

# People identify fearful faces before happy ones

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A new study proves that the brain becomes aware of fearful faces more quickly than faces showing other emotions: a capability that may have evolved to direct attention to potential threats.

You may not be fully dressed without a smile, but a look of horror will make a faster first impression. Vanderbilt University researchers have confirmed what previous research had hinted at: the brain becomes aware of fearful faces more quickly than those showing other emotions.

"There are reasons to believe that the brain has evolved mechanisms to detect things in the environment that signal threat. One of those signals is a look of fear," David Zald, associate professor of psychology and a co-author of the new study, says "We believe that the brain can detect certain cues even before we are aware of them, so that we can direct our attention to potentially threatening situations in our environment."



Examples of the fearful, neutral and happy faces used in the experiment. Paul Ekman Group ([www.paulekman.com](http://www.paulekman.com))

Randolph Blake, Centennial Professor of Psychology, and Eunice Yang, doctoral student, were co-authors of the study, which will appear in the November 2007 issue of *Emotion*.

The researchers set out to determine if we become aware of fearful, neutral or happy expressions at the same speed, or if one of these expressions reaches our awareness faster than the others. To do this, they needed to find a way to slow down the speed at which subjects processed facial information — which usually takes less than 40 milliseconds. At those high speeds it is difficult to tell which images rise to awareness the fastest.

Yang, the lead author of the study, realized that a technique being used in Blake's lab might provide a solution to the problem. The technique, continuous flash suppression, keeps people from becoming aware of what they are seeing for up to 10 seconds. Using this technique, the team had research subjects look at a screen through a viewer, similar to the eyepieces on a microscope, which allowed different images to be presented to each eye.

Many images were rapidly presented to one eye while a static image of a face was presented to the other. The multiple images served as visual "noise," suppressing the image of the face. The subjects indicated when they first became aware of seeing a face, enabling the researchers to determine if the expression on the face had any impact on how quickly the subject became aware of it.

The team found that subjects became aware of faces that had fearful expressions before neutral or happy faces. The researchers believe that a brain area called the amygdala, an area of the brain outside of the regions in the cortex that process visual information, may be responsible.

"The amygdala registers information about an image even before cortical areas involved in vision have finished their job. We think the amygdala has some crude ability to process stimuli and that it can cue some other visual areas to what they need to focus on," Blake says.

Zald and his colleagues believe the eyes of the fearful face play a key role.

"Fearful eyes are a particular shape, where you get more of the whites of the eye showing," Zald says. "That may be the sort of simple feature that the amygdala can pick up on, because it's only getting a fairly crude representation. That fearful eye may be something that's relatively hardwired in there."

A surprising finding was that subjects perceived happy faces the slowest. "What we believe is happening is that the happy faces signal safety. If something is safe, you don't have to pay attention to it," Zald says.

Next, the researchers will explore how this information influences our behavior. "We are interested in now exploring what this means for behavior," Yang says. "Since these expressions are being processed without our awareness, do they affect our behavior and our decision making? If so, how?"

The research was supported by funding from the National Institutes of Health. Blake and Zald are Vanderbilt Kennedy Center for Research on Human Development investigators.

Source: Vanderbilt University

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