

NEUROSCIENCE NEWS

Studies of interest to practicing psychiatrists

Posttraumatic stress disorder: Nature *and* nurture?

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Posttraumatic stress disorder (PTSD) can be one of the most frustrating anxiety disorders for both the patient and clinician. Asymptomatic persons become haunted by an experience they can't forget. Their resulting anxiety can sour what were once healthy relationships or disable someone who previously was productive.

In some cases, despite aggressive psychopharmacology and psychotherapy, the patient remains incapacitated by inappropriate and unremitting fear. The trauma seems to have broken something—changed something inside the brain—that can't be fixed.

Brain imaging studies of patients with PTSD—combat veterans and women with histories of childhood sexual abuse—have shown smaller hippocampal volumes compared with patients without PTSD.^{1,2} This finding has led to speculation that stress hormones (glucocorticoids) adversely affect the hippocampus (*Figure 1*).

This line of reasoning suggests that prolonged stress causes increased production of glucocorticoids that are neurotoxic to the hippocampus, resulting in hippocampal atrophy.³ Studies of rodents and patients with Cushing's syndrome support this hypothesis. The hippocampus, there-

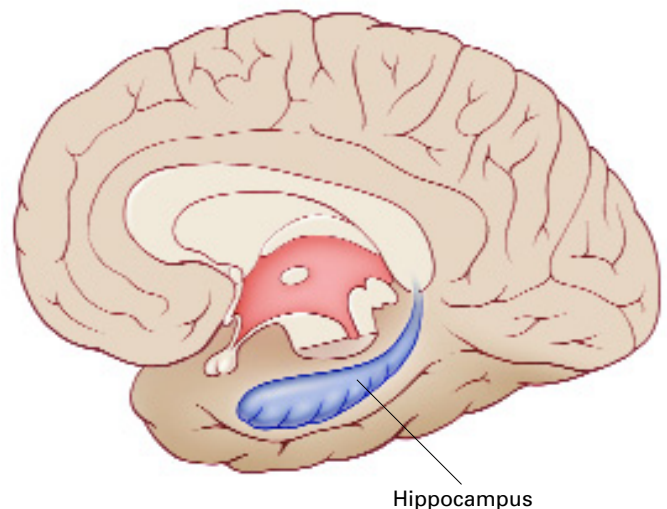


Figure 1. The hippocampus, a specialized type of cortex, is key to memory and emotion. As this medial view shows, it extends along the lateral ventricle floor on each side of the brain.

Illustration for CURRENT PSYCHIATRY by Marcia Hartsock, CMI

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fore, may have been irreversibly damaged in patients with severe PTSD.

Intuitively, this theory makes sense, as the hippocampus is crucial for memory and emotion. However, a recent study of identical twins raises doubts.

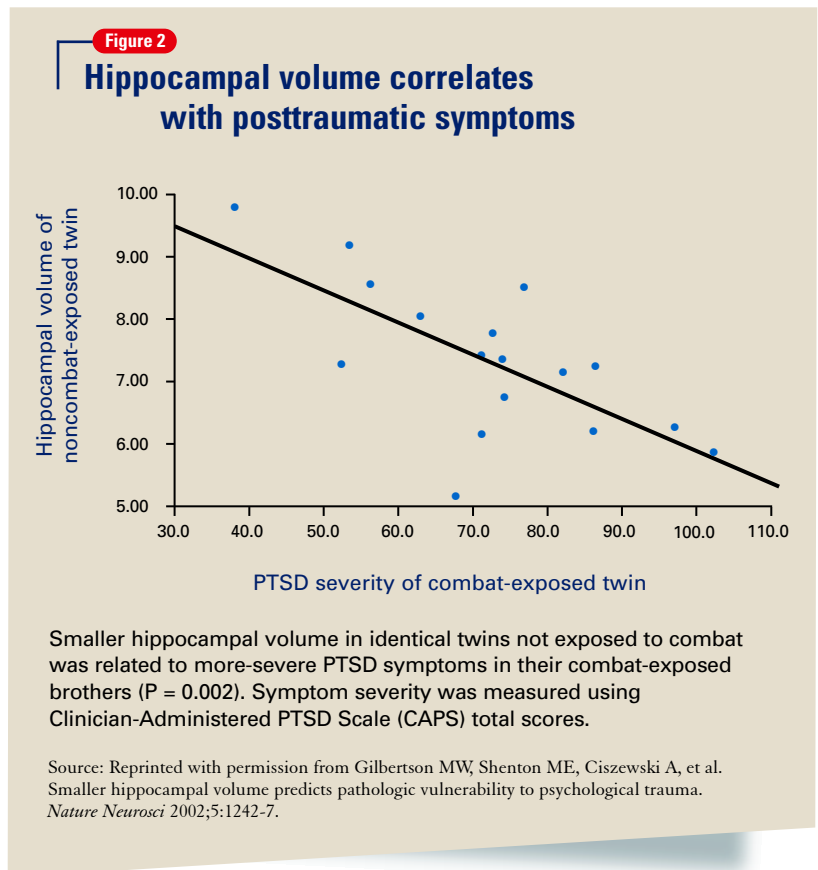
SURPRISING EVIDENCE

Gilbertson et al recruited 40 pairs of twins, in which one was a Vietnam combat veteran and the other stayed home.⁴ Using MRI, the researchers measured hippocampal volume in each twin and assessed the presence and severity of PTSD in the combat-exposed twin.

Consistent with earlier reports, the authors found smaller hippocampal volumes in combat-exposed individuals diagnosed with PTSD. However, they found an almost identical correlation between the noncombat-exposed twin's hippocampal volume and the combat-exposed twin's PTSD score (Figure 2). In other words, the twin's hippocampus size was a better predictor of the veteran's hippocampus size than was the veteran's trauma exposure or PTSD symptoms.

This finding puts a new spin on the association between small hippocampal volume and PTSD. The authors stated, "these data indicate that smaller hippocampi in PTSD represents a pre-existing, familial vulnerability factor rather than the neurotoxic product of trauma exposure per se." Put another way, the small hippocampus is not created by stress and trauma but is a pre-existing condition. Further, this study suggests that a larger hippocampus may protect a person from developing PTSD.

This study may help explain why different individuals exposed to the same trauma are frequently left with different symptoms.^{5,6} PTSD



would seem to be an excellent example of the combined effects of nature (small hippocampus) and nurture (traumatic experience).

References

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