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Research report

Insomnia and emotion dysregulation: Independent and interactive associations with posttraumatic stress symptoms among trauma-exposed smokers

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ABSTRACT

Introduction: Traumatic event exposure is common among cigarette smokers, and elevated posttraumatic stress symptoms (PTSS) are associated with increased smoking levels. As such, the current study examined factors that may contribute to elevated PTSS among trauma-exposed smokers. Insomnia and emotion dysregulation may be particularly relevant among smokers, and are each associated with PTSS. However, it remains unclear whether these factors are associated with PTSS after accounting for the effects of dispositional factors and each other, and whether they may interact to predict PTSS. Thus, the current study sought to test whether insomnia and emotion dysregulation are independently associated with PTSS after accounting for negative affectivity and number of traumas experienced, and to investigate the potential interactive influence of these factors on PTSS.
Method: Hypotheses were tested cross-sectionally among a community sample of trauma-exposed individuals who presented for smoking cessation treatment ($n=349$).
Results: Results demonstrated that insomnia and emotion dysregulation each predicted elevated PTSS after controlling for the other, negative affectivity and number of traumas experienced. In addition, the interaction between insomnia and emotion dysregulation was significant, such that higher levels of insomnia and emotion dysregulation were associated with the most severe PTSS.
Limitations: Future research should examine these factors among a clinical sample of individuals with PTSD, as well as utilize prospective designs.
Conclusions: Findings highlight the roles of insomnia and emotion dysregulation in contributing to elevated PTSS among trauma-exposed smokers, and the potential importance of targeting these factors in the context of PTSD treatment.

1. Introduction

Exposure to a traumatic event is common among smokers (Ganz, 2000), with smokers reporting traumatic event exposure at greater than twice the rate of non-smokers (Vest et al., 2002). While responses to traumatic events vary, most individuals experience some degree of posttraumatic stress symptoms (PTSS) in the acute aftermath of a trauma (Kilpatrick and Resnick, 1993). These PTSS include re-experiencing the event via nightmares, flashbacks, and intrusive memories; avoidance of reminders of the event; numbing symptoms such as an inability to feel positive emotions and loss of interest in previously enjoyed activities; and hyperarousal symptoms, such as hypervigilance and trouble sleeping (Ballenger et al., 2000). A majority of individuals exposed to a traumatic event recover from these symptoms within a few months (Kilpatrick and Resnick, 1993). However, a significant minority continue to experience PTSS, with some developing associated clinically significant distress or impairment and meeting criteria for posttraumatic stress disorder (PTSD). Both elevated PTSS severity and PTSD diagnosis are associated with a number of negative outcomes, including current smoking status as well as elevated levels of smoking (for a review, see Feldner et al., 2007). Considering research linking elevated PTSS with smoking, it is

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important to identify factors that may contribute to increased PTSS severity among this population.

One factor shown to contribute PTSS, sleep disturbance, may be particularly relevant among smokers, as disturbed sleep is common in this population (Wetter and Young, 1994). Specifically, insomnia is often reported among smokers and is the most commonly endorsed PTSS among individuals with PTSD (Neylan et al., 1998; Wetter and Young, 1994). While insomnia was previously viewed as a consequence of psychological disorders, as well as posttraumatic stress, more recent research demonstrates that insomnia may play a causal and/or maintaining role in various mental health conditions (Harvey, 2008). Specifically, insomnia prospectively predicts episodes of depression (Perlis et al., 2006), the onset of problematic alcohol and substance use (Wong et al., 2004), and anxiety disorder development (Breslau et al., 1996). In addition, experimental research has indicated that sleep is critical for mood regulation and appropriate emotional responding (Dinges et al., 1997; Yoo et al., 2007), as well as cognitive functioning (e.g., the encoding and consolidation of memories, particularly emotional memories; Walker and Stickgold, 2006), leading some to hypothesize that insomnia affects mental health conditions via impaired emotional and cognitive functioning (e.g., Harvey, 2008).

In terms of PTSS, previous research indicates insomnia is associated with elevated PTSS, with prospective studies finding that insomnia predicts development of PTSD after traumatic event exposure (Koren et al., 2002; Wright et al., 2011). In addition, longitudinal studies show that insomnia often does not remit spontaneously or through PTSD treatment alone, and is associated with ongoing PTSS (Pigeon et al., 2013), whereas treating insomnia through CBT-I may lead to a reduction in PTSS (Smith et al., 2005). There are several pathways through which sleep disturbances such as insomnia are thought to impact PTSS, including cognitive impairment, emotional disturbances, and impaired processing of emotional memories due to sleep loss (Goldstein and Walker, 2014; Walker, 2009). Specifically, studies show that sleep loss is associated with increased negative emotions such as irritability, as well as emotional lability and increased intensity of both subjective negative emotions and neural reactivity to negative emotional cues, in combination with decreased positive emotions during rewarding activities (Dinges et al., 1997; Horne, 1985; Yoo et al., 2007; Zohar et al., 2005). Thus, sleep loss due to insomnia may be associated with emotional disturbance and difficulties coping with the negative emotions associated with posttraumatic stress, leading to increased PTSS (Germain, 2013).

Another factor predictive of elevated PTSS is emotion dysregulation (Tull et al., 2007). Gratz and Roemer (2004) conceptualized emotion dysregulation as problems with the ability to understand and differentiate emotions, as well as difficulties modulating emotions. Specifically, emotion dysregulation may include problems with: (1) awareness and understanding of emotions, (2) acceptance of emotions, (3) control of impulsive behaviors and achievement of goals when distressed, and (4) use of appropriate emotion regulation strategies to modulate emotional responses (Gratz and Roemer, 2004). Emotion dysregulation may exacerbate negative emotional states by leading to increased physiological arousal, distress, and avoidance (Cisler et al., 2010). Indeed, recent research suggests that difficulties with emotion regulation may play a role in a variety of psychological disorders (Aldao et al., 2010). Finally, emotion dysregulation may be a factor of particular importance among smokers, as smoking has often been conceptualized as a maladaptive attempt to regulate one's emotions (e.g., Gehricke et al., 2007).

Both cross-sectional and prospective studies show that emotion dysregulation predicts elevated PTSS severity (Bardeen et al., 2013; Ehring and Quack, 2010; Tull et al., 2007). Some have hypothesized that emotion regulation is particularly important in the context of posttraumatic stress because intense negative emotions, such as those triggered by reminders of the traumatic event, are common in the acute aftermath of a trauma. Thus, individuals who have difficulty regulating negative emotions and arousal associated with posttraumatic stress may be at risk for developing elevated PTSS or PTSD (Bardeen et al., 2013; Tull et al., 2007). For example, individuals with emotion regulation difficulties may see their emotions as uncontrollable, and develop a fear of internal and external triggers leading to emotional reactions, such as trauma reminders (Bardeen et al., 2013; Bouton et al., 2001). In addition, limited access to emotion regulation strategies may contribute to avoidance of these reminders, which would prevent emotional processing of the event (Bardeen et al., 2013).

Despite research indicating that both insomnia and emotion dysregulation predict PTSS (Bardeen et al., 2013; Koren et al., 2002; Tull et al., 2007; Wright et al., 2011), and that insomnia is associated with emotional disturbances (Walker, 2009), relatively little research has examined these factors together in terms of PTSS. Furthermore, no known research to date has examined these factors in a smoking sample. One recent cross-sectional study of patients with comorbid PTSD and alcohol use disorder (AUD) found although insomnia and emotion dysregulation are related, both factors are independently associated with PTSS (Fairholme et al., 2013). However, this study did not account for dispositional factors predictive of PTSS, such as negative affectivity (Monson et al., 2004). In addition, it is unclear whether insomnia and emotion dysregulation may interact to predict PTSS. Because sleep loss is associated with emotional disturbances (Yoo et al., 2007; Zohar et al., 2005), it is possible those with elevated levels of emotion dysregulation may be more susceptible to the effects of insomnia on PTSS. For example, sleep loss due to insomnia may be associated with increased negative emotional reactivity and intensity when confronted with negative emotional cues, such as reminders of the trauma (Yoo et al., 2007; Zohar et al., 2005). These negative emotional reactions may be amplified by existing problems with emotion dysregulation, such as a lack of understanding of emotions, limited access to effective emotion regulation strategies, and problems with impulse control when distressed. Thus individuals may experience increased anxiety regarding the event and its reminders due to the intensity and perceived uncontrollability of associated negative emotions (Bardeen et al., 2013; Bouton et al., 2001). In addition, a lack of effective emotion regulation strategies may lead to avoidance of reminders of the event and thus elevated PTSS (Bardeen et al., 2013; Foa and Kozak, 1986).

The current study sought to, (1) replicate and extend previous research by testing whether elevated levels of insomnia and emotion dysregulation each predict more severe PTSS after accounting for the effects of the other, negative affectivity, and number of traumas experienced, and (2) to test the interactive influence of insomnia and emotion dysregulation on PTSS. We chose to investigate these hypotheses among a sample of trauma-exposed daily smokers, as they represent a population with increased risk for PTSS and sleep disturbance (Feldner et al., 2007; Wetter and Young, 1994). We hypothesized that both insomnia and emotion dysregulation would independently predict PTSS. In addition, we predicted a significant interaction between insomnia and emotion dysregulation in predicting PTSS, such that those with greater levels of insomnia and emotion dysregulation would have the most severe PTSS. Finally, we investigated which components of emotion dysregulation would predict PTSS and interact with insomnia to predict PTSS. Consistent with previous research, we expected limited access to emotion regulation strategies, lack of emotional clarity, and impulse control problems would be associated with PTSS, and that these components would interact with insomnia to predict to PTSS (Tull et al., 2007).