Home
News
Features
Columns & blogs
Archive
Specials
In focus
- Asian tsunami
- Future computing
- Gulf War syndrome
- Bird flu
- Mars

Stories by subject

NEWS CHANNELS
- My news
- Biotechnology
- Careers
- Drug discovery
- Earth and environment
- Medical Research
- Physical Sciences

Feedback
About this site
About us
For librarians

NEWS

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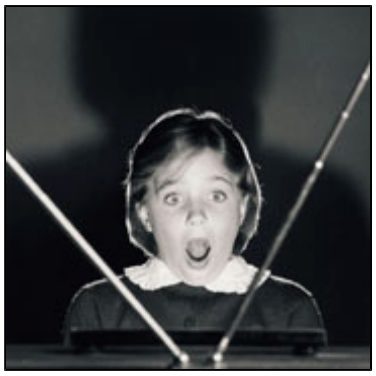
Terror shows only in the eyes

Roxanne Khamsi

Knowing where to look is key to recognizing others' emotions.

A woman who cannot recognize fear in people's faces is causing neuroscientists to rethink theories of how our brains read emotions.



Focusing on a person's eyes is crucial for detecting their fear.

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Scientists have been testing the 38-year-old woman for more than a decade. She has a rare disease that has damaged both sides of her amygdala, the almond-shaped part of the brain that is known from imaging studies to be involved in recognizing facial expressions.

The woman, known as SM, finds it very difficult to tell from facial expressions when another person is afraid, although she has no problem recognizing other emotions, such as happiness, sadness and anger.

Originally, researchers thought this meant that different emotions are processed by distinct neural circuits in the brain. But new studies with SM, published in this week's *Nature*[1], suggest quite a different explanation.

A closer look

Neuroscientist Ralph Adolphs of the California Institute of Technology in Pasadena and his colleagues showed SM photographs of various different facial expressions and asked her what emotion she thought the people were feeling.

Researchers have done this many

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This is a radical rethink of amygdala function.

Ralph Adolphs
Neuroscientist at the California Institute of Technology, Pasadena

times before. But this time, to find the part of the faces on which SM was focusing, the team used a 'bubble test' in which only part of the face is revealed at a time.

The researchers were intrigued to find that SM totally avoided looking at people's eyes. She discerned her information simply from looking around the nose and mouth.

This was generally enough for her to identify emotions such as happiness or anger, where features such as a smile, or bared teeth, are important.

But wide eyes are a particularly important component of a fearful expression. Because SM was only looking at the nose and mouth, she did not notice the eyes and concluded that the person was feeling neutral.

"First you have to look at the eyes, and then the brain has to make use of that information to figure out it's fear," explains Adolphs.

Rescue effort

When the researchers simply told SM to look at people's eyes, she did, and her ability to distinguish fear dramatically improved.

She needed constant reminding, as otherwise she stopped looking at the eyes. But this ability to regain lost function simply through receiving the correct instructions is extremely unusual in patients with brain damage. It suggests that SM doesn't have a problem processing the visual cues at all.

Instead, says Adolphs, the area she has damaged may tell us where and how to look. "It's a radical rethink of amygdala function," he says.

If our brains simply took in all the information around us, we would be completely overwhelmed, he points out. "What's needed is selectivity of some kind, to decide what's important," he says.

Adolphs believes that the amygdala is a critical component of such a mechanism.

Potential treatments

The team suggests that this new understanding could be used to help develop

treatments for people with disorders such as autism, who find it difficult to read emotions.

Autism sufferers are known to focus abnormally on certain facial features. Giving them direct reminders of how to look at other people's faces could help them to improve their perception of social cues.

Top

References

1. Adolphs R., *et al*. *Nature*, **433**. 68 - 72 (2005). | Article |

Top

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