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First impressions of adults with autism improve with diagnostic disclosure and increased autism knowledge of peers

Noah J Sasson and Kerrianne E Morrison

Abstract

A practical consideration for many intellectually able adults with autism spectrum disorder (ASD) is whether to disclose their diagnostic status or try to mask their autistic characteristics to avoid judgment and discrimination. Here, we assessed first impressions of adults with ASD and typically developing controls ($N = 40$) made by typically developing observers ($N = 215$) when their diagnostic status was either withheld, accurately provided, or inaccurately provided. First impressions were less favorable for ASD participants compared to typically developing controls across a range of judgments, but were significantly more positive when accurately labeled as ASD compared to when no label was provided, when mislabeled as typically developing, or when mislabeled as having schizophrenia. For typically developing participants, ratings did not change when accurately labeled but improved when mislabeled as ASD. Greater autistic traits for the ASD and typically developing participants were associated with less favorable first impressions, and females were rated more favorably than males. Autism knowledge of the raters, but not age, IQ, or autistic traits, was positively associated with more favorable impressions of ASD participants. Collectively, these findings suggest that first impressions for intellectually able adults with ASD improve with diagnostic disclosure and increased autism understanding on the part of peers.

Keywords

adults, autism, diagnostic disclosure, first impressions

Introduction

Despite strong desires to establish relationships, work, and live independently (Shattuck et al., 2012; Strunz et al., 2016), intellectually able adults with autism spectrum disorder (ASD) experience significant occupational difficulties and social isolation (Barnhill, 2007; Howlin, 2000; Howlin and Moss, 2012; Mazurek, 2014; Orsmond et al., 2013). These impairments are driven in large part by the social, cognitive, and behavioral differences that define autism (Chevallier et al., 2012; Sasson et al., 2011), and psychosocial treatments targeting improvement in these areas have shown some benefit (Gates et al., 2017). Unfortunately, the positive effects of these treatments appear restricted to increasing social knowledge in individuals with ASD, not improving actual social ability (Gates et al., 2017), and generalization to real-world outcomes is often limited (Bishop-Fitzpatrick et al., 2014; Rao et al., 2008; Turner-Brown et al., 2008).

One possible reason for the modest real-world benefit of these treatments is that they often focus on mitigating individual deficits without consideration of environmental and community factors hindering optimal social functioning for adults with ASD (Tobin et al., 2014). For instance, the quantity and quality of social experiences for those with ASD are not only affected by their own social abilities but also by the perceptions and judgments made by others in the environment (Mitchell, 2015; Sasson et al., 2017; Sheppard et al., 2016). Indeed, there is increasing evidence that social interaction impairments in ASD may be more bidirectional in nature than previously recognized: not only

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do individuals with ASD have difficulty discerning the beliefs and intentions of their typically developing (TD) peers (Frith, 2001), but differences in social presentation and expression in ASD (Faso et al., 2015; Grossman, 2015; Morrison et al., 2017) can make it difficult for TD individuals to accurately interpret the mental states of those with ASD (Ede et al., 2016; Sheppard et al., 2016). One implication of acknowledging the bidirectionality of social impairment in ASD is that improving social outcomes for adults with ASD can occur not only by focusing on the individual (i.e. the traditional approach of treating and developing social abilities), but also by educating peers and modifying the social environment to accommodate and support autistic differences (Baron-Cohen, 2017; Gillespie-Lynch et al., 2015). From this perspective, social difficulties for intellectually able adults with ASD can be viewed as a relational impairment, not just an individual one (Milton, 2013), in which social disability emerges from an interaction between internal and external factors (Kapp et al., 2013).

One explicit way the social experiences of adults with ASD are shaped by the perceptions of those around them is in the formation of first impressions. First impressions are almost immediate character judgments of people based upon limited information (Ambady and Rosenthal, 1992) that predict behavioral action toward that person and are often stubbornly resistant to change (Human et al., 2013). Sasson et al. (2017) recently reported that TD observers, blind to the diagnostic status of those they were evaluating, made first impressions of individuals with ASD that were far more negative than those made of TD controls. These judgments were formed within seconds, occurred for both child and adult observers, and were associated with a reluctance to pursue subsequent social interaction: observers indicated reduced desire to hang out or start a conversation with those with ASD and even reported they would feel a greater level of discomfort sitting next to them. These findings suggest that the biases of potential social partners may limit the quantity of social opportunities for adults with ASD and hinder their quality when they do occur.

Fearing such negative evaluations, many intellectually able adults with ASD, particularly females, develop effortful "camouflaging" strategies that try to mask their social differences in order to behave in more neurotypical ways (Hull et al., 2017; Lai et al., 2016). These strategies can be stressful and exhausting and are associated with anxiety, depression, and poorer self-image (Attwood, 2007; Boyd et al., 2011; Williams, 1992). The motivation to camouflage one's autism presupposes a perceived stigma attached to autism and its associated characteristics, which historically has been an accurate assumption (Campbell, 2007; Gray, 1993; Shtayermman, 2009). However, awareness and attitudes about autism are improving rapidly in the general population (Dillenburger et al., 2013), particularly among young adults (White et al., 2016), and these societal changes could mean that self-identifying as autistic in some settings may no longer prove as socially damaging as once feared. Indeed, a recent study reported that adults with ASD who disclosed their diagnosis were three times more likely to be employed compared to those who did not disclose (Ohl et al., 2017). However, this study did not assess whether diagnostic disclosure was a causal reason for higher employment rates rather than explained by other factors (e.g. more skilled individuals may be more capable or motivated to disclose).

A practical consideration for many intellectually able adults with ASD is determining when and if it benefits them to disclose their diagnosis in various social and professional settings. One piece of information that can help in this determination is whether adults with ASD are evaluated more or less favorably when their diagnostic status is known. This study examines this issue by having unfamiliar TD observers report their first impressions of intellectually able adults with ASD relative to matched TD controls when diagnostic information is withheld, accurately provided, or inaccurately provided (i.e. a participant with ASD is labeled as being TD). Given recent evidence that the presence of diagnostic information can reduce negative perceptions of autistic behaviors (Brosnan and Mills, 2016; Butler and Gillis, 2011), we predicted that participants with ASD would be rated more favorably when an accurate diagnostic label was provided compared to when no label or an inaccurate label was provided. Further, we added a fourth manipulation: mislabeling participants as having schizophrenia. Schizophrenia is a distinct disorder from ASD but nevertheless shares many social behaviors and impairments with ASD in adulthood (Morrison et al., 2017). It also is a highly stigmatized condition (Angermeyer and Matschinger, 2003; Dickerson et al., 2002), driven in large part by misconceptions about the disorder (De Jong and Mather, 2009). The inclusion of a "schizophrenia label" condition allowed us to assess the relative stigma of an ASD diagnosis compared to a socially similar neurodevelopmental condition on the same individuals. We predicted that providing a label of autism would result in more favorable ratings than when a label of schizophrenia was provided. Finally, given the assumption that social experiences for adults with ASD will benefit from increased autism awareness and knowledge on the part of their neurotypical peers (Baron-Cohen, 2017; Gillespie-Lynch et al., 2015), we explored whether first impressions of those with ASD were positively associated with autism knowledge of TD observers.

Methods

Participants

Participation occurred in two stages. First, 40 adults (20 ASD and 20 TD) matched on gender (17 males in each group), and comparable on age (ASD mean = 24.5 years,

TD mean = 25.0; $p = 0.79$) and full-scale IQ on the Wechsler Abbreviated Scale of Intelligence (WASI; ASD mean = 106.4, range: 86–126; TD mean = 110.5, range: 86–127; $p = 0.29$), served as stimulus participants. Stimulus participants with ASD had diagnoses confirmed by a certified clinician using the revised Module 4 algorithm (Hus and Lord, 2014) of the Autism Diagnostic Observation Schedule-2 (ADOS; Lord et al., 2012). TD stimulus participants self-reported no ASD diagnosis for themselves or any first-degree family members. Stimulus participants were first included and are described in more detail in Sasson et al. (2017). In the second stage, a new sample of 215 undergraduates (153 females; mean age = 21.8 years; mean estimated IQ using the reading subtest of Wide Range Achievement Test (WRAT-3; Wilkinson (1993): 107.6) served as rating participants. This sample size is consistent with the number of rating participants in Sasson et al. (2017) that was determined based upon a power analysis using metrics comparable to previous related studies (Faso et al., 2015): an alpha level of 0.05, a power level of 0.8, and an anticipated effect of 0.3. This power analysis recommended 160 rating participants, but like Sasson et al. (2017), we oversampled relative to previous studies because of our greater number of stimulus participants and experimental conditions. The University of Texas at Dallas Office of Research Institutional Review Board (IRB) approved this study, and both stimulus and rating participants provided written informed consent.

Stimuli and materials

Video recordings of the stimulus participants were captured as they participated in the High Risk Social Challenge Task (Gibson et al., 2010), a performance-based measure of social skill in which stimulus participants perform a mock 60 s audition for a reality/game show. The task was chosen because it represents a strong compromise between experimental control and ecological validity. Please see Sasson et al. (2017) for more detail on how the video recordings were created and edited.

Procedure

After the recording, stimulus participants completed a basic demographic form and the Autism Quotient (AQ; Baron-Cohen et al., 2001) to provide an index of autistic traits in both the TD and ASD groups (ASD mean = 22.7, range: 11–40; TD mean = 14.9, range: 4–32; $p = 0.003$). AQ scores were not available for one ASD stimulus participant.

In phase two of the study, rating participants were individually tested on a desktop computer monitor using Qualtrics survey software. They viewed a total of 40 video recordings, one for each stimulus participant. Each video adhered to one of four label conditions: (a) "no label," in which the video was not accompanied by any additional information; (b) "accurate label," in which the video was accompanied by text providing an accurate diagnostic label for the stimulus participant (either "This person has an autism diagnosis" or "This person has no diagnosis"); (c) "mislabeled," in which the video was accompanied by text providing the opposite diagnostic label for the stimulus participant (i.e. a stimulus participant with autism was labeled as having no diagnosis, and a TD stimulus participant was labeled as having autism); and (d) "schizophrenia label," in which the video was accompanied by text stating "This person has a schizophrenia diagnosis."

Four versions of the task were created. Each version consisted of the same 40 videos, but differed systematically in the label applied to each video. To prevent carryover effects, rating participants were randomly assigned to one of the four versions so that they only viewed and rated each stimulus participant one time under a single-label condition. For instance, stimulus participant 1 would have no label in version one, an accurate label in version two, be mislabeled in version three, and have a schizophrenia label in version four. Each version differed in the 10 videos (5 ASD and 5 TD) that were assigned to each label condition. This resulted in rating participants evaluating each of the 40 stimulus participant only once—10 with no labels, 10 accurately labeled, 10 mislabeled, and 10 given a schizophrenia label—ensuring that no ratings were influenced from previously encountering a stimulus participant video under a different label condition. Rating participants assigned to the four versions did not differ on gender, age, ethnicity, estimated IQ by WRAT-3, or number of autistic traits as measured by the Broad Autism Phenotype Questionnaire (BAPQ; Hurley et al., 2007).

Rating participants evaluated each video one at a time on 10 items using a four-point scale (1–4), accompanied by the following labels: (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Agree*, 4 = *Strongly Agree*), so that higher scores reflected more positive judgments. The first six items related to traits that are commonly and reliably perceived during first impressions: awkwardness, attractiveness, likability, trustworthiness, intelligence, and dominance/submissiveness (Grossman, 2015; Willis and Todorov, 2006). In all analyses, scores for awkwardness were reverse scored so that higher scores on all items reflected more positive judgments. The other four items were drawn from previous measures assessing behavioral intentions to socially engage with the stimulus participant being rated: likelihood of starting a conversation with the stimulus participant, likelihood of hanging out with the stimulus participant in their free time, willingness to live near the stimulus participant, and their level of comfort sitting next to the stimulus participant (Harnum et al., 2007; Nevill and White, 2011). The order of the items was randomized between rating participants to account for potential

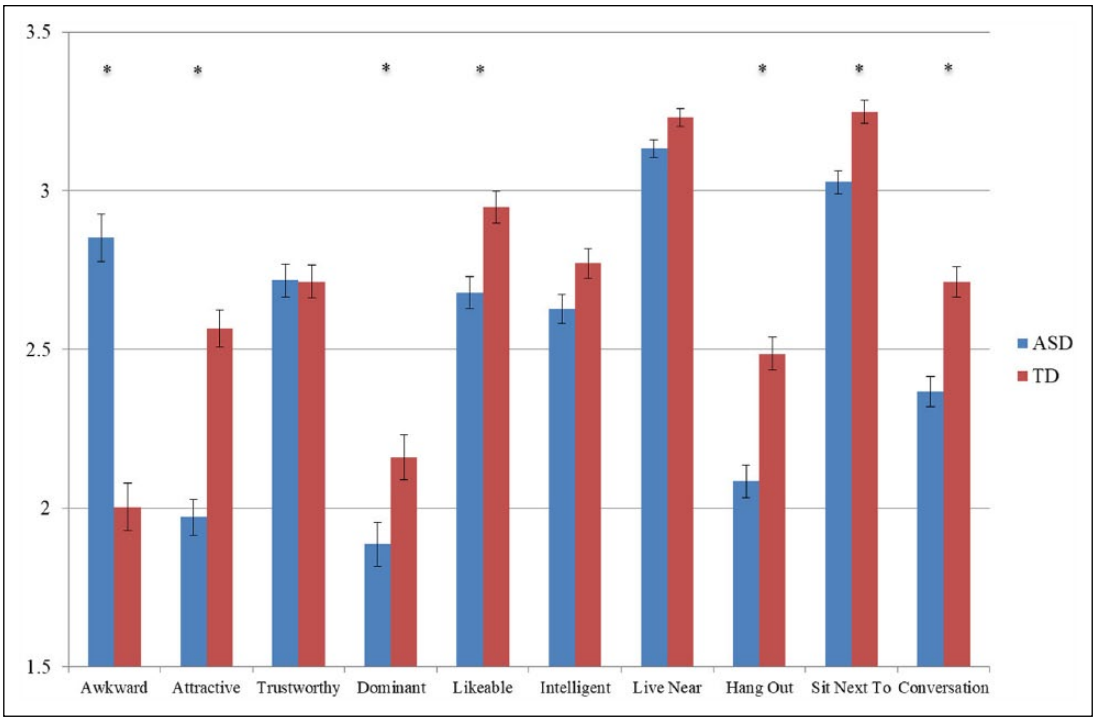

Figure 1. First-impression ratings for the ASD and TD stimulus groups across each of the 10 rated first-impression items (*$p < 0.005$).

order effects, but appeared in the same order across the 40 videos for each individual rater.

After finishing the task, rating participants completed the Autism Knowledge Scale (Gillespie-Lynch et al., 2015), the BAPQ (Hurley et al., 2007), and the Ten-Item Personality Inventory (TIPI; Gosling et al., 2003). The Autism Knowledge Scale was first developed by Stone (1987), but later updated and condensed to 13 statements about autism (Gillespie-Lynch et al., 2015). Rating participants answer each statement on a 5-point scale for accuracy of the statement, with higher total scores indicating higher autism knowledge. Rating participants in this study had a mean score on the Autism Knowledge Scale of 10.79 (standard deviation (SD) = 5.36). The BAPQ is a well-validated, 36-item measure of subclinical autism traits (see Sasson et al., 2013). Participants endorse each item on a 1–6 scale and items are averaged to produce an overall score. The BAPQ was used instead of the AQ for the rating participants because of psychometric evidence that it better captures aspects of the Broad Autism Phenotype in the general population (Ingersoll et al., 2011). The mean overall BAPQ score in the current sample of rating participants was 2.97 (SD = 0.66). The TIPI is a condensed 10-item measure of Big Five personality traits (extraversion, agreeableness, conscientiousness, emotional stability, and openness) using a 1–7 scale that converges with lengthier, more comprehensive assessments of the Big Five. It is commonly used in studies where personality is not the primary focus of investigation (Gosling et al., 2003).

Results

We conducted a 2 (ASD vs TD stimulus participant group) by 4 (label condition) by 10 (rating item) mixed-model analysis of variance (ANOVA) and found a significant main effect of stimulus participant group ($F(1, 38) = 42.20, p < 0.001, \eta_p^2 = 0.526$). The ASD stimulus group was rated less favorably ($M = 2.46$, SD = 0.15) than the TD stimulus group ($M = 2.78$, SD = 0.16). This main effect, however, was qualified by significant interactions between stimulus group and rating item ($F(9, 342) = 17.41, p < 0.001, \eta_p^2 = 0.314$), group and label ($F(3, 114) = 8.19, p < 0.001, \eta_p^2 = 0.177$), and a three-way interaction between stimulus group, label, and rating item ($F(27, 1026) = 3.63, p < 0.001, \eta_p^2 = 0.087$). Follow-up pairwise comparisons explored patterns of stimulus group differences on each of these interactions using a Bonferroni correction to an alpha of 0.005 to account for multiple comparisons across the 10 rating items.

For the stimulus group by rating item interaction (see Figure 1), ASD stimulus participants were rated less favorably than TD stimulus controls on all items except for trustworthiness ($p = 0.960$), with intelligence ($p = 0.035$) and willingness to live nearby ($p = 0.020$) also not reaching significance after correcting for multiple comparisons. The largest effects were found for awkwardness ($t(38) = 8.01, p < 0.001; d = 2.60$), attractiveness ($t(38) = 7.22, p < 0.001; d = 2.34$), and likelihood of hanging out with ($t(38) = 5.55, p < 0.001; d = 1.80$), starting a conversation with ($t(38) = 5.21, p < 0.001; d = 1.69$), and

comfortable sitting next to ($t(38) = 4.35$, $p < 0.001$; $d = 1.42$) the participant. These findings replicate findings reported in Sasson et al. (2017).

For the stimulus group by label interaction (see Figure 2), ASD stimulus participants were rated more favorably when accompanied by an accurate diagnostic label than when (a) no label was provided ($t(19) = 4.45$, $p < 0.001$, $d = 1.00$); (b) mislabeled as being TD ($t(19) = 4.99$, $p < 0.001$, $d = 1.12$); and (c) mislabeled as having a schizophrenia diagnosis ($t(19) = 3.88$, $p = 0.001$, $d = 0.87$). Ratings for ASD stimulus participants did not differ between when no label was provided and when mislabeled as being TD ($p = 0.656$) or when they were mislabeled as having a diagnosis of schizophrenia ($p = 0.947$). In contrast, only one label contrast differed significantly for TD stimulus participants: they were rated more favorably when mislabeled as having autism than when no label was provided ($t(19) = 3.21$, $p = 0.005$, $d = 0.72$).

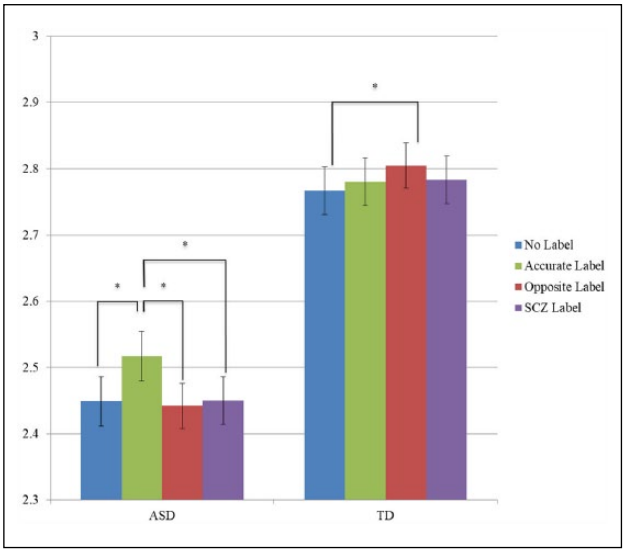

Figure 2. First impressions of the ASD and TD stimulus groups across the four labeling conditions: no label, accurate label, opposite label, and schizophrenia (SCZ) label (*$p < 0.005$).

For the three-way interaction between stimulus group, label, and rating item, the label conditions affected ratings differently for ASD and TD stimulus participants. For ASD stimulus participants, providing an accurate diagnostic label improved ratings on all items at a mean level compared to when no label was provided (see Figure 3), with three surviving the corrected alpha of 0.005: trustworthiness ($p < 0.001$), likeable ($p < 0.001$), and likelihood of starting a conversation with the participant ($p = 0.001$). Three others approached the corrected alpha: intelligent ($p = 0.01$), likelihood of hanging out with ($p = 0.01$), and comfort sitting next to ($p = 0.01$) the participant. Mislabeling ASD stimulus participants as TD, however, did not significantly affect ratings on any items for ASD stimulus participants compared to when no label was provided (all ps > 0.20).

In contrast, none of the 10 rating items for TD stimulus participants differed between when an accurate diagnostic label was provided compared to when no label

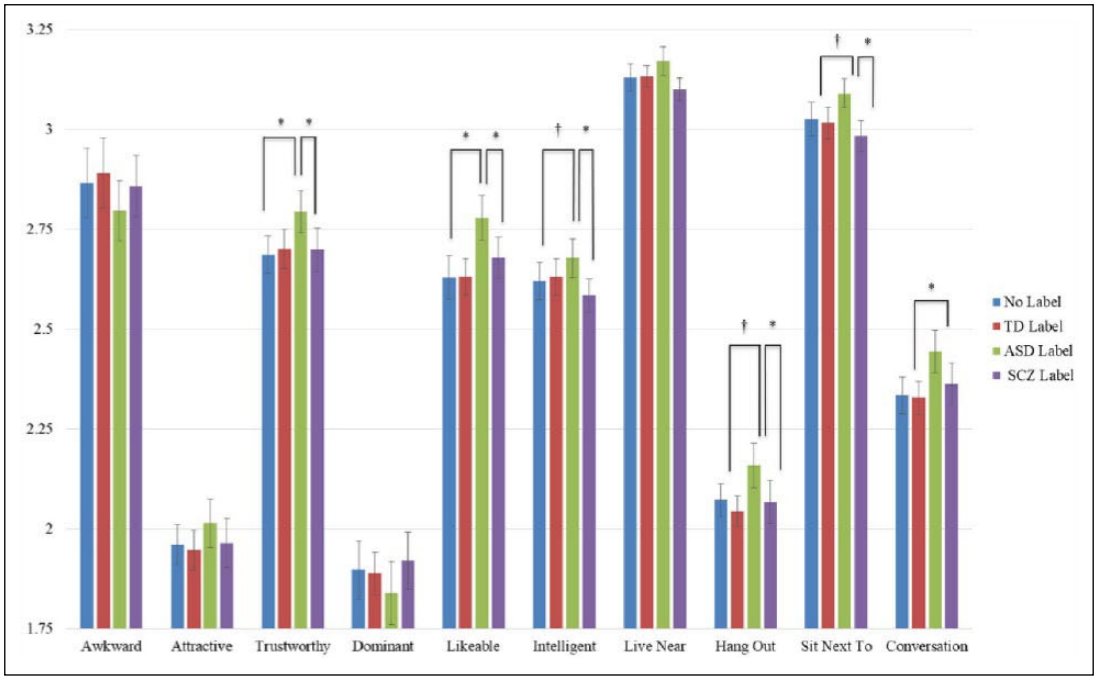

Figure 3. Ratings for ASD participants across label conditions: none, typically developing (TD), ASD, and schizophrenia (SCZ). Ratings are most favorable when an accurate diagnostic label is provided (*$p < 0.005$; †$p < 0.01$).

was provided (all ps > 0.25). However, mislabeling TD stimulus participants as ASD resulted in higher ratings of likeable ($p < 0.001$) and trustworthiness ($p = 0.001$) than when no label was provided. Furthermore, intelligence ($p = 0.01$), attractiveness ($p = 0.02$), and likelihood of hanging out with the stimulus participant ($p = 0.007$) also received higher ratings, and dominance received lower ratings ($p = 0.02$), but these did not cross the corrected alpha threshold of 0.005.

Providing a label of schizophrenia for ASD stimulus participants resulted in worse ratings for trustworthiness ($p = 0.002$), likeable ($p = 0.003$), intelligence ($p < 0.001$), likelihood of hanging out with ($p = 0.001$), and comfortable sitting next to ($p = 0.001$) the stimulus participant compared to when an accurate diagnostic label of autism was provided (see Figure 3). When TD stimulus participants were mislabeled with a schizophrenia diagnosis, none of the ratings for the 10 items differed significantly compared to when an accurate TD label was provided (all ps > 0.04), but they were worse compared to when TD stimulus participants were mislabeled as having autism for trustworthiness ($p = 0.002$) and likelihood of having a conversation with the participant ($p = 0.003$), and hanging out with the participant approached the corrected alpha ($p = 0.01$). Compared to when no label was provided, providing a schizophrenia label did not affect ratings on any items for ASD and TD stimulus participants (all ps > 0.03).

Exploratory analyses

We conducted exploratory regression analyses to assess whether first impressions were associated with characteristics of the stimulus participants and of the rating participants. To simplify the output and reduce the number of comparisons being made, the 10 first-impression items were averaged to create a single index of first-impression quality. The Chronbach's alpha for the 10 items averaged across stimulus group and label condition was 0.82, indicating strong internal consistency.

Across all labeling conditions, stimulus participant characteristics (age, gender, IQ, and AQ) accounted for a significant proportion of variance in first-impression ratings across both stimulus groups ($R^2 = 0.35$, $F(4, 34) = 4.59$, $p = 0.01$), with AQ and gender (ps < 0.04), but not age and IQ (ps > 0.14) related to first impressions when other predictor variables were controlled. Higher AQ scores in the stimulus participants predicted less favorable ratings ($b = -0.01$, $\beta = -0.44$, standard error (SE) = 0.004), and female stimulus participants were rated more favorably than males ($b = -0.19$, $\beta = -0.32$, SE = 0.09). For ASD stimulus participants, ADOS communication and social interaction total scores were added as a predictor, and higher ADOS scores were associated with less favorable impressions in the accurate label and schizophrenia label conditions at a trend level (accurate: $b = -0.02$, $\beta = -0.42$, SE = 0.01, $p = 0.06$; schizophrenia: $b = -0.03$, $\beta = -0.47$, SE = 0.01, $p = 0.05$). They were not related to ratings in the mislabeled and no label conditions (ps > 0.09).

For rating participants, rater characteristics (age, gender, IQ, Big Five personality traits, and BAPQ score) did not account for a significant proportion of total variance in ratings of ASD stimulus participants across the four labeling conditions (ps > 0.60). We then added the autism knowledge score of rating participants to the model to see whether it accounted for any variance in first-impression ratings above and beyond other rater characteristics. It produced a significant change in the variance accounted for in first-impression ratings when ASD stimulus participants were accurately labeled ($\Delta R^2 = 0.03$, $F(1, 202) = 5.32$, $p = 0.02$), but this pattern did not extend to when ASD stimulus participants were mislabeled as TD, schizophrenia, or presented with no label (all ps > 0.15). Autism knowledge score also accounted for a significant change in the variance above other rater characteristics when TD stimulus participants were labeled with ASD ($\Delta R^2 = 0.06$, $F(1, 202) = 8.15$, $p = 0.01$) and schizophrenia ($\Delta R^2 = 0.04$, $F(1, 202) = 8.96$, $p < 0.001$), but not when TD stimulus participants were given no label or an accurate label (ps > 0.11). For each of the significant effects, higher autism knowledge in rating participants was predictive of more positive first-impression ratings of stimulus participants (ASD accurately labeled: $b = 0.01$, $\beta = 0.17$, and SE = 0.004; TD labeled as schizophrenia: $b = 0.01$, $\beta = 0.21$, and SE = 0.003; and TD labeled as ASD: $b = 0.01$, $\beta = 0.20$, and SE = 0.003).

Discussion

This study examined whether first impressions made by TD observers of intellectually able adults with ASD differ when diagnoses are disclosed compared to when they are withheld. Replicating previous work (Sasson et al., 2017), first impressions made by unfamiliar TD observers were markedly less positive for adults with ASD compared to TD controls across a range of judgments, including observers reporting greater hesitancy to socially interact with ASD stimulus participants. First impressions, however, were significantly more favorable for ASD stimulus participants when they were labeled as having autism compared to when no label was provided, and higher autism knowledge on the part of raters was associated with more favorable first impressions of accurately labeled ASD stimulus participants. Taken together, these findings suggest that diagnostic disclosure helps rather than harms social evaluation of adults with ASD, particularly when peers have knowledge about the characteristics of autism.

Thus, findings align with other recent studies (Brosnan and Mills, 2016; Butler and Gillis, 2011) suggesting that

negative perceptions of behaviors associated with autism are lessened when observers are informed of the diagnostic status of the individual evaluated. A diagnostic label may provide observers with an explanation for what they perceive to be atypical social presentations or behavior (Chambres et al., 2008), resulting in a more positive assessment. This interpretation is supported by the fact that the greatest benefit of including an accurate diagnostic label for individuals with ASD occurred for the items of likability, trustworthiness, and the likelihood of starting a conversation with the participant. Likeability and trustworthiness are part of a constellation of first-impression traits associated with the development and maintenance of positive relationships (Human et al., 2013), and higher ratings for "starting a conversation" indicate that unfamiliar observers report stronger interest in pursuing social interaction with adults with ASD when an accurate diagnostic label is provided. For adults with ASD who often miss out on social opportunities because of the negative judgments of their neurotypical peers (Sasson et al., 2017), such improvements in their first impressions may benefit the quantity and quality of their social experiences.

However, even TD stimulus participants were rated more favorably when mislabeled as ASD compared to when no label was provided, suggesting that negative social judgments are softened when an autism diagnosis is assumed, regardless of the actual diagnostic status of the individual being evaluated. Further, not all diagnostic labels resulted in more favorable first impressions. In contrast to the positive effect that a label of autism provided for ASD stimulus participants, mislabeling them as having schizophrenia resulted in lower ratings compared to when a diagnosis of autism was provided. Thus, despite affording observers a clinical explanation for the differences in social behavior they were detecting, first impressions were significantly poorer when raters were told stimulus participants had a schizophrenia diagnosis. This finding indicates a stigma associated with a diagnosis of schizophrenia but not autism for raters in this study, despite similarities in social behavior between these two clinical groups (Morrison et al., 2017).

Importantly, while evaluations improved for adults with ASD when their autism diagnosis was provided, they nevertheless remained significantly lower than those of TD controls. This suggests that disclosure lessens, but by no means eliminates, negative first impressions for adults with ASD. Even when their diagnosis is known, intellectually able adults with ASD still face biases that reduce the quantity and quality of their social experiences with non-autistic people. In turn, adults with ASD may be shut out of opportunities to practice their social skills, form social connections, and make progress toward better social integration.

One factor that may mitigate these biases is increasing the autism knowledge of their peers. Autism knowledge on the part of raters—but not their other characteristics like gender, age, IQ, personality or autistic traits—was associated with more favorable impressions of adults with ASD. Although this is consistent with prior studies (Gillespie-Lynch et al., 2015; Tipton and Blacher, 2014; White et al., 2016), this association only emerged when stimulus participants were identified as having autism and did not occur when raters were blind to their diagnostic status. This suggests that autism knowledge may benefit first impressions of adults with ASD not by helping observers detect autistic characteristics and judge them more favorably, but rather by leading observers to feel more positively inclined when evaluating someone known to have autism.

Nevertheless, this finding suggests that the social experiences of adults with ASD may improve with increased autism knowledge on the part of TD peers. Although this does not negate the individual impairments experienced by adults with ASD, it acknowledges the reciprocal nature of social interaction, in which the beliefs, perceptions, and actions of others in the environment affect social functioning for adults with ASD. This perspective is consistent with a social model of disability (Oliver, 2013), in which social impairment in adults with ASD is driven by a mismatch between individual traits and the surrounding social context. Mitigating this social impairment can occur by focusing on either, or ideally both, of these factors: supporting and developing individual traits that improve social functioning and by adjusting the social context to be more accommodating and accepting of social inclusion.

An important consideration when interpreting these results is that the rater group in this study consisted exclusively of undergraduate students. Given that autism knowledge and acceptance is increasing rapidly among university students (White et al., 2016), it is unclear whether diagnostic disclosure would similarly improve first impressions of adults with ASD for other groups of raters. Notably, the raters in our study demonstrated high levels of autism knowledge relative to previous studies. The mean performance of our raters on the Autism Knowledge Scale was a 10.79, which far exceeds the 7.67 scores of the university students in the original Gillespie-Lynch et al. (2015) paper, and even exceeds their scores after they participated in a program to specifically learn about ASD (10.15; Gillespie-Lynch et al., 2015). The high autism knowledge in our sample may have occurred because our rater group consisted of undergraduate students at a university with one of the highest rates of ASD enrollment in the country (Hoffman, 2016). Raters also were Psychology/Neuroscience students, which may have increased their familiarity with autism. Thus, because autism knowledge could reasonably be expected to be lower in other groups, the benefit of disclosure on first impressions for adults with ASD may not extend to the same degree to other populations. Nevertheless, our findings are consistent with the conclusion that greater autism knowledge is associated with more favorable impressions of people with ASD and

that targeting TD peers for training and education in addition to those with ASD may be a more comprehensive strategy for improving social functioning in autism.

Further, although it produced a significant effect, autism knowledge accounted for only a small percentage of the variance in first-impression ratings of those with ASD. Future work may seek to specify additional variables associated with improved impressions of people with autism, as the other characteristics assessed here—age, gender, IQ, autistic traits, and personality—were not predictive. One promising candidate is high-quality interpersonal contact, a variable distinct from autism knowledge that is associated with greater openness and acceptance toward those with ASD (Gardiner and Iarocci, 2014). A finding that personal experience with autism accounts for a sizeable portion of the variance in positive first impressions of those with ASD would lend further support to the notion that inclusion and community integration of people with autism can help address and reduce discriminatory attitudes.

This study has several other limitations. First, it is unclear whether the benefit of diagnostic disclosure for intellectually able adults with ASD would extend to other settings and other forms of evaluation beyond first impressions. For example, what factors affect how disclosure affects established relationships, employment opportunities, or romantic prospects? Even if first impressions are improved with diagnostic disclosure, it may be the case that the professional and personal discrimination experienced by some with ASD would persist or even worsen with disclosure. The limited scope of this study precludes addressing important questions about the long-term consequences of diagnostic disclosure. Second, although females across the TD and ASD stimulus groups were rated more positively by raters than males, the small number of females with ASD in the study prevented examination of whether diagnostic disclosure affects first impressions differently for females and males with ASD. Given prior evidence that females may be more motivated and adept at "camouflaging" their autistic characteristics (Lai et al., 2016), future studies are encouraged to examine how first impressions of females with ASD might differ as a function of diagnostic disclosure and autism knowledge on the part of peers. Third, although the videos of real-world social behavior of adults with ASD used in this study are more naturalistic and ecologically valid relative to prior studies using descriptions or vignettes of autistic characteristics, they depicted participants delivering a monologue, which may not fully capture social behavior during conversation with another person. Further, rating participants did not directly interact with stimulus participants. They were third-party observers, and the effects of diagnostic disclosure upon first impressions may differ within the context of dynamic live social interactions. Finally, although we found that greater autism knowledge was associated with more favorable impressions of individuals labeled as having autism, we were unable to examine whether a similar pattern extended to schizophrenia, as has been found in prior studies (Corrigan et al., 2001). In retrospect, it would have been beneficial to also collect data on schizophrenia knowledge in our rating participants. If our sample demonstrated greater autism knowledge relative to schizophrenia knowledge, this might help explain our finding of a stigma associated with a schizophrenia label but not an autism one. Indeed, because our sample was drawn from a university with a sizeable ASD population, the discrepancy found between the autism and schizophrenia label conditions may have been driven in part by greater community integration and personal familiarity with autism relative to schizophrenia for our rating participants. However, empirical data are needed to assess the validity of this interpretation.

In conclusion, findings from this study indicate that first impressions of intellectually able adults with ASD improve when their clinical status is known to observers relative to when it is withheld. Not only were adults with ASD rated as more likable and trustworthy when their diagnosis was disclosed, but observers also reported a greater inclination to start a conversation with them compared to when no diagnosis was provided. This finding suggests that at least for the raters tested here, diagnostic disclosure for adults with ASD results in more favorable trait judgments and greater opportunities for social interaction. Further, given that autism knowledge on the part of the raters was associated with more positive first impressions of adults with ASD, social outcomes for intellectually able adults with ASD may benefit from increasing awareness, understanding, and acceptance of autism among non-autistic peers in their social environments. Taken together, these findings suggest that social evaluation of adults with ASD by unfamiliar peers is more favorable when their clinical status is known and peers have higher levels of knowledge about autism.

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