

# Men and women with autism have 'extreme male' scores on the 'eyes test' of mindreading

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Quinn, an autistic boy, and the line of toys he made before falling asleep. Repeatedly stacking or lining up objects is a behavior commonly associated with autism. Credit: Wikipedia.

Scientists at the University of Cambridge University have published new results in the journal *PLoS ONE* from the largest ever study of people with autism taking the 'Reading the Mind in the Eyes' test. Whilst typical adults showed the predicted and now well-established sex difference on

this test, with women on average scoring higher than men, in adults with autism this typical sex difference was conspicuously absent. Instead, both men and women with autism showed an extreme of the typical male pattern on the test, providing strong support for the 'extreme male brain' theory of autism.

The study was led by Professor Simon Baron-Cohen, Director of the Autism Research Centre (ARC) in Cambridge University. Almost 400 men and women with [autism](#) or Asperger Syndrome took the test online, which entails looking at a series of photographs of just the eye region of the face, and picking which of 4 words best describe what the person in the photo is thinking or feeling.

The 'Reading the Mind in the Eyes' test is known as an advanced 'theory of mind' or empathy test, designed to reveal subtle individual differences in social sensitivity. It particularly measures the 'cognitive' component of empathy, that is, the ability to recognize or infer someone else's state of mind. The test has been used in hundreds of studies worldwide, showing reliable sex differences in typical individuals, with women on average scoring higher than men, and showing that people with autism score lower on average than people without autism.

The team investigated whether men and women with autism perform differently on this test, and used it to evaluate the 'extreme male brain' theory of autism, in the largest study to date. This theory predicts that on tests of empathy, typical females will score higher than typical males, who in turn will score higher than people with autism. The results confirmed this pattern.

Professor Baron-Cohen commented: "We are seeing this pattern not just on the Eyes test but on a number of measures. Last year we saw it on the Empathy Quotient, a self-report measure of social sensitivity, and on the Systemizing Quotient, a self-report measure of one's interest and

aptitude in understanding systems. This year we saw it in prenatal testosterone levels, where boys with autism had elevated levels of this hormone compared to typically developing boys, who in turn have higher levels than typically developing girls. And a decade ago we found how much prenatal testosterone you have influences your scores on the Eyes test. Future research needs to delve into what is giving rise to this pattern."

Dr Carrie Allison, Research Manager at the ARC and another member of the team, said: "Imagine looking at people's eyes and not being able to 'read' them effortlessly and intuitively for what the other person may be thinking or feeling. This research has the potential to explain why children with autism, from the earliest point in development, avoid looking at people's eyes, and become confused in rapidly changing social situations, where people are exchanging glances without words all the time. This disability may be both a marker of the early-onset empathy difficulties in autism, and contribute to exacerbating them. Teaching children with autism how to read emotional expressions non-verbally should become an important clinical focus for future research and practice."

Dr Meng-Chuan Lai, the William Binks Autism Neuroscience Fellow at the ARC and senior author of the study, added: "There are substantial individual differences in terms of how well a person with autism performs on the Eyes test, but the social difficulties of both [men and women](#) are reflected on their test scores. In addition, women with autism differ more from typical women than men with autism differ from typical men. The relationship between autism and sex and gender is becoming an important topic for [autism research](#)."

**More information:** Baron-Cohen S, Bowen DC, Holt RJ, Allison C, Auyeung B, Lombardo MV, et al. (2015) The "Reading the Mind in the Eyes" Test: Complete Absence of Typical Sex Difference in ~400 Men

and Women with Autism. *PLoS ONE* 10(8): e0136521. [DOI: 10.1371/journal.pone.0136521](https://doi.org/10.1371/journal.pone.0136521)

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