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Remote eye gaze tracking as a marker for autism

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A study to be published in the April 2016 issue of the *Journal of the American Academy of Child and Adolescent Psychiatry* (*JAACAP*) reports that eye tracking can differentiate children with autism spectrum disorder (ASD) from children without ASD but with other developmental problems (non-ASD).

At present, ASD is identified using subjective methods such as parent report, interviews, and clinician observations. Having an objective marker of ASD could substantially increase the accuracy of clinical diagnosis. It could also help parents, who are often wary of accepting clinical impressions alone, accept the diagnosis.

Using two samples of at-risk patients referred for evaluation, a group of researchers examined whether remotely tracking patients' eye gaze to social and non-social aspects of still pictures and dynamic videos could differentiate children aged 3-8 who would go on to be diagnosed with ASD versus those without ASD. The team, led by Dr. Thomas W. Frazier, Ph.D. of Cleveland Clinic, hypothesized that more time spent looking at social targets and less time spent looking at non-social targets could be combined into a single "Autism Risk Index" to identify ASD cases.

The Autism Risk Index strongly differentiated between children with and without a clinical consensus diagnosis of ASD in both samples: using an optimal cut score, 4 out of 5 cases were correctly identified. Autism Risk Index scores also showed strong relationships across samples with a

clinical observation measure of autism severity. This relationship could not be accounted for by language level or other behavior problems exhibited by the children, indicating that the eye gaze-based Autism Risk Index is specifically measuring the severity of autism symptoms.

"Identifying children with autism early is critical to getting them appropriate interventions that will make their lives better," Frazier said. "The lack of objective methods for identifying children with autism can be a major impediment to early diagnosis. Remote eye tracking is easy to use with young children and our study shows that it has excellent potential to enhance identification and, because it is objective, may increase parents' acceptance of the diagnosis, allowing their children to get treatment faster."

Based on these findings, the authors concluded that remote eye gaze tracking may be an easy, inexpensive, and effective method to aide clinicians in detecting autism. Due to the growing prevalence of ASD (1 in 68 children in the U.S.) and the lack of objective markers, identifying remote eye gaze tracking as an objective measure of autism could aide early identification leading to more rapid treatment. Remote eye gaze tracking also has the potential to track symptom changes resulting from treatment. Finally, by removing subjectivity from outcome measurement, remote eye gaze tracking could greatly enhance our knowledge of effective treatments and reduce the time to discovery of new treatments.

Additional research in large samples is necessary to confirm these findings and to further develop remote eye tracking as a clinical tool. If validated and scaled for routine use, remote eye gaze tracking has the potential to dramatically advance our ability to identify and assist individuals with autism.

More information: Thomas W. Frazier et al. Development of an

Objective Autism Risk Index Using Remote Eye Tracking, *Journal of the American Academy of Child & Adolescent Psychiatry* (2016). DOI: 10.1016/j.jaac.2016.01.011