



limited in studying the neurological basis of live social interaction with eye-contact in ASD because of the inability to image the brains of two people simultaneously.

However, using an innovative technology that enables imaging of two individuals during live and [natural conditions](#), Yale researchers have identified specific brain areas in the dorsal parietal region of the brain associated with the social symptomatology of [autism](#). The study, published Nov. 9 in the journal *PLOS ONE*, finds that these neural responses to live face and [eye-contact](#) may provide a biomarker for the diagnosis of ASD as well as provide a test of the efficacy of treatments for autism.

"Our brains are hungry for information about other people, and we need to understand how these social mechanisms operate in the context of a real and interactive world in both typically developed individuals as well as individuals with ASD," said co-corresponding author Joy Hirsch, Elizabeth Mears and House Jameson Professor of Psychiatry, Comparative Medicine, and of Neuroscience at Yale.

The Yale team, led by Hirsch and James McPartland, Harris Professor at the Yale Child Study Center, analyzed brain activity during brief social interactions between pairs of adults—each including a typical participant and one with ASD—using functional near-infrared spectroscopy, a non-invasive optical neuroimaging method. Both participants were fitted with caps with many sensors that emitted light into the brain and also recorded changes in light signals with information about [brain activity](#) during face gaze and eye-to-eye contact.

The investigators found that during eye contact, participants with ASD had significantly reduced activity in a brain region called the dorsal parietal cortex compared to those without ASD. Further, the more severe the overall social symptoms of ASD as measured by ADOS (Autism

Diagnostic Observation Schedule, 2<sup>nd</sup> Edition) scores, the less activity was observed in this [brain](#) region. Neural activity in these regions was synchronous between typical participants during real eye-to-eye contact but not during gaze at a video face. This typical increase in neural coupling was not observed in ASD, and is consistent with the difficulties in social interactions.

"We now not only have a better understanding of the neurobiology of autism and [social differences](#), but also of the underlying neural mechanisms that drive typical social connections," Hirsch said.

**More information:** Joy Hirsch et al, Neural correlates of eye contact and social function in autism spectrum disorder, *PLOS ONE* (2022).  
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