

**Primary School Children Rate Children with Autism Negatively on Looks, Speech and  
Speech Content**

Short title: *Negative First Impression ratings*

Steven D. Stagg <sup>\*1</sup>, Lauren Thompson-Robertson, **and** Carina Morgan

<sup>1</sup> Anglia Ruskin University, East Road, Cambridge, CB1 PT1 Anglia Ruskin University  
East Road  
Cambridge  
CB1 PT1

<sup>2</sup> Anglia Ruskin University, East Road, Cambridge, CB1 3PT

<sup>3</sup> Anglia Ruskin University, East Road, Cambridge, CB1 3PT

\*Corresponding author information: Correspondence should be addressed to Steven Stagg, Anglia Ruskin University, East Road, Cambridge, CB1 1PT (steven.stagg@aru.ac.uk)

## **Abstract:**

**Background:** Adults and adolescents form negative first impressions of ASD adults and children. We examined the first impression ratings of primary school children (6 – 9 years) of their ASD peers. **Method:** 146 school children rated either silent videos, speech or transcribe speech from 14 actors (7 ASD, 7 TD). **Results:** The ASD actors were rated more negatively than the typically developing actors on all three stimulus types. **Conclusion:** Children with ASD are likely to be judged more negatively than their peers at the very start of their formal education. Contrary to previous research, for primary school children, the content of the speech was judged as negatively the delivery of the speech.

## **Keywords:**

Autism; Primary School; First Impression Formation

## **Data availability statement:**

Data available on request from the authors

## **Acknowledgements:**

N/a

Research has demonstrated that individuals with autism face negative first impressions. Research into first reactions demonstrates that impressions formed at even brief exposures can negatively influence further interactions. Recent research suggests that in relation to autism, these reactions depend on visual presentations and are not attributable to poor language performance.

Our research is the first to study this phenomenon in primary school children and the first study to examine whether language also influences first reactions in children. Our findings demonstrate that young children do form negative first impressions of autistic children. At this age, language also plays a contributing factor. This suggests that age-related improvements in language ability lessen the verbal impact on impression formation. Our paper demonstrates a clear need for classroom interventions to assist children with autism when they transfer to primary school.

Primary School Children Rate Children with Autism Negatively on Looks, Speech and  
Speech Content

### Abstract

**Background:** Adults and adolescents form negative first impressions of ASD adults and children. We examined the first impression ratings of primary school children (6 – 9 years) of their ASD peers. **Method:** 146 school children rated either silent videos, speech or transcribe speech from 14 actors (7 ASD, 7 TD). **Results:** The ASD actors were rated more negatively than the typically developing actors on all three stimulus types. **Conclusion:** Children with ASD are likely to be judged more negatively than their peers at the very start of their formal education. Contrary to previous research, for primary school children, the content of the speech was judged as negatively the delivery of the speech.

*Keywords:* Autism; Primary School; First Impression Formation

## Primary School Children Rate Children with Autism Negatively on Looks, Speech and Speech Content

Autism spectrum disorder (ASD) can be defined as a complex, lifelong, neurodevelopmental disability that is predominantly characterised by impairments in reciprocal social interaction, social communication, and by a range of restricted, repetitive and inflexible patterns of behaviours and interests (APA, 2013)

Children and adolescents with ASD frequently report a desire for more social interaction with their peers and recognise the importance of social relationships in their lives (Bauminger & Kasari, 2000; Jones & Meldal, 2001). In a school environment, poor social interaction may be bi-directional with a lack of interaction influenced by autistic traits and the beliefs, biases, and expectations that TD observers bring to potential interactions (Morrison, DeBrabander, Faso, & Sasson, 2019). Therefore, social impairments seen in individuals with ASD may be more bidirectional than previously recognised: not only do those with ASD struggle to interpret the beliefs and intentions of their TD peers, but the perceived atypicality in social presentation and social expression seen in ASD can also make it difficult for TD individuals to accurately interpret the mental state of those with ASD (Edey et al., 2016; Sasson & Morrison, 2019; Sheppard et al., 2016). In this respect, TD children could be said to lack a theory of the autistic mind.

First impressions are formed near instantaneously, become rapidly entrenched and have long-lasting effects on an individual's attitudes and behaviour (Selfhout, Denissen, Branje, & Meeus, 2009). These judgments involve integrating multisensory cues (Zaki, 2013)



and are based upon ‘thin slices’ of information (Sasson et al., 2017). Subjective first impressions have instant effects on subsequent attitudes and behaviours during social interactions, which impact reciprocal exchanges, mainly when the initial expression is negative (Uleman, Saribay, & Gonzalez, 2008). For individuals who project less than optimal social competence at first glance, this reduction in the quantity and quality of social interaction can have significant adverse effects (Grossman, 2015).

Research suggests that individuals with autism struggle to produce positive first impressions. For example, when typically developing children are exposed to autistic-like behaviours either through the presentation of vignettes of individuals depicting such behaviours (Harnum et al., 2007) or actors portraying autistic characteristics (Siperstein, Bak, & Gottlieb, 1977), negative attitudes were formed, and avoidance behaviours expressed. Studies using video recording of individuals with autism have demonstrated that both typically developing adults (Grossman, 2015) and child participants (Sasson et al., 2017; Stagg, Slavny, Hand, Cardoso, & Smith, 2014) rated autistic children less favourably across a metric of friendliness when forming first impressions. In Sasson et al.’s study (2017), adults with autism were rated by typically developing adults in five conditions (speech content, audio-visual, audio-only, silent-video, static frame), with results suggesting that negative ratings were due to judgments concerning visual appearance rather than speech content. Findings from these studies suggest that TD observers have less intention to pursue social interaction with autistic individuals, and these findings persist across both adolescent and adult age groups.

Until now, research on first impression formation of individuals with ASD has primarily focused on examining adolescent and adult observers’ evaluations of children and adults with a diagnosis of ASD (e.g., Grossman, 2015; Sasson et al., 2017; Stagg et al., 2014). However, to our knowledge, no previous research has examined the impression

formation of primary school-aged children (6-9 years) when evaluating other aged-matched primary school children with a diagnosis of autism. This is an important age group to consider. It represents the point ASD children enter into a large school setting for the first time and the age at which many ASD children receive interventions to improve social skills (Bellini, Peters, Benner, & Hopf, 2007). First impressions related to character judgments are apparent in children as young as five years (Charlesworth, Hudson, Cogsdill, Spelke, & Banaji, 2019), and judgments based on cultural tropes emerge in children around the age of six (Eggleston, Flavell, Tipper, Cook, & Over, 2020), suggesting children learn to make judgments based on physical features at an early age. With more young children being diagnosed with autism (Smiley, Gerstein, & Nelson, 2018) and educated in mainstream schools (Roberts & Simpson, 2016), it is essential to understand how their TD peers perceive autistic children. This study aimed to gain an insight into the first impressions of typically developing (TD) primary school children when observing the social presentations of other primary school children both with and without a diagnosis of ASD. The study examined the specific information channels (e.g., visual cues, audio cues & speech content) that drive first impression formation. We hypothesised that the typically developing children would rate ASD children lower than typically developing children on audio and visual presentations of the stimuli but not on the transcripts.

## **Method**

### **Participants**

A total of 146 male ( $n = 74$ ) and female ( $n = 72$ ) children were recruited from a mainstream primary school. The children were aged between 6-9 years ( $M = 7.64$ ,  $SD = 1$ ). The research received ethical approval from the Faculty Research Ethics panel at XXXXXXXXXXXX, and parents were fully informed of the research through individual letters. The school selected participants. Two classes from each of the three-year groups participated in the study. Each class was divided into three groups, and each of the groups was allocated to one of the conditions. The final makeup of each condition was as follows: Video – no sound ( $n=55$ , mean age = 7 years 3 months), Audio ( $n=38$ , 7 years, 6 months) and Transcript ( $n=53$ , mean age 7 years, 9 months).

### **Stimulus material**

A total of 14 children (male = 9) and female (female = 5) aged between 6-9 years ( $M = 7.73$ ,  $SD = 1$ ) served as stimulus participants for this study. Seven of the fourteen children (male = 5, female = 2) had independently received a formal diagnosis of autism spectrum disorder from a clinical psychologist, and the other seven children were age-matched typically developing controls (male = 4, female = 3). Children were recruited from one mainstream primary school in Cambridge and one independent ASD special education school in Cambridge. This particular special education school only accepts children with average to above-average IQ. Parents were fully informed of the study and signed consent forms, and each child consented verbally before any recording began.

We followed the procedure set out in Grossman, Edelson, and Tager-Flusberg (2013) for the creation of stimulus material. In this task, the children watch short videos about Safari Sarah and retell her adventures while being filmed. Four stories were filmed, each lasting between 27-36 seconds long and contained at least one sentence produced with either angry, fearful, positive surprise and happy emotions (see Appendix A). The participant's role was to watch the stories and retell them on video.

In order to use video clips that were considered the most expressive, the videos were viewed by ten colleagues of the research staff to determine which clips expressed the most emotion and intensity of expression. All coders were blind to diagnosis, and clips were presented in a randomised order to avoid any biases. A consensus was reached that the positive surprise emotion was the most natural, intense, and emotionally expressive and would be the clip used for the participants to rate. Brief video clips (5-6 seconds), audio clips (5-6 seconds) and transcripts representing the selected positive surprise emotion were extracted, and all stimuli contained one complete sentence each. A total of 14 video clips, 14 audio clips, and 14 transcripts were created: seven from each of the two subgroups per condition.

### **Rating Measures**

Questionnaires were created by adapting items utilised in previous research investigating first impression formation (Sasson et al., 2017; Stagg et al., 2014). The wording was kept direct and straightforward (see Appendix B). All questions were piloted on a small group (n=6) of 7-year-old children and based on their comments some adaptations were made. The six questions measured the friendliness, approachability, compassion/empathy, sociability, facial expressivity, and social awkwardness of each stimulus participant. All questions were rated on a bipolar scale. In order to allow ratings to be converted into

continuous data, participants made their responses by intersecting a line that ran underneath the question. Every line was identical in length and comprised two anchor points. For instance, for the question “Would you play with this person?” the line was anchored at not play and play, and a score of 0cm would equal not play, and a score of 10cm would equal play.

### **Rating Procedure**

Participants took part in the study in groups of 14 to 16. The participants faced an interactive monitor at the front of the classroom and were spaced out so they could not see their peers' responses. The research team handed out the paper questionnaires and explained how to complete them correctly. The participants completed a practice trial. After each stimulus was shown, the participants completed the questionnaire before moving on to the next stimulus.

## Results

A 2 (group: ASD, TD) x 3 (stimulus type: muted video, audio, transcript) x 4 (age group) x 2 (gender) ANOVA was conducted. Our main aim was to first determine if the ASD stimuli would be rated lower than the TD stimuli. The main effect of group was significant  $F(1,134) = 14.67, p < .001, \eta^2 = .10$  with the TD stimuli rated higher ( $M = 56, SD = 16.34$ ) than ASD stimuli ( $M = 52, SD = 18.38$ ). Further we wished to ascertain if the TD group was rated higher across all three stimulus types. The group x stimulus type interaction was not significant  $F(2, 134) = .50, p = .01, \eta^2 = .007$ . We further analysed the group x stimulus type x age interaction which was not significant  $F(6,134) = .54, p = .77, \eta^2 = .02$ . Mean scores are presented in Table 1

PLACE TABLE 1 AROUND HERE

There was a main effect of age  $F(3,134) = 3.65, p = .01, \eta^2 = .08$ . Post hoc tests with Bonferroni corrections revealed that the 6-year-old participants rated the stimuli higher ( $M = 64, SD = 13.59$ ) than the 8-year-olds ( $M = 47, SD = 15.85$ )  $p = .003$ , and the 9-year-olds ( $M = 51, SD = 16.61$ )  $p = .03$ .

Paired sample t-tests were conducted to compare individual item responses between diagnostic groups regardless of stimulus type. Due to the number of tests conducted, the alpha level was set to .008. The ASD stimuli were rated significantly lower for each question apart from question five, which asked, “can you tell how this person is feeling?” which did not reach significance (see Table 2).

PLACE TABLE 2 AROUND HERE

Given that the TD group were also rated more favourably on the transcripts Table 3 sets out the descriptive statistics for the language content for each group.

PLACE TABLE 3 AROUND HERE

## Discussion

The present study investigated whether primary school children with ASD would be perceived differently than their TD peers, what type of information input (e.g., visual, audio or transcript) was required to lead TD observers to these types of judgements? The results demonstrate that the first impressions of primary school children with ASD were significantly more negative than their TD age-matched peers. Our results, suggest that negative first impressions were associated with apparently reduced intentions for primary school observers to engage with age-matched children with ASD socially. Contrary to predictions, stimulus type did not affect how the ASD children were rated.

The findings in the present study suggest that primary school children are equally sensitive to both verbal and non-verbal social cues and can pick up on even the most nuanced atypicality in the social presentation of autistic children (e.g., transcribed speech content) when forming first impressions. The study specifically targeted the impression formation of primary school children (6-9 years) an age group not previously studied. The extension to primary school children is vital given that it is during this developmental period that those with ASD generally receive their diagnosis (Brett, Warnell, McConachie, & Parr, 2016; Shattuck et al., 2009) and are given the most significant amount of social skills intervention (Bellini et al., 2007). However, despite being at an age where an intense focus is often applied to social skill training, the children with ASD in this study were rated less favourably by unfamiliar age-matched observers. Sasson et al. (2017) suggested that negative first impressions by age-matched observers could limit the formation of social networks and friendships, and we demonstrate that this negative appraisal is happening in very young children.



Contrary to Sasson et al. (2017) the ASD children in our study were judged less favourably across all three stimuli. One reason for this may be that children with ASD develop more capable language skills as they grow older, which research bears out (Gantman et al., 2012; Shattuck et al., 2009). Research also suggests that adults are more sensitive to visual domains over other information channels (e.g., audio or speech content) when forming first impressions (Anzures, Mondloch, & Lackner, 2009). Given the parameters of the current study, it is challenging to assess why the children with ASD were judged more based on transcribed speech. Attention is drawn to the difference between the two groups in the number of expressive words (e.g., Oohs and ahhs) used in the texts, with TD children using more of these. This may reflect a difficulty for ASD children to play-act and become immersed in a role (Jarrold, 2003). The TD children also used fewer words of two syllables or more and syllable length is thought to affect the readability of text with longer syllable length equating to lower readability (Mikk & Elts, 1999). Our findings suggest that for young children, what is said is as important as how it is said.

Negative first impressions may restrict or limit opportunities for children with ASD to establish the intergroup contact necessary for mitigating negative biases when they are present (Sasson et al., 2017). Interventions that aim to improve overall functioning might seek to mitigate biases through meaningful personal interaction with others. Self-disclosure of a disorder can change initial negative first impressions (Voncken & Dijk, 2013). Therefore, it is equally vital to teach TD peers to be more mindful and accepting of any differences in social presentation, rather than attempting to change the many interlaced factors of self-presentation that mark the expressions of those with ASD as atypical (Sasson et al., 2017).

A few limitations should be considered when interpreting the results reported in this study. First, social presentation was analysed during a story retelling task

which may not fully reflect the real-world behaviours experienced by primary school children with ASD. Future research focused on first impression formation of autistic children should utilise a dyadic approach where participants with ASD engage in social interaction with a live conversational participant partner. Not only would this design allow for a higher degree of ecological validity, but it would also provide a more nuanced analysis of participant-partner effects in first impression formation. It is important to note that while this study can inform how primary school children (6-9 years) with ASD are perceived before social contact, the study cannot determine whether the ratings reported here would be affected by knowledge of diagnostic status.

Despite these limitations, the current study provides evidence that the first impressions of primary school children with ASD are significantly less favourable than their age-matched TD peers. These negative first impressions are also associated with reduced intentions on the part of age-matched TD observers to pursue subsequent social interaction. These findings reflect an under-recognised barrier to social interaction for individuals with ASD, and interventions that target both those with ASD and their TD peers might offer a more comprehensive approach for improving the functional and social outcomes.

### References

- American Psychiatric, A. (2013). *Diagnostic and statistical manual of mental disorders : DSM-5* (Fifth edition. ed.): Arlington, VA : American Psychiatric Association.
- Anzures, G., Mondloch, C. J., & Lackner, C. (2009). Face Adaptation and Attractiveness Aftereffects in 8-Year-Olds and Adults. *Child Dev*, 80(1), 178-191.  
doi:10.1111/j.1467-8624.2008.01253.x
- Bauminger, N., & Kasari, C. (2000). Loneliness and Friendship in High-Functioning Children with Autism. *Child Dev*, 71(2), 447-456. doi:10.1111/1467-8624.00156
- Bellini, S., Peters, J. K., Benner, L., & Hopf, A. (2007). A Meta-Analysis of School-Based Social Skills Interventions for Children With Autism Spectrum Disorders. *Remedial and special education*, 28(3), 153-162. doi:10.1177/07419325070280030401
- Brett, D., Warnell, F., McConachie, H., & Parr, J. R. (2016). Factors Affecting Age at ASD Diagnosis in UK: No Evidence that Diagnosis Age has Decreased Between 2004 and 2014. *J Autism Dev Disord*, 46(6), 1974-1984. doi:10.1007/s10803-016-2716-6
- Charlesworth, T. E. S., Hudson, S.-k. T. J., Cogsdill, E. J., Spelke, E. S., & Banaji, M. R. (2019). Children use targets' facial appearance to guide and predict social behavior. *Developmental Psychology*, 55(7), 1400-1413. doi:10.1037/dev0000734
- Edey, R., Cook, J., Brewer, R., Johnson, M. H., Bird, G., & Press, C. (2016). Interaction Takes Two: Typical Adults Exhibit Mind-Blindness Towards Those With Autism Spectrum Disorder. *J Abnorm Psychol*, 125(7), 879-885. doi:10.1037/abn0000199

- Eggleston, A., Flavell, J. C., Tipper, S. P., Cook, R., & Over, H. (2020). Culturally learned first impressions occur rapidly and automatically and emerge early in development. *Developmental Science*. doi:10.1111/desc.13021
- Gantman, A., Gantman, A., Kapp, S. K., Kapp, S. K., Orenski, K., Orenski, K., . . . Laugeson, E. A. (2012). Social Skills Training for Young Adults with High-Functioning Autism Spectrum Disorders: A Randomized Controlled Pilot Study. *J Autism Dev Disord*, 42(6), 1094-1103. doi:10.1007/s10803-011-1350-6
- Grossman, R. B. (2015). Judgments of social awkwardness from brief exposure to children with and without high-functioning autism. *Autism*, 19(5), 580-587. doi:10.1177/1362361314536937
- Grossman, R. B., Edelson, L. R., & Tager-Flusberg, H. (2013). Emotional facial and vocal expressions during story retelling by children and adolescents with high-functioning autism. *J Speech Lang Hear Res*, 56(3), 1035-1044. doi:10.1044/1092-4388(2012/12-0067)
- Harnum, M., Harnum, M., Duffy, J., Duffy, J., Ferguson, D. A., & Ferguson, D. A. (2007). Adults' Versus Children's Perceptions of a Child with Autism or Attention Deficit Hyperactivity Disorder. *J Autism Dev Disord*, 37(7), 1337-1343. doi:10.1007/s10803-006-0273-0
- Jarrold, C. (2003). A Review of Research into Pretend Play in Autism. *Autism*, 7(4), 379-390. doi:10.1177/1362361303007004004
- Jones, R. S. P., & Meldal, T. O. (2001). Social Relationships and Asperger's Syndrome: A Qualitative Analysis of First-Hand Accounts. *Journal of learning disabilities (London, England)*, 5(1), 35-41. doi:10.1177/146900470100500104

- Mikk, J., & Elts, J. (1999). A Reading Comprehension Formula of Reader and Text Characteristics. *Journal of quantitative linguistics*, 6(3), 214-221.  
doi:10.1076/jqul.6.3.214.6158
- Morrison, K. E., DeBrabander, K. M., Faso, D. J., & Sasson, N. J. (2019). Variability in first impressions of autistic adults made by neurotypical raters is driven more by characteristics of the rater than by characteristics of autistic adults. *Autism*, 23(7), 1817-1829. doi:10.1177/1362361318824104
- Roberts, J., & Simpson, K. (2016). A review of research into stakeholder perspectives on inclusion of students with autism in mainstream schools. *International journal of inclusive education*, 20(10), 1084-1096. doi:10.1080/13603116.2016.1145267
- Sasson, N. J., Faso, D. J., Nugent, J., Lovell, S., Kennedy, D. P., & Grossman, R. B. (2017). Neurotypical Peers are Less Willing to Interact with Those with Autism based on Thin Slice Judgments. *Sci Rep*, 7(1), 40700-40700. doi:10.1038/srep40700
- Sasson, N. J., & Morrison, K. E. (2019). First impressions of adults with autism improve with diagnostic disclosure and increased autism knowledge of peers. *Autism*, 23(1), 50-59. doi:10.1177/1362361317729526
- Selfhout, M., Denissen, J., Branje, S., & Meeus, W. (2009). In the Eye of the Beholder: Perceived, Actual, and Peer-Rated Similarity in Personality, Communication, and Friendship Intensity During the Acquaintanceship Process. *J Pers Soc Psychol*, 96(6), 1152-1165. doi:10.1037/a0014468
- Shattuck, P. T., Durkin, M., Maenner, M., Newschaffer, C., Mandell, D. S., Wiggins, L., . . . Cuniff, C. (2009). Timing of identification among children with an autism spectrum disorder: Findings from a population-based surveillance study. *Journal of the American Academy of Child & Adolescent Psychiatry*, 48(5), 474-483.  
doi:10.1097/CHI.0b013e31819b3848

Sheppard, E., Sheppard, E., Pillai, D., Pillai, D., Wong, G. T.-L., Wong, G. T.-L., . . .

Mitchell, P. (2016). How Easy is it to Read the Minds of People with Autism Spectrum Disorder? *J Autism Dev Disord*, 46(4), 1247-1254. doi:10.1007/s10803-015-2662-8

Siperstein, G. N., Bak, J. J., & Gottlieb, J. (1977). Effects of Group Discussion on Children's Attitudes Toward Handicapped Peers. *The Journal of educational research (Washington, D.C.)*, 70(3), 131-134. doi:10.1080/00220671.1977.10884969

Smiley, K., Gerstein, B., & Nelson, S. (2018). Unveiling the autism epidemic. *Neurology and Clinical Neuroscience*, 2(1), 1.

Stagg, S. D., Slavny, R., Hand, C., Cardoso, A., & Smith, P. (2014). Does facial expressivity count? How typically developing children respond initially to children with autism. *Autism*, 18(6), 704-711. doi:10.1177/1362361313492392

Uleman, J. S., Saribay, S. A., & Gonzalez, C. M. (2008). Spontaneous Inferences, Implicit Impressions, and Implicit Theories. *Annu Rev Psychol*, 59(1), 329-360. doi:10.1146/annurev.psych.59.103006.093707

Voncken, M. J., & Dijk, K. F. L. (2013). Socially anxious individuals get a second chance after being disliked at first sight: The role of self-disclosure in the development of likeability in sequential social contact. *Cognitive Therapy and Research*, 37(1), 7-17. doi:10.1007/s10608-012-9449-4

Zaki, J. (2013). Cue Integration: A Common Framework for Social Cognition and Physical Perception. *Perspect Psychol Sci*, 8(3), 296-312. doi:10.1177/1745691613475454



## Tables

*Table 1 ASD and TD Comparisons Across the Three Stimulus Types*

Stimulus Type	Video Type		<i>t</i>	<i>p</i>	<i>d</i>
	ASD Video	TD Video			
Video	52 (17.2)	55 (16.4)	2.11	.04	.30
Audio	49 (20.15)	55 (16.34)	2.96	.005	.48
Transcript	53 (18.34)	58 (16.40)	3.72	< .001	.51

Means scores with standard deviations in parentheses

*Table 2 ASD and TD Comparison on Individual Questions*

Questions	Mean difference	<i>t</i>	<i>p</i>	<i>d</i>
Would you be friends with this person?	6.46	4.21	<.001	.34
Would you play with this person?	5.38	4.09	<.001	.31
Would this person play with you?	4.31	3.89	<.001	.30
Would this person help you?	4.10	3.90	<.001	.34
Can you tell how this person is feeling?	2.78	2.07	.02	.19
Would this person enjoy the same games as you?	3.24	2.62	.005	.20

Positive mean differences relate to more favourable ratings for the TD group

*Table 3 ASD and TD Comparison on Transcript Content*

	TD	ASD
Mean number of words	12	13
number of words over two syllables	17	23
Grammatical errors	0	0
Expressive language	5	3
Emotive language	0	0
Self-reference	11	10