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## Predictors of Attitudes About Autism Spectrum Disorder (ASD)

### Abstract

Students with Autism Spectrum Disorder (ASD) are far less likely to enroll in secondary education than neurotypical students and students with disabilities (White et al., 2016). There is little research on the factors contributing to the reluctance of young adults on the autism spectrum to seek higher education. This study aims to answer two research questions. The first research question aims to determine if there is a predominance of negative attitudes towards ASD amongst present undergraduate college students. The second research question explores whether this could be a determining factor in a college determination for students with ASD. This current study is comprised of two sample sizes. Ninety-eight undergraduate college students comprised the sample population for the first research question and seven undergraduate students participated in the second research question. Online surveys were sent out to both sample populations and then analyzed. The results of this study indicate that belonging to a lower socioeconomic class, having more knowledge about ASD, belonging to a non-White race, and partaking in a non-stem major were all predictive of positive attitudes about ASD. Further, students with ASD at Eastern Illinois University were likely to feel accepted and positive about their experiences with their non-autistic peers. These results constitute a foundation for further research on factors that contribute to positive attitudes towards ASD and can generate preventative tactics for negative attitudes towards ASD.

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### **Abstract**

Students with Autism Spectrum Disorder (ASD) are far less likely to enroll in secondary education than neurotypical students and students with disabilities (White et al., 2016). There is little research on the factors contributing to the reluctance of young adults on the autism spectrum to seek higher education. This study aims to answer two research questions. The first research question aims to determine if there is a predominance of negative attitudes towards ASD amongst present undergraduate college students. The second research question explores whether this could be a determining factor in a college determination for students with ASD. This current study is comprised of two sample sizes. Ninety-eight undergraduate college students comprised the sample population for the first research question and seven undergraduate students participated in the second research question. Online surveys were sent out to both sample populations and then analyzed. The results of this study indicate that belonging to a lower socioeconomic class, having more knowledge about ASD, belonging to a non-White race, and partaking in a non-stem major were all predictive of positive attitudes about ASD. Further, students with ASD at Eastern Illinois University were likely to feel accepted and positive about their experiences with their non-autistic peers. These results constitute a foundation for further research on factors that contribute to positive attitudes towards ASD and can generate preventative tactics for negative attitudes towards ASD.

## **Literature Review**

### **Autism Spectrum Disorder (ASD) Overview**

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder often characterized by detriments in social communication and interaction (American Psychiatric Association, APA 2013). According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5, APA, 2013), there are many symptoms that are often persistent and required for diagnosis in cases of ASD. These include lack of social-emotional reciprocity, nonverbal communication and relationship building. There must also be cases of narrowed repetitive behaviors and repetitive movements. Two or more symptoms that must be present in order to make an official ASD diagnosis are as follows: likeness for sameness, rigidity in schedules and patterns, hyper or hypoactivity, and restricted interests. These symptoms must be present in the early developmental period typically before the age of three and cause significant impairment in one's life. Also, the ASD diagnosis is a separate diagnosis from an intellectual disorder diagnosis. Although prevalently comorbid, the two disorders remain separated as it is not a requirement for an individual to be intellectually impaired in order to become diagnosed with ASD. Criterion set by the APA (2013), also described varying levels of severity for ASD. Level one is the lowest level of support, while level three is reserved for the highest levels of support. All levels have in common noticeable impairments in social communication with low interest in interaction.

The American Psychiatry Association dates that the previously stated symptoms are typically shown between the first twelve and twenty-four months of life. Depending on the



severity of ASD, the symptoms can be seen closer to twelve months, or closer to twenty-four months. ASD is not a degenerative disorder, and therefore symptoms will not worsen over time. Because individuals with ASD are on a spectrum, some individuals are able to live independently while others may need continued support throughout their lives. Importantly, it is noted that some individuals diagnosed with ASD are able to live independent lives and excel at jobs that individuals without ASD may find repetitive and/or isolating (Griffiths et al., 2020). Contrary to this professional opinion, it is under popular belief that all people with ASD are unable to live independently and are incapable of holding jobs (Stevenson et al., 2011). Considering the factors that contribute to these negative beliefs may help eliminate such preliminary thinking, it is important to further discount this belief.

Regarding sex, males are more frequently diagnosed with ASD than females at a ratio of 4:1 (Fombonne et al., 2009). Research by Ratto et al. (2018) highlighted the sex-trait differences in symptoms and skills that could contribute to this disparity. It was concluded that females needed a stronger manifestation of symptoms for an ASD diagnosis. Females with ASD are often prone to masking their symptoms, making it more difficult to obtain a diagnosis (Milner et al., 2019). Werling and Geschwind (2013) found a genetic component to the manifestation of ASD, reporting females are more likely to have a genetic variant that “protect” them from the ASD phenotype. Other researchers persist that this ratio is more discriminatory because the symptoms of females who have ASD are “camouflaged” (Wood-Downie et al., 2021), which contribute to the delay or recognition of an ASD diagnosis. Therefore, more research is needed to signify the sex differences in presentation of symptoms in individuals with ASD.

### **Socio-economic Disparities, a Factor in ASD Perception**

Before evaluating the role of socio-economic disparities in the perception of ASD, it is paramount to acknowledge socio-economic status (SES) as a factor in the prevalence of ASD, and further, its relationship to the perception of ASD. Primarily, this can be hypothesized to be because the prevalence of ASD in a community can contribute to the attitudes that the community holds about ASD. This is because a higher prevalence of ASD in certain SES communities can contribute to the amount of exposure an individual in that community has to ASD. Further, distribution of knowledge can be correlated with the number of resources a community has which may be dependent on the SES of the community.

It is reported that socio-economic disparities are evidential in their contribution to the prevalence (Delobel-Ayoub, 2015) and symptomatic manifestation (Maltman, 2021) of ASD. Delobel-Ayoub (2015) evaluated the prevalence of isolated incidences of ASD and SES. The study concluded that there was a higher prevalence of children with ASD and an associated intellectual disability (ID) in low SES classes. Overall, there was a higher prevalence of ASD in more “deprived” (Delobel-Ayoub, 2015) areas of the population. It is important to note this study took place in France where there is free and universal healthcare. This suggests that even in areas where free and universal healthcare exists, there still exists SES disparities. Therefore, it is critical to compare eastern demographic studies with western demographic studies to maintain external validity.

A study conducted by King and Bearman (2011), published the prevalence of ASD in the United States in California. This study found wealthier communities were diagnosed with fewer cases of ASD than poor communities. Interestingly, this is a social gradient reversal. California used to experience higher rates of ASD in wealthier communities than poor communities from

1992-2000. King and Bearman (2011) hypothesized that expanded knowledge and resources to low SES community areas over time revealed the true prevalence of the community, suggesting that an expansion of resources and knowledge are a contributing factor in the perception of ASD. In contrast, The United States has experienced a positive correlation regarding the relationship between the ASD prevalence and high SES (Awylard et al., 2021). Awylward et al. (2021) found parents of children diagnosed with ASD early were assumed to have a higher education and high levels of ASD developmental knowledge that led to an early diagnosis. Therefore, the prevalence of ASD symptoms may be similar in low SES and high SES communities. However, disparities may exist because access to diagnostic tools, resources, and knowledge about ASD are more accessible to those from higher SES communities, compared to those from lower SES communities.

The Child Find Project was created to distribute information and resources related to early identification of young children with disabilities (Barger et al., 2018). This includes disabilities such as ASD, down syndrome, and learning disabilities. Regardless of socioeconomic status, the Child Find Project is designed to distribute these resources in order to get children the early interventions and diagnoses that they might need. Unlike other developmental disabilities, ASD is difficult to diagnose because there is no blood test to diagnose the disorder. Physicians must observe the child's development and history over a period of at least 18 months to make a diagnosis (Hyman et al., 2020). This could be a possible explanation as to why there are still disparities among the different socioeconomic communities. Another example may be that children with only one caregiver may visit a physician less frequently, especially when they are not sick, because of transportation issues or scheduling issues that may occur. Although some autism screenings are financially covered by the National Health Service, the average ASD

screening costs \$1,200 dollars (Galliver et al., 2017). Through a meta-analysis of 45,944 children ages 3–17 years in the Medical Expenditure Panel Survey (MEPS), Zuvekas et al. (2021) found the average annual cost to treat a child with ASD is \$3,390. Extra costs of intervention not covered by the IDEA can be financially burdensome to families in the lower socioeconomic classes.

Regarding the symptomatic manifestation of ASD in the differing SES populations, it is critical in the understanding of why such differing manifestations occur and the role that SES plays in this development because it affects the perception of ASD by others overall. Research conducted by Maltman et al. (2021) found that parents of always verbal children with ASD were found to have incomes above the median level at around \$50,000, compared to minimally verbal children with ASD with less income. Further, the study insinuates that earlier access to resources, tools, and programs can be a contributing factor in the way that ASD symptoms develop over time. Accompanying SES are the consequences that emerge from lack of access to resources and early diagnosis that contribute to an increased severity of symptoms (Lee, 2016). Therefore, SES likely influences the severity of ASD symptoms.

It is similarly reasonable to consider that these SES differences could lend themselves to the construction of attitudes. It is interesting to consider how it affects the perception of ASD, and whether socio-economic status plays as important a role in perception as it does prevalence. The book “The Nature of Prejudice” written in 1954 by Gordon Allport, emphasized contributing factors such as “social class” which include facets like economic status. Allport also emphasized that although individualistic characteristics can deviate one’s attitudes away from the “in-group”, the attitudes and prejudices of the group are factors that influence the attitudes and prejudices of the individual. The definition of “In-group” for this paper being the belonging to a group with

whom one shares similarities, specifically socio-economic status. Income level was found to be a significant factor in the level of discomfort that one experiences when interacting with people who have Intellectual disabilities (Morin et al., 2013). Although the study found that income was not the main contributing factor to attitudes towards people with disabilities, Allport (1997) highlighted that it is a combination and not a singular element that manufacture attitudes.

Lastly, individuals with lower SES may be more empathetic because they attribute faults and discrepancies towards an external environment (Kraus et al., 2010). Manstead (2018) argued lower class individuals score higher on tests of empathy and are able to accurately judge the emotions of others. Empathy is an important facet to consider because it affects behaviors and attitudes towards other people (Babik & Gardner, 2021). Manstead (2018) argued universities to be a place where more individuals were from a higher SES; however, this study focused on universities such as Harvard, Yale, and Cambridge. In the context of this paper, Eastern Illinois University (EIU) students likely come from more modest SES backgrounds, comparatively. For instance, EIU has a high population of first-generation college students. In 2021, EIU won the First Gen Forward Designation which honors EIU's commitment to first generation student access (Eastern Illinois University, 2021). On average, 40-50% of undergraduate students at EIU belong to a first generation student class (Eastern Illinois University, 2016). A high percentage of students (+28%) studied in this paper are from EIU, have reached the same level of higher education, and all participants are members from an undergraduate university. Thus, academic education will not be a factor discussed in this paper, albeit it be included in the definition of socio-economic class.

**Knowledge about ASD, a Factor in ASD Perception**

A meta-analysis conducted by Wang et al. (2021) reviewed 27 research studies and found individuals with less education were more likely to hold negative attitudes towards people with disabilities. Considering that the population used in this study is a college undergraduate sample, it can be rationalized that this population has a high education level with various SES backgrounds. In the terms of this paper, knowledge is operationalized by ones understanding of ASD.

Research suggests individuals with less knowledge about disabilities tend to have more negative attitudes about individuals with disabilities (Livneh, 1982). With ASD Specifically, lack of knowledge about disabilities is associated with negative stereotypic attitudes and maladaptive behavior tendencies (Campbell & Barger, 2014). Further, Campbell and Barger (2011) provided evidence that children in middle school reported inaccuracies in their knowledge of ASD, which contributed to their negative behaviors and attitudes. When surveying neurotypical individuals who are 18 years or older, it was found that general education level was not a factor in attitudes towards people with ASD. Instead, knowledge about individuals with ASD was found to be a significant factor and showed individuals who had a lack of knowledge in areas of ASD were found to have more negative perceptions (Kuzminski et al., 2019). Congruently, Shand et al. (2020) conducted a survey study and found a positive correlation between neurotypicals lack of knowledge on ASD and a negative attitude. The Kuzminski et al. (2019) study surveyed participants ages 16-78; therefore, it is unclear whether the current study will find similar findings with a college aged population.

**Exposure to people with ASD, a Factor in ASD Perception**

Contact theory is the idea that contact between two groups can increase positive attitudes (Allport, 1954). Contact theory also stipulates that the two groups must have similar goals and an equal power balance. However, recent research by Pettigrew and Tropp (2000) indicates that only contact is necessary (i.e., similar goals and an equal power balance is not necessary) in increasing cognitive and emotional competence towards other groups. The studies discussed next provide support for both theories.

A survey by Sasson et al. (2017) found that 16 neurotypical adults and seven children were less willing to interact with their ASD peers. For this reason, it is appropriate to assume that mere exposure to someone with ASD is not likely to increase positive attitudes towards this population. Therefore, it is important to consider the strength of the relationship between the neurotypical person and the ASD individual. For example, Green (2013) reviewed research showing siblings of individuals with ASD had a more positive perspective towards an individual with ASD's behavior and intelligence than individuals with non-autistic siblings. Considering this, for the current study, it is important to understand whether types of relationships contribute to positive attitudes toward individuals with ASD. This could help determine if simple contact is related to positive attitudes.

Overall, exposure to people with ASD has been associated with positive attitudes towards people with ASD. Such research includes that a greater level of contact with individuals who have ASD increases positive attitudes (Shand et al., 2020). Regarding college students, research conducted by White et al. (2016) found that students who knew someone with ASD had more positive attitudes towards individuals with ASD than those who did not know someone with ASD. Increased contact overtime can aid in the process of developing more positive attitudes. A longitudinal study by Mavropoulou and Sideridis (2014) observed the attitudes of young students

and found that three months of increased exposure to ASD peers resulted in more positive attitudes. Moreover, the positive attitudes developed during this time frame were maintained after the interventions were complete which suggests that attitudes developed from increased levels of contact may be a reliable factor in the overall goal of increasing positive attitudes towards those with ASD. Levels of contact is one of the most consistent factors that appears in a plethora of research surrounding attitudes.

### **Gender, a Factor in ASD Perception**

It is possible that gender is a contributing factor in the outsider's perception of ASD. A meta-analysis conducted by Babik and Gardner (2021) reported studies that indicated self-identified girls have more positive attitudes towards those with disabilities than boys. Nowicki (2006) found 4–10-year-old girls were more tolerant of people with disabilities than boys in multiple disability dimensions including physical disabilities, intellectual disabilities, or both. Furthermore, these differences are most likely due to a “gender-specific” (Nowicki, 2006) response bias rather than gender differences. This might be due to the societal expectations of how girls are supposed to act with typically more empathy and sympathy than boys. Gender was also found to be significant in research by Müller et al. (2016) regarding externalized behavior delinquency. Müller et al. (2016) studied how boys were more likely than girls to be more susceptible to student influences. For example, should an individual display bullying behaviors/attitudes towards an individual with ASD, it is more likely that a boy would succumb to join the bullying than a girl. This is important to consider because it showcases that peer pressure can influence genders differently which influences their behaviors and results in the formation of attitudes. Considering these studies involved elementary children, it is important to



analyze gender differences in attitudes amongst college students to determine whether their gender attitude differences are similar to elementary children.

### **Area of Academic Study in School, A Factor in ASD Perception**

Universities generally divide their areas of study into two classic categories: Science, Technology, Engineering, and Mathematics (STEM), and non-STEM. Examples of non-STEM majors would be humanity majors and social science majors. Considering the current study will consist of college-aged participants, it is important to understand whether STEM majors have more negative attitudes towards individuals with ASD than non-STEM majors, or vice versa.

Tomczyszyn et al. (2022) examined 540 college students in Poland and found that students studying social sciences and humanities displayed positive attitudes towards those with disabilities. Healthcare majors were also shown to have strong positive regard for people with Intellectual disabilities (Boyle et al., 2010). Through MRI imaging, humanities majors were observed to display greater levels of empathy on a neurological level than science majors (Takeuchi et al., 2014). Compared to humanities majors, science majors had a higher level of regional gray matter volume (rGMV) around the medial prefrontal cortex and frontal areas of the brain than humanity students. Lower levels of regional gray matter has been shown to be associated with lower levels of empathy (Takeuchi et al., 2014).

Research demonstrates differences in “openness” towards individuals with ASD between students studying engineering, social sciences, and physical sciences (Nevill & White, 2011). Nevill and White (2011) utilized an openness survey scale and found engineering majors reported feeling the most comfortable around students with ASD. Physical science majors reported the most willingness to spend time with someone with ASD and the strongest credence

that individuals with ASD are likeable and intelligent. Social science majors reported the lowest fearfulness score, as well as the least concern about having an individual with ASD living near them. The reasoning for such discrepancies was congruent with the research of Takeuchi et al. (2014). The researchers argued that engineering/science students are likely to be more comfortable around individuals with ASD because they share qualities and personality traits with those who have ASD. Furthering this claim, Baron-Cohen et al. (2001) determined the basis for which this research was founded by providing the first evidence that scientists scored higher on an Autism Spectrum Quotient test (a test that determines the symptoms of ASD that one has) than non-scientists. Specifically, math majors, physical science majors, computer science, and engineers scored higher than the humanistic science population. The qualities that one displays in similarity with individuals with ASD may contribute to a more positive attitude without necessarily needing to have exhaustive knowledge about ASD.

Overall, it was found that there are different reasons for varying majors to display empathy and positive attitudes towards people with ASD. The current study lends itself to one of these hypotheses in evidence of some majors displaying more positive attitudes or negative attitudes towards individuals with ASD than others.

### **Racial/Ethnic Differences, a Factor in ASD Perception**

The prevalence of ASD in specific racial and ethnic populations may contribute to the exposure to ASD that people in those communities have. Considering that increased exposure to individuals with ASD may be positively correlated with positive attitudes towards persons with ASD, it is possible that where there is a high prevalence of ASD that populations may have more positive attitudes towards persons with ASD compared to a population with a lower prevalence of ASD.

The racial/ethnicity trends among ASD have largely remained the same (CDC, 2019). Interestingly, from 1996-2004, there was a steep increase in the prevalence of ASD among White children that plateaued in 2006 (Nevison & Zahorodny, 2019). During this time, estimates showed that the prevalence of ASD in Hispanic and Black children was significantly lower than in White children (Nevison & Zahorodny, 2019). More recently, however, a study by Nevison and Zahordony (2019) noted that by the year 2017, White and Hispanic children made up about 66% of children diagnosed with ASD. Black children made up about 17% of that increase. Therefore, although children among the White population exhibited the most ASD diagnoses, there has been a steady increase of the diagnosis in Black and Hispanic populations. More recently, Pham et al. (2022) reported data taken from the electronic health record data in 2017 found White children still had the highest prevalence of ASD followed by Hispanic children and then Black children. However, by 2021 White children had the lowest prevalence of ASD. Consistent with Center for Disease Control (CDC) data, this suggests that the gap between races/ethnicity concerning ASD prevalence is closing rapidly. The CDC reports that in 2019 racial/ethnic differences persist, but that the gap is still narrowing. Data reports that White children are 1.1x more likely to have ASD than Black children and 1.2x more likely to have ASD than Hispanic children. Among Black children, they are 1.1x more likely to have ASD than Hispanic children (CDC, 2019). Compared to early 2000's data, this suggests the gap is closing. This could be due to a number of factors including decreased stigma surrounding the diagnosis and increased resources to low-income areas.

Examining more than just prevalence, however, there is evidence to suggest that some races/ethnicities have stronger associations with empathy than others. Data reports that non-White populations possess more empathy than White populations by a slim margin (Sommerland

et al., 2021). Empathy is an important contributor in an individual's thoughts, behaviors, and attitudes (Ratka, 2018). Therefore, population groups that exhibit more empathy may also express more positive attitudes towards individuals with ASD. As well, empathy is an innate human quality that has the capacity to change over time. This is an important aspect pertaining to this study because the attitudes that participants of this study display are not static. Increasing empathy overtime can be a contributing factor in changing negative attitudes towards people with ASD. Therefore, it would be important to identify the population groups that exhibit the most empathy.

Overall, it is important to consider the prevalence of ASD in different racial/ethnic groups in order to estimate the amount of exposure that each group innately has towards ASD. Equally, it is important to consider evidence that suggests certain racial/ethnic groups have stronger empathy associations than others that can impact attitudes towards minority groups. Considering the prevalence of ASD appears to be narrowing between different race/ethnicity groups and that empathy associations differed slightly, it is interesting to explore whether one's race/ethnic group has a significant impact on their attitudes towards individuals with ASD.

### **The Difference Between Attitude, Bias, and Prejudice**

For the purposes of this paper, it is important to distinguish the differences between attitude, bias, and prejudice in order to accurately clarify the meaning of the measurements of this study. To begin, the definition of "attitude" has been contested for decades. Allport (1935) popularly and firstly described attitudes as "a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related" (Allport, 1935). Attitudes are a mental state with a direct correlation to an individual's behaviors and are consistent with behavior. More

recently, research by Hepler and Alberici (2014) demonstrated people who have positive attitudes will engage in more activities, while people with negative attitudes will engage in less activities. Overall, when attitudes do predict behavior, the positive attitudes are associated with more action and negative attitudes associated with inaction. When concerning specific behaviors and the concept of cognitive dissonance, it is worth noting that this is not always the case. Research since then has embellished upon this definition in the defense that attitudes are not consistent with behaviors under specific conditions. It is interesting to note that not everyone behaves according to the attitudes they hold. According to a meta-analysis conducted by Glasman and Albarracín (2016), there was a significant finding of factors that contribute to how likely an individual's attitudes are to match their behaviors. These factors include: the motivation to consider the evaluated subject, experience with the attitude subject, the frequency of reports of the attitude, ability to reveal positive and/or negative information on the subject, and if the individual believes their attitude is correct. Therefore, it is again illustrated that experience and knowledge about the subject are adjacent in the formation of attitudes and is why attitudes are the most appropriate measurement for the current study.

Prejudice is similar to attitudes in the fact that prejudice is assimilated with negative attitudes (Verkuyten et al., 2019). Further, prejudice can emulate positive emotions as well as negative emotions based on their group membership which is similar to attitudes (Park et al., 2017). Therefore, prejudice refers to group membership attitudes only while attitudes can encompass all emotions towards people, places, or things. Importantly, prejudice is most commonly used to refer to race and comprises of racial discrimination (Phelan et al., 2008). This creates an important distinction between the common uses of attitudes versus the common uses of prejudice. Research by Phelan et al. (2008) also addressed the synonymous use of prejudice

and stigma, discovering whether the two were one phenomenon, or two. The study concluded that stigma was more commonly used to address “deviant behavior and identities, and disease and disabilities” (Phelan et al., 2008). Therefore, stigma would be a more appropriate term to describe the behaviors and attitudes of this study, considering the target population is a group of people considered to have a disability. However, this concept is itself contested as the Diagnostic and Statistical Manual does not provide a strict categorical way to classify disability and ability, in ASD or in general (de Schipper et al., 2015). Thus, more research needs to be done concerning the relatively modern spectrum that individuals can fall into regarding ASD.

Lastly, similar to attitudes, bias also has a plethora of definitions depending on one’s area of study. Most simply, bias is the tendency to form impressions not based on data (Satya-Murti, 2015). Considering that there is a proven basis for a correlation between experience, knowledge, and attitudes, and accepting the premise that bias is built upon no such experiences, then attitudes would be the most acceptable form of measurement for the current study.

### **Summary and Current Study**

This study analyzed the predictive factors of socio-economic disparities, level of exposure/strength of exposure with people who have ASD, area of academic study, gender, race/ethnicity, and level of knowledge about ASD that affects their relationship towards their overall social attitudes towards people with ASD in a college population. Prior research has examined which factors contribute towards individuals’ attitudes of persons with ASD (Babik & Gardner, 2021; Allport, 1997). However, it is unclear whether similar findings will be obtained in a college setting. This study aims to examine what aspects of a person contribute more to a positive attitude toward ASD. Furthermore, this study also considers the perspective of college

students with ASD and whether attitudes by their peers without ASD influenced their decision to attend college.

### **Research Questions**

The primary research question explored in this study is how predictive the following variables (i.e., level of exposure/strength of exposure with people who have ASD, area of academic study, gender, socioeconomic status, race/ethnicity, and level of knowledge about ASD) are in determining non-autistic college-student's attitudes towards people with ASD. There is an exploration of which factors are the most predictive of both negative and positive attitudes towards people with ASD, as well as which factors are least predictive of both negative and positive attitudes towards people with ASD.

The secondary research question explores whether the attitudes of present college students are a determining factor in the decision of college students with ASD to attend college. The results were analyzed through a transcription of the answers that the students wrote for the survey questions. In order to participate in this part of the survey, individuals must already be diagnosed with ASD and an accompanying diagnosis of an intellectual disability is not required.

## **Method**

### **Participants**

#### **Research Question One**

Two participant samples were required to answer both research questions. To answer the first research question, there was a sample size of 98 students. Forty Eastern University Undergraduate students participated in the survey and 28 of those were used in the final analysis. Students were recruited from the introductory psychology pool. To be included in the final analysis, students needed to be 18-25 years old, answer all the validity questions correctly (select

the correct number shown on the screen), answer all survey questions fully, and were United States college students. The students who participate in this study received course credit.

Participants were also recruited from social media. Social media has been increasingly used by researchers to reach more participants, especially among psychology fields (Goldberg et al., 2022). Thirty-eight people participated in the study and 22 people of this sample were used in the final analysis. People who were not used in this study did not meet the mandatory criteria.

Participants were also recruited from Amazon Mechanical Turk. The utilization of Amazon Turk by researchers in the psychology field has increased and has proven to be a new tool in the recruitment of participants. Amazon Mechanical Turk has the ability to reach diverse populations rapidly and provide valid reliable results (Mortensen et al., 2018; Thomas & Clifford, 2017). Each participant was compensated \$.50 cents for their participation. Of the 198 people that completed the survey, only 48 people met the criteria and were included in the final analysis.

### **Sociodemographic and Source Participant Information**

Acquiring participants from different sources resulted in different demographic distributions. The demographic frequencies between different sources of data are important to consider when the interpretation of analysis is dependent on the demographic variables for the answering of research questions.

The participant population sample was between 18-25 years-old, had an average age of 21.85 years old ( $SD = 2.29$ ) and were almost evenly split between genders: female (46.9%), male (50%), and written answer (.02%). The participants were largely White (74.5%) with a 25.5% non-White population. 37.8% of the participants majored in non-STEM majors (e.g., business, theatre, English, etc.) and 59.2% majored in STEM majors (e.g., computer science, information



technology, biology, etc.). Majors were organized into non-STEM and STEM categories according to the U.S. Department of Homeland Security (DHS) STEM Designated Degree Program List. A summary of the sociodemographic frequencies of all participants can be found in Table 1.

The social media participant population sample was between 19-25 years-old, had an average age of 21.82 years old ( $SD = 1.56$ ) and was split almost evenly between genders with 54.5% of participants being female. The participants were largely White (72.7%) with a 26.2% non-White population. 77.3% of the participants majored in STEM majors and 22.7% majored in non-STEM majors.

The SONA participant population sample was between 18-23 years-old, had an average age of 19.21 years old ( $SD = 1.40$ ) and was split almost evenly between genders with 51.1% of participants being female. The participants were largely White (53.6%) with a 46.4% non-White population. 25% of the participants majored in STEM majors and 75% majored in non-STEM majors.

The participant Amazon Mechanical Turk population sample was between 19-25 years-old and had an average age of 23.4 years old ( $SD = 1.43$ ) and were mostly male (62.5%). The participants were largely White (87.5%) with a 12.5% Native American population. 70.8% of the participants majored in STEM majors and 29.2% majored in non-STEM majors.

Participants from Amazon Mechanical Turk had the highest percentage of White participants (87.5%) compared to SONA participants (52.6%) and social media participants (72.7%). Further, Social Media participants had a considerably large amount of STEM majors (77.3%). Amazon Mechanical Turk participants also had a high number of STEM majors (70.8%) while SONA participants had the lowest amount of STEM majors (25%).



Table 1

*Sociodemographic Characteristics of All Participants (N = 98)*

Demographics	All Participants <i>n</i> , (%)	SONA <i>n</i> , (%)	Social Media <i>n</i> , (%)	Amazon Mechanical Turk <i>n</i> , (%)
<b>Gender</b>				
<i>Female</i>	46, 46.9%	16, 51.1%	12, 54.5%	18, 37.5%
<i>Male</i>	50, 51.0%	12, 42.9%	8, 36.4%	30, 62.5%
<i>Other</i>	2, .02%	-	2, 9.1%	-
<b>Race/Ethnicity</b>				
<i>White</i>	73, 74.5%	15, 53.6%	15, 72.7%	42, 87.5%
<i>African American</i>	7, 7.1%	7, 25%	-	-
<i>Hispanic</i>	3, 3.1%	2, 7.1%	1, 4.5%	-
<i>Asian</i>	6, 6.1%	3, 10.7%	3, 13.6%	-
<i>Native American</i>	6, 6.1%	-	-	6, 12.5%
<i>Two or More</i>	3, 3.1%	1, 3.6%	2, 9.1%	-
<b>Age</b>				
<i>18yo</i>	10, 10.2%	10, 35.7%	-	-
<i>19yo</i>	13, 13.3%	11, 39.3%	1, 4.5%	1, 2.1%
<i>20yo</i>	6, 6.1%	2, 7.1%	3, 13.6%	1, 2.1%
<i>21yo</i>	12, 12.2%	2, 7.1%	6, 27.3%	4, 8.3%
<i>22yo</i>	10, 10.2%	2, 7.1%	6, 27.3%	2, 4.2%
<i>23yo</i>	20, 20.4%	1, 3.6%	3, 13.6%	16, 20.4%
<i>24yo</i>	13, 13.3%	-	1, 4.5%	12, 33.3%
<i>25yo</i>	14, 14.3%	-	2, 9.1%	12, 25%
<b>Area of Study</b>				
<i>Non-STEM</i>	37, 37.8%	18, 84.3%	5, 22.7%	14, 29.2%
<i>STEM</i>	58, 59.2%	7, 25.0%	17, 77.3%	34, 70.8%
<i>Undecided</i>	3, 10.7%	3, 10.7%	-	-
<b>Total Participants</b>	<b>98</b>	<b>28</b>	<b>22</b>	<b>48</b>

## Research Question Two

A minimum of seven students with ASD answering the question was necessary in order to provide significant data. The average size of a focus group is 7-10 participants (Leung & Savithiri, 2009). This question is simply meant to provide insight into some students' thought process in attending college at EIU. The sample is not representative of the entire EIU college student population with ASD, but rather a few students that attend college at EIU to provide a glimpse into whether attitudes by non-autistic students are under consideration by some students with ASD when choosing whether to attend college.

Seven undergraduate students at EIU participated in the second research question. These participants needed to have an ASD diagnosis and were recruited from the SONA introductory psychology pool and the Students' Transitional Education Program (STEP) at Eastern Illinois University. The STEP program provides support and skill development for students with ASD attending Eastern Illinois University. The STEP program provides additional support for students beyond what is required by the ADA at each college. With approval from the STEP program director, an email was sent to all students enrolled in the STEP program highlighting the purpose of the study and asking students to voluntarily participate. One undergraduate student was recruited from the SONA population and that student was included in the final analysis. Twelve students were recruited from the STEP program and data from six were included in the final analysis. For student data to be included in the final analyses, students needed to fully answer the demographic survey and two open-ended questions.

The average age of participants was 21.14 years-old ( $SD = 2.73$ ) and were mostly White ( $N = 4$ ) and male ( $N = 3$ ). Also, 6 of the participants were from the Eastern Illinois University

STEP program. A summary of the demographic characteristics of ASD participants can be found in Table 2.

Table 2  
*Sociodemographic Characteristics of Participants with ASD (N = 7)*

Demographics	<i>n</i>	%
Gender	1	14.3
<i>Female</i>	5	62.5
<i>Male</i>	1	14.3
<i>Non-binary</i>		
Race/ethnicity		
<i>White</i>	4	57.1
<i>African American</i>	1	14.2
<i>Two or More</i>	1	14.2
<i>Other</i>	1	14.2
Student type		
<i>STEP program</i>	6	85.7
<i>Non-STEP</i>	1	14.2

*Note.*  $N = 8$ . Participants were on average 21.14 years-old ( $SD = 2.73$ ). All participants were undergraduate college students at Eastern Illinois University.

## Procedure

Participants were recruited from three different places to answer the first research question. Participants were first recruited from EIU's SONA system which is a combination of students from introductory psychology classes offered at EIU. The SONA system allows students to easily access research projects at the university and they receive credit for participating in online research projects. Next, students were recruited from social media via Facebook and Instagram. A public post on these social media platforms was made asking current undergraduate college students to voluntarily participate in this current study. Amazon Mechanical Turk was used to collect the remaining participants. Amazon Mechanical Turk is an

online servicing website that allows individuals to outsource jobs to a large workforce. Each participant in this domain was offered \$.50 cents in compensation. The STEP program population and the SONA student population were used to answer the second research question.

All participants answering the first research question were administered one survey comprised of four questionnaires online to complete at their own pace once they agreed to the informed consent. The surveys were counter balanced, randomized, and included validity questions such as “choose the number that you see here-5” to ensure that the participants are alert while completing the surveys.

All participants answering the second research question were administered the demographic questionnaire along with two open-ended questions asking about their concerns attending college and whether they felt accepted by their peers. These individuals did not complete the 4-part survey.

## **Measures**

### **Screening Questions**

A screening question was asked to ensure that the survey was administered to college students without ASD for the first research question. Two secondary open ended qualitative questions were asked towards students with ASD, seeking to learn the reservations they had towards attending college and whether they feel accepted at their university to answer the second research question.

### **Demographic Questions for All Participants**

The first part of the survey included three demographic questions. Gender was measured in a demographic survey style with four options for students to choose from: Male, female, nonbinary, and written answer. Exposure to people with ASD was measured by the style of

relationship that the participant has to a person with ASD with options of parent, sibling, friend, classmate, and other (then categorized into family member, classmate, friend, partner, and none). Race/Ethnicity was measured in a typical demographic survey style as follows: White, African American, Latino or Hispanic, Asian, Native American, Native Hawaiian or Pacific Islander, Two or More, Other/Unknown, or Prefer not to say (further categorized into non-White and White categories). Area of academic study was measured by asking the participant what their major is and then sorted into STEM (science, technology, engineering, and mathematics) and non-STEM by the analyst using the U.S. Department of Homeland Security (DSH) STEM Designated Degree Program List (Department of Homeland Security, 2022).

### **Social Attitudes**

Social attitudes towards persons with ASD were assessed using Factor 1 of the Social Attitudes Towards Autism Scale (SATA) (Flood et al., 2012), built off a Social Attitudes Towards Autism questionnaire by Mahoney (2008). The SATA is a measurement of attitudes towards people with ASD and is a self-report measure consisting of 16-items that are scored on a Four-point response scale of '1 strongly disagree to 4 strongly agree', with a possible range of 16-64 maximum points by summing the total of all 16-items. The SATA was found to have good internal consistency and construct validity (Flood et al., 2013). Importantly, it was found that the attitudes towards ASD are related to, but distinct from, attitudes towards general disabilities. The reliability of the SATA is .86 in the original validity study (Flood et al., 2013). The utilization of the SATA in the current study ( $N = 98$ ) generated a reliability of .87. The SATA was also found to have a small correlation with the disability's implicit association test (.17) (Flood et al., 2012), implicating that this scale can be found to be in relation with implicit bias as well as explicit bias.

### **Socioeconomic Status**

Socioeconomic status was assessed using The MacArthur Scale of Subjective Social Status (Adler et al., 2000). The MacArthur Scale of Subjective Social Status is a single item measure that assesses a person's perceived ranking compared to others. Participants view a ladder with ten rungs and are asked to answer which rung they fall onto that best represents them. Rungs 1-3 represent the "lower class", rungs 4-7 represent the "middle class", and rungs 8-10 represent the "higher class". The scale demonstrates significant test-retest reliability at .62. The scale is shown to have a moderate kappa value at .55 and has strong face validity (Ferreira et al., 2018). There has been little research on the cross-cultural utility of this scale. This scale is appropriate to use with college students because students are likely to take a more subjective approach to their socioeconomic standing and may be unaware of what the monthly income is of their family.

### **Knowledge About ASD**

The Autism Stigma and Knowledge Questionnaire (ASK-Q) (Harrison et al., 2017) is a corrected nominal 49-item questionnaire based psychometric tool used to identify knowledge gaps in particular groups. One point is assigned for every correct knowledge response; therefore, a higher score indicates the participant has more knowledge on the subject. Higher responses on the stigma portion of the questionnaire reflect the opposite and are reverse scored so that lower scores indicate stigma endorsement while high scores exhibit failed stigma endorsement. The questions proved to have high validity and meet a reasonable threshold for item representation. The ASK-Q has a high internal consistency of .88 (Harrison et al., 2017). The current study ( $N = 98$ ) also reported a high internal consistency of .93 using the Kuder-Richardson 20 test. The



ASK-Q has four subscales: diagnosis, etiology, treatment, and stigma. The stigma subscale included 8 items associated with the endorsement of ASD stigma and 3 items assessing the knowledge of ASD stigma. This survey was chosen for its cross-cultural utility and goal of examining group normal (typical behaviors/characteristics).

### **Analytic Plan**

Primarily, a summary of the sociocultural demographic of all participants was conducted in order to analyze any discrepant or surprising data that may affect the overall data analysis process. A demographic summary of the participants for each recruitment source was provided and evaluated for insight into analysis results.

Using G-Power, an a priori analysis indicated that approximately 98 students will be needed to find a moderate  $R^2 = .06$  effect in a multiple regression analysis. The power is .80 and there are 6 predictors. The predictors are socio-economic disparities, level of exposure/contact with people who have ASD, area of study, gender, racial/ethnic differences, and level of knowledge about ASD. Using SPSS-16, a multiple linear regression statistical analysis was run to determine the effects.

Exploratory analysis was also run to determine the reasoning behind the statistical significance of some predictors compared to others. This analysis was cohesive with the results of the multiple regression analysis.

Finally, the Means of attitude scores and the Means from the knowledge about ASD scores from the three source domains (SONA, social media, and Amazon Mechanical Turk) were calculated through descriptive statistic frequencies to determine the differences between sources and to navigate the implications of utilizing different sources.

### Results for Research Question One

#### Attitudes

The average attitude score across all three recruitment domains was 45.84. Each source provided a different overall range of average attitude scores on the Social Attitudes Towards Autism Test (Flood et al., 2012). The SONA participants reported the highest attitude score ( $M = 51.11$ ,  $SD = 8.61$ ,  $N = 28$ ), and social media participants had the second highest average attitude score ( $M = 50.77$ ,  $SD = 9.72$ ,  $N = 22$ ). Amazon Mechanical Turk participants had the lowest average attitude score ( $M = 35.63$ ,  $SD = 4.74$ ,  $N = 48$ ).

#### Knowledge About ASD

The average knowledge about ASD score across all three recruitment domains was 27.57. Among all sources, social media participants had the highest knowledge about ASD scores ( $M = 32.5$ ,  $SD = 5.94$ ). SONA participants had the second highest knowledge about ASD scores ( $M = 27.61$ ,  $SD = 7.92$ ). Amazon Mechanical Turk participants on average had the lowest knowledge about ASD scores ( $M = 22.60$ ,  $SD = 5.55$ ).

Table 3

*Summary of Attitude and Knowledge Scores From Sources (N=98)*

Sources	Attitude Scores		Knowledge Scores	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
SONA	51.11	8.61	27.61	7.92
Social Media	50.77	9.72	32.50	5.94
Amazon Mechanical Turk	35.63	4.74	22.60	5.55

### Research Question One Analysis

In order to conduct the multiple regression analysis, gender type “non-binary” and major type “undecided” were treated as missing variables and their data was enveloped into other categories of interest. This was done in order to prevent the skew of data as both populations in these types were too small (nonbinary,  $N = 2$ , undecided,  $N = 3$ ). As well, the five categories of non-White races/ethnicities (African American, Hispanic, Native American, Asian American, and two or more) were condensed into one category: non-White. This was done to prevent the skew of data as there was a large number of White participants,  $N = 73$ .

A multiple regression analysis was conducted to examine how the following predicted attitudes towards ASD: gender, race/ethnicity, socioeconomic status, knowledge about ASD, area of study, and relationship to someone with ASD. Results show that the relationship between this set of six predictors and attitude scoring was statistically significant,  $F(6, 86) = 13.92, p < .001$ , accounting for 49% of variance in attitude scores. However, only four predictors were statistically significant. The area of study was statistically significant ( $p = .017$ ) and made up for the smallest amount of the variance at 4% in attitude scores. Non-stem majors were more associated with positive attitude scores. Race/ethnicity was statistically significant ( $p = .002$ ) and made up for 7% of the variance in attitude scores. Non-White individuals were associated with higher attitude scores. Socioeconomic status was statistically significant ( $p = .002$ ) and made up for 8% of the variance in attitude scores. Lower socioeconomic statuses were associated with higher positive attitude scores. Lastly, knowledge about ASD was statistically significant ( $p < .001$ ) and made up for the highest amount of the variance at 25% in attitude scores. Higher

knowledge scores were associated with positive/higher attitude scores. A summary of the results of the multiple regression analysis can be found in Table 4.

Table 4

*Summary of Multiple Regression Analysis for Variables Predicting Attitude Scores (N = 98)*

Variable	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Gender	.64	1.743	.03	.367	.714
Race/Ethnicity	6.51	2.048	.270	3.129	.002**
Socioeconomic Status	-1.65	.529	-.279	-3.122	.002**
Knowledge about ASD	.72	.121	.504	5.964	<.001***
Area of Study	-4.78	1.841	-.206	-2.432	.017*
Relationship to Someone with ASD	.15	.455	.027	.322	.748

*Note.*  $R^2 = .49$  and adjusted  $R^2 = .46$ .

\*: $p < .05$

\*\*: $p < .01$

\*\*\*: $p < .001$

### **Exploratory Analysis**

An exploratory one-way ANOVA was conducted to determine a statistically significant difference between SES levels on knowledge scores. There was a non-significant effect type of SES levels on knowledge scores  $F(2, 95) = 2.075, p = .131$ . The differences between SES categories were insignificant in reporting knowledge scores.

### **Research Question Two Results**

This analysis was conducted through a self-reported survey with a demographic questionnaire, accompanied by two open-ended questions for the participant to answer. Three major themes were collected among the questions asked to the participants with ASD. Themes of acceptance, bullying, and accommodations were observed within the data. STEP program students reported that they were very comfortable at Eastern Illinois University and were not concerned with the attitudes of other students. STEP students also reported that they felt accepted and accommodated for their disability at Eastern Illinois University. One STEP student reported “I never had any concerns with that decision (the decision to attend college)”. Another STEP student reported having “no (none)” concerns about attending university.

STEP students were more concerned with the ability of the university to accommodate their disability than the acceptance of other students. One STEP student reported their main concerns were “adequate counseling, check-ins, autism program”. Another student reported “I wasn’t sure how I’d do being totally on my own but I knew I wanted to have more freedom than I felt at home”. Another STEP student reported they valued the college that “is best for accommodating with my disability”. All STEP students reported feeling accepted by their peers.

Data was collected from one non-STEP Eastern Illinois Student who reported that she feared bullying. “I was concerned that people would be mean to me because I am not like them”. Upon attending Eastern Illinois University, she reported that she felt accepted. Although most of the data collected was acquired from STEP program students, it is notable that every STEP student felt accepted within the university and had no concerns regarding the attitudes of other students. Regarding the non-step student, although a small sample, it is important to note that they were worried about the attitudes of other students but felt accepted after attending the university. This evidence suggests that the STEP program provides a comfortable and accepting transitional period for students with ASD before they enter university. The evidence that the non-step student felt accepted among her peers after attending the university provides confirmation that the student population at EIU has positive interactions with students who have ASD ( $M = 51.11$ ,  $SD = 8.61$ ).

### **Discussion and Summary of Current Findings**

This study analyzed the following predictors: socioeconomic status, gender, area of academic study, race/ethnicity, exposure to people with ASD, and knowledge about ASD to predict attitudes about ASD. Collectively, the multiple regression analysis revealed that four predictors were statistically significant in predicting attitudes towards individuals with ASD: knowledge about ASD, socioeconomic status, race/ethnicity, and area of study ( $p < .001$ ). Gender and exposure type to people with ASD were not reported to be statistically significant predictors. The current study provides support that attitudes held by non-ASD undergraduate students are influenced by their sociocultural demographic backgrounds and current understandings of ASD.

First, knowledge about ASD was statistically significant in predicting attitude scores ( $p < .001$ ) and supported the research hypothesis that knowledge is an important factor in the prediction of attitudes towards ASD. Specifically, higher scores on the Autism and Stigma Knowledge Questionnaire (Harrison et al., 2017) were associated with higher scores on the Social Attitudes Towards Autism Test (Flood et al., 2012). Knowledge about ASD held the most variance in the contribution to attitudes towards autism at 25%, the largest variance among the four statistically significant predictors. This result is consistent with preceding research on elementary/adult individuals without ASD attitudes towards autism (Shand et al., 2020; Campbell & Barger, 2011; Livneh, 1982). However, other research has minimized the effect of knowledge on attitudes towards ASD in the college student population. White et al. (2019) found support that the relationship between knowledge and attitudes was not significant at a midsized United States university in the northeast. Research in Western Australia reported statistical significance of specific knowledge on ASD on attitudes (Kuzminski et al., 2019). It is possible the STEP program at Eastern Illinois University assists in ensuring the community is knowledgeable about ASD and may explain the discrepancies between the current study's findings and other studies (White et al., 2019). Due to the limited research on the knowledge about ASD as a factor in attitudes towards autism, more research needs to be conducted on this special population in order to make definite conclusions.

There is no current research to our knowledge examining the effect of SES on attitudes towards individuals with ASD. Socioeconomic status was revealed by the multiple regression analysis to be the second largest statistically significant predictor ( $p = .002$ ) of attitude scores with a variance of 8%. The results support the research question that the level of one's SES was

significant in predicting their attitude scores. Specifically, lower SES levels (1-3) were associated with more positive attitude scores.

Further, the one-way ANOVA reported non-statistically significant ( $p = .131$ ) differences on SES groups and its effect on knowledge about ASD scores. Meaning, that knowledge scores were equally distributed across SES categories and that no level of SES category had a statistically significantly higher knowledge score than the other. Research postulated that higher income SES groups may have more knowledge about ASD due to increased resources and access to that knowledge (Bearman, 2011). However, these results create a discrepancy between the logic that higher income communities would possess more knowledge about ASD than lower SES communities, and that these knowledge differences would cause attitude scores to shift in favor of the higher income communities (Bearman, 2011). The overall significance of SES groupings in favor of lower income communities possessing more positive attitudes towards individuals with ASD directly refutes this hypothesis.

There is no current research to our knowledge that researches the effect of race/ethnicity on attitudes towards individuals with ASD. Race and ethnicity were revealed by the multiple regression analysis to be statistically significant at  $p = .002$  with a variance of 7%. Specifically, non-White individuals are associated with more positive attitude scores than White participants. This result supports the possibility that non-White populations possess qualities (like empathy) that increase their attitude scores (Sommerland et al., 2021). These results contribute to the anti-hypothesis that the frequency of ASD prevalence in different races/ethnicities has little effect on one's attitudes towards ASD in their racial/ethnic community.



This may be because the difference in prevalence between White and non-White communities is relatively small in the United States (CDC, 2023), or that prevalence of ASD in communities is a non-contributing factor in attitudes towards ASD. However, research in other geographic areas have observed drastic differences in prevalence of ASD in different racial and ethnic communities in the United Kingdom and the United States (Mandell et al., 2009; Roman-Urrestarazu et al., 2021). Research should be conducted to make definite conclusions about the effect of ASD prevalence in various communities on attitudes towards ASD and to also observe the prevalence of ASD cross-nationally.

Area of academic study was reported to be statistically significant ( $p = .017$ ) by the multiple regression analysis. Specifically, non-STEM majors were associated with positive attitude scores compared to STEM majors. This is supportive of the hypothesis that non-STEM majors possess more empathy than science majors (Takeuchi et al., 2014), which may have been a factor in the effect of major type on attitude scores.

However, other research postulates that STEM majors have a greater chance of forming positive attitudes towards those with ASD than non-STEM majors (Wei et al., 2014). Interestingly, students with STEM majors in this study had the highest number of friends with ASD ( $N = 32$ ) than any other exposure type, and also than non-STEM majors. Considering that ASD students are more likely to enter STEM majors (Wei et al., 2014), it would be likely that students without ASD would encounter and befriend students with ASD in the classroom. Research by Faur et al. (2022) supports the idea that friendships are more commonly formed in the classroom. Therefore, secondary studies should explore the mediatory factors between area of study and attitudes towards individuals with ASD to ascertain more specific reasonings behind these conclusions.

Regarding exposure type, the multiple regression analysis revealed that exposure to people with ASD was statistically insignificant at  $p = .748$ . These results disprove the hypothesis and go against the preceding research that exposure to people with ASD will improve attitudes about individuals with ASD (Shand et al., 2020; White et al., 2016). However, the number of people who knew no individuals with ASD in this study was a very small sample ( $N = 4$ ) and may have affected the overall results of this study. In the future, observing the exposure of ASD type in singularity may yield different results.

Lastly, the multiple regression revealed that gender was statistically insignificant at  $p = .714$ . These results disapprove the hypothesis that the difference between genders would be a factor in attitude scores. Specifically, this pertains to the hypothesis that girls would portray more positive attitudes towards individuals with ASD than males. Babik and Gardner (2021) provided evidence for girls having more positive attitudes towards those with disabilities than boys. Further, societal expectations imply that girls have more empathy than boys, which would increase their attitude scores (Müller et al., 2016).

### **Source Discrepancies in Data for Research Question One**

The different recruitment methods could lead to explained variances of attitude and knowledge scores between SONA participants, social media participants, and Amazon Mechanical Turk Participants. Further, although the increased diversity of participants due to different recruitment methods helped increased the sample size of some unique predictor subsections (e.g., all Native American participants were recruited from Amazon Mechanical Turk), the variety of geographic location and university environments increased the likeliness of unknown confounding variables in this study.

Firstly, the multiple regression analysis revealed that the difference between White and non-White participants was statistically significant at predicting attitude scores, where non-White participants were associated with positive attitude scores ( $p = .002$ ). Considering that Amazon Mechanical Turk participants had the lowest attitude scores ( $M = 35.63$ ,  $SD = 4.74$ ), the majority of White participants in this population compared to the SONA and social media populations could be a factor in the explanation as to why.

The multiple regression analysis also revealed that the difference between non-STEM and STEM majors was statistically significant at predicting attitude scores, where non-stem majors were associated with positive attitude scores ( $p = .017$ ). Therefore, the large number of STEM majors present in the Amazon Mechanical Turk participant data could potentially explain the attitude score disparities. Although social media participants also had a high number of STEM majors, social media participants had a higher knowledge score ( $M = 32.55$ ,  $SD = 5.94$ ) about ASD than Amazon Mechanical Turk participants ( $M = 22.6$ ,  $SD = 5.48$ ). The multiple regression analysis revealed that individuals with higher knowledge scores were significantly associated with positive attitude scores ( $p < .001$ ). The knowledge that an individual has about ASD has more variance (25%) than variance of area of study (4%). The larger contribution of knowledge in predicting attitude scores could be a potential reason why although social media participants have a larger number of STEM majors, the attitude scores of social media participants are higher than those of Amazon Mechanical Turk participants.

### **Discussion of Second Research Question**

Students with ASD are less likely to enroll in secondary education than neurotypical students and students with disabilities (White et al., 2016). It is hypothesized that this is due to something other than intellectual capability for the reason that as of 2014, a majority of young

individuals living with ASD fall into average or above average intellectual capacity (United States Center for Disease Control and Prevention, 2014). Therefore, these students are academically fit to succeed in college. However, it is well known that one's ability to succeed in college is based on far more than one's academic fitness. Considering that individuals with ASD are more likely to be bullied in their youth than their neurotypical peers (Sterzing et al., 2012; Fisher & Taylor, 2016), it was important to determine whether bullying may influence persons with ASDs' decision to attend college.

Findings from the ASD student analysis of concerns attending a university and whether the students felt accepted by their peers yielded interesting results. One hundred percent of the students interviewed felt accepted by their peers at EIU. Only one student was concerned about their perception by other students, and they were uninvolved in the STEP program. Beyond the small sample size of this specific population, these results give a positive impression that EIU is actively creating positive and accepting environments for students with ASD.

### **Limitations**

Primarily, conducting research across multiple recruitment domains can threaten the validity of a research study. This current study utilized three participant sources: the SONA system at Eastern Illinois University, social media platforms, and Amazon Mechanical Turk. Although specific requirements were installed into surveys and questionnaires to ensure that all participants met the standards of the study (undergraduate students, aged 18-25 years old), it is difficult to determine whether the predictors evaluated in this study contribute to a direct causal link to attitude scores without considering the different contextual impact of each source.

Further, results may have differed if all participants gathered were recruited from one primary source.

Another limitation in this study would be the small sample size of certain categorical groupings. For example, the small sample size of minority groups, which resulted in the creation of the non-White category to retain the minority populations. Results from this current study may have been more specific and data informed if the study was able to retain separate groups from the different minority populations without sacrificing effective analysis. In the future, more measures should be taken to ensure a more diverse group of participants.

Lastly, a larger group of participants with ASD from different universities would have been effective in evaluating whether the culture at Eastern Illinois University is particularly positive, or if modern generations are embracing and accepting of neurodiversity. Future research could determine whether the implementation of transitional programs for students with ASD is responsible for more accepting and welcoming community environments.

### **Conclusions and Implications**

Navigating ASD as a young adult is difficult, even more so in a society that creates barriers towards the success of neurodiverse people. Studies report that ASD students have more difficulties completing college (Bakker et al., 2023; Shattuck et al., 2012;). More individuals with ASD are enrolling in higher education (Gurbuz et al., 2019) and it is important that these students feel welcomed and accepted by their peers and faculty at the university. By improving attitude acceptance rates by students without ASD, students with ASD are more likely to stay and succeed in university settings. This study suggests that increasing student knowledge about ASD is a preventative measure that can be taken against negative preconceptions that students

without ASD have formed. Further, this study takes into consideration characteristics describing individuals that may lead to the formation of negative attitudes about ASD. Recognizing these characteristics is also a preventative measure in the formation of negative attitudes. This research may also be used in the investigation of attitudes towards other disabilities, and how these attitudes may differ.

To a large extent, this study reinforced preceding conclusions that certain factors are significant in predicting attitudes towards ASD, while also introducing new factors that contribute to negative attitudes. These concurrent conclusions are significant for universities to use when evaluating their programs and developing stronger initiatives for the acceptance of students with ASD.

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**Appendix A: Social Attitudes Towards Autism Scale (Flood et al, 2013)**

Instructions: For each item, please mark the number to indicate when answer you believe most to be true.

0 = I am indifferent

1 = I strongly disagree

2 = I disagree

3 = I agree

4 = I strongly agree

1. People with autism should not engage in romantic relationships.
2. People with autism should have the opportunity to go to college.
3. People with autism should not have children.
4. People with autism should be institutionalized for their safety and others.
5. If a facility to treat people with autism opened in my community, I would consider moving out.
6. Individuals with autism are incapable of living on their own
7. I would be afraid to be around a person with autism.
8. A person with autism is an emotional burden to his/her family.
9. I would be comfortable sitting next to a person with autism in the same class
10. A person with autism is a financial burden to his/her family.
11. People with autism should be encouraged to marry someone with autism.
12. People with autism are incapable of forming relationships and expressing affection.
13. Children with autism should be fully integrated into mainstream classes.
14. I would be uncomfortable hugging a person with autism.
15. People with autism cannot understand other people's feelings.
16. Students with autism who are mainstreamed into regular classrooms are a distraction to students without autism in that classroom.

**Appendix B: Questionnaire Tool for Stigma and Knowledge about Autism ASK-Q  
(Harrison et al, 2017) Survey**

Instructions: For each item, mark Agree, Disagree, or I don't know

Agree = 1

Disagree = 1

Don't Know = 0

<b>Item wording</b>	<b>Category</b>
3. Some children with autism may lose acquired speech	Diagnosis/symptoms
46. There is currently no medical test to diagnose autism	Diagnosis/symptoms
44. Many children with autism have difficulty using everyday language to communicate their needs	Diagnosis/symptoms
54. Many children with autism get upset if their routine is changed	Diagnosis/symptoms
28. Most children with autism may not look at things when you point at them	Diagnosis/symptoms
10. Some children with autism do not talk	Diagnosis/symptoms
40. Autism can be diagnosed as early as 18 months	Diagnosis/symptoms
29. Some children with autism show interest in parts of objects	Diagnosis/symptoms
25. Many children with autism show the need for routines and sameness	Diagnosis/symptoms
18. All children with autism usually have problems with aggression	Diagnosis/symptoms
15. many children with autism have trouble tolerating loud noises or certain types of touch	Diagnosis/symptoms
7. Many children with autism have trouble understanding facial expressions	Diagnosis/symptoms
34. Many children with autism repeatedly spin objects or flap their arms	Diagnosis/symptoms
43. Many children with autism get excessively focused on one thing	Diagnosis/symptoms
41. A lot of children with autism have problems with being aggressive or hyperactive	Diagnosis/symptoms
23. Children with autism do not enjoy the presence of others	Diagnosis/symptoms

6. Children with autism may have strange reactions to the way things smell, taste, look, feel, or sound	Diagnosis/symptoms
24. Most children with autism are also intellectually disabled	Diagnosis/symptoms
32. Autism is a result of a curse or evil eye put upon/inflicted on the family	Etiology/Stigma
51. Autism is caused by God or a supreme being	Etiology/Stigma
47. traumatic experiences very early in life can cause autism	Etiology
35. Autism is a communication disorder	Etiology
37. Autism is a developmental disorder	Etiology
55. Autism is due to cold, rejecting parents	Etiology/Stigma
26. vaccinations can cause autism	Etiology
14. autism is preventable	Etiology/Stigma
52. autism is a brain-based disorder	Etiology
16. Autism is more frequently diagnosed in male than females	Etiology
48. The number of diagnosed cause of autism has increased over the past ten years	Etiology
36. autism occurs more commonly among higher socio-economic and educational levels	Etiology
50. Autism is something that is very rare	Etiology
19. Autism effects people of all races and ethnicities	Etiology
53. The cause of autism is not yet known for sure.	Etiology
13. Autism happens mostly in middle class families.	Etiology/Stigma
9. it is important that all children diagnosed with autism receive some form of special education services at school	Treatment
22. The earlier that treatment starts, the more effective it tends to be	Treatment
45. Early interventions demonstrates no additional benefit to children with autism	Treatment
8. We now have treatments that can cure autism	Treatment
20. Children with autism need extra help to learn	Treatment

12. There is currently no cure for autism	Treatment
21. Children with autism are never too old to benefit from treatment	Treatment
42. children with autism cannot learn any social skill	Treatment
39. Early intervention can lead to significant gains in children with autism's social and communication skills	Treatment
38. Behavior therapy is an intervention most likely to be effective for children with autism	Treatment
11. medication can alleviate the core symptoms of autism	Treatment
27. Most children with autism are extremely impaired and cannot live independently as adults	Treatment/Stigma
17. Children with autism can grow up to live independently	Treatment
49. With proper treatment, most children diagnosed with autism eventually outgrow their disorder	Treatment

**Appendix C: Demographic Survey**

1. Are you diagnosed with Autism?
  - a. If yes, answer this question: “What (if any) concern(s) did you have when deciding whether to attend college?”
  - b. If yes, answer this question; “Do you feel accepted by your peers at your university?”
  - c. If no, skip this question
2. What is your age?
3. What is your gender? Female, Male, Nonbinary, Other
4. What is your race/Ethnicity? White, African American, Latino or Hispanic, Asian, Native American, Native Hawaiian or Pacific Islander, Two or More, Other/Unknown, or Prefer not to say.
5. What is your Major?
6. What is the closest relationship you have to a person with Autism? None, Parent, Sibling, Friend, Classmate, Other.



**Appendix D: MacArthur Scale of Subjective Social Status - Adult Version (Adler et al, 2000)**

Scoring:

Rungs 1-3 are scored as “lower class”. Rungs 4-7 are scored as “middle class”. Rungs 8-10 are scored as “upper class”.

Respondents view a drawing of a ladder with 10 rungs, respondents further read: “At the top of the ladder are the people who are the best off, those who have the most money, most education, and best jobs. At the bottom are the people who are the worst off, those who have the least money, least education, worst jobs, or no job. Please choose the rung on the ladder which best represents you.”

Instructions: Think of this ladder as representing where people stand in the United States. At the top of the ladder are the people who are the best off – those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off – those who have the least money, least education, the least respected jobs, or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

