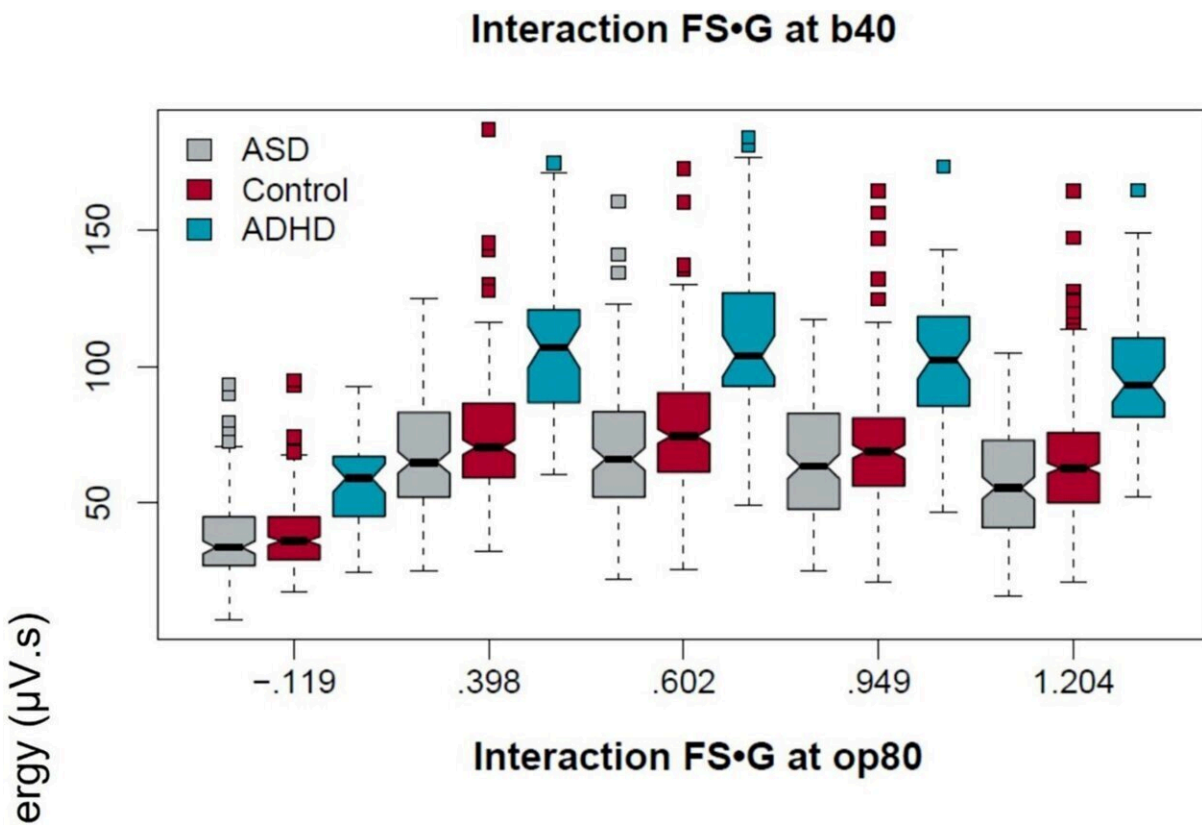


# When it comes to ADHD and ASD, the eyes could reveal all

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Group differences in the b40 and op80 DWT coefficients across the five flash strengths. The ADHD group exhibited higher b40 and op80 energy levels across the flash series. In contrast the difference between ASD and controls was more significantly reduced for the op80 energy compared to the b40 at the higher flash strengths. Boxplots display ~95% CIs around the median values. Credit: *Frontiers in Neuroscience* (2022). DOI: 10.3389/fnins.2022.890461

The eyes may be able to signal neurodevelopmental disorders such as ASD and ADHD, according to new research from Flinders University and the University of South Australia.

In the first study of its kind, researchers found that recordings from the retina could identify distinct signals for both [attention deficit hyperactivity disorder](#) (ADHD) and [autism spectrum disorder](#) (ASD) providing a potential biomarker for each condition.

Using the electroretinogram (ERG)—a [diagnostic test](#) that measures the electrical activity of the retina in response to a light stimulus—researchers found that children with ADHD showed higher overall ERG energy, whereas children with ASD showed less ERG energy.

Research optometrist at Flinders University, Dr. Paul Constable, says the preliminary findings indicate promising results for improved diagnoses and treatments in the future.

"ASD and ADHD are the most common neurodevelopmental disorders diagnosed in childhood. But as they often share similar traits, making diagnoses for both conditions can be lengthy and complicated," Dr. Constable says.

"Our research aims to improve this. By exploring how signals in the retina react to light stimuli, we hope to develop more accurate and earlier diagnoses for different neurodevelopmental conditions.

"Retinal signals have specific nerves that generate them, so if we can identify these differences and localize them to specific pathways that use different chemical signals that are also used in the brain, then we can show distinct differences for children with ADHD and ASD and potentially other neurodevelopmental conditions."

"This study delivers preliminary evidence for neurophysiological changes that not only differentiate both ADHD and ASD from typically developing children, but also evidence that they can be distinguished from each other based on ERG characteristics."

According to the World Health Organization, one in 100 children has ASD, with 5 to 8 percent of children diagnosed with ADHD.

Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental condition characterized by being overly active, struggling to pay attention, and difficulty controlling impulsive behaviors. Autism spectrum disorder (ASD) is also a neurodevelopmental condition where [children](#) behave, communicate, interact, and learn in ways that are different from most other people.

Co-researcher and expert in human and artificial cognition at the University of South Australia, Dr. Fernando Marmolejo-Ramos, says the research has potential to extend across other neurological conditions.

"Ultimately, we're looking at how the eyes can help us understand the brain," Dr. Marmolejo-Ramos says.

"While further research is needed to establish abnormalities in retinal signals that are specific to these and other [neurodevelopmental disorders](#), what we've observed so far shows that we are on the precipice of something amazing.

"It is truly a case of watching this space; as it happens, the eyes could reveal all."

The current study is published in *Frontiers in Neuroscience*.

**More information:** Paul A. Constable et al, Discrete Wavelet

Transform Analysis of the Electroretinogram in Autism Spectrum Disorder and Attention Deficit Hyperactivity Disorder, *Frontiers in Neuroscience* (2022). [DOI: 10.3389/fnins.2022.890461](https://doi.org/10.3389/fnins.2022.890461)

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