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A functional magnetic resonance imaging study of amygdala and medial prefrontal cortex responses to overtly presented fearful faces in posttraumatic stress disorder.

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Source

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Abstract

BACKGROUND:

Previous functional neuroimaging studies have demonstrated exaggerated amygdala responses and diminished medial prefrontal cortex responses during the symptomatic state in posttraumatic stress disorder (PTSD).

OBJECTIVES:

To determine whether these abnormalities also occur in response to overtly presented affective stimuli unrelated to trauma; to examine the functional relationship between the amygdala and medial prefrontal cortex and their relationship to PTSD symptom severity in response to these stimuli; and to determine whether responsivity of these regions habituates normally across repeated stimulus presentations in PTSD.

DESIGN:

Case-control study.

SETTING:

Academic medical center.

PARTICIPANTS:

Volunteer sample of 13 men with PTSD (PTSD group) and 13 trauma-exposed men without PTSD (control group).

MAIN OUTCOME MEASURES:

We used functional magnetic resonance imaging (fMRI) to study blood oxygenation level-dependent signal during the presentation of emotional facial expressions.

RESULTS:

The PTSD group exhibited exaggerated amygdala responses and diminished medial prefrontal cortex responses to fearful vs happy facial expressions. In addition, in the PTSD group, blood oxygenation level-dependent signal changes in the amygdala were negatively correlated with signal changes in the medial prefrontal cortex, and symptom severity was negatively related to blood oxygenation level-dependent signal changes in the medial prefrontal cortex. Finally, relative to the control group, the PTSD group tended to exhibit diminished habituation of fearful vs happy responses in the right amygdala across functional runs, although this effect did not exceed our a priori statistical threshold.

CONCLUSIONS:

These results provide evidence for exaggerated amygdala responsivity, diminished medial prefrontal cortex responsivity, and a reciprocal relationship between these 2 regions during passive viewing of overtly presented affective stimuli unrelated to trauma in PTSD.

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