

Interactions between cortical and subcortical regions important in hypersensitivity in ASD

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The increased interaction between cortical and subcortical brain regions highlights the central role of hypersensitivity and other sensory symptoms in defining Autism Spectrum Disorder (ASD). This is presented in research performed by a team led by Christian Keysers and Leonardo Cerliani at the Netherlands Institute for Neuroscience in Amsterdam. This finding provides a key to understand the often underestimated sensory hypersensitivity in autism and to seed a scientific understanding of how to tackle this hypersensitivity. The research was published in *JAMA Psychiatry* on June 10.

People with ASD are known for their unusual behavior in the social environment. Moreover, they often report other traits, linked to the sensory environment: for instance the ability to perceive small details in a picture or to detect a very soft sound coming from a distance. "This hypersensitivity, however, is not always a gift: being captured by the myriad of [sensory stimuli](#) we continuously receive from the environment can be distracting and even overwhelming, and prevents us to focus on what we care most," says Cerliani. The scientists present in their research that increased interaction between the cortical and subcortical [brain regions](#) is at the root of this hypersensitivity.

Brain activity

Brain regions that are strongly coupled have [brain activity](#) that goes up and down together, even while relaxing, while regions that are not

coupled will have their brain activity fluctuate independently from each other. By comparing how this spontaneous brain activity synchronizes across various brain regions the team identified an abnormally high synchrony between the sensory cortices involved in perception and subcortical regions relaying information from the sensory organs to the cortex. They found that a higher synchrony was associated with a higher severity of autistic traits.

"During the development from childhood to adolescence, the spontaneous activity of cortical regions involved in basic sensory perception decouples from the activity of subcortical structures relaying sensory information from the sensory organs to the cortex," explains Keyzers. "This decoupling is thought to reflect the increasing ability to block out irrelevant sensory information from perception, allowing people to focus on their stream of thoughts and actions. In ASD this process appears to be altered: their [sensory cortex](#) appears to be abnormally coupled to subcortical structures."

Large database

The team made these observations using resting-state functional magnetic resonance imaging (fMRI) data from the largest neuroimaging database on ASD aggregated so far: the ABIDE, founded and coordinated by Dr. Adriana Di Martino, Dr. Stuart Mostofsky and Dr. Michael Milham. The team of Keyzers and Cerliani also contributed to the aggregation of this database with the neuroimaging data acquired by Dr. Marc Thioux.

Autism Spectrum Disorder

ASD is an umbrella name for a number of developmental disorders, including classic autism and Asperger syndrome. The number of people

with ASD is almost eightfold in the last twenty years and is seen in more than 1% of the children.

More information: *JAMA Psychiatry*,
[archpsyc.jamanetwork.com/artic ... px?articleid=2301161](https://archpsyc.jamanetwork.com/artic...px?articleid=2301161)

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