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# Children's and adults' thinking about autism spectrum disorder: Conceptualizations, dehumanization, and willingness for inclusion

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## ABSTRACT

Participants were 82 children aged 9–11 and 169 adults aged 18–65, majority White European; data were collected in Northern Ireland between January and June 2022. Children's awareness of autism was assessed by asking what they know about autism. Children and adults also judged the extent to which a hypothetical autistic peer had capacity for mental experiences (emotions and personality traits). Emotions and personality traits varied between non-uniquely, or uniquely human, and the effect of valence (positive/negative) was also examined. We describe the extent to which children and adults attribute capacity for mental experiences to an autistic peer, and examine potential dehumanization of the peer through relative denial of uniquely human mental experiences. Denial of uniquely human mental experiences predicted how happy participants expected themselves (adults) and others (children and adults) to be about including the peer. Findings suggest children of this age hold fairly accurate representations of autism, and that dehumanization of autistic people may contribute to their exclusion by neurotypical peers.

Autism/Autism Spectrum Disorder (ASD) is a developmental disorder characterized by persistent deficits in social communication and interactions, accompanied by restricted and repetitive behaviors ([American Psychiatric Association, 2013](#)). Autism diagnoses are common. For example, in Northern Ireland (where the current study took place), the prevalence is estimated at 3.21% of school aged children ([McConkey, 2020](#)), and comparable rates are observed in other Westernized contexts (e.g., 3.14% in the USA, [Li et al., 2022](#)). Crucially, the majority of autistic children attend mainstream education ([McConkey, 2020](#)), yet, tend to experience worse outcomes than their non-autistic peers ([Sterzing et al., 2012](#)). In particular, autistic youth are at increased risk of social exclusion, reporting having significantly fewer friends, being ignored by peers, and experiencing bullying on a regular basis ([Wainscot et al., 2008](#)). Indeed, this is the case when compared against both neurotypical peers, and those with other disabilities ([Humphrey & Symes, 2010](#); [Rowley et al., 2012](#)). Such exclusion has enduring consequences, and is longitudinally linked to poorer mental health outcomes for both autistic children ([Botha & Frost, 2020](#)) and adults ([Cage et al., 2018](#)). Thus, the current study examines factors which may contribute to neurotypical individuals' decisions to include or exclude an autistic peer. We examine, first, the conceptualizations that children hold of autism. Second, we examine the extent to which children and adults potentially dehumanize an autistic peer through the relative denial of uniquely human mental experiences. And third, we investigate participants' expectations that they, or others, would include a peer with autism, the affective consequences of such inclusion, and if denial of mental experiences predicts willingness for inclusion. Note, we wish to recognize the ongoing debate about the appropriateness of identity-first (autistic person) versus person-first (person with autism) language ([Botha et al., 2021](#)). In the current study, we adopt 'autistic/autistic person' in line with recent

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recommendations (Bury et al., 2020; Kapp et al., 2013).

## 1. Children's understanding of autism/ASD

Children recognize social categories (Rhodes & Baron, 2019), and the hierarchies that exist between those categories (Elenbaas et al., 2020). Extensive research has focused on children's conceptualizations of, and inferences about, gender (Bian et al., 2017; Mandalaywala et al., 2020), race (Dukler & Liberman, 2022; Qian et al., 2019), and ethnicity (Birnbaum et al., 2010; Dautel et al., 2020). However, relatively less is known about how children and youth represent categories relating to disability in general (Granata et al., 2022; Huckstadt & Shutts, 2014; Wiebe et al., 2022), and in particular, intellectual disabilities (Nowicki et al., 2014) or developmental disorders (Dillenburger et al., 2017). With respect to autism, specifically, some studies have examined the proportion of children and young people who recognize and provide relatively accurate definitions of autism (Campbell & Barger, 2011). For example, UK based population surveys conducted in 2015 ('the Kids' Life and Times' survey - 11-year-olds, and 'the Young Life and Times' survey - 16-year-olds) found that 50% of 11-year-olds and 80% of 16-year-olds had an awareness of autism. In their explanations, children frequently used the words 'disability', 'disease' or 'illness', alongside 'learning' and 'mental', and also made reference to autism as a 'difference from others' with effects on 'thinking', 'talking', 'speaking', and 'problems making friends' (Dillenburger et al., 2017). Similar findings have also been reported in a US population study (Campbell & Barger, 2011); 46% of children aged 11–13 recognized autism and could correctly answer questions regarding its etiology and course. Thus, though evidence remains limited, it appears that by age 11, a substantial proportion of children have a fairly accurate concept of autism, in these contexts.

Understanding the emergence and change in children's awareness of autism is important because prior studies have found that an increased understanding of autism predicts, or co-occurs, with improved attitudes towards autistic people (Campbell et al., 2019; Dillenburger et al., 2017; Morris et al., 2021). Though, it may be that simply providing explanatory or descriptive information about autism is insufficient to elicit an improved effect on attitudes (Swaim & Morgan, 2001). Rather, having knowledge of autistic peers as being individualized, and having specific capabilities, appears to be beneficial (Ochs et al., 2001). Indeed, contact, which is likely to generate precisely this type of knowledge, appears to be an effective means of improving the attitudes of neurotypical youth towards autistic peers (Mavropoulou & Sideridis, 2014; Nistor & Dumitru, 2021). Therefore, it is critical to understand not only if children have an awareness of autism (e.g., its etiology and symptoms), but also the specific content of their social conceptualizations about autistic/autistic persons (e.g., positive/negative differences, homogenization of autism). Understanding the latter will be beneficial for further refinement of intervention practices, e.g., addressing particularly harmful stereotypes (Lu et al., 2022). Thus, in the current study, we sought to replicate previous findings on children's spontaneous conceptualizations of autism (research question one [RQ1]), by asking children what they know about autism.

### 1.1. Development of dehumanization

In addition to examining children's explicit conceptualizations of autism, we also examined the extent to which children and adults attributed capacity for mental experiences to an autistic peer, and potentially dehumanized them through the relative denial of uniquely human mental experiences (research question two [RQ2]). We investigated dehumanization because this type of cognition can be a mechanism for justifying biased treatment of outgroups, such as exclusion (Haslam & Stratemeyer, 2016). Dehumanization is the process by which individuals are perceived as somehow less human; often, this process involves evaluating the humanness of an outgroup relative to the ingroup (Haslam & Loughnan, 2014). Previous evidence demonstrates that dehumanization occurs with respect to a wide range of outgroup targets, including groups based on race, social class, and mental illness diagnoses (Costello & Hodson, 2014; Loughnan et al., 2014; Martinez et al., 2011).

Many salient historic examples of dehumanization are blatant (e.g., comparisons of racial and ethnic groups to rats, snakes, or insects); yet, everyday dehumanization may be subtle (Haslam & Loughnan, 2014; Kteily et al., 2015). For example, both infrahumanization and dual models of dehumanization consider how 'uniquely human' characteristics may be less often attributed to outgroups than ingroups, but that 'non-uniquely human' characteristics may be attributed to both groups with equal frequency and intensity (Haslam, 2006; Leyens et al., 2007). Thus, outgroups may be relatively denied characteristics thought to separate humans from non-human entities (e.g., other non-human animals and machines). These characteristics are derived from empirical studies which ask participants to rate how exclusive a characteristic is to humans (Demoulin et al., 2004; Enock, Flavell, et al., 2021), and oftentimes relate to concepts of civility, morality, and logic (e.g., cultured, sophisticated, moral, ethical, wise, rational). Though subtle, the consequences of such dehumanization can still be serious; for example, infrahumanization is linked with reduced outgroup prosocial behaviors following a natural disaster (Cuddy et al., 2007), and decreased forgiveness of outgroup members in post-conflict societies (Tam et al., 2007).

Dehumanization has also been documented in childhood (McLoughlin, 2023). For example, children aged between 6 and 10 attributed more uniquely human emotions (e.g. embarrassment and guilt) and personality traits (e.g. curiosity and creativity) to their racial ingroup, relative to an outgroup (Costello & Hodson, 2014). This effect was also found among children aged 6–7 and 10–11, in the context of groups based on national (Scotland/England) football teams. A significantly greater intensity of uniquely human emotions was attributed to the ingroup than non-uniquely human emotions, while no significant difference was found between intensity of uniquely and non-uniquely human emotions for the outgroup, and this effect was not associated with age (Martin et al., 2008). Children as young as five also demonstrated dehumanization towards both gender and geographic outgroups, by perceiving less humanness in their faces, an effect which increased with age (McLoughlin et al., 2018). Children of this same age group were found to describe ingroup members (gender and geographic location-based groups) with a greater number of mental state terms compared to

members of their outgroup (McLoughlin & Over, 2017). Furthermore, the extent to which children think of outgroup members as experiencing mental states appears linked to their outgroup behaviors; McLoughlin and Over (2019) found that encouraging children to consider the emotions of outgroup members (immigrant children) led to increases in prosocial sharing with outgroup members. These findings are relevant to the third research question of the current study (RQ3): does dehumanization predict participants' willingness to include an autistic peer?

### 1.2. Dehumanization and Autism/ASD

Relative to other types of outgroup, dehumanization of autistic people has been relatively less researched. Yet, prior commentaries have noted that autistic individuals have been dehumanized even within the research process, being described, for example, as less domesticated, and compared to great apes (Botha et al., 2021; we note that humans are technically great apes, but that the comparison may, nonetheless, have negative consequences). Accounts from autistic individuals also reveal experiences of stigma from childhood including infantilization, discrimination and dehumanization, and report engaging in attempts to fit in and concealment to manage this (Botha et al., 2022). In one of the few experimental investigations, Cage et al. (2019) found dehumanization of autistic individuals by non-autistic young adults, aged 16–21, through the denial of uniquely human personality characteristics (e.g., conscientious and polite). Parker et al. (2020) also found evidence of prejudice toward autistic people, which included beliefs that individuals with developmental disabilities are harmful and should be isolated from others; holding such beliefs was associated with a greater tendency to dehumanize through denial of uniquely human and human nature traits (traits that are typical, though not unique to, human nature, e.g., emotion responsiveness, warmth). We were unable to find any prior investigations which examined the dehumanization of autistic individuals by children. Yet, as discussed above, inclusion of autistic peers was facilitated by discussion of their likes, dislikes, strengths, and weaknesses, which may be interpreted as encouraging mentalizing (Ochs et al., 2001), suggesting that dehumanization may contribute towards the exclusion of autistic youth by their peers.

### 1.3. Exclusion

Exclusion because of group membership (e.g., race, gender, ethnicity) is a persistent global issue; the antecedents of which first become evident in childhood (Abrams & Killen, 2014). For example, in mid-childhood, a clear preference for ingroup members is demonstrated, with respect to, e.g., sharing of resources (Taylor et al., 2021), offers of instrumental help (Sierksma et al., 2015), and friendship choice (Kinzler et al., 2009). 'Social Identity Theory' outlines how a preference for one's ingroup can be adaptive; that is, evaluating our own groups relatively more positively yields benefits to self-esteem and sense of identity (Tajfel & Turner, 2004). However, any potential benefits to oneself may be outweighed by the negative effects experienced by those who receive biased treatment and are excluded (Timeo et al., 2019). For example, among youth, exclusion is linked to depressed affect (Bukowski et al., 2010), decreased academic engagement and achievement (Buhs et al., 2006), and a range of internalizing problems (Reijntjes et al., 2010). In summary, the negative consequences of group-based exclusion among youth remain a prevalent concern.

### 1.4. The current study

There is a pressing need to understand the factors that contribute to the exclusion and bullying of autistic people, particularly given the frequency of contact between autistic and non-autistic youth in mainstream education settings. The current study aimed, first, to replicate and extend the existing research on children's conceptualizations of autism/ASD by examining children's spontaneous explanations of this construct, which strengthens the interpretation of evidence obtained from scale responses (Campbell & Barger, 2011). Second, we examined the extent to which children and adults attribute or deny various mental experiences to a peer with autism; dehumanization was evidenced in the current study by greater denial of uniquely human mental experiences, relative to non-uniquely human experiences. When examining dehumanization, we also accounted for the valence (positive/negative) of mental experience terms, because recent analysis and critiques suggest that the denial of mental experiences to outgroups may largely be driven by their valence (Enock, Tipper, et al., 2021; Over, 2021). That is, some uniquely human characteristics may actually be *more* likely to be attributed to outgroups because they are antisocial in nature (e.g., arrogance, contempt, scorn).

We examined emotions and personality traits separately to explore potential differences in how participants attributed them to autistic individuals. Emotions and personality traits differ in that the former are understood to be more temporally bound and context dependent (Kramer et al., 2021; Lagattuta, 2005), while the latter tend to be stable and enduring. Given that autism is characterized by atypical emotional response and deficits in emotional regulation, specifically (Cai et al., 2018; Mazefsky et al., 2013), it was plausible that participants may have attributed emotions and personality traits differently to an autistic peer. Moreover, in a prior investigation of children's dehumanization, Costello and Hodson (2014) analyzed denial of emotion and personality traits separately. Yet, they only analyzed the effect of valence in relation to emotion; thus, the current study extends the literature by also examining the role of valence in relation to personality traits. Potential differences in emotions and personality traits were exploratory, and we had no a priori hypotheses regarding this difference.

Finally, we explored participants' expectations that they, or others, would include an autistic peer, how they would feel as a result, and whether their denial of mental experiences to an autistic peer related to their judgements about inclusion/exclusion. It is important to examine these questions developmentally because children and adolescents may be particularly susceptible to negative outcomes following exclusion, when compared with adults (Abrams et al., 2011; Sebastian et al., 2010). We selected 9–11-year-olds to participate because previous research had shown that only about 50% of similarly aged (indeed, slightly older) youth had an awareness

of autism (Campbell & Barger, 2011). Yet, we noted the sustained public awareness efforts that have occurred in the time since these prior investigations (e.g., the introduction of ‘just a minute [JAM]’ cards) (Donnelly et al., 2018). Therefore, we believed it was possible that a substantial proportion of children in this age group may have an awareness of autism.

## 2. Method

### 2.1. Participants

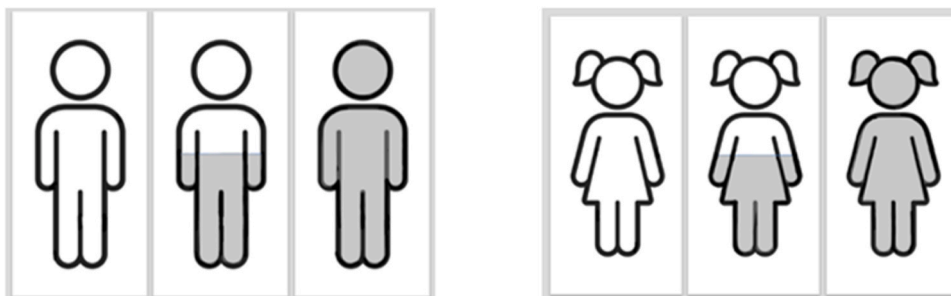
A total of 251 participants took part: 82 children aged 9–11 ( $M_{age} = 10.69$  years,  $SD = 0.77$ , 58.54% female) and 169 adults aged 18–65 ( $M_{age} = 25.74$  years,  $SD = 12.80$ , 71.08% female), majority White European descent. Children were recruited from two primary schools in Northern Ireland, where they completed the study in person, and were given a small gift as thanks for participation; opt-in consent was obtained from parents and guardians. The percentage of children entitled to free school meals within the schools sampled provides an indicator of socioeconomic status (SES); an average of 46.18% of children in the schools sampled were entitled to free school meals, compared to the national average of 27.20% ( $SD = .17$ ). Thus, children were sampled from areas with below average SES; SES data were unavailable for adults. Adults were recruited via social media ( $n = 71$ ) and through an undergraduate psychology research participation scheme ( $n = 98$ ), and they completed the study online. Participants with a diagnosis of autism/autism spectrum disorder were not eligible to participate. Data were collected between January and June 2022. A priori power analysis conducted in GPower 3.1 (Faul et al., 2007) recommended the following minimum sample sizes (per analysis) to detect medium effect sizes with 80% power at a significance criterion of  $\alpha = .05$ : one sample Wilcoxon signed ranks tests ( $N = 35$ ), chi-squared test ( $N = 88$ ), linear regression with 4 predictors ( $N = 85$ ), and  $2 \times 2$  mixed ANOVA ( $N = 48$ ).

### 2.2. Procedure

The study was granted ethical approval by the faculty research ethics committee at the authors’ institution. Parents and guardians provided consent by returning signed permission slips in advance of the research team’s visit. A research assistant introduced themselves to children with parental consent and received children’s assent to participate in a study about the types of people with whom the participant might like to be friends. After gaining children’s assent, but prior to receiving any further information, a subsample of children ( $n = 55$ ) were asked, “Have you heard of autism before?”. Fewer children answered this item as it was added to the protocol following some initial data collection, but prior to inspection of the data. Positive responses were followed by “Can you tell me what you know about autism?”. A written record of responses was obtained. For all participants, the procedure then proceeded with an explanation of autism using a gender matched autistic character (Paul/Sarah); for children, this was presented on paper with child appropriate graphics, while for adults, the same text was presented in Qualtrics (see [Supplementary Materials, Figs. 1 and 2](#)). The description was designed to map onto the DSM-V diagnostic criteria for ASD (American Psychiatric Association, 2013). Participants were told, “not all people with autism are the same but they can have a lot of things in common”, before being provided with exemplar behaviors of an autistic person, including restrictive and repetitive behaviors, deficits in social communication and interaction, and sensory differences. After receiving a description of autism, the remaining measures were administered in a standard order, as below. The procedure took approximately 30 min to complete.

#### 2.2.1. Dehumanization

Approximating the design of Costello and Hodson (2014), participants were asked to attribute capacity for emotions and personality traits to autistic individuals: “I am going to read out some feelings and what they mean. Remember Paul/Sarah? I want you to tell me how much you think someone like Paul/Sarah (a person with autism) can have these feelings, compared to someone like you, who doesn’t have autism.” To indicate their answer, children were asked to point at one of three images on a ‘stick-figure’ scale, that was a novel contribution of the current study (see [Fig. 1](#)). The scale consisted of three gender-matched human outlines shaded to different extents; a fully shaded figure corresponded to ‘very much so’, a half-shaded figure corresponded to ‘a little bit’, and a non-shaded figure corresponded to ‘not at all’.



**Fig. 1.** Novel pictorial scale used in the dehumanization measure (gender matched to males [left] and females [right]). Participants judged how much the autistic target could have mental experiences. Scale points left through right correspond to, ‘not at all’, ‘a little bit’ and ‘very much so’.



Fig. 2. Base storyboard for the female child condition [top] and response options: exclude (bottom left) and include (bottom right).

Scale training was provided to children using the term ‘joy’, as follows: “Joy means when a person feels very happy. Compared to someone like you (who does not have autism), how much do you think someone like Paul/Sarah (who does have autism) can feel joy? You can say ‘not at all’ by pointing at this stick person – they are not colored in at all because they cannot feel joy at all. Or you can say ‘a little bit’ by pointing to this stick person – they are colored in a little bit because they can feel joy a little bit. Or you can say ‘very much so’ by pointing at this stick person – they are completely colored in because they can feel joy very much.” These three scale points were coded as 0 (indicating no denial of mental experiences), 1 and 2 (indicating some or full denial of mental experiences), respectively. Scale training was provided with respect to an autistic character to minimize the switching demands for children (i.e., from reasoning about a non-autistic character to an autistic character).

Children were asked to point to each of three response options (e.g., “which picture would you point to if you thought Paul/Sarah cannot feel joy at all?”), in a randomized order. Errors on the training task (i.e., pointing to the incorrect image) were recorded, and any incorrect answers were followed with a reexplanation of the scale, and repetition of the question. Error data was available (due to technical error) for  $n = 54$  children; 11 children (13.4%) made one error practice error on the dehumanization scale. All other children successfully completed scale familiarization without error. Adults responded on a text only Likert-scale of the same scale points. Emotion and personality terms (see Table 1) were selected based on Costello and Hodson (2014), and prior investigations which involve adult participants judging the extent to which terms are associated with humanness (Demoulin et al., 2004; Enock, Flavell,

**Table 1**  
Mental experience terms as function of human uniqueness and valence.

Experience	Valence	Non-Uniquely Human	Uniquely Human
Emotion	Positive	Happiness, Excitement	Sympathy, Love
	Negative	Fear	Guilt, Embarrassment
Personality Trait	Positive	Calm, Friendly	Curious, Creative
	Negative	Nervous, Mean	Careless, Disorganized

et al., 2021). A brief, child friendly definition of each term was provided (see [Supplementary Materials, Table 1](#); e.g., “guilty – a feeling of being sorry for having done something wrong”). Average scores were created; higher scores corresponded to greater dehumanization. The whole scale demonstrated acceptable internal consistency (Cronbach’s alpha = .76). Correlation coefficients indicating consistency between items (as a function of human-uniqueness, mental experience type, and valence) are presented in [Supplementary Materials Table 2](#).

### 2.2.2. Exclusion

Participants were then shown a 3-part storyboard (see [Fig. 2](#)) depicting the autistic character in a scenario with potential for either inclusion or exclusion (e.g., attempting to initiate an interaction with peers at school [children] or at a work party [adults]: see [Supplementary Materials, Fig. 3](#)). A vignette was simultaneously presented: “Try to imagine this cartoon is real. In the first picture, we can see Anna and Chris are in a playground/at a work party. They are enjoying talking with each other. Neither Anna or Chris have autism. In the second picture, Paul/Sarah has arrived at the playground/party and would like to join in Anna and Chris’ conversation, but is not sure how. Remember, Paul/Sarah has autism.” Prior studies have established the use of storyboards both to present stimuli and as a response option, potentially reducing verbal demands for children ([Davis et al., 2002](#); [Westerman et al., 2007](#)).

### 2.3. Others’ exclusion

The final square of the storyboard was blank. Participants were asked, “What do you think Anna and Chris would do? Do you think they would ask Paul/Sarah to join the conversation, like this picture, or say nothing and hoped he/she talked to someone else, like this picture? Can you pick the picture to show what you think would happen?” This question assessed participants’ expectation that others would exclude a person with autism. Each response option was presented as a further storyboard image which children could select and place on the blank square to complete the storyboard. Adults selected the equivalent text and image within Qualtrics.

### 2.4. Others’ happiness

Next, participants were told, ‘Let’s pretend Paul/Sarah did join the conversation’. The original storyboard was completed, displaying the option where the autistic character was included as the final square. Participants were then asked, ‘How happy do you think Anna and Chris would be that Paul/Sarah joined their conversation?’ Response options were: ‘really happy, a little happy, a little bit sad, or really sad.’ Children responded by pointing to emoji-style faces (see [Supplementary Materials, Fig. 4](#)); such pictorial scales are a well-established method of measuring experienced and anticipated emotion in children (e.g., [McCormack et al., 2019](#); [Weller & Hansen Lagattuta, 2013](#)). The meaning of each face was explained to children in a randomized order after completing the dehumanization measure, and they were required to successfully label each face before proceeding. Incorrect answers were followed by repetition of the scale and requestioning. The happiness scale was scored from 0–3, and higher scores indicated feeling happier; 7 children (8.5%) made one practice error on the happiness scale (errors data available for  $n = 54$ ). All other children successfully completed scale familiarization without error.

**Table 2**

Coding categories, their inclusion criteria, and intraclass correlations (ICC) between two raters.

Code [Sub-Code]	Criteria	ICC
Mental State Attribution [Negative Valence] [Denial of Mental States]	Indication that autistic people have mental experiences: thoughts and desires (e.g., “to want,” “to try,” “to like,” “to know,” “to decide,” “to look for”), emotions (e.g., “angry,” “scared,” “upset”), intentions (e.g., “to be naughty,” “to be cheeky”), or current states (e.g., “funny,” “shy”), traits, characteristics, personality. Example: “excited easily” The context in which mental experiences are mentioned is generally negative, e.g., “they get angry easily so they have mad issues.” Mental experiences are mentioned in order to deny or detract from their occurrence in autistic people. This may be in its entirety or relatively speaking (e.g., to say autistic people have these experiences less often or less intensely than non-autistic people) (e.g., “might not understand things so well).	.93 .79 .70
Deficit	Indication that autistic people are less capable than non-autistic people, or that ASD creates difficulties in functioning (e.g., intellectually, physically, socially, emotionally). Example: “makes you do things slower than others.”	.90
Difference	Stating that autistic people are different in some way. On some occasions difference and deficit codes may overlap. However, differences may also be expressed positively or neutral, i.e. not be framed as a deficit. Example: “special and different to others.”	.98
Disability	ASD understood using disability language, to include association with other disorders/disabilities/syndromes. Example: “Disability some people have.”	.87
Lower Social Status	ASD understood and explained with respect to how other people treat/perceive/act towards autistic people; specifically, references to autistic people being of lower social status, and at increased risk of being excluded. May also include expressing a personal opinion that suggests thinking about Autistic people as lower status. Example: “people look down on them.”	.79
Relationships	ASD understood and explained through knowing or having heard about someone with ASD. Example: “Someone in class has it’.	1.00
No elaboration	I don’t know/no further explanation given	1.00

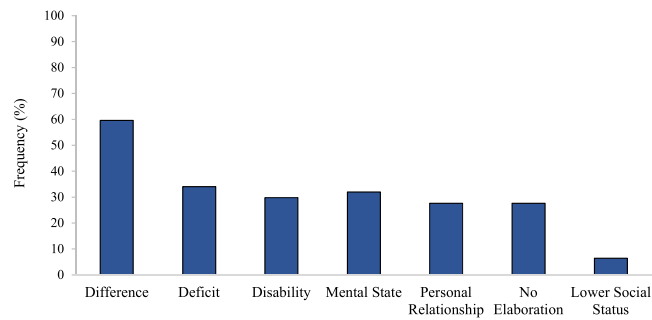


Fig. 3. Frequency of categories in children's spontaneous conceptualizations of autism.

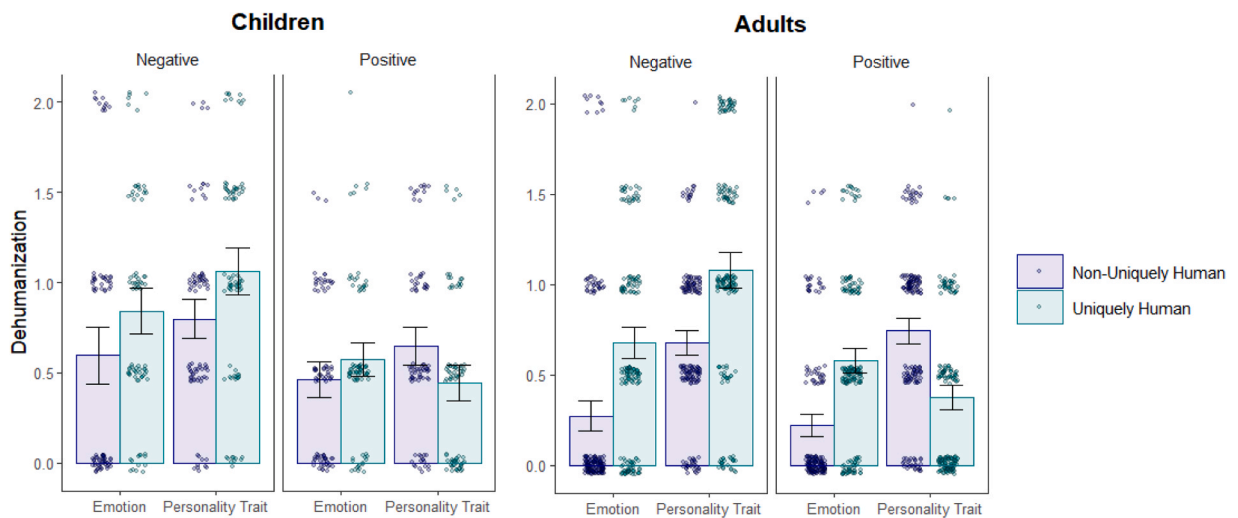


Fig. 4. Children's and adults' dehumanization (i.e., denial) of mental experiences, as a function of human uniqueness, experience type, and valence.

2.5. Own exclusion

The original two-image storyboard was re-presented. Participants were asked, "Now imagine you are Anna or Chris in this situation" (gender matched to participant). The steps for 'others' actions' were repeated, except that participants were now asked, "Do you think you would ask Paul/Sarah to join the conversation, like this picture, or say nothing and hoped he/she talked to someone else, like this picture". The exclusion response was designed to be 'passive', as we anticipated participants may be reluctant to suggest they would engage in a more active, and potentially aversive, form of exclusion (e.g., 'they would tell them to go away').

2.6. Own happiness

This measure was identical to that of 'others' happiness', except that participants were asked how happy they would personally feel, if the autistic character joined their conversation.

3. Results

3.1. Conceptualizations of ASD

The first set of analyses relate to RQ1: exploring children's conceptualizations of ASD (see Fig. 3). The first author generated coding categories through observation of the data (see Table 2). Two further individuals were trained by the first author on 5% of the data, before independently coding the data according to these criteria; categories were not mutually exclusive (i.e., participant's responses could be coded positively across multiple categories). Coding training involved discussing the coding criteria before coding a series of example responses as a group; discrepancies were discussed and clarification was provided by the first author, where required. Coders were blind to identifying details of the participant (e.g., age and gender), and the other coder's scoring. Inter-rater agreement was established on the whole data set, and was high: intraclass correlations ranged between good and excellent (see Table 2). Discrepancies were resolved through conversation between the two coders to produce the final data set.



When asked, “Have you heard of autism before?”, 85.45% of children said they had; these positively responding children were then invited to tell what they know about autism. The identified categories and the frequency with which they occurred were: autism understood through attribution of difference (59.57%, e.g., “special and different to others”), deficits (34.04%, e.g., “makes you do things slower than others”), mental experiences (31.91%, “excited easily”), disability (29.79%, e.g., “disability some people have”), personal relationships (27.66%, e.g., “my cousin has it”), no elaboration (27.66%), and lower social status (6.38%, e.g., “people look down on them”). Given the conceptual overlap with the second set of analyses, we also identified two subcodes within attribution of mental experiences: of those children who spontaneously mentioned mental experiences to explain autism, 86.67% made negatively valenced comments (e.g., “they get angry easily so they have mad issues”), and 53.33% invoked mental experiences in order to deny their occurrence in autistic people (e.g., “struggle [...] to concentrate”, “don’t understand[...]”).

### 3.2. Dehumanization of autistic peers

#### 3.2.1. Denial of mental experiences

These analyses relate to RQ2; examining denial of mental experiences to autistic people. We first explored the extent to which various mental experiences were either attributed or denied to autistic individuals in absolute terms, by performing a series of one-sample Wilcoxon signed rank tests. We compared responses against a value of ‘0’ – this scale point indicated thinking that an autistic person could experience that emotion or personality characteristic ‘very much so’. Alternatively, the remaining scale points indicated some degree of denial of these experiences to an autistic person (i.e., could have these experiences ‘a little bit’ [1] or ‘not at all’ [2]). A Bonferroni correction was applied such that statistical significance was accepted at  $p < .006$ , to account for multiple comparisons. The frequency of responses per item and age group are presented in the [Supplementary Materials, Table 3](#) (e.g., approximately 25% of children and adults judged that an autistic person could feel sympathy, ‘very much so’). In each case, with one exception (adults’ judgements of non-uniquely human emotions), children and adults somewhat denied an autistic individual’s capacity for mental experiences, i.e., the median value differed significantly from 0 (see [Table 3](#)).

#### 3.2.2. Relative denial of uniquely human experiences

These analyses also relate to RQ2 and are an extension of the above analysis, where we established that participants deny mental experiences to autistic individuals in absolute terms. The current set of analyses aimed to quantify potential differences in extent of dehumanization, dependent on human uniqueness (non-uniquely human/uniquely human) and experience type (emotion/personality trait). The terms for each of these combinations is as follows: non-uniquely human emotions (happiness, excitement, fear), uniquely human emotions (sympathy, love, guilt, embarrassment), non-uniquely human personality traits (calm, friendly, nervous, mean), uniquely human personality traits (curious, creative, careless, disorganized). Enock and colleagues ([Enock, Flavell, et al., 2021](#); [Enock, Tipper, et al., 2021](#)) found that biases in mental state attribution to ingroup and outgroup members were primarily driven by their valence, not the extent to which they were uniquely human. Therefore, we also included the valence (positive/negative) of terms in the model to account for their potential influence. We performed two hierarchical linear mixed models in R (v4.2.2), separately for children and adults, using the lme4 package ([Bates et al., 2015](#)), specifying random intercepts. Additional specification of random slopes produced convergence failures, and so these terms were removed ([Matuschek et al., 2017](#)). Comparison of models with (i) intercept only, and (ii) varying intercepts, indicated that accounting for variation in intercepts significantly improved the variance explained (AIC change = 124.11,  $p < .001$ ), and justified the use of a linear mixed model ([Field et al., 2012](#)). In the first step, experience type, human uniqueness, and valence were entered as predictors of dehumanization. In a second step, all two- and three-way interactions were explored. A third, final step, checked whether adding age and gender significantly improved the variance explained.

Model fit statistics and fixed effect findings for the child data are reported in [Table 4](#); model 2 was retained as the final model. In the final model, greater dehumanization was linked to personality traits, uniquely human mental experiences, and negatively valenced terms (marginal effect). A significant three-way interaction emerged between each of these factors (see [Fig. 3](#)). Pairwise comparisons were conducted using the emmeans package with mvt adjustment to interpret the interaction ([Lenth, 2022](#)). Children denied uniquely human emotions ( $b = .24$ ,  $se = .07$ ,  $p = .023$ ) and personality traits ( $b = .26$ ,  $se = .07$ ,  $p = .010$ ) to a greater extent than their non-uniquely human counterparts, only when those characteristics were negative. When the characteristics were positive in valence,

**Table 3**

Results of one-sample Wilcoxon signed rank tests demonstrating denial of emotions and personality traits to individuals with ASD (comparing observed median values against ‘0’ – no denial; higher values indicate greater denial of capacity).

Extent of Dehumanization		Median	SD	z
Non-Uniquely Human Emotions	Children	.50	.40	6.88***
	Adults	.00	.39	-
Uniquely Human Emotions	Children	.75	.42	7.52***
	Adults	.50	.44	10.36***
Non-Uniquely Human Personality Traits	Children	.75	.33	7.79***
	Adults	.75	.38	10.79***
Uniquely Human Personality Traits	Children	.75	.38	7.71***
	Adults	.75	.41	10.75***

\*\*\* $p < .001$ . – observed value equal to the comparison value.

**Table 4**

Hierarchical linear mixed model results with dehumanization as the outcome, and mental experience, human uniqueness, valence (model 1), and their interactions (model 2), as predictors. The model was performed on the child data only. Model 2 was retained as the final model.

	Model 1					Model 2				
	<i>b</i>	<i>S.E</i>	lower CI	upper CI	<i>p</i>	<i>b</i>	<i>S.E</i>	lower CI	upper CI	<i>p</i>
Intercept	.71	.05	.62	.80	<.001	.60	.06	.48	.71	<.001
Personality Characteristic	.12	.04	.04	.19	<.001	.20	.07	.06	.35	.01
Uniquely Human	.10	.04	.03	.18	.01	.24	.07	.10	.39	<.001
Positive Valence	-.29	.04	-.37	-.22	<.001	-.13	.07	-.28	.01	.07
Personality Characteristic x Uniquely Human						.02	.10	-.19	.22	.86
Personality Characteristic x Positive Valence						-.02	.10	-.22	.19	.86
Uniquely Human x Positive Valence						-.13	.10	-.34	.07	.20
Personality Characteristic x Uniquely Human x Valence						-.33	.15	-.62	-.04	.03
<i>N</i>	82					82				
AIC	1009.46					986.68				
Pseudo R <sub>2</sub> fixed effects	.09					.12				
Pseudo R <sub>2</sub> total	.26					.30				

no differences were observed in denial of uniquely human and non-uniquely human emotions ( $b = .11, se = .07, p = .817$ ) and personality traits ( $b = .20, se = .07, p = .119$ ; see Fig. 4). Note, adding age and gender did not significantly improve the fit of the model ( $\chi^2(2) = 5.26, p = .072, AIC\ change = 1.26$ ).

The steps for models 1 and 2 were repeated on the adult data and model 2 was selected as the final model (see Table 5). As with children, dehumanization in adults was associated with personality traits, uniquely human mental experiences, and negatively valenced terms (marginal effect). A significant three-way interaction between these factors emerged. Adults demonstrated the classic infrahumanization effect by denying an autistic person’s capacity for uniquely human emotions to a greater extent than non-uniquely human emotions, both when terms were positive ( $b = .36, se = .05, p < .001$ ) and negative in valence ( $b = .40, se = .04, p < .001$ ). The same effect was also observed for negatively valenced personality traits ( $b = .40, se = .05, p < .001$ ). Unexpectedly, the opposite effect was observed regarding positive personality traits, such that non-uniquely human characteristics were relatively more denied than uniquely human characteristics ( $b = -.37, se = .05, p < .001$ ; see Fig. 4).

3.3. Exclusion

3.3.1. Others’ vs. own exclusion

The following analyses relate to RQ3: examining children’s and adults’ willingness to include an autistic peer, and whether denial of mental experiences related to willingness to include. Participants were asked, (i) if they expected others would include or ignore an autistic peer (others’ exclusion), and (ii) whether they would include or ignore themselves (own exclusion). Frequency of responses are presented as a function of age group in Table 6. Note that 100% ( $N = 82$ ) of children indicated they would personally include the peer. A  $2 \times 2$  chi-squared test examined if there was an association between age group (child/adult), and own exclusion (include/exclude) responses. There was a small, statistically significant association,  $\chi^2(1) = 5.72, p = .017, \phi = .15$ ; children were more likely to say they would include the peer than adults. However, no significant association with age group was found for responses to others’ exclusion;  $\chi^2(1) = 2.80, p = .09, \phi = .11$ ; children and adults were as likely to think that someone else would include or exclude the autistic peer. McNemar tests were performed to examine differences in the distribution of include and exclude responses across targets

**Table 5**

Hierarchical linear mixed model results with dehumanization as the outcome, and mental experience, human uniqueness, valence (model 1), and their interactions (model 2), as predictors. The model was performed on the adult data only. Model 2 was retained as the final model.

	Model 1					Model 2				
	<i>b</i>	<i>S.E</i>	lower CI	upper CI	<i>p</i>	<i>b</i>	<i>S.E</i>	lower CI	upper CI	<i>p</i>
Intercept	.44	.03	.37	.50	<.001	.27	.04	.20	.35	<.001
Personality Characteristic	.28	.03	.23	.33	<.001	.41	.05	.32	.50	<.001
Uniquely Human	.20	.03	.15	.24	<.001	.41	.05	.32	.50	<.001
Positive Valence	-.20	.03	-.25	-.14	<.001	-.05	.05	-.14	.04	.286
Personality Characteristic x Uniquely Human						-.01	.07	-.14	.12	.895
Personality Characteristic x Positive Valence						.12	.07	-.02	.25	.083
Uniquely Human x Positive Valence						-.05	.07	-.18	.08	.450
Personality Characteristic x Uniquely Human x Valence						-.72	.09	-.91	-.54	<.001
<i>N</i>	169					169				
AIC	2004.63					1807.90				
Pseudo R <sub>2</sub> fixed effects	.12					.22				
Pseudo R <sub>2</sub> total	.30					.41				

**Table 6**  
Frequency of include and exclude responses for others' and own actions.

		% Include	% Exclude
Others' Inclusion	Child	89.02	10.98
	Adult	80.61	19.39
Own Inclusion	Child	100.00	.00
	Adult	93.33	6.66

(others' vs. own exclusion). Both children ( $p = .008$ ) and adults ( $p < .003$ ) were more likely to report that others would exclude an autistic peer than they were themselves.

### 3.3.2. Happiness

We examined how happy participants expected others and themselves to be when including an autistic peer (Table 7). A two-way mixed ANOVA was performed with within subject factor of target (others'/own) and between subjects factor of age-group (child/adult). There was a large, statistically significant effect of target,  $F(1, 244) = 57.76, p < .001, \eta^2 = .19$ ; participants reported that others would be less happy to include the autistic peer than they would. There was a moderate, statistically significant main effect of age group,  $F(1, 244) = 26.60, p < .001, \eta^2 = .10$ ; compared to adults, children expected both themselves and others to be happier when including an autistic peer. The age group x target interaction was not statistically significant.

### 3.4. Dehumanization and willingness for inclusion

A complete lack of variation in children's own inclusion (include/exclude) responses prevented analysis of relations with dehumanization (Allison, 2008). To allow for comparison across (i) own/other responses, and (ii) children and adults, we focused on relations between happiness ratings and dehumanization. Using multiple linear regression, we examined if the extent to which mental experiences were denied predicted how happy participants expected they and others would be, if they were to include an autistic peer. We included each of the four categories of terms (non-uniquely/uniquely human and emotion/personality trait) to examine if effects were specific to uniquely human mental experiences, as would be expected by models of dehumanization. A Bonferroni correction was applied (to account for four regression models), and statistical significance was accepted at  $\alpha < .013$ ; findings are reported in Table 8. Children's denial of mental experiences to an autistic peer was unrelated to their own reported happiness. However, the more children denied uniquely human personality traits to autistic individuals the less happy they expected others to be when including an autistic individual. For adults, the more they denied uniquely human emotions to an autistic individual, the less happy they expected both themselves and others to be to include an autistic individual.

## 4. Discussion

A lack of understanding of autism creates opportunity for conflict; that is, the nonconformance to social and communicative conventions that is associated with ASD, may result in stigmatization and exclusion of the autistic person (Humphrey & Symes, 2010; Wainscot et al., 2008). Conversely, educating peers about autism and involving them in intervention processes has been shown to improve outcomes for autistic children (Chan et al., 2009). Therefore, it is important to know how children conceptualize ASD, if at all. We found the majority of children responded positively when asked if they had heard of autism, and moreover, gave plausible explanations. In many cases, children's conceptualizations mapped on to the DSM-V diagnostic criteria for ASD (APA, 2013) or experiences commonly cited by autistic people (McLeod et al., 2019). For example, references were made to atypical emotional processes (e.g., "angry easily", "mood changes), difficulty maintaining social relationships (e.g., "can find it hard to make friends", "can be bullied"), restricted or repetitive speech (e.g., "they talk a little", "trouble talking"), and academic difficulties (e.g., "need help in school", "stunts learning"). 'Difference' also emerged as the most frequent category to define autism, in line with how older adolescents describe the key essence of being autistic (Fondelli & Rober, 2017). We note that a particular focus on difference is also consistent with research on children's use of a dichotomizing heuristic, where the outgroup are assumed to have opposite characteristics of the ingroup, even when children have no prior knowledge of those groups (Kramer et al., 2021). Potentially, some children may not fully understand autism, but do understand that autism is different from 'them'. Thus, even at 9–11-years-old, children conceptualize ASD in a manner that resonates with some of the common experiences of this group. These findings are consistent with prior research which demonstrates that children of this age have sophisticated concepts of social categories (Rhodes & Baron, 2019); though, this research has less often been extended to disorders and disabilities. That said, we do also note a perhaps somewhat undifferentiated

**Table 7**  
Descriptive statistics of participants' happiness ratings.

		Mean	SD
Children	Others' Happiness	2.33	.721
	Own Happiness	2.74	.466
Adults	Others' Happiness	1.86	.774
	Own Happiness	2.30	.915

**Table 8**

Multiple linear regression findings, examining effects of dehumanization on ratings of own and other's happiness, to include an autistic peer.

		Children					Adults				
		<i>b</i>	<i>S.E</i>	lower CI	upper CI	<i>p</i>	<i>b</i>	<i>S.E</i>	lower CI	upper CI	<i>p</i>
Own Happiness	Intercept	2.95	.15	2.65	3.25	< .001	2.40	.18	2.04	2.76	< .001
	Non Uniquely Human Emotions	-.07	.17	-.41	.28	.690	-.27	.20	-.67	0.13	.191
	Uniquely Human Emotions	.06	.15	-.23	.35	.691	-.49	.19	-.86	-.11	.011*
	Non Uniquely Human Personality Characteristics	-.13	.22	-.56	.30	.547	-.04	.23	-.50	.41	.845
	Uniquely Human Personality Characteristics	-.15	.15	-.44	.14	.300	.40	.18	.05	.75	.026
Others' Happiness	Intercept	2.60	.22	2.16	3.05	< .001	2.15	.15	1.85	2.45	< .001
	Non Uniquely Human Emotions	-.28	.26	-.79	.23	.279	-.15	.17	-.48	.19	.397
	Uniquely Human Emotions	.13	.22	-.31	.56	.568	-.44	.16	-.75	-.13	.006*
	Non Uniquely Human Personality Characteristics	.33	.32	-.31	.97	.305	-.17	.19	-.54	.21	.377
	Uniquely Human Personality Characteristics	-.61	.22	-1.04	-.17	.006*	.19	.15	-.10	.48	.200

\* statistically significant following the Bonferroni correction (alpha &lt;.013)

understanding of ASD and disabilities more generally, for example, through references to “Down’s Syndrome” and “stutters”. These findings have implications for intervention and education, which are addressed below.

We next examined the extent to which participants might deny an autistic individual’s capacity for different mental experiences in absolute terms. This analysis was complementary to the analysis of open-ended responses, providing further insight into how autism is perceived by children and adults. Both children and adults demonstrated some denial of mental experiences to an autistic person, by indicating they could have such experiences only ‘a little’ or ‘not at all’. Adults’ attribution of non-uniquely human emotions was the one exception to this rule; on average, adults judged that an autistic individual had capacity for such experiences ‘very much so’. Adults’ complete attribution of capacity for less-sophisticated, non-uniquely human emotions, but not more sophisticated and uniquely human emotions is consistent with theorizing on the infrahumanization effect: a proposed means of subtle dehumanization that legitimizes less fair treatment of that group (Leyens et al., 2007).

Further analysis examined differences in denial of mental experiences based on whether they were uniquely human, while also accounting for the effect of valence. Prior investigations have found an interaction between human uniqueness and valence such that desirable uniquely human characteristics are more commonly attributed to ingroups, while undesirable, yet still uniquely human characteristics are attributed to outgroups (Enock, Flavell, et al., 2021; Enock, Tipper, et al., 2021). These findings present a serious challenge to infrahumanization and dual models of dehumanization. In the current study, a three-way interaction between human uniqueness (uniquely/non-uniquely human), mental experience (emotion/personality trait), and valence (positive/negative) emerged for both children and adults. Children denied an autistic individual’s capacity for uniquely human emotions and personality traits to a greater extent than their non-uniquely human equivalents, only when mental experiences were negatively valenced. Adults also denied an autistic individual’s capacity for uniquely-human personality traits to a greater extent than non-uniquely human personality traits, only when those traits were negative. However, adults did deny uniquely human emotions to a greater extent when emotions were both positive and negative. Differing patterns of response for emotions and personality traits in adults suggests that, as theorized, these discrete mental experiences may be attributed differently to autistic people. Developmental differences were also observed, such that adults, but not children, denied uniquely human emotions both when emotions were positive and negative. In future, the addition of justifications for dehumanization ratings could help to explain these differences; that is, how children and adults conceptualize emotions and personality traits, specifically, in relation to autism.

If we conceptualize ‘autistic’ as an outgroup in this context, then the observed effect runs counter to that demonstrated by Enock and colleagues. That is, participants did not demonstrate a general negativity bias towards an outgroup member, but rather, generally attributed less capacity for uniquely human, negative mental experiences to an autistic target. There are some important differences between the current study and prior investigations, which could explain the discrepancy in findings. Unlike previous studies, we examined an outgroup that is not typically associated with competition, threat, and animosity (vs. political opponents, immigrants, and criminals). Indeed, consistent with the pattern of current findings, autistic and disabled people often report being infantilized and characterized as heroic for carrying out everyday acts (Loja et al., 2013; Stevenson et al., 2011). While potentially well-intentioned, exceptionally positive characterizations of autism may serve to deny autistic people the complexity of the full human experience. Future studies should examine the correlates and outcomes associated with denial of negative mental experiences to autistic and disabled people. For example, the denial of negative mental experiences may be used as a justification to exclude autistic people from certain activities and rights (e.g., sexual health education: Burke et al., 2019), by suggesting innocence and a need to be protected. A second notable difference between our study and prior investigations is that we did not ask participants to make attributions to both an ingroup and an outgroup target (instead, asking them to make a relative judgement). It is possible that setting up a more explicit contrast between ingroup and outgroup would lead to attributions of positive and negative uniquely human characteristics that evidence ingroup favoritism. Though, we do note that evidence of the classic infrahumanization effect in adults suggests that the

currently methodology did have face validity.

Finally, with respect to attribution valence, we do note that there is somewhat of a discrepancy between the findings of the open-ended responses (where 86.67% of children who mentioned mental states did so in a negative context) and the findings relating to the dehumanization ratings (where uniquely human negative mental experiences were relatively more denied). Yet, it is likely that children (and participants in general) reason differently when giving spontaneous explanations vs. responding to scale items due to inherently different task demands, e.g., priming, framing, spontaneous retrieval. Also, open-ended responses were obtained only from those children who already had knowledge of autism, while all children responded to scale items. And indeed, children responded to scale items after having heard of an exemplar case of autism, which may have primed a particular response (see below for further discussion of this issue). The congruence between spontaneous and scale responses is an interesting question for future research.

Subsequent analyses examined participant's expectations that they and others would include an autistic peer, how happy they would be doing so, and if denial of mental experiences predicted these outcomes. Children and adults more often reported that others would exclude the autistic peer than they reported they would do so personally, and also that others would be less happy about including the peer than they would be themselves. This pattern suggests socially desirable or 'better than thou' responses, such that participants seem to have an awareness that autistic people may face exclusion, but they suggest that they would not be the ones to perpetrate it. Indeed, 100% of children reported they would include the peer, which is clearly at odds with the lived experiences of autistic people (Chown & Beavan, 2012; Howlin, 2013). Thus, we recommend that future investigations should use more subtle measures of willingness for inclusion. That said, we can at least conclude that participants did not infer that 'autistic' was a category that is socially acceptable to exclude. We also found that greater denial of uniquely human mental experiences was linked to the expectation that either oneself or others would be less happy to include an autistic peer. For children, this pattern was only evidenced with respect to 'others' happiness'. We interpret the lack of relation with 'own happiness' responses as also being potentially underpinned by their socially desirable nature; that is, if they are not true responses, it is unsurprising they are unrelated to extent of dehumanization. The interpretation of socially desirable responses by children is further supported by the effect of age seen in own exclusion responses (where adults were more likely to report they would exclude than children) but not in others' exclusion responses (where children and adults were equally likely to expect other's would exclude). Of note, valence was not included in this analysis as that would have led to an excessive number of factors in the model predicting willingness for inclusion. An interesting question to address in future work is whether denial of negative, uniquely human mental experiences (stemming from infantilizing or protecting autistic individuals) specifically predicts lower inclusion. In summary, children's and adults' denial of uniquely human mental experiences to an autistic peer meaningfully relates to (affective) inclusion, suggesting that dehumanization of autistic people may be a factor contributing to their exclusion.

#### 4.1. Limitations and future directions

A limitation of the current work was that the dehumanization measure did not include a control group per se (rather, participants were asked to make judgements about the autistic target relative to a non-autistic target), and therefore, it is possible that participants were predisposed to judge anyone other than themselves (and similar others) as having less capacity for those experiences. This makes intuitive sense, given the salience and availability of our own experiences, relative to those of others. Yet, in this case (where our own experiences are simply more valued), it is unclear why we would see differences in attributions based on human uniqueness and valence, assuming these experiences may all be recalled. We also note that, in their explanations of ASD, children also spontaneously engaged in dehumanizing language by invoking mental states in order to deny their relative occurrence in those with ASD. Furthermore, the associations between dehumanization and happiness to include an autistic person suggest that responses are not merely an artefact of scale demands.

A further limitation is that, to ensure children did have an accurate concept of ASD, we provided an exemplar description of a person on the autism spectrum. Clearly, one exemplar fails to capture the vast heterogeneity of ASD; we attempt to address this by including the opening statement, "not all people with autism are the same but they can have a lot of things in common", and repeated uncertainty language, e.g., "Sarah/Paul might not know how to share or take turns". We also note the description of ASD, as a whole, is framed in a deficit-based way, highlighting things the autistic target may not be able to do. This may have predisposed participants to consider the autistic target as having less complex mental experiences. Future work would benefit from varying the perceived severity of ASD, highlighting strengths associated with ASD, and how this influences children's and adult's judgements about autistic individuals. It may be of particular benefit to isolate certain characteristics (e.g., verbal communication difficulties, restricted routines) to examine the relative weight they contribute to participant's judgements (which has the potential to identify nuanced intervention targets).

We accept, also, that our explanation of ASD – which was provided after the spontaneous explanations, but prior to the dehumanization task – does mention, and potentially primes two mental experiences (upset and angry). Thus, the description may have influenced the types of attributions made. Yet, the observed findings do run counter to the intuitive bias, where one would expect greater attribution of negative mental experiences following this description. Readers may also be reassured that neither of these words were involved in the dehumanization task. We also acknowledge the limitations associated with a narrow age range and a sample from a single culture. Future research should seek to replicate the effects demonstrated here, and examine their variability across development and different cultural contexts. Finally, we note that our study involved novel measures with single trial types (e.g., responding via storyboards), and thus the availability of psychometric data was limited.

## 5. Conclusions

The findings of the current study may inform interventions in the classroom (and related settings), designed to increase ASD inclusivity among peers. For example, some educators may feel hesitant to discuss social groups and group differences, but this could be alleviated by the knowledge that children already have an awareness of those groups (Lingras, 2021). Indeed, children's own explanations of autism may be leveraged to build inclusivity, for example, references to positive differences (e.g., "hobbies and talents", "children that are more happy"). Findings across the three strands of analysis suggest that encouraging children to mentalize about autistic people may be an effective intervention to improve inclusivity, given that, e.g., 53.33% of children spontaneously referenced mental states to deny their occurrence in autistic people, and denial of mental states within the dehumanization task negatively predicted happiness to include for both children (others') and adults (own and others'). This finding is consistent with previous intervention frameworks; the novel contribution of this research is to provide initial evidence that these interventions may also be appropriate in the context of an autistic outgroup (McLoughlin & Over, 2019; Ochs et al., 2001). In summary, the current study extends the social categorization, dehumanization, and exclusion literatures to include a novel outgroup target (autistic), and demonstrates that children treat 'autistic' similarly to more frequently examined outgroups.

### CRedit authorship contribution statement

**Corbett Bethany:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Visualization, Writing – original draft, Writing – review & editing. **Anderson Tara:** Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Dautel Dr Jocelyn:** Supervision, Writing – original draft, Writing – review & editing.

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### Conflict of interest

There are no known conflict of interests. A clean Stat Check report was produced from this manuscript prior to submission. Materials required to replicate the study are available in the online supporting information.

### Data availability

Data will be made available on request.

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### Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.cogdev.2024.101419](https://doi.org/10.1016/j.cogdev.2024.101419).

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