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NYU brain imaging study shows fears learned by observing others are similar to those learned from direct experience

Humans acquire fears using similar neural processes whether they've personally experienced an aversive event or only witnessed it, according to a study by researchers at New York University's Departments of Psychology. This is the first study examining the brain basis of fears acquired indirectly, through the observation of others. The study shows that the amygdala, which is known to be critical to the acquisition and expression of fears from personal experience, is also involved during the acquisition and expression of fears obtained indirectly through social observation. The findings appear in the most recent issue of the journal *Social Cognitive and Affective Neuroscience* (SCAN). [1]

The research team, from the laboratory of NYU Professor Elizabeth Phelps, also includes Andreas Olsson, now a post-doctoral fellow at Columbia University's Department of Psychology, and Katherine Nearing from NYU's School of Medicine.

Previous research has shown how people develop fears after first-hand experience of an aversive event—getting stung by a bee or being burned by a hot pan. In acquiring these fears, a process known as fear conditioning, the brain's amygdala plays a critical role. However, it's unclear if fear conditioning can occur indirectly—that is, through social observation with no personal experience. It is also uncertain what neural processes take place in the acquisition of fears stemming from events or circumstances not experienced first-hand.

In this study, subjects witnessed a short video of another individual participating in a fear-conditioning experiment. In the video, subjects saw another person responding with distress when receiving mild electric shocks paired with a colored square. The subjects watching the video were then told they would take part in an experiment similar to the one they just viewed. Unlike the experiment in the video, these subjects never received shocks.

The results showed that the participants had a robust fear response when they were presented with the colored square that predicted electric shocks in the video, indicating that such a response resulted from merely observing—rather than directly experiencing—an aversive event. In addition, using brain imaging techniques, the researchers found that the amygdala response was equivalent with both when watching others receive a shock and when presented with the colored square that was previously paired with shock in the video. This finding demonstrates that similar neural systems are engaged when fears are learned through first-hand experience or by merely observing others.

“In our daily lives, we are frequently exposed to vivid images of others in emotional situations through personal social interactions as well as the media,” explained Phelps. “The knowledge of somebody else’s emotional state may evoke empathic responses. However, as our results reveal, when others’ emotions are accompanied with vivid expressions and perceived as potentially relevant to our own future well being, we may engage additional learning mechanisms.”

Olsson added: “In a way, learning by observing others’ emotional responses is like exploiting their expertise without being directly exposed to the potential risks associated with the direct learning. This seems a very adaptive thing to do for most social animals, which could explain why it is commonly seen across species. However, it remains to be explored in what way uniquely human social abilities contribute to learning fears through social observation.”

(ends)

Notes to Editors:

[1] Learning fears by observing others: the neural systems of social fear transmission. Social Cognitive and Affective Neuroscience. doi:10.1093/scan/nsm005

Please acknowledge Social Cognitive and Affective Neuroscience as a source

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2. PDF version of the paper can be found from 06.00 hrs EDT/10.00 hrs London time on Wednesday 14 March 2007 at: http://www.oxfordjournals.org/our_journals/scan/press_releases/freepdf/nsm005.pdf

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