

# Reading a face is tricky business

July 31 2007

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Reading the face of a person who is trying to conceal fear or other emotions is tricky business, according to a new Northwestern University study of electrical activity in the brain.

Though such “microexpressions” as a brief flash of fear are unlikely to be consciously noticed, they still get picked up by the brain and make their way through the visual system. The effect can alter perception and the way other people are treated or judged, the study concludes.

”Even though our study subjects were not aware that they were viewing subliminal emotional expressions, their brain activity was altered within 200 milliseconds,” said Ken Paller, co-investigator of the study and professor of psychology in the Weinberg College of Arts and Sciences at Northwestern. “As a result, the ratings of facial expressions they did see were biased.”

In other words, sometimes when it seems like you are acting on the vagaries of instinct, your brain is actually responding to real information about others that bubbles just beneath your consciousness.

The study included tests to determine whether study volunteers had a tendency to experience anxiety, particularly in social situations. Those who tended to be socially anxious had the strongest brain response to subliminal expressions of fear.

”The findings have direct implications for understanding psychiatric disorders such as phobia, obsessive-compulsive disorder and generalized

anxiety disorder,” said Wen Li, lead author of the study and postdoctoral fellow at Northwestern’s Feinberg School of Medicine.

“Neural and Behavioral Evidence for Affective Priming from Unconsciously Perceived Emotional Facial Expressions and the Influence of Trait Anxiety,” will be published in an upcoming issue of the Journal of Cognitive Neuroscience. Besides Li and Paller, the study’s co-authors include Stephan Boehm, currently at the University of Wales at Bangor, and Richard Zinbarg, associate professor of psychology at Northwestern.

The study utilized neuroelectrical activity recorded from 64 EEG electrodes placed on the scalps of the volunteers to monitor their brains’ analyses of sensory input. Volunteers evaluated 70 different surprise faces. Half of the faces were primed by fearful expressions and half by happy expressions. The prime faces -- with happy or fearful expressions -- were shown for 30 milliseconds immediately prior to each surprise face.

The expressions of surprise could be interpreted as positive (the sudden arrival of a friend) or as negative (a sudden violent act). Each was rated as “extremely positive,” “moderately positive,” “mildly positive,” “mildly negative,” “moderately negative” or “extremely negative.”

The volunteers rated the surprise faces primed by fear more negatively on average than those primed by happiness.

Results of the study revealed that the visual system differentially processed the fearful and happy faces, even though this processing did not lead to conscious experiences.

“Environmental events that signal danger, such as someone’s facial expression of fear, may be preferentially detected so as to alert the

individual to make an appropriate response,” Paller said.

Yet participants only noticed the surprise faces. When asked about the stimuli, volunteers were surprised to learn that prime faces with other expressions briefly appeared prior to the surprise faces.

“Our results show that an unconsciously perceived signal of threat, such as a brief facial expression of fear, can still bubble up and unwittingly influence social judgments and how we act,” said Li.

Those with a more anxious personality exhibited more biased negative evaluations of fear-primed surprise faces and also greater brain-wave indications of threat processing. Greater brain responses to threat in those prone to anxiety may thus lead to larger influences on social evaluation.

”Although people can do their best to avoid situations that they perceive as threatening, their brains may still be highly attuned to subtle environmental signals of threat,” Paller said. “A heightened sensitivity to subliminal threat may thus cause excessive anxiety.”

Microexpressions that people make may differ from voluntary expressions of emotion. But in either case, fear can be signaled by contraction of muscles that raise the inner brow, the outer brow, the upper lid, plus stretching the lips, parting the lips and dropping the jaw.

“The ability to detect microexpressions may allow an observer to be more empathetic and sense someone’s true intentions or motivation,” said Paller. “Valuable as this ability may be, when someone is paying you a compliment it is sometimes better to take it at face value rather than read more into it.”

Source: Northwestern University

Citation: Reading a face is tricky business (2007, July 31) retrieved 28 April 2024 from <https://medicalxpress.com/news/2007-07-tricky-business.html>

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