Supplemental Materials

S1. Inclusion criteria

Youth were excluded if they were born premature (<34 weeks), non-native English speakers, had a history of concussion or head trauma, or had a full-scale IQ < 80 as assessed by the Kaufman Brief Intelligence Test, Second Edition (Kaufman, 2004). Parents of neurotypical youth reported no history of neurological or psychiatric disorders or first-degree relatives with autism or schizophrenia. Autistic youth were not excluded if parents reported a common co-occurring mental health condition, including attention-deficit/hyperactivity disorder (n = 19), obsessive-compulsive disorder (n = 1), or anxiety (n = 8). Autistic youth were eligible to participate only if they had a prior clinical diagnosis of autism which was then confirmed by our research team using the Autism Diagnostic Observation Schedule, 2nd edition (ADOS-2, Lord *et al.*, 2012) via a licensed clinical psychologist or clinical psychology graduate student who was research-reliable in ADOS administration and coding. Of youth who completed the MRI scan, the following inclusion criteria were used: believed they were chatting with a real peer partner (see section 2.3 Post-scan interview), and adequate task performance (i.e., responding to at least 2/3 of trials) and with three or more usable runs (i.e., mean framewise displacement (FD) < 0.5mm and maximum FD < 5.2mm, corresponding to the diagonal length of a 3mm isomorphic cube). The final sample (n = 86) overlaps with the sample used in McNaughton *et al.* (2023).

S2. Experiment

Participants were first informed whether the recipient was a peer (peer trial) or a computer (computer trial), both of which had an equal possibility. Then, the participants initiated an interaction by answering a Yes/No question about their likes and hobbies (e.g., “I like soccer”). After a jittering 2-6 sec (mean 3.5 sec) fixation period, participants received a response in the

two-second reply phase. The responses consisted of engagement (e.g., "Me too!", indicating the peer agreed with the participant, or "Matched!", indicating that the computer randomly generated the same answer as the child), non-engagement (e.g., "I'm away" or "Disconnected"), and disagreement (e.g., "That's not what I picked").

For peer trials, the participants were told that the peer would sometimes be unable to respond because the peer was playing another game. For these disengaged trials, an away message was displayed as the peer response. Moreover, participants believed that the peer always saw their answer, and the peer would either respond if they were able to or not respond if they had been assigned to play another game. For computer trials, participants believed that the computer would randomly pick an answer following participants' answering the Yes/No question. Moreover, participants were informed that the computer would sometimes lose the connection and be unable to generate an answer, resulting in disengage trials. The order and timing of trials were predetermined, and we used four sets of stimuli to avoid pairing the questions with reply types (e.g., the "I play soccer" trials did not always receive a "Me too" response).

S3. Post-scan enjoyment questionnaire

A post-scan questionnaire was filled by participants using a 1-5 Likert scale (1 = not at all, to 5 = a lot). The items used in the analysis are listed below.

How much did you want to see his/her answer to your question?

How much did you want to see if the computer matched your answer?

How much did you like chatting with _____?

How much did you like it when you were just answering the computer?

S4. Preprocessing

A standardized preprocessing pipeline fMRIprep v1.4.1 was used to preprocess the imaging data (Esteban *et al.*, 2019). The skull-stripped BOLD images underwent motion correction, slice timing correction, and susceptibility distortion correction, and were lastly resampled to MNI space. Automatic removal of motion artifacts using independent component analysis was performed on the preprocessed BOLD images after removal of non-steady-state volumes and spatial smoothing with an isotropic, Gaussian kernel of 6mm FWHM (full-width half-maximum). Lastly, the BOLD images were then intensity normalized to have a mean intensity of 1,000, and a binary group mask at the threshold of 0.9 probability was applied.

Table S1. Clusters with significant main effect and group differences with MNI coordinates of their center of mass (voxel-wise p-value = 0.001, cluster-wise threshold = 124 voxels).

Contrast	Seed	Region	x	y	z
Main effects					
Social context	NAcc	L IFG	-45	27	-8
Group differences (AUT > TD)					
Social reward	Amygdala	R pSTS	56	-61	13
Social reward	Amygdala	L pSTS	-59	-41	3
Social reward	Amygdala	R TPJ	-54	-58	20

Reference:

Esteban, O. *et al.* (2019) 'fMRIPrep: a robust preprocessing pipeline for functional MRI.', *Nature methods*, 16(1), pp. 111–116. doi: 10.1038/s41592-018-0235-4.

Kaufman, A. S. (2004) 'Kaufman brief intelligence test–second edition (KBIT-2)', *Circle Pines, MN: American Guidance Service*.

Lord, C. *et al.* (2012) *Autism diagnostic observation schedule (ADOS-2)*. 2nd editio. Los Angeles: Western Psychological Services.

McNaughton, K. A. *et al.* (2023) 'Social-interactive reward elicits similar neural response in autism and typical development and predicts future social experiences', *Developmental Cognitive Neuroscience*, 59(January), p. 101197. doi: 10.1016/j.dcn.2023.101197.