



Exposure to Trauma Can Affect Brain Function in Healthy People Several Years After Event; May Increase Susceptibility to Mental Health Problems In The Future

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May 6, 2007, WASHINGTON, DC—Exposure to trauma may create enough changes in the brain to sensitize people to overreact to a innocuous facial gesture years later, even in people who don't have a stress-related disorder, says new research. It appears that proximity to high-intensity traumas can have long lasting effects on the brain and behavior of healthy people without causing a current clinical disorder. But these subtle changes could increase susceptibility to mental health problems later on. These findings are reported in the May issue of *Emotion*, published by the American Psychological Association (APA).

Evidence that trauma can have long-term effects on the brains of healthy individuals was demonstrated by measuring adults' reactions to emotional stimuli several years after witnessing a trauma, said lead author Barbara Ganzel, PhD, and colleagues. In the experiment, 22 healthy adults viewed fearful and calm faces while undergoing functional magnetic resonance imaging (fMRI) to measure their bilateral amygdala activity (part of the brain that judges emotional intensity, and that forms and stores emotional memories) between 3.5 and 4 years after September 11, 2001.

All of the participants had some level of exposure to the events of September 11. The authors wanted to determine whether close proximity to a traumatic event - September 11 - sensitized parts of the brain to emotional stimuli 41 and 48 months after the terrorist attacks. Eleven of the participants were within 1.5 miles of the World Trade Center on September 11, 2001 and the other 11 participants lived at least 200 miles away [control group]. The control group - those participants living at least 200 miles from New York on 9/11/01 - subsequently moved to the New York metropolitan area at the time of the MRI scanning.

According to the study, participants who were within 1.5 miles of the World Trade Center on 9/11 had significantly higher bilateral amygdala activity to fearful versus calm faces compared to those who were living more than 200 miles away. These results show that exposure to traumatic events in the past was associated with emotional responses several years later in people who were close to the initial trauma. Yet, the participants did not meet the criteria for a diagnosis of PTSD, depression or anxiety at time of imaging. All the participants were screened for psychiatric, medical and neurological illnesses.

This finding indicates that a heightened amygdala reactivity following high-intensity trauma exposure may be slow to recover and can be responsible for heightened reactions to everyday emotional stimuli, said the authors. Furthermore, the group closest to the World Trade Center on 9/11 reported more current symptoms and more symptoms at the time of the trauma than the group further from 9/11. These symptoms included increased arousal (e.g., difficulty sleeping, irritability, hypervigilance), avoidance (e.g., not wanting to go downtown when they used to enjoy doing so), and intrusion (e.g., recurrent and distressing memories or dreams). And, those who reported 9/11 as their worst and most intense trauma experienced in their life time also had more brain activity when viewing the fearful faces.

“Our findings suggest that there may be long-term neurobiological correlates of trauma exposure, even in people who appear resilient. Since these effects were observable using mild, standardized emotional stimuli (not specific trauma reminders), they may extend further into everyday life than previously thought,” said Dr. Ganzel. “We have known for a long time that trauma exposure can lead to subsequent vulnerability to mental health disorders years after the trauma. This research is giving us clues about the biology underlying that vulnerability. Knowing what's going on will give us a better idea how to help.

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