



# Emotional lability and affective synchrony in posttraumatic stress disorder pathology<sup>☆</sup>

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## ABSTRACT

This study examined the relations of PTSD pathology to both the lability of three specific emotions (anxiety, anger, self-conscious emotions [SCE]) and the extent to which changes in one emotional state co-occur with changes in another emotional state (i.e. affective synchrony). Moreover, given evidence that emotional responding in PTSD may be heightened in response to trauma-related cues, these relations were explored in the context of a trauma cue versus neutral cue. Trauma-exposed patients in residential substance use disorder treatment ( $N = 157$ ) completed a diagnostic interview and two laboratory sessions involving presentation of neutral and individualized trauma scripts. State anxiety, anger, and SCE were assessed at five points throughout each laboratory session. Hierarchical linear modeling indicated that participants (regardless of PTSD status) exhibited greater lability of all emotions following the trauma script versus neutral script. Only anger lability was elevated among those with (versus without) a current PTSD diagnosis following the neutral script. Results also revealed synchrony (i.e., positive covariation) between each possible pair of emotions, regardless of PTSD status. Findings suggest that concurrent changes in anxiety and anger may be especially relevant to PTSD symptom severity.

## 1. Introduction

Difficulties in the experience and expression of emotion have been theorized to play a central role in the development and maintenance of posttraumatic stress disorder (PTSD) symptoms among individuals exposed to a traumatic event (e.g., Carlson & Dalenberg, 2000; Ehlers & Clark, 2000; Foa & Kozak, 1986; Litz, Orsillo, Kaloupek, & Weathers, 2000). For example, research indicates that trauma-exposed individuals with elevated PTSD symptoms report heightened emotional responding to emotionally evocative stimuli (e.g., Badour & Feldner, 2013; Orsillo, Batten, Plumb, Luterek, & Roessler, 2004) and reduced emotional responding to positive stimuli shortly after exposure to trauma cues (e.g., Litz et al., 2000). PTSD symptoms are also positively associated with broad deficits in emotion regulation (e.g., Tull, Barrett, McMillan, & Roemer, 2007).

One aspect of emotional dysfunction that has received less attention in PTSD is emotional lability (i.e., intense, frequent, and reactive shifts in emotional experience). Additional research in this area may be important for furthering our understanding of the possible ways in which specific negative beliefs about emotions develop among individuals

with PTSD, including the perception of emotions as being unpredictable or out-of-control (Price, Monson, Callahan, & Rodriguez, 2006). Such research may also assist in identifying vulnerability factors for the development of specific maladaptive behaviors (e.g., substance misuse; see Simons, Carey, & Gaher, 2004) among patients with PTSD. Although limited, research provides evidence of a positive association between PTSD symptoms and trait emotional lability (Lindley, Carlson, & Benoit, 2004; Marshall-Berenz, Morrison, Schumacher, & Coffey, 2011), and suggests that trait emotional lability may interfere with habituation to trauma-related cues in PTSD. Specifically, Dutton, Badour, Jones, Mischel, and Feldner (2016) found that repeated exposure to trauma cues facilitated reductions in state PTSD symptoms only in the context of low trait emotional lability. Additionally, experience sampling studies have revealed positive associations between PTSD pathology and negative emotion lability, with Newton and Ho (2008) finding that state lability of anxiety and anger over a one day period was associated with greater PTSD symptom severity among women exposed to interpersonal traumas. Similarly, Kashdan and colleagues found that Veterans with (vs. without) PTSD reported more frequent and intense shifting of negative emotions from day-to-day in a

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two-week daily diary study (Kashdan, Uswatte, Steger, & Julian, 2006). Despite this research, however, no studies to date have examined associations between PTSD symptom severity and changes in individual emotional states in response to trauma-relevant emotionally evocative cues. Research is also needed to investigate lability at the level of mixed emotions (i.e., affective synchrony) in the context of PTSD pathology.

Affective synchrony refers to the extent to which changes in one emotional state tend to co-occur with changes in another emotional state (see Rafaeli, Rogers, & Revelle, 2007). Originally used to refer to pleasant-unpleasant emotion mixtures, recent studies have begun examining the co-occurrence of similarly valenced emotions (given the prominence of unpleasant emotional states in psychopathology; Schoenleber et al., 2016; Scott et al., 2015). To date, only one study has considered affective synchrony in PTSD Kleim, Graham, Bryant, and Ehlers (2013) asked a sample of trauma-exposed individuals to report state levels of various unpleasant emotions (i.e., fear, helplessness, anger, guilt, and shame) following naturally occurring intrusive memories over the course of a week. Results suggested that emotions generally demonstrated synchrony (i.e., positive covariation) following intrusive trauma memories, with the exception of fear and shame, which evidenced de-synchrony (i.e., co-occurring changes in the opposite direction; Rafaeli et al., 2007). However, relations between PTSD symptom severity and emotion covariations were not reported, limiting our knowledge of how affective synchrony relates to PTSD pathology.

Notably, theory and research highlight the particular relevance of anxiety, anger, and self-conscious emotions (SCE; i.e., emotions elicited when individuals negatively evaluate their personal characteristics and/or behavior; cf. Tangney & Tracy, 2012) to PTSD pathology. Anxiety and fear are key elements of prominent theories of the development of PTSD (e.g., Foa, Steketee, & Rothbaum, 1989), and PTSD symptoms are positively related to anxiety intensity and lability (Newton & Ho, 2008). Anger is also common among individuals with traumatic exposure and PTSD pathology (e.g., Olatunji, Ciesielski, & Tolin, 2010; Orth & Wieland, 2006; see also McHugh, Forbes, Bates, Hopwood, & Creamer, 2012). Individuals with PTSD who report high levels of anger have more severe PTSD symptoms (see McHugh et al., 2012), and PTSD symptom severity is associated with anger lability (Newton & Ho, 2008). Furthermore, cognitive models of PTSD (e.g., Ehlers & Clark, 2000) suggest that anger may arise alongside other emotions as a result of negative appraisals related to the traumatic event and its consequences (e.g., “the world is a dangerous and unfair place”). Such appraisals have been found to be associated with trauma-related anger (Whiting & Bryant, 2007). Finally, negative appraisals of the self or behavior at the time of, or subsequent to, the event are thought to elicit shame and guilt (e.g., “I deserved what happened to me;” “what happened was my fault;” Ehlers & Clark, 2000). Indeed, several studies support the associations of PTSD pathology with SCE and SCE-related traits, such as shame (Andrews, Brewin, Rose, & Kirk, 2000) and shame-proneness (e.g., Andrews, Brewin, Stewart, Philpott, & Hejdenberg, 2009; Robinaugh & McNally, 2010; Schoenleber, Sippel, Jakupcak, & Tull, 2015).

Proposed functional relationships among these emotions in the context of PTSD pathology suggest that they may exhibit shared patterns of change over time. For example, anger in PTSD has been conceptualized as a reaction to the onset of anxiety in the presence of a perceived trauma-related threat (e.g., Foa, Riggs, Massie, & Yarczower, 1995; Feeny, Zoellner, & Foa, 2000). Consistent with this view, Novaco and Chemtob (1998) found that treatments that primarily target the anxiety-related symptoms of PTSD also reduce anger. Similarly, seminal theories of SCE (e.g., Lewis, 1971) and newer theories of SCE in the context of psychopathology (e.g., Bateman & Fonagy, 2004; Schoenleber & Berenbaum, 2012) assert that anger responses can reflect efforts to down-regulate SCE. Numerous studies have reported positive associations between SCE and anger responses (e.g., Heaven, Ciarrochi, & Leeson, 2010; Tangney, Wagner, Fletcher, & Gramzow, 1992), including among individuals exposed to potentially traumatic events

(e.g., Schoenleber et al., 2015), suggesting that anger and SCE may demonstrate synchronous change over time in trauma-exposed populations. Finally, although Kleim et al. (2013) found a negative covariation between state fear and shame, other research has demonstrated positive associations between trait anxiety and SCE among adolescents (Paulus, Vanwoerden, Norton, & Sharp, 2016) and between features of anxiety disorders and shame-related traits among adults (Fergus, Valentiner, McGrath, & Jencius, 2010; Schoenleber, Chow, & Berenbaum, 2014).

### 1.1. Aims of the present study

The present study examined the temporal dynamics of anxiety, anger, and SCE at the individual (i.e., emotional lability) and mixed (i.e., affective synchrony) emotion levels in a high-risk sample of trauma-exposed substance-dependent patients with and without PTSD. Such a sample is particularly relevant, as individuals with substance dependence experience elevated levels of both emotional dysfunction (e.g., Berking et al., 2011) and PTSD symptoms (e.g., Brady, Back, & Coffey, 2004). Moreover, given evidence that individuals with PTSD who use substances exhibit greater emotional reactivity than those with PTSD and no substance use (e.g., Beckham et al., 2007), the use of this sample increases the likelihood of observing fluctuations in emotions over time (thus providing a better context in which to test our hypotheses).

We expected individuals with a PTSD diagnosis to demonstrate greater lability of anxiety, anger, and SCE relative to those without PTSD. Moreover, in line with the theorized functional relationships among these emotions described above, we hypothesized that individuals with PTSD would generally report greater affective synchrony among anxiety, anger, and SCE over time. Furthermore, in light of existing research demonstrating the relevance of trauma-related stimuli to the heightened emotional responding seen in PTSD pathology (e.g., Badour et al., 2011), we hypothesized the between-group differences in lability and synchrony would be most prominent in the context of trauma-related cues (vs. neutral cues). Finally, given evidence that trauma-exposed individuals who do not meet full criteria for a diagnosis of PTSD may also exhibit difficulties in the experience and regulation of emotion (Jakupcak et al., 2007), we examined lability and synchrony in relation to PTSD symptom severity. Specifically, because the relevance of affective synchrony may depend on the extent to which each individual emotion is changing over time (e.g., Schoenleber et al., 2016), we hypothesized that synchrony between any pair of emotions would be more strongly related to PTSD symptom severity when the lability of one or both of the involved emotions was high.

## 2. Method

### 2.1. Participants

A total of 184 adults were recruited for a larger study on risk-taking propensity among individuals with PTSD receiving treatment for substance use disorders at a residential treatment facility in the Southern United States. The present study included the 157 participants (52.2% female) who reported experiencing at least one Criterion A traumatic event. Participants reported experiencing a variety of traumatic events, with the most common being sudden unexpected death of a loved one (20.4%), sexual assault (18.5%), assault with a weapon (17.2%), and physical assault (15.3%). Notably, 153 (97.5%) participants reported multiple types of traumatic events. All participants met criteria for alcohol dependence (27.4%), cocaine dependence (29.3%), or both (43.3%). Participants ranged in age from 18 to 59 years ( $M = 34.4$  years;  $SD = 9.9$ ) and were ethnically diverse (61.8% White; 34.4% African-American; 1.9% Latino/a; 1.3% Native-American). More than half of participants were single (64.3%) and unemployed (66.9%).

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