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Posttraumatic stress symptom severity and cognitive-based smoking processes among trauma-exposed treatment-seeking smokers: The role of perceived stress☆

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HIGHLIGHTS

- Posttraumatic stress symptom severity relates to perceived stress for smokers.
- Perceived stress is associated with smoking processes among trauma-exposed smokers.
- Perceived stress indirectly links posttraumatic stress symptom severity and cognitive-based smoking processes.
- Perceived stress may be clinically relevant to target among trauma-exposed smokers.

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ABSTRACT

Trauma exposure and smoking co-occur at an alarmingly high rate. However, there is little understanding of the mechanisms underlying this clinically significant relation. The present study examined perceived stress as an explanatory mechanism linking posttraumatic stress symptom severity and smoking-specific avoidance/inflexibility, perceived barriers to smoking cessation, and negative affect reduction/negative reinforcement expectancies from smoking among trauma-exposed smokers. Participants were trauma-exposed, treatment-seeking daily cigarette smokers ($n = 179$; 48.0% female; $M_{age} = 41.17$; $SD = 12.55$). Results indicated that posttraumatic stress symptom severity had an indirect significant effect on each of the dependent variables via perceived stress. The present results provide empirical support that perceived stress may be an underlying mechanism that indirectly explains posttraumatic symptoms relation to smoking-specific avoidance/inflexibility, perceived barriers to smoking cessation, and negative affect reduction/negative reinforcement expectancies among trauma-exposed smokers. These findings suggest that there may be clinical utility in targeting perceived stress among trauma-exposed smokers via stress management psychoeducation and skills training.

1. Introduction

Trauma exposure is alarmingly high among the general population, with more than half of individuals reporting exposure to a DSM-defined traumatic event (Spitzer et al., 2009). Trauma-exposed persons (with or without post-traumatic stress disorder [PTSD]) are more likely to be smokers, have higher levels of nicotine dependence, and have poorer outcomes during quit attempts than non-trauma exposed persons (Feldner, Babson, & Zvolensky, 2007; Zvolensky, Gibson, Vujanovic, et al., 2008). Despite the documented co-occurrence and clinically-significant relations between trauma exposure and smoking, the mechanisms by which posttraumatic stress symptom severity contributes to smoking have rarely been empirically explored.

One potential construct linking posttraumatic stress symptom severity and smoking is perceived stress. Perceived stress reflects one's perception of his/her global life stress (Norris, 1992) and is unique from negative affect because it taps into the stress appraisal process (Cohen, Kamarck, & Mermelstein, 1983). Perceived stress is higher in current smokers than nonsmokers and recent quitters (Carey, Kalra,

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Carey, Halperin, & Richards, 1993; Cohen & Lichtenstein, 1990; Ng & Jeffery, 2003) and predicts higher odds of quit failure and shorter time to smoking relapse (Al'Absi, Hatsukami, & Davis, 2005). Moreover, 'successful quitters' report decreased perceived stress (Cohen & Lichtenstein, 1990) whereas those who relapse report greater perceived stress (Carey et al., 1993). Biologically, smoking alters stress management systems, including the hypothalamic-pituitary-adrenal axis and the autonomic nervous system, which subsequently contributes to smoking maintenance and more difficulty quitting (Richards et al., 2011). In terms of trauma-exposure, trauma-exposed persons report higher levels of perceived stress than non-trauma exposed persons (Norris, 1992). Evidence also suggests that more severe PTSD symptoms and greater perceived stress frequently co-occur (Besser, Neria, & Haynes, 2009; Frasier, Belton, Hooten, et al., 2004). Indeed, greater perceived stress is associated with increased posttraumatic stress symptom severity (Hu, Koucky, Brown, Bruce, & Sheline, 2013; Hyman, Paliwal, & Sinha, 2007). Despite past work, research has not yet explored the role of perceived stress in the relation between posttraumatic stress symptom severity and smoking processes.

Trauma-exposed persons who experience greater levels of posttraumatic stress symptom severity may be prone to higher levels of perceived stress (Hyman et al., 2007). As a result, in the absence of alternative adaptive regulatory strategies, trauma-exposed smokers may smoke to manage stressful negative mood states in the short term. In turn, this pathway may relate to more maladaptive smoking behavior and cognition, including smoking inflexibly in response to negative mood states, perceiving quitting to be more difficult, and expecting that smoking can relieve negative affect. With this background, the current study tested the hypotheses that, among adult, treatment-seeking trauma-exposed daily smokers, perceived stress would explain the relation between posttraumatic stress symptom severity and (1) the tendency to respond with avoidance/inflexibility in the presence of aversive smoking-related thoughts, feelings, or internal sensations; (2) perceived barriers to smoking cessation; and (3) negative affect reduction/negative reinforcement expectancies from smoking.

2. Methods

2.1. Participants

The sample consisted of 179 treatment-seeking, trauma exposed, adult daily smokers (48.0% female; $M_{age} = 41.17$; $SD = 12.55$) who endorsed at least one lifetime Criterion A traumatic event according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000). Participants were asked to identify one traumatic event that was most disturbing. Traumatic events identified as most disturbing included accident (30.7%), life threatening illness (12.3%), non-sexual assault by a stranger (9.5%), sexual assault by someone participant knew (8.9%), non-sexual assault by someone participant knew (8.9%), disaster (5.0%), sexual assault by a stranger (3.9%), sexual contact while under 18 with someone 5 or more years older (2.8%), combat (2.2%), imprisonment (1.1%), torture (1.1%), and other event (12.8%). Only participants who reported smoking at least 8 cigarettes a day during the past year, as indexed by the Smoking History Questionnaire (Brown, Lejuez, Kahler, & Strong, 2002), were included. Exclusion criteria included current suicidality and psychosis. See Table 1 for the sample characteristics.

Table 1
Participant characteristics.

	M(*SD*)/N[%]	Range
Age	41.17 (12.55)	18–65
Gender		
Male	93 [52.0]	–
Female	86 [48.0]	–
Race/ethnicity		
White	158 [88.3]	–
Black non-Hispanic	10 [5.6]	–
Black Hispanic	1 [0.6]	–
Hispanic	4 [2.2]	–
Asian	2 [1.1]	–
Other	4 [2.2]	–
Education completed		
Less than high school	9 [5.0]	–
High school graduate or equivalent	34 [19.0]	–
Some college	57 [31.8]	–
Associates degree	16 [8.9]	–
Bachelor degree	32 [17.9]	–
Some graduate or professional school	13 [7.3]	–
Graduate or professional school	18 [10.1]	–
Marital status		
Married or living with someone	77 [43.0]	–
Widowed	5 [2.8]	–
Separated	5 [2.8]	–
Divorced or annulled	32 [17.9]	–
Never married	60 [33.5]	–
Smoking rate	18.42 (7.64)	8–40
Number of trauma types	3.17 (1.73)	1–9
Time since [index] trauma	5.38 (0.99)	2–6
PANAS-NA	18.88 (7.39)	10–44
PDS	8.19 (9.54)	0–42
PSS	24.47 (7.97)	1–43
Avoidance & Inflexibility	46.25 (10.68)	17–65
Barriers to Cessation	24.72 (10.92)	0–52
SCQ-NR	5.95 (1.63)	1.58–9

Note. N = 179; M(*SD*) = mean (standard deviation). PANAS-NA = Positive and Negative Affect Schedule-Negative Affect subscale (Watson et al., 1988); PDS = Posttraumatic Diagnostic Scale (Foa, 1995); PSS = Perceived Stress Scale (Cohen et al., 1983); SCQ-NR = Smoking Consequences Questionnaire- Negative Reinforcement/Negative Affect Reduction Subscale (Brandon & Baker, 1991). Smoking rate = average number of cigarettes smoked per day in the last week. Time since [index] trauma = time since traumatic event identified as most disturbing on the PDS ranging from 1 "less than one month [ago]" to 6 "more than 5 years [ago]."

2.2. Measures

2.2.1. Demographics questionnaire

Demographic information collected included gender, age, race, educational level, and marital status.

2.2.2. Posttraumatic Diagnostic Scale (PDS)

The PDS (Foa, 1995) is a 49-item self-report instrument that assesses trauma exposure and the presence of posttraumatic stress symptoms based on DSM-IV criteria (American Psychiatric Association, 2000). Respondents report if they have experienced any of 13 traumatic event types (e.g., "natural disaster", "sexual or non-sexual assault by a stranger"), including an "other" category, and then indicate which event was most disturbing. In the current study, only those participants indicating that they experienced, witnessed, and were confronted with a traumatic event that involved actual or threatened death or serious injury that was accompanied by a feeling of helplessness and terror (i.e., met DSM-IV-TR defined criterion A trauma; American Psychiatric Association, 2000) were included. Participants report the frequency of 17 past-month PTSD symptoms for the most disturbing event endorsed according to a scale ranging from 0 (*not at all/only once*) to 3 (*5 or more times a week/almost always*). The PDS has evidenced excellent psychometric properties (Foa, Cashman, Jaycox, & Perry, 1997), including excellent internal consistency (alpha = 0.92) and good test-retest reliability (kappa = 0.74). The current study utilized the total score for the frequency of the 17 PTSD symptoms ($\alpha = 0.93$). Two covariates were derived from this measure: (1) number of trauma types experienced was the total number of traumatic event types endorsed and (2) participants report how long ago the traumatic event occurred on a 6-point scale from 1 (*less than one month* [*ago*]) to 6 (*more than 5 years* [*ago*]).