

## Visual Preferences of Elementary School Children with Autism Spectrum Disorder: An Experimental Study

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**Abstract :** Visual preferences that can be assessed via eye tracking technologies are considered one of the defining hallmarks of Autism Spectrum Disorder (ASD). Specifically, children with ASD show a decreased preference for social compared to geometric images compared to typically developed (TD) children. Such differences are already prevalent at a very early age and indicate the severity of the disorder: toddlers with ASD who preferred the geometric images when presented with social and geometric images also showed higher ASD symptom severity than toddlers with ASD who showed higher social attention. Furthermore, the complexity of social pictures (one child playing vs. two children playing together) as well as the mode of stimulus presentation (video or image), appear to have no influence on the hallmark. Although such visual preferences are also a hallmark of the diagnosis of ASD, studies have primarily been conducted with toddlers and preschool children. Since the age for diagnosis often falls into this age group – the average age of diagnosis for ASD in Germany is 6.5 years – we were investigating whether visual preferences (1) persist into this age range and (2) might be used for a technology-based screening. We examined the visual preferences of 16 boys aged 6 to 11 with ASD and normal cognition and TD children (1:1 matching) within an experimental setting. Matching criteria are the children's age and the parent's level of education. Different stimulus presentation formats (images vs. videos) and different levels of stimulus complexity are included. Children with and without ASD always receive pairs of social and non-social images and video stimuli on a screen. For images, the social stimuli show one or more children playing whereas the non-social show images of the universe. For videos, the social stimuli show a man or a woman making faces, and the non-social are dynamic geometric shapes. During stimulus presentation of approx. 10 s length by image and of approx. 18 s length by video, eye movements (i.e., eye position and gaze direction) are captured. Therefore, KIZMO GmbH developed a customized, native iOS app (KIZMO Face-Analyzer) for use on iPads. In addition, the preferences of the image stimuli are directly measured. Data collection is currently ongoing, with an expected sample size of 32 (16 children with ASD and 16 TD children). One expected finding is that children with ASD demonstrate lower attention (total fixation time) on social stimuli (images and video) compared to their TD peers, even at this elementary school age. We also expect that the stimulus presentation, including different complexity levels, will not affect social attention. The data for the group of children with ASD is already available, while the data for the control group will be collected in the coming months. Preliminary descriptive analyses for 16 children with ASD show that in 80 possible image comparisons 52 times the non-social one was selected, 8 times the social one and 20 are missing or cannot be correctly assigned. The results will be discussed concerning various clinical implications, e.g. implementation of an automated digital screening.

**Keywords :** autism spectrum disorder, visual preference, hallmark, eye movement

**Conference Title :** ICA 2024 : International Conference on Autism

**Conference Location :** Berlin, Germany

**Conference Dates :** July 22-23, 2024