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Negative Affect Mediates the Association Between Posttraumatic Cognitions and Craving in Veterans with Posttraumatic Stress Disorder and Alcohol Use Disorder

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Abstract

Objective: The co-occurrence of posttraumatic stress disorder (PTSD) and alcohol use disorder (AUD) is common. Individuals with PTSD/AUD commonly drink to cope with PTSD symptoms, which maintains PTSD/AUD, and may result in increased craving for alcohol. Negative affect is implicated in negative reinforcement models of craving. Further, Emotional Processing Theory posits that posttraumatic cognitions lead to the experience of negative affect, which may result in increased craving in PTSD/AUD. The current study aims to advance the understanding of craving in PTSD/AUD by evaluating if specific posttraumatic cognitions (e.g., cognitions about the self, world, and self-blame) are associated with increased negative affect, and whether higher negative affect is associated with heightened craving.

Methods: Three separate simple mediation models were utilized to test if negative affect mediated the relationship between each specific posttraumatic cognition type and craving among 136 treatment-seeking veterans with PTSD/AUD.

Results: We found that negative affect mediated the association between all posttraumatic cognition types and craving. Specifically, viewing oneself as being unable to handle PTSD related distress, viewing the world as very dangerous, and blaming oneself for one's role in a traumatic event were all associated with increased negative affect, which was related to higher craving.

Conclusions: Given that posttraumatic cognitions improve via trauma-focused treatment for PTSD, future work should evaluate whether improvements in posttraumatic cognitions via trauma-focused treatment lead to decreased negative affect and craving in PTSD/AUD.

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Keywords

Posttraumatic Stress Disorder; PTSD; Alcohol Use Disorder; AUD; craving; negative affect

Introduction

Alcohol use disorder (AUD) commonly co-occurs with posttraumatic stress disorder (PTSD; Pietrzak, Goldstein, Southwick, & Grant, 2011; Seal et al., 2011). The comorbidity of PTSD/AUD presents with greater symptom severity and complexity than either disorder alone (Blanco et al., 2013; Norman, Haller, Hamblen, Southwick, & Pietrzak, 2018). Cravings for alcohol (i.e., urges or desires to drink) may play an important role in the maintenance of PTSD/AUD, as individuals with PTSD often report using alcohol to cope with their PTSD symptoms and thus may experience more frequent and intense cravings to drink (Simpson, Stappenbeck, Luterek, Lehavot, & Kaysen, 2014; Simpson, Stappenbeck, Varra, Moore, & Kaysen, 2012). Further, cravings can persist long after individuals with AUD stop drinking, are predictive of alcohol use during treatment for AUD, and are associated with relapse after AUD treatment (Bottlender & Soyka, 2004; Flannery, Poole, Gallop, & Volpicelli, 2003). Better understanding factors that contribute to craving among individuals with PTSD/AUD may help to elucidate important targets for the treatment of PTSD/AUD.

Two factors that may contribute to craving among individuals with PTSD/AUD are negative posttraumatic cognitions and negative affect. Research has found that among men with PTSD/AUD, posttraumatic cognitions about the self (e.g., “If I think about the (traumatic) event, I will not be able to handle it”) were associated with increased cravings for alcohol even when controlling for PTSD symptom severity (Jayawickreme, Yasinski, Williams, & Foa, 2012). Negative affect (e.g., feelings of distress, nervousness, fear, guilt, and shame) also contributes to increased cravings, as individuals use alcohol to alleviate negative feelings, (which are common among individuals with PTSD; Mcdevitt-Murphy, Fields, Monahan, & Bracken, 2015; Simpson et al., 2014), which then perpetuates cravings to drink through a negative reinforcement mechanism (Baker, Piper, Mccarthy, Majeskie, & Fiore, 2004; Verheul, van den Brink, & Geerlings, 1999).

Researchers have demonstrated that both alcohol cues and trauma reminders lead to increased negative affect and craving in PTSD/AUD via cue reactivity paradigms (Coffey et al., 2002, 2010). To our knowledge, researchers have not examined the role of cognitive factors, such as posttraumatic cognitions, in contributing to both negative affect and craving among individuals with PTSD/AUD. According to Emotional Processing Theory (Rauch & Foa, 2006), cognitions such as viewing oneself as unable to cope with trauma-related distress or seeing the world as very dangerous lead to feelings of distress, nervousness, fear, guilt, and shame (i.e., negative affect). Given that negative posttraumatic cognitions may theoretically lead to increased negative affect, negative affect may mediate the association between posttraumatic cognitions and craving among individuals with PTSD/AUD. For instance, Ralevski et al. (2016) found that both trauma and stress scripts were associated with stronger negative affect in PTSD/AUD, but trauma scripts produced stronger craving

for alcohol than general stress scripts. Perhaps this increased craving is related to distress that comes with views of being unable to handle details of trauma and evidence supporting the idea that the world is very dangerous. If the proposed model is supported, it may mean that intervention to reduce posttraumatic cognitions may reduce craving through reductions in negative affect.

The primary aim of this study was to examine the relationship between specific posttraumatic cognitions, negative affect and craving in PTSD/AUD among 136 treatment-seeking veterans with PTSD/AUD. We hypothesized that negative affect would mediate the relationship between posttraumatic cognitions (e.g., about the self, world, and self-blame) and craving.

Methods

Participants

The study included 136 treatment-seeking veterans with PTSD/AUD who consented to a VA Institutional Review Board approved randomized controlled trial (RCT) comparing Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure (Back et al., 2015) and Seeking Safety (Najavits, 2002) for the treatment of PTSD/AUD (Norman et al., 2019) after discussing study requirements and passing a consent quiz. In order to be eligible for current study inclusion, potential participants had to meet the following criteria: 1) full or subthreshold PTSD (one symptom under diagnostic threshold); 2) current alcohol abuse or dependence with at least 20 days of heavy drinking (≥ 4 drinks for females and ≥ 5 drinks for males) in the past 90 days.

Procedures

Data for the current study were collected at a large urban VA hospital during the baseline visit of the parent RCT (Norman et al., 2015, 2019). Potential participants provided written and informed consent and passed a consent quiz before enrolling. Veterans completed self-report measures and semi-structured interviews to determine eligibility in the parent RCT. Veterans who completed the Posttraumatic Cognitions Inventory (PTCI; Foa, Tolin, Ehlers, Clark, & Orsillo, 1999), the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), the Penn Alcohol Craving Scale (PACS; Flannery, Volpicelli, & Pettinati, 1999), the Clinician Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2017), and a Timeline Followback (TLFB; Sobell & Sobell, 1992) were included in the current study.

Measures

Posttraumatic Cognitions Inventory—The PTCI is a self-report measure that assesses posttraumatic cognitions. The PTCI consists of three subscales which assess posttraumatic cognitions about the self (SELF; e.g., “my life has been destroyed by the trauma”), the world (WORLD; e.g., “the world is a dangerous place”), and self-blame (SELF-BLAME; e.g., “the event happened because of the way I acted”). Items are rated on a scale of 1 (*totally disagree*) to 7 (*totally agree*). Higher scores on the PTCI indicate the presence of more beliefs in posttraumatic cognitions. The PTCI displayed excellent internal consistency in the

development (α_{Total} = .97, α_{Self} = .97, α_{World} = .88, and $\alpha_{Self\text{-}Blame}$ = .86; Foa et al., 1999) and in the current sample (α_{Total} = .93, α_{Self} = .92, α_{World} = .85, $\alpha_{Self\text{-}Blame}$ = .83).

Positive and Negative Affect Schedule—The PANAS is a 20-item self-report assessment that measures mood states over the past week. The PANAS is composed of two 10-item subscales—positive affect and negative affect. The PANAS negative affect subscale displayed strong internal consistency as well as stability when directions instructed participants to rate affect up to 2 months in the development sample (Watson et al., 1988). Items are endorsed on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*). The negative affect subscale was used in analyses for the current study. The PANAS negative affect subscale displayed good internal consistency in the current sample (α = .91).

Penn Alcohol Craving Scale—The PACS is a 5-item self-report measure that assesses frequency, intensity, duration of craving, the ability to resist drinking, and an overall rating of craving (Flannery et al., 1999). In the development sample, the PACS displayed convergent validity with additional measures of craving, good internal consistency, and predictive validity for alcohol relapse after AUD treatment. In the current study, the PACS displayed excellent internal consistency (α = .91). The PACS total score was used in the current study.

Clinician Administered PTSD Scale for DSM-5—The CAPS-5 is a 30-item semi-structured interview used as the gold standard assessment for determining PTSD diagnosis, symptom severity, subjective distress, and functional impairment (Weathers et al., 2017). Clinicians assessed the frequency and intensity of 20-symptom items over the past month to determine severity of each symptom. A total score of 20-symptom items was calculated to determine PTSD severity for the current study. CAPS-5 severity displayed good interrater reliability and internal consistency in the development sample (α = .88), as well as convergent validity with CAPS for DSM-IV severity scores (r = .83) in veteran samples (Weathers et al., 2017).

Timeline Followback—The TLFB is a semi-structured interview used to retrospectively assess the frequency and quantity of alcohol (i.e., standard drinking units) and drug use (Sobell & Sobell, 1992). Use was assessed over the 90-day period before the baseline visit. In the current study, *percentage heavy drinking days* was used as the alcohol use variable. *Percentage heavy drinking days* was calculated as the total number of days during a period that men drank greater than or equal to five standard drinking units of alcohol and women drank greater than or equal to four standard drinking units of alcohol divided by the total number of days assessed during the baseline period (National Institute on Alcohol Abuse and Alcoholism, 2004). On average, participants drank heavily on 45 days over the 90-day assessment period.

Analytic Plan

Analyses were conducted using PROCESS, Version 3.0 (Hayes, 2014) in SPSS Version 24 (IBM Corp., 2016). We utilized a series of multiple linear regression analyses to assess whether the association between posttraumatic cognitions and craving was mediated by

negative affect (Baron & Kenny, 1986; MacKinnon, Fairchild, & Fritz, 2007). The product of coefficients method was used to compute the indirect effect of negative trauma related cognition on craving via negative affect (MacKinnon et al., 2007). Bootstrapped 95% confidence intervals were calculated to determine the significance of indirect effects. We included specific negative trauma related cognition subscales (i.e., SELF, WORLD, SELF-BLAME) as independent variables in three separate mediation models. As alcohol use, PTSD severity, and gender were significantly associated with craving at the bivariate level, they were controlled for in all models. Unstandardized regression coefficients (β) are reported below.

Results

Demographics and Zero-Order Correlations

See Table 1 for the demographic characteristics of the sample. The current sample consists of a majority of white (64.0%) males (90.4%) with an average age of 42.0 years (SD = 12.58). Gender was significantly associated with craving for alcohol (r = −.19, p = .027), with women (mean = 19.15) endorsing higher craving than men (mean = 14.48). As no other demographic variables were significantly associated with craving, only gender was included as a demographic covariate. Table 2 includes zero-order correlations between study independent variables (e.g., SELF, WORLD, and SELF-BLAME), negative affect, craving, percentage heavy drinking days and PTSD severity. Overall, craving was significantly and positively correlated with all study variables except self-blame cognitions.

Mediation Models

Results of mediation analyses are presented in Figure 1. Findings indicated that negative affect significantly mediated the effects of all three types of negative trauma-related cognitions (i.e., SELF, WORLD, and SELF-BLAME) on craving, controlling for gender, PTSD severity, and percentage heavy drinking days. The direct effects of all three types of negative trauma-related cognitions on craving were non-significant when negative affect was included in the model. The indirect effects of posttraumatic cognitions on craving via negative affect were significant across all three models, SELF: β = 1.071, 95% CI [0.536, 1.793]; WORLD: β = .815, 95% CI [0.354, 1.516]; SELF-BLAME: β = .366, 95% CI [.107, .744].

Discussion

The goal of the study was to examine if negative affect mediated the relationship between posttraumatic cognitions and craving for alcohol among veterans with PTSD/AUD. In support of our hypothesis, we found that negative affect mediated the association between specific posttraumatic cognitions related to SELF (e.g., “my life has been destroyed by the trauma”), WORLD (e.g., “the world is a dangerous place”), and SELF-BLAME (e.g., “the event happened because of the way I acted”), and craving in three separate mediation models while controlling for PTSD/AUD symptom severity and gender. Specifically, all posttraumatic cognitions were associated with increased negative affect, which in turn was related to increased craving.

To our knowledge, the current study is the first to examine how posttraumatic cognitions are associated with both negative affect and craving in PTSD/AUD. These findings are novel, as they show that increased negative affect and craving are not solely triggered by external cues, but are also linked to the way individuals view themselves and the world after experiencing trauma. These findings build on previous research that has demonstrated associations between negative affect and craving for alcohol in PTSD/AUD in response to external alcohol and trauma cues (Coffey et al., 2002; Coffey, Stasiewicz, Hughes, & Brimo, 2006).

Our results raise important directions for future PTSD/AUD treatment research, as findings raise the question of whether decreasing negative posttraumatic cognitions may lead to reductions in both negative affect and craving. Posttraumatic cognitions are targeted in trauma-focused treatments such as Prolonged Exposure and Cognitive Processing Therapy as an important mechanism for reducing PTSD severity (Foa & Rauch, 2004; Kleim et al., 2012). Although imaginal exposure (Coffey et al., 2006) and a modified version of Prolonged Exposure (e.g., 60-minute sessions; Nosen et al., 2014) led to reductions of negative affect and craving, no studies we know of have evaluated if trauma focused therapies lead to reduced craving via changes in posttraumatic cognitions among individuals with PTSD/AUD. To test if posttraumatic cognitions are a salient target for craving reduction in PTSD/AUD, future intervention research should examine if trauma-focused treatments that decrease negative posttraumatic cognitions also lead to reductions in negative affect and craving. Limitations to this study include its cross-sectional design, which precludes interpretations about the directions of causality among study variables. Additionally, the study sample is composed of veterans and is predominantly male. Therefore, results from the current study should be interpreted with caution as the findings may not generalize to women or civilians with PTSD/AUD.

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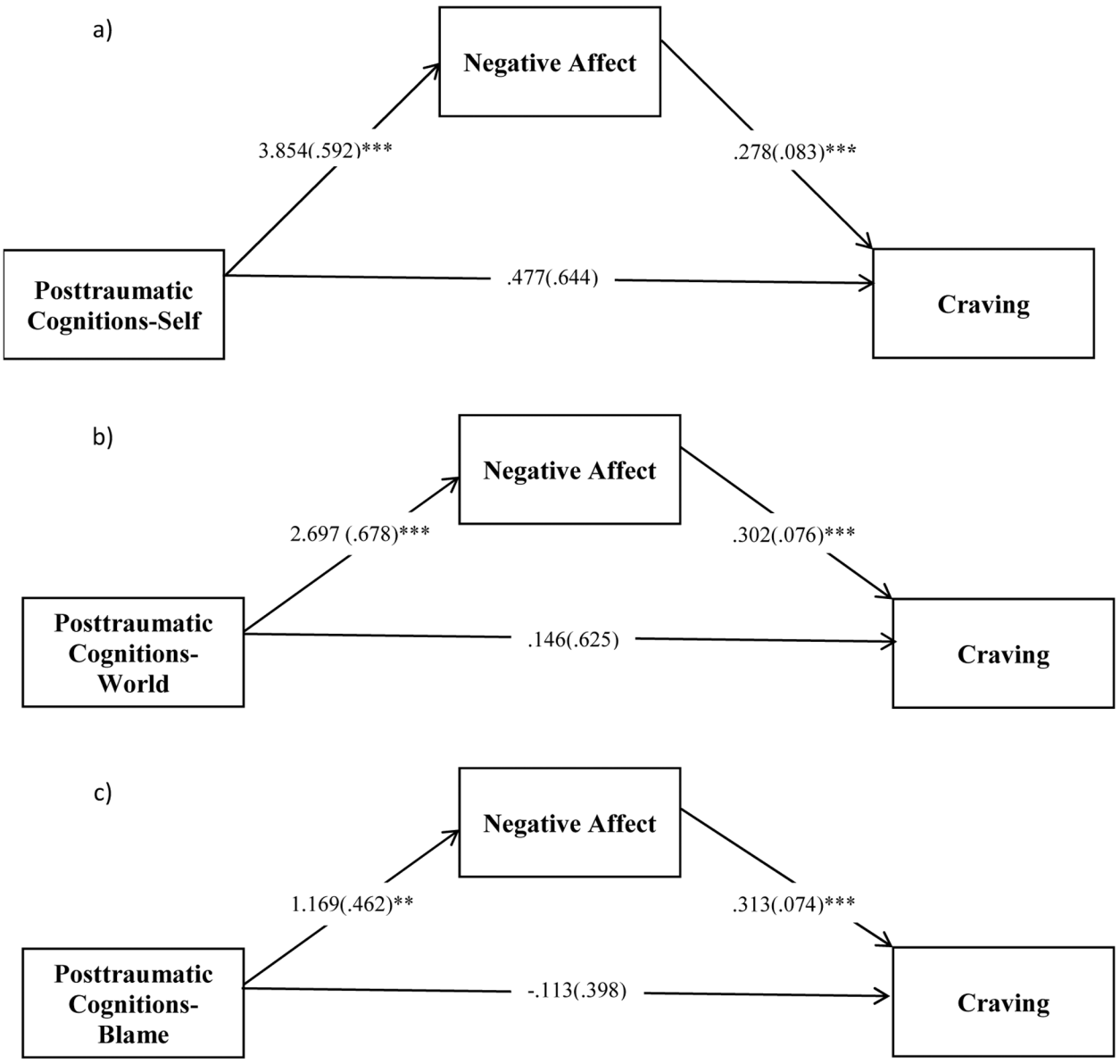

Figure 1.

Results of analyses examining negative affect as a mediator of negative trauma related cognitions on cravings. PTSD, percentage heavy drinking days, and gender were controlled for in all models. Unstandardized betas and standard errors (in parentheses) are presented. ***p* < .01. ****p* < .001.

Table 1

Demographics

Cohort characteristics (N =136)	
Age in years, mean (*SD*)	42.0 (12.6)
Women, *n (%)*	13 (9.6)
Race and Ethnicity	
White, *n (%)*	87 (64.0)
Black, *n (%)*	18 (13.2)
Other or unknown, *n (%)*	31 (22.8)
Hispanic ethnicity, *n (%)*	41 (30.1)
Marital Status	
Married or remarried, *n (%)*	34 (25.0)
Separated or divorced, *n (%)*	68 (50.0)
Widowed, *n (%)*	4 (2.9)
Never married, *n (%)*	30 (22.1)
Education	
Completed high school or less, *n (%)*	22 (16.2)
Some College, *n (%)*	76 (55.9)
College Grad, *n (%)*	38 (27.9)
Employment Status	
Fulltime employed, *n (%)*	37 (27.2)
Unemployed (seeking and not seeking work), *n (%)*	14 (10.3)
Military history	
Deployed to a combat zone more than once, *n (%)*	61 (44.8)

Note. Missing deployment data for one participant.

Table 2

Zero-Order Correlations of Study Variables.

	1.	2.	3.	4.	5.	6.	7.	*M(SD)*
1. Craving	-							14.93(7.29)
2. Posttraumatic Cognitions-Self	.324**	-						4.08(1.22)
3. Posttraumatic Cognitions-World	.183*	.520**	-					5.63(0.99)
4. Posttraumatic Cognitions-Blame	.102	.542**	.141	-				3.21(1.60)
5. Negative Affect	.448**	.641**	.414**	.327**	-			30.51(9.19)
6. PTSD Severity	.220**	.571**	.310**	.386**	.494**	-		41.51(10.40)
7. Heavy Drinking Days (%)	.303**	.150	.036	−.111	.272**	.117	-	50.29%(26.62%)

Note. PTSD = posttraumatic stress disorder.

* $p < .05$.

** $p < .01$.