Perception of Motion Complexity is Deficient in Adults with Autism Spectrum Disorder

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INTRODUCTION

Preference for biological motion is characteristic of typical development, but such is not the case for individuals with an autism spectrum disorder (ASD; Blake et al., 2003). However, this does not appear to be due to a sensory deficit in individuals with ASD, because they remain responsive to non-social, physical contingencies of object motion (Klin et al., 2009).

Recent work in biomechanics of human movement has revealed that these movements can be characterized by specific nonlinear measures of temporal complexity, including entropy and local stability (Stergiou, et al., 2006). In fact, the health of a biological system can be evaluated based on the presence of this complexity.

We hypothesize that the underlying deficit in the perception or identification of this temporal complexity may be characteristic of ASD, and the functional basis for the lack of discrimination of biological motion.

METHODS

Rhythmic Visual Stimulus

 Entrainment of gaze and posture to particular patterns of healthy variability structure

RESULTS

The Embodied Mind

Posture

Vision

Touch

Intelligence emerges from interactions between individuals and the environment – as a result of sensorimotor activity

PURPOSE

Evaluate the perception and motor replication of visual stimulus movement variability; in adults with and without ASD

DISCUSSION

The individuals with ASD exhibited more complex gaze response to both stimulus conditions, compared to those without ASD (SN, p = 0.009; CH, p = 0.013). Although this finding is clearly interesting and potentially important, our primary hypothesis was that individual without ASD would show clear differentiation between the lower and higher complexity conditions whereas those with ASD would not differentiate between these conditions, which is what we observed. That is, adults without ASD exhibited greater complexity of their gaze behavior towards the more complex motion (CH, p = 0.016), whereas adults with ASD did not differ in their gaze towards the two types of motion (p = 0.544). Finally, results indicate that the condition-response of posture did not occur in the postural response of persons with and without ASD.

CONCLUSION

This study provides preliminary evidence that the perception of motion complexity differs for adults with ASD, compared with adults without ASD. This finding has potentially important implications for explaining the lack of perception of biological motion reported for individuals with autism in prior research.

REFERENCES


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