

# Alexithymia in PTSD

## Psychometric and FMRI Studies

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**ABSTRACT:** Two studies examined correlates of alexithymia in posttraumatic stress disorder (PTSD). In study 1 ( $n = 77$  individuals with PTSD and 45 controls) Toronto alexithymia scale (TAS-20) scores were positively correlated with PTSD symptoms, dissociation, and childhood abuse and neglect. In study 2, TAS-20 scores were examined as correlates of functional magnetic resonance imaging (fMRI) blood oxygen level dependent (BOLD) response to trauma script imagery. In 16 controls, TAS-20 scores correlated positively with response in medial prefrontal cortex (mPFC), and negatively with response in anterior cingulate cortex (ACC) and thalamus. In 26 individuals with PTSD, TAS-20 scores correlated positively with response in insula, posterior cingulate cortex (PCC), and thalamus, and negatively with response in ACC.

**KEYWORDS:** alexithymia; posttraumatic stress disorder; dissociation; child abuse; child neglect; fMRI

### ALEXITHYMIA IN PTSD: PSYCHOMETRIC AND FMRI STUDIES

Posttraumatic stress disorder (PTSD) is currently classified within the spectrum of the anxiety disorders and, accordingly, is primarily regarded as a condition of elevated subjective fear and anxiety. However, individuals with PTSD also frequently display clinically significant anger, shame, guilt, dysphoria, and dissociation. On the other hand, they may also report feeling emotionally

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“numb” and experience a *restricted* range of affect. These complexities are difficult to account for within the scope of fear conditioning models of PTSD alone.<sup>1</sup>

Fear conditioning models are very effective in elucidating the development of intense fear and anxiety following traumatic events in adults who are otherwise relatively well adjusted with respect to socioemotional development. To individuals with average or above pre-event levels of emotional intelligence, PTSD symptoms often represent extremely distressing but nevertheless understandable and coherent reactions to a severe incident. Specifically, these individuals bring a certain level of emotional insight and discernment to bear on their interpretation of the event and their resulting symptoms, which might be predictive of resilience and a positive prognosis with treatment.

In contrast, the development of emotion processing skills, such as the ability to identify, verbally express, and regulate one's emotional states, may be obstructed in individuals who are chronically abused and neglected as children. As a result of their deficits in emotional awareness and control, these individuals may be especially vulnerable to the effects of traumatic stressors as adults. Specifically, these individuals may be less capable of identifying, expressing, and regulating their responses to traumatic events, and experience what might aptly be called a posttraumatic *alexithymia*. Alexithymia is a psychological construct that refers to difficulties identifying and labeling emotional states.<sup>2</sup> Alexithymic individuals with PTSD may experience intense emotional–physiological states (e.g., fear, anger, and dysphoria) that are poorly integrated with, and modulated by, higher-order verbal cognitive processing. Therefore these individuals may report that they either do not know what they feel, or cannot feel anything at all.<sup>3</sup>

The present studies examined whether alexithymia is associated with PTSD symptoms in a psychometric and functional magnetic resonance imaging (fMRI) study. In the fMRI study, alexithymic symptoms were correlated with BOLD response in areas known to be involved in emotional experience and expression: medial prefrontal cortex (mPFC), anterior cingulate cortex (ACC), posterior cingulate cortex (PCC), insula, and thalamus.

### ***Study 1 Method and Results***

Seventy-seven individuals with PTSD and 45 controls completed the Toronto alexithymia scale (TAS-20), clinician administered PTSD scale (CAPS), dissociative experiences scale (DES), peritraumatic DES (P-DES), and childhood trauma questionnaire (CTQ). TAS-20 scores were positively correlated ( $P < 0.001$ , one-tailed) with: CAPS scores,  $r = 0.76$ , DES scores,  $r = 0.61$ , and P-DES scores,  $r = 0.59$ . TAS-20 scores were also positively correlated ( $P < 0.001$ , one-tailed) with all of the

CTQ subscale scores: emotional neglect,  $r = 0.76$ , emotional abuse,  $r = 0.70$ , sexual abuse,  $r = 0.62$ , physical abuse,  $r = 0.75$ , and physical neglect,  $r = 0.72$ .

### *Study 2 Method and Results*

Twenty-six individuals with PTSD and 16 trauma-exposed controls completed a trauma script imagery task during fMRI BOLD scanning. Averaged BOLD response to a 60-sec baseline task (monitoring breathing) was subtracted from a 30-sec imagery period following trauma script listening. In the second-level analysis, two-tailed correlates ( $P < 0.05$ ,  $k = 5$ ) of TAS-20 scores were examined in relation to fMRI-BOLD signal contrast in mPFC, ACC, PCC, insula, and thalamus in the PTSD and control groups separately. In controls, TAS-20 scores positively correlated with signal in bilateral mPFC (Brodmann Area [BA] 9 and 10), and negatively correlated with signal in left thalamus and bilateral ACC (BA 32). In PTSD subjects, TAS-20 scores positively correlated with signal bilaterally in thalamus, insula (BA 13 and 47), and PCC (BA 23, 29 and 31), and negatively correlated with signal in ACC (BA 24).

## DISCUSSION

The psychometric study demonstrated that self-reported symptoms of alexithymia are associated with increasing severity of PTSD, dissociation, and childhood abuse and neglect (see also Ref. 4). The fMRI study demonstrated that trait symptoms of alexithymia significantly predicted state neural responses to PTSD symptom provocation and, more specifically, were associated with activation in areas devoted to emotional self-awareness, executive control and self-regulation, and arousal-related body state mapping. In controls, higher levels of alexithymia were associated with increased activation in mPFC, and reduced activation in left thalamus and bilateral ACC. These results are consistent with Berthoz *et al.*'s<sup>5</sup> findings of increased mPFC activation in alexithymic men during viewing of pleasant stimuli relative to neutral stimuli, and Lane *et al.*'s<sup>6</sup> findings of increased right ACC activation in more emotionally aware subjects during focal attention to emotional responses. These findings may relate to increased self-reference but decreasing cognitive control during imagery of traumatic memories in more alexithymic controls. In contrast, TAS-20 scores in PTSD subjects correlated positively with response in thalamus, PCC, and insula, and negatively with ACC activation. Greater insula activation may have been associated with increasing body state mapping of arousal<sup>7</sup> in PTSD subjects with increasing alexithymia, in combination with reduced regulatory control via ACC. Increasing thalamic and PCC activity with increasing alexithymia in PTSD, however, was not in the predicted direction (Ref. 8).

These findings offer a unique conceptualization of individual differences in psychiatric vulnerability to traumatic events. The greater an individual is capable of identifying and in turn understanding and verbalizing his or her posttraumatic psychophysiological symptoms, the less likely that he or she will be overwhelmed by them, and correspondingly experience a loss of self-regulatory control and consciousness in the presence of reminders of their traumatic memories.

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