Attention Shifting from Social and Non-Social Images as a Predictor of Autistic Traits in Infancy

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BACKGROUND
• Autism spectrum disorder (ASD) is a developmental disorder presenting itself through social-communicative difficulties (APA, 2013).
• With a typical age of diagnosis at 24 to 36 months old (APA, 2013), prospective studies are being conducted with infants who have an older sibling with ASD, who themselves are at a higher likelihood for ASD (HLA), to potentially identify early signs of ASD.
• Previous studies with HLA infants have found differences in attentional patterns to be an early predictor of ASD; specifically, HLA infants later diagnosed with ASD show slower attention shifting between two stimuli than infants at low likelihood for ASD (LLA) (e.g., Elsabbagh et al., 2013; Zwangersbaan et al., 2005).
• Wagner et al. (2020) looked at attention shifting from emotional faces in HLA and LLA and found that both groups showed an attentional bias to fearful faces as compared to happy and neutral faces. HLA with a later ASD diagnosis also showed slower attention overall by 12 months.

Current Study
• The current study will extend the work of Wagner et al. (2020) to look at attention shifting from social and non-social images in HLA and LLA infants, with the goal of further understanding attentional biases in HLA infants.

METHOD
Participants
• Participants included 13 6- to 12-month-old infants (4 male, 9 female), 11 LLA (with no family history of ASD) and 2 HLA (with an older sibling diagnosed with ASD).

Procedure
• Infants were seated on their caregiver’s lap in front of an SMI RED 120 Hz eye-tracker.
• Based on Peltola et al. (2008), 30 attention disengagement trials were presented, beginning with a central image presented for 1000 ms (happy face, fearful face, or object), followed by 2500 ms where the central image remained and a checkerboard image appeared on the right or left side (see Figure 1).
• Afterwards, infants’ ASD-related characteristics were assessed using the Autism Observation Scale for Infants (AOSI) (Bryson et al., 2008), which consists of 18 semi-structured activities, including measures of visual tracking and attentional disengagement, coordination of eye gaze, and communicative behaviors.

Data Analysis
• Areas of interest (AOIs) were drawn around the central image and checkerboard, and for valid trials, the time when gaze first reached the checkerboard AOI was used to calculate latency to shift attention.
• Analyses were performed using SPSS statistical software.

RESULTS, continued
Correlation With ASD-Related Characteristics
• A Pearson correlation examined the relationship between infants’ average latency to shift attention (averaged across all stimuli) and their ASD-related characteristics, as measured by the AOSI, and no significant association was found, r(11) = 0.037, p = 0.904.

RESULTS, continued
Attention Disengagement Across Stimuli in HLA vs. LLA Infants
• A 3 (Stimulus; fearful face, happy face, object) x 2 (Group; HLA, LLA) repeated-measures ANOVA was conducted to measure the latency to shift attention, with stimulus as the within-subjects factor and group as the between-subjects factor.
• A main effect of stimulus was found, $F(2, 22) = 4.532, p = 0.022$, with significantly longer latency to disengage from fearful faces as compared to happy faces ($p = 0.044$), and marginally longer to fearful faces than objects ($p = 0.099$; see Figure 2).

Figure 2.

DISCUSSION
• Past work has found that in infancy, attention is captured by threat-relevant faces as compared to other emotional stimuli (e.g., Ebletn et al., 2008, Wagner et al., 2020), and the current findings are consistent with this, showing that infants were slower to disengage attention from fearful faces than happy faces and objects.
• The current study also found that overall, HLA infants showed longer latency to disengage attention than LLA, and this relates to findings with older children with ASD who also showed slowed shifting of attention between competing stimuli (e.g., Landry et al., 2004).
• While past work with HLA has found that slowed shifting in infancy can be related to later ASD outcomes (e.g., Elsabbagh et al., 2013, Zwangersbaan et al., 2005), there was no relationship between attention shifting and ASD-related characteristics at the same age in the current sample.
• The current results are preliminary due to the small sample sizes (especially among HLA), but further work has begun to expand the samples and follow infants longitudinally through 24 months in order to examine how early attentional biases might relate to developmental outcomes, including diagnosis of ASD.

REFERENCES

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