

Holding a mirror to brain changes in autism

March 2 2012

Impaired social function is a cardinal symptom of autism spectrum disorders (ASDs). One of the brain circuits that enable us to relate to other people is the "mirror neuron" system. This brain circuit is activated when we watch other people, and allows our brains to represent the actions of others, influencing our ability to learn new tasks and to understand the intentions and experiences of other people.

This mirror neuron system is impaired in individuals with ASD and better understanding the neurobiology of this system could help in the development of new treatments.

In their new study, Dr. Peter Enticott at Monash University and his colleagues used transcranial magnetic stimulation to stimulate the brains of individuals with ASD and healthy individuals while they observed different [hand gestures](#). This allowed the researchers to measure the activity of each individual's mirror neuron system with millisecond precision in response to each observed action.

They found that the individuals with ASD showed a blunted brain response to stimulation of the [motor cortex](#) when viewing a transitive hand gesture. In other words, the mirror neuron system in the ASD individuals became less activated when watching the gestures, compared to the healthy group. In addition, among people with ASD, less mirror neuron activity was associated with greater social impairments. This finding adds to the evidence that deficits in [mirror neuron system](#) functioning contribute to the social deficits in ASD.

This finding also directly links a specific type of brain dysfunction in people with [autism spectrum disorder](#) to a specific symptom. This is important because "we do not have a substantial understanding of the brain basis of autism spectrum disorder, or a validated biomedical treatment for the disorder," said Dr. Enticott. "If we can develop a substantial understanding of the biology of specific symptoms, this will allow us to develop treatments targeted specifically to the symptoms."

"This study is an example of the effort to break down the component problems associated with autism spectrum disorder and to map these problems on to particular [brain circuits](#)," commented Dr. John Krystal, editor of *Biological Psychiatry*.

Enticott added, "We are currently investigating whether non-invasive brain stimulation can be used to improve mirror [neuron activity](#) in autism spectrum disorder, which would have substantial potential therapeutic implications."

More information: The article is "Mirror Neuron Activity Associated with Social Impairments but not Age in Autism Spectrum Disorder" by Peter G. Enticott, Hayley A. Kennedy, Nicole J. Rinehart, Bruce J. Tonge, John L. Bradshaw, John R. Taffe, Zafiris J. Daskalakis, and Paul B. Fitzgerald ([doi: 10.1016/j.biopsych.2011.09.001](https://doi.org/10.1016/j.biopsych.2011.09.001)). The article appears in *Biological Psychiatry*, Volume 71, Issue 5 (March 1, 2012)

Provided by Elsevier

Citation: Holding a mirror to brain changes in autism (2012, March 2) retrieved 8 May 2024 from <https://medicalxpress.com/news/2012-03-mirror-brain-autism.html>

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