Scientists learn how brains process images of faces

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Researchers (left to right): Allan Reiss, Kalanit Grill-Spector and Golijeh Golarai.

(PhysOrg.com) -- Stare at a stranger's face for too long, and two things will likely happen: You'll feel uncomfortable, and you'll get the sense that the stranger doesn't like it.

For most people, that type of social awareness comes naturally.

But not for those with Williams syndrome. The genetic condition affecting about one in every 7,500 people creates a wide range of physical abnormalities, learning problems and behavioral quirks - including a smaller brain and a fascination with faces.

"People with Williams syndrome, in some ways, show a profile of social behavior that's opposite of what we think about in autism," said Allan Reiss, a psychiatrist and neuroscientist at the Stanford School of

Medicine who has studied Williams syndrome for about 25 years. "Individuals with Williams have increased drive to be socially engaged with others, particularly with respect to face-to-face interaction."

In a collaboration of researchers at the Medical School's Center for Interdisciplinary Brain Sciences Research and the Psychology Department's Vision and Perception Neuroscience Lab, Reiss and his fellow scientists have come to a better understanding of what's behind that facial fixation.

The team ran functional magnetic resonance imaging scans on 16 adults with Williams syndrome and found their brains show an enormous amount of activity in the fusiform face area, which processes information about faces.

"Adults with Williams syndrome are also devoting about twice as much of their fusiform cortex to processing faces, compared to healthy adults," said Golijeh Golarai, a research associate in psychology. "It is a pretty significant difference."

Golarai is the lead author of a paper published this week in the Journal of Neuroscience that outlines the researchers' findings.

Because people with Williams syndrome are all missing the same genes, the researchers are using their findings to ask whether the heightened brain activity they've detected is rooted in their subjects' genetic makeup.

And the answers - which the researchers hope will come from more experiments they're planning - can help determine the degree to which genetics and experience shape social behavior in Williams syndrome, making a contribution to the "nature vs. nurture" discussion.

"Suppose one of these missing genes influences how long you stare at somebody's face, and the effect of this gene decreases the time children look at faces at a certain point during development," said Kalanit Grill-Spector, an associate professor of psychology. "For someone with Williams, if that gene doesn't turn off their interest in faces, they'll spend more time looking at faces. If that's the case, it gives us an example of how a genetic effect drives an experience and tells us how the two interact to shape the brain."

While Williams syndrome is relatively rare, studying it might shed more light on autism - a much more prevalent developmental disorder whose symptoms include problems in social behavior.

"If we understand how genes and environment affect the development of face processing, that could teach us something of real value about people who have autism or fragile X syndrome, conditions associated with a tendency to look away from faces," Reiss said.

Researchers from Harvard Medical School, the Salk Institute for Biological Studies and Bangor University contributed to the *Journal of Neuroscience* study.

More information: www.jneurosci.org/

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