

NEWS

Sense of 'self' impaired in autism

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People with autism struggle to see their own role in social situations. That's the conclusion from the first study to scan individuals' brains while they interact with another person – a technique that could lead to a diagnostic tool.

Individuals with autism have long been thought to find social situations difficult because they cannot comprehend what's going on in the minds of others. But a new paper published last week in *Neuron* suggests that the problem may also lie in their concept of 'self.'

Read Montague at Baylor College of Medicine in Houston, Texas, and his colleagues developed a method they call hyperscanning, which uses functional magnetic resonance imaging (fMRI) to observe brain blood flow in two people simultaneously as they learn to trust each other during an investment game.

In the game, one player, the investor, offers another, the trustee, a small sum of money. That sum is tripled and given to the trustee, who then decides how much to repay the investor. As the game is repeated over ten rounds, players typically learn that by trusting each other and investing some money, they will receive something in return.

In earlier work, Montague showed that this game triggers two characteristic patterns of activity in the cingulate cortex of healthy individuals: one pattern when the players decide what to invest – which is thought to correlate with a concept of self – and a second when they learn whether they have received money back¹. The cingulate cortex is involved in integrating many types of cognitive information involved in making decisions.

In individuals with autism and high IQs comparable to the control group, the first of these cingulate cortex patterns – at the point of investment – is missing or reduced, even though these subjects fully understood how to play the game and the amount of money they made was no different from that of the control group, the researchers have found². These individuals instead responded as if they were playing against a computer.

The result suggests that some of the social problems observed in people with autism may lie in their poorly defined perception of 'self.' Montague suggests that they are unable to attribute part of what is going on in a social situation to themselves. "They're not understanding their role in the social exchange," he says.

Controlled interactions

Neuroscientist **Chris Frith**, who wrote an accompanying article about the work³, has a slightly different interpretation of the results.

Individuals with autism do not worry about how they might be perceived by others when, for example, they decide how much to invest, says Frith, who studies the neural basis of social interaction at University College London. "They don't think of their reputation," Frith says. "It suggests they're not totally unsocial – only in this particular aspect."

Those with autism probably have trouble with both self and with interpreting others' minds because these concepts are so intimately intertwined in the mind, notes **Marco Iacoboni**, who studies social behavior at the University of California, Los Angeles. "There is no self without other, and no other without self," Iacoboni says.

Montague's group is working on a simpler version of the experiment for people with autism who have lower IQs, but say it is possible that the observation is unique to individuals with high-functioning autism. The method could be developed into a diagnostic tool for autism, Montague says. For instance, the degree of activity in the cingulate cortex might help doctors determine to what degree a person suffers from autism or, perhaps, whether drugs or therapies improve their response.

This type of neuroeconomic study could prove invaluable in further examining autism and personality disorders, researchers say, because it boils down very complicated social situations into well-controlled interactions in which responses can be measured in a scanner and quantified. Still, Iacoboni points out that such structured social exchanges can risk oversimplifying interpersonal dynamics, missing some of the subtleties of real life: "We may lose something important about the complexities of social interactions."

REFERENCES:

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