

Background

- Peer friendships are fundamental for social and affective functioning throughout the lifespan.
- In a recent meta-analysis, Mendelson et al. (2016) proposed a model of friendship success in children with autism spectrum disorder (ASD): efficient social information processing speed (SIPS), social cognition, and social motivation may underlie increased friendship quality and quantity and improve psychosocial functioning in individuals with ASD who are able to form and maintain successful friendships.
- Electroencephalography (EEG) can be used to study SIPS because of its high temporal resolution.
- The present study utilized the latency of the N170 event-related potential (ERP) as an index of face-sensitive SIPS.
- We hypothesized SIPS, social cognition, social motivation, and psychosocial functioning would relate to friendship interest and quantity in children with ASD.

Objective

- To empirically investigate and extend Mendelson et al. (2016)'s model of successful friendship in ASD by examining the behavioral and neural correlates of friendship.

Method

Participants (N=72):

	M	SD	Range
Age	14	3	8-19
FSIQ	105	20	72-161

- DSM-5 diagnosis of ASD was confirmed by the ADOS-2 and ADI-R, administered by research reliable clinicians to all participants.
- All children had a Full Scale IQ of 70 or higher as measured by the Differential Abilities Scale-2 (DAS-2).

EEG and ET Data Acquisition and Collection:

- EEG was recorded at 1000 Hz with a 128-channel Hydrocel Geodesic Sensor net.
- ET data was collected using an Eyelink-1000 remote camera system.

ERP Analysis:

- N170 (150-300ms) ERPs were extracted from electrodes over left and right occipitotemporal regions (electrodes 58, 64, 59, 66, 65, and electrodes 96, 95, 91, 84, 90 respectively; see Fig. 1).
- Data were filtered at 0.1 to 30Hz and segmented from -100 to 500ms relative to eyes or mouth opening.
- Peak latency was analyzed for response to gaze-contingent eye and mouth movement.

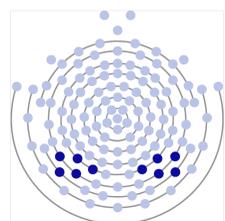


Figure 1. Selection of electrodes for analysis.

Method

Behavioral Variables:

- As shown in Table 1, Friendship, social motivation, social cognition, and psychosocial functioning were measured with standardized interviews (Vineland Adaptive Behavior Scale-2 [VABS-2]) and questionnaires (Child and Adolescent Symptom Inventory-5 [CASI-5], Child Behavior Checklist [CBCL], Social Responsiveness Scale-2 [SRS-2]).

Method	Variable
CASI-5 item: "Not interested in making friends"	Friendship Interest
CBCL item: "How many close friends does your child have?"	Friendship Quantity
SRS-2 Social Cognition Subscale	Social Cognition
SRS-2 Social Motivation Subscale	Social Motivation
VABS-2 Socialization Subscale	Psychosocial Functioning

Table 1. Behavioral variables.

Paradigm

- Participants were cued by an up or down arrow (A) to look at the eyes or mouth, respectively, of a subsequently appearing face (B).
- In response to participant gaze to the region cued by the arrow, the mouth or eyes of the face opened, resulting in four conditions (see Fig. 2): fixate on eyes, eyes open (eye:eye); fixate on eyes, mouth opens (eye:mouth); fixate on mouth, eyes open (mouth:eye); fixate on mouth, mouth opens (mouth:mouth).

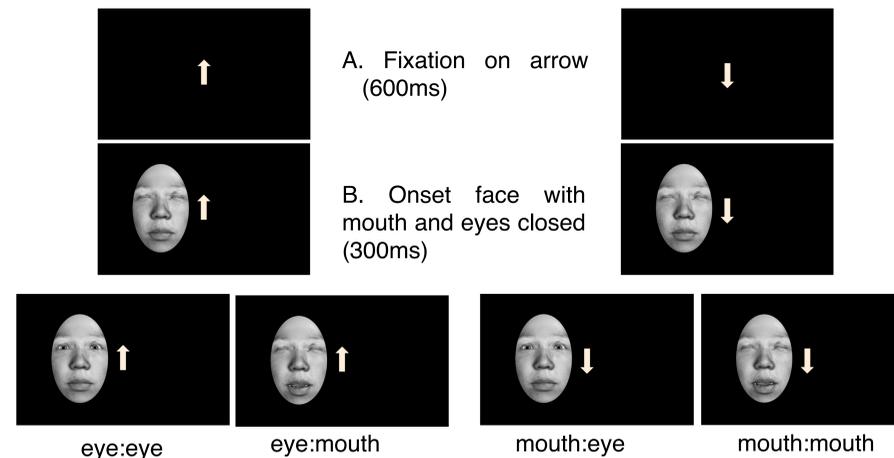


Figure 2. Paradigm.

Results

- Two ordinal regressions were conducted to examine the predictors of friendship quality and interest, respectively, with N170 latency, social cognition, and social motivation entered into the model as independent variables.
 - Shorter N170 to mutual eye contact [Wald $\chi^2(1)=12.34, p<.001$] and higher social motivation [Wald $\chi^2(1)=4.31, p<.05$] significantly predicted greater number of friends.
 - Only higher social motivation [Wald $\chi^2(1)=7.15, p<.05$] emerged as a significant predictor of greater friendship interest.
- T-tests were conducted to assess whether children with ASD with friends versus no friends differed in their SIPS, social cognition, social motivation, and psychosocial functioning.
 - Children with ASD with friends had significantly faster N170 latencies to mutual eye contact [$t(29)=-2.05, p<.05$] compared to children with ASD without friends (see Fig. 3).
 - Children with ASD with friends had significantly more social motivation [$t(29)=2.48, p<.05$] compared to children with ASD without friends.

Results

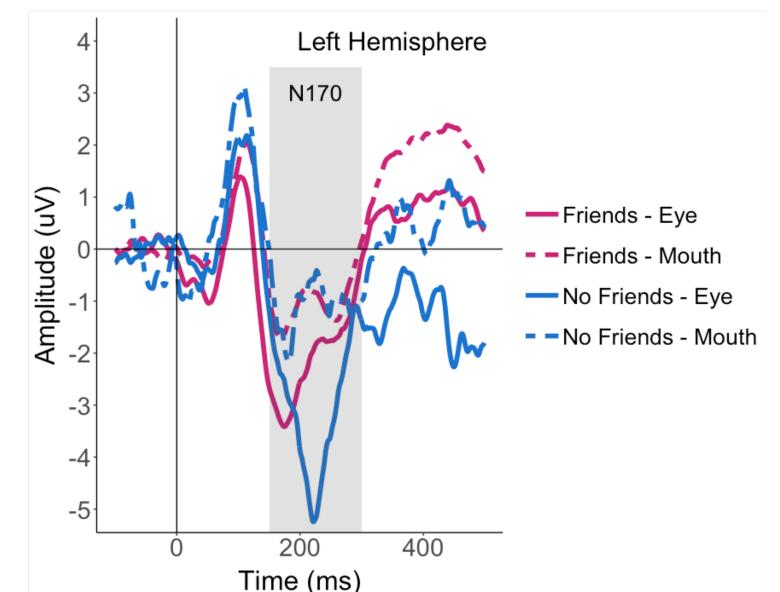


Figure 3. N170 latency in children with ASD (with friends versus without friends).

Conclusions

- Associations between friendship and SIPS, social motivation, and psychosocial functioning in ASD are consistent with the model proposed by Mendelson et al. (2016).
- Results suggest neural differences in SIPS and social motivation in children with ASD are associated with enhanced ability to form and maintain friendships and thereby positively impact psychosocial functioning.
- These clinically significant findings suggest that targeting SIPS and social motivation may lead to improved friendships in ASD and, eventually, improved psychosocial functioning.

Acknowledgements

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Reference:

Mendelson, J. L., Gates, J. A., & Lerner, M. D. (2016). Friendship in school-age boys with autism spectrum disorders: A meta-analytic summary and developmental, process-based model. *Psychological Bulletin*, 142(6), 601.

