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Study targets brain area that helps reads emotion

By Kimm Groshong, Staff Writer

PASADENA -- Ballplayers stare deeply into their opponents' eyes looking for signs of nervous fear; Western movies often display cowboys looking into one another's eyes before shootouts, trying to get the upper hand by identifying any trace of fear.

And now science has validated the common belief that eyes tip us off to fear.

For the first time, Caltech neuroscientist Ralph Adolphs and his colleagues have determined that if a part of a person's brain, called the amygdala, does not function properly, a person will not naturally hone in on others' eyes to read emotion the way most people do. Without that skill, such a person will be much less successful at identifying fear.

The finding, published in the current issue of the British scientific journal Nature, may lead to therapies for people with disorders such as autism who have difficulty recognizing emotion in others, Adolphs said.

The group has studied an unusual 38-year-old female patient for more than a decade. Nicknamed SM, the patient has significant, disease-caused amygdala damage. Her condition offers scientists a rare opportunity to try to discern the amygdala's role in brain function and perception.

Ten years ago, Adolphs and his team, then at the University of Iowa, published work establishing that SM did not display normal responses to fear and indiscriminately trusted others.

The group's most recent work traced the root of SM's problem to her inability to look for information in people's eyes. Control subjects in the study relied heavily on the eye region to identify fear in pictures of either happy or fearful faces. Whereas SM was unable to use enlarged eyes in pictures to realize faces as fearful, she was able to use smiling mouths to pinpoint happy faces. And not surprisingly, SM has no difficulty identifying happiness, Adolphs said.

After pinpointing SM's problem, the researchers instructed her to focus on the eyes in photographs. She was able to do that and to then successfully differentiate fear from happiness.

SM's success points to the possibility of therapies for people like her and others who cannot differentiate emotions. But Adolphs said a more permanent way to improve emotional recognition is desirable since the researchers had to repeatedly tell SM to look at the eyes.

Paul Whalen, a neuroscientist from the University of Wisconsin Madison, published a

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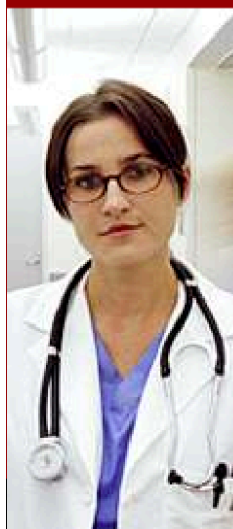
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related study in the journal Science last month. His group found that an increased amount of white showing in people's eyes is an indicator of fear for people with normally functioning brains.

Adolphs and Whalen agreed that although conducted independent of one another, their groups' studies are complementary.

Whalen said Adolphs' paper is interesting because it shows "In the human, the amygdala is not the be all, end all." It shows that although a normal amygdala makes a person better at identifying fear, if a subject with an abnormal amygdala is told where to look, she can still "use other machinery in the brain to get at the answer."

For Adolphs, the next step in the work will be "to try to see if it extends more broadly to social judgments people make about faces."

The other members in Adolphs' group are from the University of Iowa, the University of Montreal and the University of Glasgow.

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