilities were asked the specific types of disabilities they had had contact with. The context of this contact was measured using a multiple-choice question with options including professional, family member, and other contexts. A single question regarding

the amount of contact included options ranging from at least once in the past week to at least once over a year ago. Participants who reported previous contact with an individual with ASD answered questions about the context of the contact and the amount of contact identical to those questions asked regarding contact with individuals with disabilities in general (see *Appendix F*).

Data Analysis

First, descriptive statistics were calculated for each variable measured including demographic characteristics. Frequency statistics were also calculated for these same variables. Multiple items on the MAS were reverse coded and scores were summed for the affect, cognition, and behavior dimensions. Data were then divided into two groups based on the version of the vignette viewed (child or young adult) and t-tests were used to compare attitudinal differences across the three dimensions. Data were also grouped based on various participant characteristics including gender, age, and education level. Three age groups were formed as follows: age 18 to 24, age 25 to 39, and age 40 or older. In addition, three groups were formed based on level of education and included: 2-year degree or below, 4-year degree or some college, and above a 4-year degree. To examine the relationship between these variables and attitudes, a t-test was used for the gender of participants, while one-way Analysis of Variance (ANOVA) was used for age and level of education. T-tests were used to address the relationship between absolute contact with both individuals with disabilities in general and individuals with ASD and attitudes. ANOVAs were then used for amount of contact and attitudes.

Next, the relationship between attitudes and disability literacy was examined using an ANOVA. The impact of level of education and previous contact on disability literacy was determined using a chi-square analysis. Additional chi-square analyses were used to examine possible relationships between other variables, for example, age group differences or gender

differences for specific believed causes or prevalence. Finally, social desirability scores were calculated and correlations were run between these scores and the three dimensions of attitudes. Post-hoc (LSD) tests were conducted for all significant items based on the results of the ANOVAs. The level of significance was held at $p < .05$ for all analyses.

Results

This study addressed three hypotheses and an additional research question. Based on previous work addressing individuals with disabilities of differing ages, the first hypothesis examined possible attitudinal differences based on the age of the individual depicted. The second hypothesis considered the relationship between previous contact with individuals with disabilities and both attitudes and disability literacy. The impact of level of education on these two variables was included in the third hypothesis. Finally, the possibility of a reciprocal relationship between attitudes and disability literacy was addressed by our final research question.

Hypothesis 1 stated that attitudes towards the vignette depicting a child would be more positive when compared to attitudes towards the young adult. The results of multiple t-tests revealed that attitudinal differences were not significant for any of the three dimensions [$t_{\text{aff.}}(338) = -1.82, p > .05$; $t_{\text{cog.}}(337) = -.61, p > .05$; $t_{\text{beh.}}(338) = -.40, p > .05$]. As a result, the age of the person with a disability did not have an effect on attitudes. Although not significant, differences in attitudes were in the predicted direction. The mean scores for items included in the MAS as well as reliabilities for each dimension and the entire scale are shown in Table 2.

Table 2

Mean Scores of Multidimensional Attitude Scale Towards Persons with Disabilities (MAS)

MAS Factors	Child		Adult		Combined		Cronbach's Alpha
	Mean	SD	Mean	SD	Mean	SD	
Affect	32.49	7.12	33.92	7.45	33.19	7.31	0.81
Depression	1.61	0.95	1.58	0.87	1.59	0.9	
Guilt	1.7	0.97	1.78	1.07	1.74	1.02	
Pity	2.75	1.15	2.97	1.15	2.85	1.13	
Rejection	1.29	0.62	1.3	0.59	1.29	0.58	
Upset	2.35	1.2	2.43	1.23	2.39	1.2	
Tension	2.76	1.18	2.87	1.28	2.81	1.24	
Stress	2.49	1.18	2.72	1.23	2.6	1.22	
Shyness	2.46	1.26	2.38	1.23	2.42	1.24	
Alertness	3.17	1.14	3.54	1.08	3.35	1.12	
Relaxation*	4.14	0.98	4.22	0.85	4.18	0.91	
Serenity*	4.2	0.92	4.32	0.89	4.26	0.88	
Calmness*	3.76	1.17	3.93	1.06	3.85	1.11	
Cognition	13.87	4.4	14.16	4.33	14.01	4.36	0.85
He seems to be an interesting boy.*	2.56	1.01	2.6	1.06	2.58	1.02	
He looks like an OK person.*	2.5	1.08	2.67	1.04	2.58	1.06	
I enjoy meeting new people.*	2.65	1.17	2.58	1.19	2.62	1.18	
We may get along really well.*	3.07	1.11	3.19	1.09	3.13	1.1	
He looks friendly.*	3.14	1.1	3.17	1.1	3.16	1.1	
Behavior	8.38	3.93	8.56	4.39	8.46	4.16	0.86
Get out	1.57	0.92	1.58	0.98	1.58	0.96	
Move away	1.43	0.79	1.56	1.01	1.49	0.89	
Move to another table	1.32	0.68	1.37	0.82	1.34	0.76	
Find an excuse to leave	1.91	1.23	1.95	1.27	1.93	1.25	
Dwell on reading the newspaper or talking on a cell phone	2.14	1.3	2.14	1.2	2.14	1.25	
Complete Scale					55.96	12.32	0.88

Note. More negative attitudes are represented by higher scores.

* Reverse Coded

Hypothesis 2 stated that individuals reporting previous contact with individuals with ASD would have more positive attitudes and higher literacy. This hypothesis was partially supported. First, we conducted t-tests to determine whether absolute contact (yes/no) with individuals with disabilities and individuals with ASD affected attitudes. With respect to contact with disabilities in general, results indicated significant differences for the cognition dimension [$t(335) = -2.41, p = .02$] but not for affect or behavior. These results are not considered meaningful, however, because only 9 respondents reported no contact with individuals with disabilities (see Table 3). History of absolute contact with ASD resulted in significantly more positive attitudes on both the cognition dimension ($M_{\text{yes}} = 13.58, M_{\text{no}} = 16.49$) and the behavior dimension ($M_{\text{yes}} = 8.04, M_{\text{no}} = 10.57$). However, results for the affect dimension were not significant ($M_{\text{yes}} = 32.80, M_{\text{no}} = 34.43$).

Table 3

Percentage of Sample Reporting Previous Contact

	<u>Percentage of Sample</u>
Contact with Individuals with Disabilities	
Yes	96.8
No	2.6
Don't Know/Not Sure	0.6
Types of Disabilities (Selected all that applied)	
Physical	81.8
Cognitive/Intellectual	85
Emotional	70.3
Multiple	58.8
Don't Know/Not Sure	4.7
Context of Contact with Disabilities ($N=327$)*	
Professional (patients, clients, etc.)	41.2
Work relationship (colleagues, coworkers, etc.)	46.8
Immediate Family Member	35.3
Other Relative	39.1
Friend	62.4

	<u>Percentage of Sample</u>
Other	51.2
Amount of Contact with Disabilities (<i>N</i> =327)	
At least once in the past week	41.3
At least once in the past month	20.7
At least once in the past few months	17.9
At least once in the past year	10.3
At least once over a year ago	6.4
Other	3.3
Contact with ASD	
Yes	79.6
No	10.3
Don't Know/Not Sure	10
Context of Contact with ASD (<i>N</i> =270)*	
Professional (patients, clients, etc.)	36.2
Work relationship (colleagues, coworkers, etc.)	35.9
Immediate Family Member	12.4
Other Relative	22.9
Friend	43.5
Other	52.1
Amount of Contact with ASD (<i>N</i> =270)	
At least once in the past week	22.3
At least once in the past month	19.7
At least once in the past few months	23.4
At least once in the past year	17.5
At least once over a year ago	13.8
Other	3.3

* Given 3 Choices

Next, we examined whether the amount of contact with disabilities was associated with attitudes. We selected out the “other time” responses. Results of one way analyses of variance (ANOVA) indicated that the amount of contact was significantly associated with affect [$F(4,313)=2.83, p < .05$], cognition [$F(4, 313)= 5.45, p < .000$], and behavior [$F(4, 313)= 6.02, p < .000$]. Post-hoc tests (LSD) examining the between-group differences for affect indicated significance for the following pairs: at least once in the past week and at least once in the past month, at least once in the past week and at least once in the past year. Post-hoc tests (LSD)

examining the between-group differences for cognition indicated significance for the following pairs: at least once in the past week and at least once in the past few months, at least once in the past week and at least once in the past year, at least once in the past week and at least once over a year ago. Finally, post-hoc tests (LSD) examining the between-group differences for behavior indicated significance for the following pairs: at least once in the past week and at least once in the past few months, at least once in the past week and at least once in the past year, at least once in the past week and at least once over a year ago, at least once in the past month and at least once in the past year. For all three dimensions of attitudes, contact with individuals with disabilities within the past week resulted in the greatest number of differences when compared to other amounts of reported contact. Overall, these results show that the amount of previous contact with individuals with disabilities in general significantly impacts attitudes towards individuals with ASD.

Then, we examined whether the amount of contact with ASD was associated with attitudes. We again selected out “other time” responses. One-way ANOVAs indicated significant differences between the amount of contact with ASD and cognition [$F(4, 255)= 4.17, p=.003$] and behavior [$F(4, 256)= 3.13, p=.016$]. As previously reported with absolute contact with ASD, these differences were not significant for the affect dimension [$F(4,256)=1.85, p=.120$]. Post-hoc tests (LSD) examining between-group differences for the cognition dimension indicated significance for the following pairs: at least once in the past week and at least once in the past year, at least once in the past week and at least once over a year ago, at least once in the past month and at least once in the past year, at least once in the past month and at least once over a year ago. Post-hoc tests (LSD) examining between-group differences for the behavior dimension indicated significance for the following pairs: at least once in the past week and at least once in

the past few months, at least once in the past week and at least once over a year ago, at least once in the past month and at least once over a year ago. The impact of contact with ASD was also related to the context of the contact. A t-test revealed significant differences for individuals reporting having a family member with ASD for the behavior dimension [$t(338)= 2.44, p= .015$]. For both contact with disabilities in general and with ASD, greater contact was related to more positive attitudes and contact at least once within the past week seems to be pivotal. These findings support our hypothesis regarding the impact of previous contact on attitudes.

To address the disability literacy portion of our hypotheses, we classified disability literacy according to whether respondents correctly identified ASD in the vignette. Then we used chi-square analyses to determine whether the proportions of individuals correctly identifying ASD were significantly different according to levels of contact with individuals with ASDs. Results were non-significant; absolute contact with ASD was not associated with correct recognition, $X^2(2, N= 316) = 3.53, p > .05$, nor was level of contact with ASD significantly associated with recognition, $X^2(5, N= 248) = 10.38, p > .05$.

Hypothesis 3 stated that participants reporting higher levels of education would have more positive attitudes and higher levels of literacy. To address education, participant responses were divided into three groups based on the highest level of education reported. The first group included individuals with a 2-year degree, high school diploma, or below. The second group included those having earned a 4-year degree or reporting having completed some college. The third group consisted of individuals reporting levels of education above a 4-year degree, from having completed some graduate school to having earned a professional degree. Results of one-way ANOVAs revealed that the relationship of education and attitudes was not significant for affect [$F(2, 338)= 1.20, p > .05$], behavior [$F(2, 337)= 1.29, p > .05$], or cognition [$F(2, 338)=$

.86, $p > .05$]. Using the same classification of disability literacy as previously described, chi-square analysis was used to examine the relationship of education and literacy. Results indicated that education was not associated with autism literacy, $X^2(2, N=248) = 4.35, p > .05$.

Our final research question was to determine whether there was a relationship between attitudes and disability literacy. Results of ANOVAs indicated that accuracy of diagnosis does not relate to the three dimensions of attitudes [$F_{\text{Aff.}}(1, 339) = .063, p > .05$; $F_{\text{Cog.}}(1, 338) = .75, p > .05$; $F_{\text{Beh.}}(1, 339) = .63, p > .05$]. In addition, although social desirability was included to serve as a covariate, it was not significantly related to attitudes or literacy. Likewise, there were no significant relationships between social desirability and the remaining variables.

Although not included in our hypotheses, we conducted analysis on the impact of age and gender on attitudes. Three age groups were formed including those age 18 to 24 in the first group, those age 25 to 39 in a second group, and respondents over 40 years old in the third group (see Table 1). Using these groupings, a one-way ANOVA revealed significant differences on the affect dimension [$F(2,339) = 3.55, p = .03$] and the behavior dimension [$F(2,339) = 6.60, p = .002$]. Post-hoc tests (LSD) examining between-group differences for affect indicated significance between the first group and the third group for the entire affect dimension as well as the following items: guilt, rejection, and shyness. Significance was also indicated between group one and two for shyness. Post-hoc tests (LSD) examining between-group differences for behavior indicated significance between the first and second group for the following items: “Get out”, “Find an excuse to leave”, and “Dwell on reading the newspaper or talking on a cell phone”. Differences were also significant between the first and third groups for “Find an excuse to leave” and “Dwell on reading the newspaper or talking on a cell phone”. Finally, post-hoc tests (LSD) revealed significant differences between the first and second group and between the first and

third group for the entire behavior dimension. Age was negatively correlated with affect [$r(340) = -.15, p < .01$] and behavior [$r(340) = -.19, p < .01$] but not significantly correlated with cognition [$r(339) = .06, p > .05$]. Specifically, as age increased, attitudes became more positive on the affect and behavior dimensions; older participants were more likely to have more positive attitudes on these dimensions when compared to younger participants. Gender effects were also shown in relation to attitudes. A t-test revealed significant differences on the cognition dimension ($t(336) = 2.64, p < .01$). On this dimension, males reported more negative attitudes ($M = 15.23$) when compared to females ($M = 13.71$).

Recognition

In the disability literacy portion of this study, overall recognition of ASD was high with 93.2% of participants selecting the disorder as one of their three responses. ASD was also the most frequent choice for the disorder that was ranked as the most likely, with 75.7% selecting ASD as their top choice. Anxiety Disorder and Obsessive-Compulsive Disorder were the second and third most common responses, respectively. Schizophrenia was the least common response (7.4%). A complete listing of results for recognition and the remaining literacy elements are shown in Table 4. When asked to rank their confidence in recognition of the disorder, participants ranged from extremely confident (11.4%) to not confident (15.3%) with slightly confident being the most frequent response (31.4%).

Causal Beliefs

Participants were asked to choose the top three reasons they believed to be the cause of the disorder. Biological causes including genetics (79.4%) and brain abnormality (76.8%) were the most frequent responses. In addition, a total of 120 participants (35.6%) reported believing there was no particular cause.

Intervention and Prognostic Beliefs

When asked to choose specific professionals that would be the most helpful to the individual presented in the vignette, a therapist (physical, occupational, or speech) was the most frequent response (86.5%) and also the most common first choice (55.1%). Behavioral therapy and educational approaches were ranked as the most helpful interventions. The mean rankings of interventions are reported in Table 4. Most participants believed that when given ideal help, the individual presented would “Recover with some living impairments” (63.1%) but when given no help, the most frequent believed outlook was “Get worse” (53.4%).

Believed Prevalence

Finally, participants were asked what they believed the prevalence of the disorder is in the United States. Responses were spread fairly evenly across multiple answers, however only 25% selected the most accurate prevalence of “About 1%”. About 40% of the sample believed the prevalence to be 10% or more, including 5% of participants who believed it to be greater than 20%.

Table 4

Percentages of Responses for ASD Literacy Scale

Element of Literacy	Percentage of Sample
Recognition*	
Typically Developing	11.2
Anxiety Disorder	55.3
Attention Deficit Hyperactivity Disorder (ADHD)	17.9
Obsessive-Compulsive Disorder (OCD)	50.3
Autism	93.2
Intellectual Disability	45.3
Schizophrenia	7.4
None of the above	12.4
Confidence	
Extremely Confident	11.4

Element of Literacy	Percentage of Sample
Very Confident	17.9
Confident	24
Slightly Confident	31.4
Not Confident	15.3
Causal Beliefs*	
Stress	15.6
Genetics	79.4
Complications During Pregnancy	41.2
Upbringing	5
Temperament	13.2
Brain Abnormality	76.8
Social Environment	17.1
Vaccinations	5
Diet	1.8
No Particular Cause	35.6
Helpfulness of Specific Individuals*	
Family Physician	30.9
Psychiatrist	35.9
Psychologist or Counselor	73.2
Teacher	39.1
Social Worker	28.2
Therapist (Physical, Occupational, Speech)	86.5
Helpfulness of Intervention Approaches**	
Educational	2.38
Behavior Therapy	1.44
Dietary	4.42
Antipsychotics	5.04
Antidepressants	5.16
Psychotherapy	3.5
Detoxification	6.07
Outlook When Receiving Ideal Help	
Recover fully without any problem	2.1
Recover to the point of having no living impairments	17.4
Recover with some living impairments	63.1
No change	3.5
Get worse	0
I Don't Know	13.9
Outlook When Receiving No Help	
Recover fully without any problem	0.9

Element of Literacy	Percentage of Sample
Recover to the point of having no living impairments	0.9
Recover with some living impairments	2.9
No change	27.1
Get worse	53.4
I Don't Know	14.7
Believed Prevalence	
Less than about .01%	0
About .01%	7.9
About 1%	25
About 5%	27.1
About 10%	23.5
About 20%	11.5
More than 20%	5

* Given 3 Choices

** Mean Ranking, from 1 to 7

Information Seeking

As shown in Table 5, out of the six sources listed, participants were most likely to use websites to learn more about the disorder in general ($M=2.37$). When seeking information about the disorder after learning a family member had been diagnosed, websites still had the highest mean ranking ($M=2.93$). However, chi-squared analyses revealed rankings for a family member were significantly different from seeking information in general, $X^2(25, N=331)=258.94, p < .000$. This trend of significance between the rankings of sources in general and rankings when seeking information for a family member was consistently seen for the remaining five sources as well ($p < .000$). When asked to rank the accuracy of these sources, there were a number of changes in the order of the rankings based on the likelihood of use. Notably, although websites had the highest likelihood of use, the mean accuracy was ranked fifth out of the six sources ($M=4.28$).

Table 5

Likelihood of Use and Perceived Accuracy of Information Sources

Source of Information	Percentage of Sample		Perceived Accuracy
	General	Family	
Doctor	3.95	3.35	2.4
Educator	3.64	3.99	3.46
Mental Health Professional	3.31	3.06	2.04
Friend or Family Member	4.26	3.78	5.3
Books	3.37	3.78	3.48
Websites	2.37	2.93	4.28

Note. Ranked 1 to 6, where 1 indicated the most likely resource to be used/most accurate and 6 indicated the least likely resource to be used/least accurate

We also addressed the use and perceived accuracy of specific websites (see Table 6). Given three choices, 67.4% of participants chose “www.autismspeaks.org” as the website they would most likely use first, making it the most frequently chosen among the sixteen choices. The website with the lowest frequency was “www.kidshealth.org” (1.8%). Participants were asked to rank the top five most accurate websites and the website perceived to be the most accurate was “www.nationalautismassociation.org” ($N= 112$). The website with the highest likelihood of use, “www.autismspeaks.org”, was ranked as the second most accurate ($N= 109$). Lastly, the website ranked as the least accurate was “www.kylestreehouse.org” ($N= 13$).

Table 6

Likelihood of Use and Perceived Accuracy of Websites

Name of Website	Percentage of Sample	
	Likelihood of Use*	Perceived Accuracy**
First Website Listed	12.9	5.0
www.autism.about.com	12.4	13.5
www.autismrecovery.com	9.1	21.8
www.autismspeaks.org	67.4	78.2

Name of Website	Percentage of Sample	
	Likelihood of Use*	Perceived Accuracy**
www.autismtreatment.info	12.1	32.6
www.cdc.gov	26.8	50.3
www.health-reports.com	2.6	8.2
www.kidshealth.org	1.8	9.7
www.kylestreehouse.org	3.2	3.8
www.mayoclinic.com	28.8	39.7
www.nationalautismassociation.org	57.9	78.2
www.talkaboutcuringautism.org	5.9	20.3
www.med.umich.edu	5.0	31.8
www.webmd.com	17.9	24.4
www.wikipedia.org	12.9	10.0
www.med.yale.edu	19.1	55.6

* Given 3 Choices

** Given 5 Choices

Disability Literacy and Demographic Variables

As was seen with attitudes, significant differences were also seen within elements of disability literacy based on a number of variables including age and gender. Chi-square analyses showed that age was significantly related to believed prevalence, $X^2(10, N= 340) = 19.38, p < .05$. Individuals in the second age group (age 25 to 39) were more likely to have chosen the prevalence that was considered the most accurate (37.9%) when compared to the other age groups. Trends within the frequencies showed that the believed prevalence within the third age group was shifted towards a higher prevalence when compared to the first and second groups. Chi-squared analyses showed that there were also significant gender differences for prevalence, $X^2(5, N= 339) = 19.34, p = .002$. Males were more likely to report a lower prevalence than did females. In terms of helpful interventions, antipsychotics showed significant differences by age group, $X^2(12, N= 328) = 28.05, p = .005$. Those participants age 18 to 24 (Group 1) ranked the

helpfulness of antipsychotics higher when compared to those in the third group (age 40 and older).

Finally, multiple relationships were found between aspects of information seeking and both age and education. Looking at “doctor” as a source of information, chi-square analyses showed there were significant differences between age groups and the likelihood of use in general [$X^2(10, N= 332)= 22.36, p= .013$] and for a family member [$X^2(10, N= 335)= 26.01, p= .004$]. In addition, the perceived accuracy of doctors as a source of information showed significant differences by age group [$X^2(10, N= 334)= 28.56, p= .001$]. Again using a chi-square analyses, level of education also showed significance for the perceived accuracy of doctors [$X^2(10, N= 333)= 20.80, p= .023$]. Individuals reporting a level of education above a four-year degree were less likely to rank doctors as the most accurate source of information about ASD.

Discussion

This study manipulated the age of an individual with an ASD depicted in a vignette and measured the impact of age on attitudes toward ASD. Although the age of the individual with autism spectrum disorder did not have an effect on attitudes, other variables did. Specifically, previous contact with individuals with disabilities in general and individuals with ASD in particular was shown to have a significant and positive relationship with attitudes. The results also indicated that the overall level of disability literacy for ASD was relatively high. The vast majority of participants accurately recognized the disorder, with most indicating ASD as the most likely diagnosis. Other elements also contributed to a high level of literacy including the number of participants with causal beliefs and beliefs about helpful interventions that were consistent with current professional knowledge. Despite this, the element of disability literacy addressing the prevalence of ASD did reveal misconceptions within our sample.

As previously discussed, attitudes held towards individuals with ASD have important implications for inclusion. Although the results of this study did not support the hypothesis that attitudes would be more positive towards a child with ASD when compared to a young adult, this can be considered a positive finding. A lack of significance indicates that the perceived stigma and believed negative view of young adults with disabilities held by the public (Gray, 1993; Groce, 2004) may not impact attitudes held towards these individuals. Therefore, behaviors that may partially stem from attitudes (Ajzen & Fishbein, 2005) are not likely to differ based on whether the individual with a disability is a child or a young adult. This has significant implications for the inclusion of these individuals within society across the lifespan. Despite a limited quantity of previous research regarding this age variable, the results are generally consistent with previous work (Ahlborn et al., 2006; Panek & Jungers, 2007). To date, the results of the only known study revealing significant differences based on this variable have yet to be replicated (Ahlborn et al., 2006).

A significant finding in this study, that partially supported our second hypothesis, was the impact of previous contact on attitudes. This relationship was shown in multiple ways. Results indicated a significant impact of previous contact with individuals with disabilities in general and with ASD along with the significance of the amount of contact. Across all three of the dimensions of attitudes that were measured, contact resulted in more positive attitudes. In addition, individuals that reported more contact, particularly within the past week, had the most positive attitudes. Finally, this relationship was again supported by the impact of having a family member with ASD on the behavior dimension of attitudes. Not only does this finding add to the existing body of work on the positive impact of previous contact (Scior, 2011), but it also contributes to efforts aimed at improving attitudes towards individuals with disabilities.

Recognizing the positive consequences of contact with these individuals, regardless of the type of disability, has the potential to improve attitudes towards individuals with ASD; attitudes that have previously been shown to be more negative when compared to typically developing peers (Harnum et al., 2007).

The lack of support for the third hypothesis regarding the impact of education conflicts with previous research. Although not shown by our results, higher levels of education have been previously and consistently related to more positive attitudes (Scior, 2011). This lack of significance may be attributable to the homogeneity of our sample. Despite an absence of support for this hypothesis and the impact of education, attitudes were found to differ by both the age and gender of the respondent. Overall, males had more negative attitudes, which is consistent with previous research while results regarding the age of the respondent were contrary (Scior, 2011). Our results revealed that attitudes became more positive as the age of the respondent increased as opposed to previous work indicating a relationship in the opposite direction. It is possible that this difference is related to the impact of previous contact; older respondents have likely had more opportunities for contact with individuals with disabilities. The relationship between these variables and attitudes, in combination with previous research, suggests that programs aimed at improving attitudes towards individuals with disabilities should target both older and younger adults and particularly males.

The second part of this study was comprised of elements of disability literacy and contributed to the limited body of work regarding literacy of ASD in the general public. Results showed a rate of recognition that was significantly higher than previous studies regarding ASD (Koyama et al., 2009). Although these rates differ, a higher recognition rate is positive in that it may contribute to a greater level of understanding and acceptance of individuals with ASD.

Analyses did not reveal any variables that contributed significantly to accurate recognition despite previous research suggesting that both contact and education would have an effect (Furnham & Buck, 2003; Heidgerken et al., 2005). This high rate of recognition, along with the number of participants reporting beliefs that are considered to be in line with professional beliefs, demonstrates a fairly accurate and comprehensive literacy level.

The one notable exception to this summation of literacy is the misconception regarding the believed prevalence of ASD. Only a quarter of the sample chose the most accurate answer (“About 1%”) while a significant number of participants believed the prevalence was much higher. Most concerning is the 40% of participants who believed that the prevalence was 10% or higher. When compared to results of perceived prevalence in the Japanese population, our sample was more likely to overestimate the prevalence whereas the Japanese sample underestimated prevalence (Koyama et al., 2009). A comparison of results between these two studies also shows that while older participants were more likely to underestimate prevalence in Japan, believed prevalence was higher for the oldest age group in this study (Koyama et al., 2009). A number of factors may have impacted these results including a lack of understanding of the concept of prevalence, however, the high level of education in the sample makes this less likely. Furthermore, considering the level of education, a response that was artificially more accurate would be expected. Trends seen based on age may be the result of a misinterpretation of information, such as media reports, by older participants. Younger participants are more likely to be currently or have been recently in school and thus may have received more accurate interpretations of information. Although this element of disability literacy may not be as critical to inclusion as recognition, it is significant in that the general public may overly attribute the

behaviors of individuals with disabilities to ASD, at the expense of recognizing other types of disabilities.

These misconceptions regarding prevalence may also indicate the use of inaccurate sources of information. The results showed that despite fairly low accuracy rankings of websites, they are consistently the most likely source to be used for information about ASD. While this is congruent with the comparison of the growth of both ASD and the Internet made by Jordan (2010), it is clear this growth has increased the number of inaccurate sources of information and thus the potential for misconceptions. In terms of information seeking, it is also important to note the differences seen between the sources used to learn about ASD in general when compared to the sources used to learn about the disorder for a family member. These differences, particularly when looking at the rankings of “doctor” and “websites”, showed a tendency to use sources that are more accurate when it concerns a family member. Although this was not unexpected, it points once again to the possible impact of contact. Individuals may be more likely to use sources they perceive to offer more accurate information when it concerns someone they know personally, in this case a family member.

When looking specifically at the rankings of websites, we can see where misconceptions may arise. Based on the results of the study by Reichow et al. (2012), the rankings found in this study showed that the general public is not likely to use the most accurate websites available. Of the websites presented, those such as the Center for Disease Control and Prevention’s website and the Yale Child Study Center’s website would be considered two of the more accurate options (Reichow et al., 2012), yet respondents reported being more likely to use multiple other websites before these. Although the consistency between likelihood of use and perceived accuracy of websites appears to suggest the public is more likely to use accurate websites, respondent

accuracy rankings are inconsistent with the results of previous quality rankings by professionals (Reichow et al., 2012). Despite websites having the potential to be an easily accessible source of information, they also present the potential to spread false information. There is a clear lack of consistency between websites that have been previously tested for quality and those that respondents reported being most likely to use. This demonstrates a need for educating the public to be better able to distinguish between accurate and inaccurate sources online. Addressing these trends in the use of websites as a source of information and ultimately as a source of literacy is significant because it may decrease the dissemination of inaccurate beliefs and misconceptions that may hinder the inclusion of individuals with ASD.

Interpretation of these results must consider the limitations of this study. Although based on a number of previous studies regarding literacy, there are methodological issues. The vignette may not have adequately addressed the presentation of differing ages of the individual with ASD. This may have contributed to the lack of significance seen in attitudes in both this study and previous work (Ahlborn et al., 2006; Panek & Jungers, 2007). Likewise, the measures used, including the social desirability scale, may not have been sensitive enough account for other possible trends. Another major limitation of this study was the homogeneity of our sample. The high proportions of females and college students does not accurately reflect the general public and therefore limits the degree to which these results can be applied to larger populations. It may also have contributed to a lack of variability seen in responses. Lastly, the literacy portion of this study differed from previous research in that questions were in a multiple-choice format as opposed to open-ended, which may have artificially increased literacy. This limits comparisons, particularly of rates of recognition, to previous studies on ASD and other disorders. In addition, analyses regarding the relationship between disability literacy and other variables were limited to

using a single element, recognition, to represent overall literacy. The lack of a measure inclusive of multiple elements of literacy may have diminished any possible relationships between literacy and the other variables addressed.

Despite these limitations, the results of this study contribute to the larger body of work concerning disability literacy and attitudes towards autism spectrum disorders. It has also presented opportunities to further this area of research. It is suggested that the impact of the age of the individual with a disability should be studied further and that alternative methodologies that better represent this age variable be utilized. The presence of or lack of attitudinal differences has important, lifelong implications for the successful inclusion of individuals with disabilities. The development of a comprehensive disability literacy scale for ASD should also be addressed. Establishing a greater understanding of the beliefs held by the public about ASD is not only important now but will continue to be with the current prevalence of the disorder. Ultimately, the results of this study indicate a need for educational and awareness campaigns that address elements of disability literacy, particularly appropriate information seeking, and also advocate the importance of contact and experience with individuals with disabilities.

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*Appendix A: Demographic Questionnaire***1. What is your gender?**

- Male
- Female

2. What is your age?**3. What is the highest level of education you have completed?**

- Did not attend school
- Below High School
- High School
- Some College
- 2-Year Degree (Associates)
- 4-Year Degree (BA or BS)
- Some Graduate School
- Master's Degree
- Doctoral Degree
- Professional Degree (MD, JD)

4. What is your current employment status? (Select all that apply)

- Part-time Student
- Full-time Student
- Employed Part-time
- Employed Full-time
- Unemployed
- Retired

5. Which of the following best describes your current/most recent occupation?

- Management, Business, and Financial Operations Occupations

- Computer and Mathematical Occupations
- Architecture and Engineering Occupations
- Life, Physical, and Social Science Occupations
- Community and Social Service Occupations
- Legal Occupations
- Education, Training, and Library Occupations
- Arts, Design, Entertainment, Sports, and Media Occupations
- Healthcare Practitioners and Technical Occupations
- Healthcare Support Occupations
- Protective Service Occupations
- Food Preparation and Serving Related Occupations
- Building and Grounds Cleaning and Maintenance Occupations
- Personal Care and Service Occupations
- Sales, Office, and Administrative Support Occupations
- Farming, Fishing, and Forestry Occupations
- Installation, Maintenance, Repair, Production, and Construction Occupations
- Transportation and Materials Moving Occupations

*Appendix C: Vignettes***Vignette (Child Version):**

Imagine the following situation: You went out to lunch with some friends to a coffee shop. A woman and her young son, with whom you are not acquainted, enter the coffee shop and join the group after ordering their lunch. Before they joined the table, you noticed the boy rocking back and forth while waiting in line. When his mother asked him what he wanted to drink, he brought her hand to a bottle of juice instead of speaking. You are introduced to this woman and her 4-year-old son Jacob and continue your conversation. During this short time, Jacob continues to rock while focusing only on lining up the crackers he is eating without saying anything. Shortly thereafter, everyone else leaves, with only you, this woman and her son remaining at the table. The last person to leave accidentally bumps into the table knocking Jacob's crackers onto the floor. He begins to cry hysterically and starts biting his hand. His mother quickly picks up the crackers and is able to calm Jacob down enough to continue with lunch. You have 15 minutes to wait for your ride. Try to imagine this situation.

Vignette (Adult Version):

Imagine the following situation: You went out to lunch with some friends to a coffee shop. A woman and her teenage son, with whom you are not acquainted, enter the coffee shop and join the group after ordering their lunch. Before they joined the table, you noticed the boy rocking back and forth while waiting in line. When his mother asked him what he wanted to drink, he brought her hand to a bottle of juice instead of speaking. You are introduced to this woman and her 18-year-old son Jacob and continue your conversation. During this short time, Jacob continues to rock while focusing only on lining up the crackers he is eating without saying anything. Shortly thereafter, everyone else leaves, with only you, this woman and her son remaining at the table. The last person to leave accidentally bumps into the table knocking Jacob's crackers onto the floor. He begins to shriek and starts biting his hand. His mother quickly picks up the crackers and is able to calm Jacob down enough to continue with lunch. You have 15 minutes to wait for your ride. Try to imagine this situation.

Appendix D: Modified Multidimensional Attitudes Scale Toward Persons with Disabilities (MAS)

In this situation, you would feel:	Not at all				Very much
	1	2	3	4	5
-Depression					
-Guilt					
-Pity					
-Rejection					
-Upset					
-Tension					
-Stress					
-Shyness					
-Alertness					
-Relaxation					
-Serenity					
-Calmness					

In this situation, you would think about Jacob:

-He seems to be an interesting boy					
-He looks like an OK person					
-I enjoy meeting new people					
-We may get along really well					
-He looks friendly					

In this situation, you would:

-Get out					
-Move away					
-Move to another table					
-Find an excuse to leave					
-Dwell on reading the newspaper or talking on a cell phone					

Appendix E: Autism Literacy Scale

What, if anything, do you think is most likely wrong with Jacob? (Select #1 for most likely, #2 for second most likely, and #3 for third most likely)

- Typically Developing
- Anxiety Disorder
- Attention Deficit Hyperactivity Disorder (ADHD)
- Obsessive-Compulsive Disorder (OCD)
- Autism
- Intellectual Disability
- Schizophrenia
- None of the above

How confident would you say you are with your identification of Jacob's problem?

- Extremely Confident
- Very Confident
- Confident
- Slightly Confident
- Not Confident
- Don't know

What could be the possible cause of Jacob's problem? (Select #1 for most likely, #2 for second most likely, and #3 for third most likely)

- Stress
- Genetics
- Complications during pregnancy
- Upbringing
- Temperament
- Brain abnormality
- Social Environment
- Vaccinations
- Diet
- No particular cause

Which of the following individuals do you think would be the most helpful to Jacob? (Select #1 for most likely, #2 for second most likely, and #3 for third most likely)

- Family Physician
- Psychiatrist
- Psychologist or counselor
- Teacher
- Social Worker
- Therapist (Physical, Occupational, Speech)

Which of the following treatments do you think would be the most helpful to Jacob? (Select #1 for most likely, #2 for second most likely, and #3 for third most likely)

- Educational approaches

- Behavioral therapy
- Dietary Interventions
- Antipsychotics
- Antidepressants
- Psychotherapy
- Detoxification of heavy metals

What is most likely Jacob's outlook if he receives the most ideal help?

- Recover fully without any problem
- Recover to the point of having no living impairments
- Recover with some living impairments
- No change
- Get worse
- Don't Know

What is most likely Jacob's outlook if he receives no help?

- Recover fully without any problem
- Recover to the point of having no living impairments
- Recover with some living impairments
- No change
- Get worse
- Don't Know

What would you estimate is the prevalence of autism in the United States population?

- Less than about .01%
- About .01%
- About 1%
- About 5%
- About 10%
- About 20%
- More than 20%

If you wanted to learn more about autism in general, which of the following sources would you most likely use? (Rank from most likely to least likely, with #1 being the most likely and #6 being the least likely)

- Doctor
- Educator
- Mental Health Professional
- Friend or family member
- Books
- Website

If you wanted to learn more about autism after learning a close relative had been recently diagnosed with the disorder, which of the following sources would you most likely use? (Rank from most likely to least likely, with #1 being the most likely and #6 being the least likely)

- Doctor

- Educator
- Mental Health Professional
- Friend or family member
- Books
- Website

Which of the following sources of information do you think would offer the most accurate information about autism? (Rank from most accurate to least accurate, with #1 being the most accurate and #6 being the least accurate)

- Doctor
- Educator
- Mental Health Professional
- Friend or family member
- Books
- Website

After using a search engine to look for autism, which of the following websites would you click first?

- The first website listed on the search results
- About.com: www.autism.about.com
- Autism Recovery Centre: www.autismrecovery.com
- Autism Speaks: www.autismspeaks.org
- Autism Treatment Info: www.autismtreatment.info
- Center for Disease Control and Prevention: www.cdc.gov
- Health Reports: www.health-reports.com
- Kid's Health: www.kidshealth.org
- Kyle's Tree House: www.kylestreehouse.org
- Mayo Clinic: www.mayoclinic.com
- National Autism Association: www.nationalautismassociation.org
- Talk About Curing Autism: www.talkaboutcuringautism.org
- University of Michigan: www.med.umich.edu
- WebMD: www.webmd.com
- Wikipedia: www.wikipedia.org
- Yale Child Study Center: www.med.yale.edu

Which of the following website do you think would offer the most accurate information about autism? (Rank top 5)

- The first website listed on the search results
- About.com: www.autism.about.com
- Autism Recovery Centre: www.autismrecovery.com
- Autism Speaks: www.autismspeaks.org
- Autism Treatment Info: www.autismtreatment.info
- Center for Disease Control and Prevention: www.cdc.gov
- Health Reports: www.health-reports.com
- Kid's Health: www.kidshealth.org
- Kyle's Tree House: www.kylestreehouse.org

- Mayo Clinic: www.mayoclinic.com
- National Autism Association: www.nationalautismassociation.org
- Talk About Curing Autism: www.talkaboutcuringautism.org
- University of Michigan: www.med.umich.edu
- WebMD: www.webmd.com
- Wikipedia: www.wikipedia.org
- Yale Child Study Center: www.med.yale.edu

Appendix F: Measure of Previous Contact

In your own life, have you ever had contact with an individual or individuals with a disability?

- Yes
- No
- Don't Know/ Not Sure

Which of the following types of disabilities have you had contact with? (Select all that apply)

- Physical disabilities
- Cognitive/intellectual disabilities
- Emotional disabilities
- Multiple disabilities
- Don't know/ Not Sure

Which of the following categories best describe the individual/individuals with a disability you have had contact with? (Rank top three, starting with most contact to least contact)

- Professional (Patients, clients, etc.)
- Work relationship (colleagues, coworkers, etc.)
- Immediate family member
- Other Relative
- Friend
- Other

Which of the following best describes the amount of contact you have had with an individual/individuals with a disability?

- At least once in past week
- At least once in past month
- At least once in past few months
- At least once in past year
- At least once over a year ago

In your own life, have you ever had contact with an individual or individuals with autism?

- Yes
- No
- Don't Know/ Not Sure

Which of the following categories best describe the individual/individuals with autism you have had contact with? (Rank top three, starting with most contact to least contact)

- Professional (Patients, clients, etc.)
- Work relationship (Colleagues, coworkers, etc.)
- Immediate family member
- Other relative
- Friend
- Other

Which of the following best describes the amount of contact you have had with an individual/individuals with autism?

- At least once in past week
- At least once in past month
- At least once in past few months
- At least once in past year
- At least once over a year ago