



News Releases

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Neuroscientists discover that humans evaluate emotions by looking at the eyes

PASADENA, Calif.--If your mother ever told you to watch out for strangers with shifty eyes, you can start taking her advice to heart. Neuroscientists exploring a region of the brain associated with the recognition of emotional expressions have concluded that it is the eye region that we scan when our brains process information about other people's emotions.

Reporting in the January 6 issue of the journal *Nature*, California Institute of Technology neuroscientist Ralph Adolphs and colleagues at the University of Iowa, University of Montreal, and University of Glasgow describe new results they have obtained with a patient suffering from a rare genetic malady that has destroyed her brain's amygdala. The amygdala are found in each side of the brain in the medial temporal lobe and are known to process information about facial emotions. The patient, who has been studied by the researchers at the University of Iowa for a decade, shows an intriguing inability to recognize fear and other emotions from facial expressions.

"The fact that the amygdala is involved in fear recognition has been borne out by a large number of studies," explains Adolphs. "But until now the mechanisms through which amygdala damage compromises fear recognition have not been identified."

Although Adolphs and his colleagues have known for years that the woman is unable to recognize fear from facial expressions in others, they didn't know until recently that her problem was an inability to focus on the eye region of others when judging their emotions. They discovered this by carefully recording the way her eyes focused on pictures of faces.

In normal test subjects, a person's eyes dart from area to area of a face in a quick, largely unconscious program of evaluating facial expressions to recognize emotions. The woman, by contrast, tended to stare straight ahead at the photographs, displaying no tendency to regard the eyes at all. As a result, she was nonjudgmental in her interpersonal dealings, often trusting even those individuals who didn't deserve the benefit of the doubt.

However, the good news is that the woman could be trained to look at the eyes in the photographs, even though she had no natural inclination to do so. When she deliberately looked at the eyes upon being instructed to do so, she had a normal ability to recognize fear in the faces.

According to Adolphs, the study is a step forward in better understanding the human brain's perceptual mechanisms, and also a practical key in possible therapies to help certain patients with defective emotional perception lead more normal lives.

In terms of the former, Adolphs says that the amygdala's role in fear recognition will probably be better understood with additional research such as that now going on in Caltech's new magnetic resonance imaging lab. "It would be naïve to ascribe these findings to one single brain structure," he says. "Many parts of the brain work together, so a more accurate picture will probably relate cognitive abilities to a network of brain structures.

"Therefore, the things the amygdala do together with other parts of the brain are going to be a complex matter that will take a long time to figure out."

However, the very fact that the woman could be trained to evaluate fear in other people's faces is encouraging news for individuals with autism and other maladies that cause problems in their recognizing other people's emotions, Adolphs says.

"Maybe people with autism could be helped if they were trained how to look at the world and how to look at people's faces to improve their social functioning," he says.

Adolphs is a professor of psychology and neuroscience at Caltech, and holds a joint appointment at the University of Iowa College of Medicine. The other authors of the paper are Frederic Gosselin, Tony Buchanan, Daniel Tranel, Philippe Schyns, and Antonio Damasio.

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