

Heightened level of amygdala activity may cause social deficits in autism

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Something strange is going on in the amygdala - an almond-shaped structure deep in the human brain - among people with autism.

Researchers at the University of Washington have discovered an increased pattern of [brain](#) activity in the amygdalas of adults with [autism](#) that may be linked to the [social deficits](#) that typically are associated with the disorder. Previous research at the UW and elsewhere has shown that abnormal growth patterns in the [amygdala](#) are commonly found among young children diagnosed with autism.

The amygdala is popularly associated with the "fight-or-flight response" in dangerous situations. But it has other functions, including identifying faces and situations and evaluating social information such as emotions.

The new research shows that brain activation in adults with autism remains elevated long after similar [brain regions](#) of typically developed adults have stopped being activated when exposed to a series of pictures of human faces. A decrease in activation over time to the same type of information is called neural habituation and is connected with learning, according to Natalia Kleinhans, lead author of the new study and a UW research assistant professor of radiology.

"What we are seeing is hyperexcitability or overarousal of the amygdala, which suggests that neurons in the amygdala are firing more than expected," said Kleinhans, who is associated with the UW Autism Center.

"If you consider that habituation reflects learning in as simple a task as looking at a face, slowness to habituate in people with autism may contribute even more markedly to difficulty with more complex social interactions and [social cognition](#). If the brain is not reacting typically to a static face with a neutral expression, you can imagine how difficult it may be for someone with autism to pick up more subtle social cues."

The National Institute of Child Health and Human Development and the National Institute of Mental Health funded the research, which appears in the online edition of *The American Journal of Psychiatry*.

The UW researchers used functional magnetic resonance imaging to examine brain activation in 19 individuals with autism and in a comparison group of 20 healthy adults. The subjects ranged in age from 18 to 44 and the two groups were matched for IQs in the low-normal range. Both groups had their brains scanned while they looked at series of faces with neutral expressions. Each face appeared on a screen for three seconds and occasionally a face would be repeated two consecutive times. When that happened subjects were instructed to push a button.

The scientists were interested in what happened in two brain regions, the amygdala and the fusiform gyrus, when the subjects viewed the faces. It turned out that the fusiform gyrus, which helps determine what kind of object a person is looking at - a face or a house, for example - showed no habituation in either group. But the differences were striking when it came to the amygdala.

"The differences we found were in the amygdala and specific to the amygdala," said Kleinhans. "They originated there and did not go across the brain."

She said one theory about autism is that when this hyperarousal occurs an individual misses important information. Those individuals with

autism who had the most social impairment exhibited the highest levels of amygdala arousal.

"This is another piece of evidence that there is something wrong with the amygdala in autism that contributes to social impairment. These results help refine our understanding of functional abnormalities in autism and are a new way of thinking about social dysfunction in autism," said Kleinhans.

Source: University of Washington ([news](#) : [web](#))

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