

PTSD linked to smaller brain area regulating fear response

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Recent combat veterans who are diagnosed with post traumatic stress disorder have significantly smaller volume in an area of the brain critical for regulating fear and anxiety responses, according to research led by scientists at Duke University and the Durham VA Medical Center.

The finding, published Nov. 5, 2012, in the journal [Archives of General Psychiatry](#), for the first time provides clear evidence that smaller amygdala volume is associated with PTSD, regardless of the severity of trauma. But it's not clear whether the physiological difference was caused by a traumatic event, or whether PTSD develops more readily in people who naturally have smaller amygdalas.

"Researchers found 20 years ago that there were changes in volume of the hippocampus associated with PTSD, but the amygdala is more relevant to the disorder," said Rajendra A. Morey, M.D., M.S., assistant professor at Duke and lead author of the study. Morey said studies in animals have established the amygdala's role in regulating fear, anxiety and stress responses, but its effect on human behavior is less well known.

"It's associated with how fear is processed, especially abnormal fear processing." Morey said. "So it makes sense to look at the structure of the amygdala."

The researchers enrolled 200 [combat veterans](#) who served in Iraq and Afghanistan after Sept. 11, 2001; half had PTSD and the other half had been exposed to trauma, but had not developed PTSD. Amygdala and

hippocampus volumes were computed from [MRI scans](#) of all the participants.

The researchers found significant evidence that PTSD among [study participants](#) was associated with smaller volume in both the left and right amygdala, and confirmed previous studies linking the disorder to a smaller left hippocampus. The differences in brain volumes between the two groups were not due to the extent of depression, substance abuse, trauma load or PTSD severity – factors the researchers took into account in their [statistical model](#).

The finding provides new insight into a condition that strikes nearly 14 percent of combat veterans serving in Iraq and Afghanistan, according to the Department of Veterans Affairs. PTSD is also estimated to afflict 6.8 percent of adults in the general population who have suffered abuse, crimes and other traumas over their lifetimes.

"The next step is to try to figure out whether a smaller amygdala is the consequence of a trauma, or a vulnerability that makes people get PTSD," Morey said.

He said the study demonstrated that amygdala volume does not appear to be affected by the severity, frequency or duration of trauma, indicating that such exposures do not cause the amygdala to shrink. As a result, it appears more likely that people with measurably smaller amygdala to begin with are susceptible to PTSD, but more studies are needed to make that determination.

Morey said he and colleagues are exploring that question, and are intrigued by evidence from their study that suggests people may have a propensity for developing PTSD based on inherently smaller [amygdala](#) volume.

"This is one piece in a bigger puzzle to understanding why some people develop [PTSD](#) and others do not," Morey said. "We are getting closer to that answer."

Provided by Duke University Medical Center

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