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Smoking to Regulate Negative Affect: Disentangling the Relationship Between Posttraumatic Stress and Emotional Disorder Symptoms, Nicotine Dependence, and Cessation-Related Problems

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Abstract

Introduction: Posttraumatic stress disorder (PTSD) is associated with various aspects of cigarette smoking, including higher levels of nicotine dependence and cessation difficulties. Affect-regulatory smoking motives are thought to, in part, underlie the association between emotional disorders such as PTSD and smoking maintenance, although few studies have empirically tested this possibility.
Methods: Data were analyzed from 135 treatment-seeking smokers who were directly exposed to the World Trade Center disaster on September 11, 2001. We modeled the direct effect of 9/11 PTSD symptom severity on nicotine dependence, perceived barriers to smoking cessation, and severity of problematic symptoms experienced during prior cessation attempts. We also examined the indirect effect of PTSD on these outcomes via negative affect reduction smoking motives. Parallel models were constructed for additional emotional disorder symptoms, including panic and depressive symptoms.
Results: PTSD symptom severity was associated with nicotine dependence and perceived barriers to cessation, but not problems during prior quit attempts indirectly via negative affect reduction smoking motives. Panic and depressive symptoms both had significant indirect effects, via negative affect reduction smoking motives, on all three criterion variables.
Conclusions: Affect-regulatory smoking motives appear to underlie associations between the symptoms of emotional disorders such as PTSD, panic, and depression in terms of smoking dependence and certain cessation-related criterion variables.
Implications: Overall, this investigation suggests negative affect reduction smoking motives help to explain the relationship of PTSD, depression, and panic symptoms to nicotine dependence, severity of problems experienced during prior quit attempts and perceived barriers to cessation. These results highlight the importance of assessing motivations for smoking in the context of cessation treatment, especially among those with emotional disorder symptoms. Future interventions might seek to utilize motivational interviewing and cognitive restructuring techniques to address coping-oriented motives for smoking, in addition to skills for managing negative affect, as a means of improving quit outcomes.

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Introduction

Despite a precipitous decline in the prevalence of smoking in the United States since 1980,[1] people with psychological disorders remain significantly more likely to smoke, smoke more cigarettes per day, and have greater difficulty quitting than those without psychological disorders.[2–5] Individuals with posttraumatic stress disorder (PTSD), in particular, are more likely to smoke than the general population[6] (44.6% vs. 22.5%) and have quit rates that are substantially lower than those for smokers without a psychological disorder[6] (23.2% vs. 42.5%;) or trauma exposure.[7] Although a robust literature exists which examines mechanisms linking psychopathology in general to the maintenance of smoking, relatively less work has focused on understanding these links in the context of PTSD.

Exploring the role of negative affect may represent one avenue for illuminating the mechanisms at play. Individuals with PTSD report notably high levels of global negative affect.[8] Indeed, in a recent meta-analysis of the literature on personality traits across anxiety, depressive and substance use disorders, individuals with PTSD emerged as having the highest levels of trait negative affectivity—even higher than that observed in individuals with depression.[8] This is consistent with biopsychosocial models of PTSD which suggest that individuals with PTSD respond with excessive negative affect when confronted with stressful events[9] and is also reflected in the most recent revisions to the Diagnostic and Statistical Manual's diagnostic criteria for PTSD (Criterion D: Negative Alterations in Cognitions and Mood)[10] which highlights the diagnostic salience of negative affect. As such, it has been theorized that smokers with PTSD may be motivated to smoke as a (perceived) means of reducing high levels of negative affect.[11–15] Likewise, negative reinforcement models of drug addiction[16,17] suggest that motivation to use psychoactive substances is tied to a desire to reduce negative affect. There is also evidence that smokers with PTSD, relative to healthy controls, report greater motivation to smoke for affect-regulatory reasons and stronger beliefs that smoking will help them to achieve this.[18,19] Ambulatory monitoring studies also suggest that smokers with PTSD smoke more often to reduce anxiety and tension than healthy controls.[20] Moreover smokers with PTSD, relative to those without psychopathology, are more likely to attribute first time lapses to negative affect.[21]

Although negative affect reduction motives are frequently conceptualized as an explanatory mechanism underlying nicotine addiction and the maintenance of smoking, no work has yet examined the relationship of PTSD symptoms to nicotine dependence and smoking behavior through negative affect reduction motives. Some work, however, signals a potential role for such motives in understanding these relations. For example, one study found that PTSD symptoms were associated via negative affect reduction smoking outcome expectancies with daily cigarette consumption among trauma-exposed smokers enrolled in a substance detoxification program.[22] Another related study found that negative affect and negative affect reduction smoking motives sequentially indirectly explained the relationship between number of traumatic exposures and nicotine dependence, expired carbon monoxide (CO) levels, problems during prior quit attempts and perceived barriers to cessation.[23] These data provide preliminary support for the role of affect-regulatory motives in the maintenance of smoking in trauma exposed individuals. They do not, however, directly speak to the nature of this relationship in the context of smokers with trauma exposure and PTSD symptoms. Exploring this relationship in cessation-seeking symptomatic individuals is an important next step given that trauma exposure is only associated with an increased risk for developing nicotine dependence in the presence of PTSD symptoms.[24]

Beyond PTSD, there is data linking negative affect reduction smoking motives to other emotional disorders including panic and, to a lesser extent, depression. Specifically, smokers with panic disorder endorse greater negative affect reduction smoking motives than healthy controls and those with sub-clinical symptoms, but endorse levels comparable to smokers with PTSD.[18,25] Smokers with depression, as compared to those without, also report smoking more frequently in the presence of negative affect[26] and report stronger beliefs that smoking reduces negative affect.[27] As with PTSD, despite emerging evidence that smokers with panic and depression symptoms endorse elevated negative affect reduction smoking motives, work has not yet evaluated a possible mechanistic role of these motives in promoting dependence and the maintenance of smoking behavior.

The aims of the present study were therefore twofold. First, we examined the association between PTSD symptoms, negative affect reduction smoking motives, and key smoking related variables. Specifically, the indirect effect of negative affect reduction smoking motives was tested in the association between PTSD symptom severity and nicotine dependence, number of problems during prior quit attempts (eg, the experience of somatic symptoms and irritability), and perceived barriers to cessation. It was hypothesized that PTSD symptom severity would be related to the three smoking variables of interest in part via negative affect reduction smoking motives. Second, given the evidence that affect regulatory smoking motives are also salient to smokers with symptoms of other emotional disorders (eg, panic and depression), the current study also tested the indirect effect of negative affect reduction smoking motives in terms of the association between depression and panic symptoms and all three smoking criterion variables.

Methods

Participants

A sample of 168 smokers were screened for inclusion in a larger smoking cessation treatment trial focused on individuals who were directly exposed to the World Trade Center (WTC) disaster on September 11, 2001 (9/11) and who were experiencing elevated WTC-related PTSD symptoms. Participants were recruited from the WTC Health Program, the New York City Department of Health WTC Health Registry, local newspapers, and Craigslist and were prescreened via telephone for (1) currently smoking at least 5 cigarettes per day, (2) motivation to quit smoking, (3) exposure to the WTC disaster (ie, responding to or witnessing 9/11 in person), and (4) scoring at least 30 on the Posttraumatic Stress Disorder Checklist Specific Version (PCL-S).[28] A minimum score of 30 was selected because it reflects at least moderate symptom severity and scores of 30–35 fall within the suggested clinical referral range for civilians.[29] Potentially eligible participants were invited for a baseline appointment—only data collected at this session was used in the present study. Thirty-three cases were excluded from this analysis due to (1) incomplete data, (2) smoking less than five cigarettes per day at baseline, (3) no direct exposure to the WTC disaster, (4) endorsing symptoms of alcohol dependence in the last 6 months, (5) current severe mental illness (ie, current mania or psychotic symptoms), or (6) participating in concurrent smoking cessation treatment. Thus, 135 smokers were included in these analyses. Participants were

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compensated $50 for completing baseline procedures. This study was approved by the Stony Brook University Institutional Review Board.

Measures

Posttraumatic Stress Disorder Checklist-Specific Version

The PCL-S[28] is a 17-item self-report measure assessing the severity of *DSM-IV* PTSD criterion symptoms. Participants are asked to rate how bothered they were by problems in the past month "in relation to 9/11" on a scale of "1 = *not at all*" to "5 = *extremely*." The scale possesses good temporal stability, internal consistency, test-retest reliability, and convergent validity.[29] The scale items demonstrated excellent internal consistency in this sample (Cronbach's α = 0.93).

Inventory of Depression and Anxiety Symptoms

The Inventory of Depression and Anxiety Symptoms (IDAS)[30] is a multidimensional measure of anxiety and depression symptoms, containing 64 items with 10 symptom scales and two broader scales assessing general depression and dysphoria. The 20-item general depression scale was utilized as a measure of depressed mood and the 8-item panic scale as a measure of panic symptoms. The general depression subscale is designed to be comparable to measures such as the Beck Depression Inventory II[31] and the panic scale is strongly correlated (r = 0.78) with self-report measures of anxiety such as the Beck Anxiety Inventory.[32] Both scales are highly internally consistent, stable and display good convergent validity with diagnostic interviews.[33] Both scales demonstrated excellent internal consistency in this sample (Depression Cronbach's α = 0.90; Panic Cronbach's α = 0.85).

Structured Clinical Interview for *DSM-IV* Axis I Disorders-Non-Patient Version

The Structured Clinical Interview for *DSM-IV* Axis I Disorders-Non-Patient Version[34] is a semi-structured clinical interview to assess Axis I psychopathology. Interviews were administered by trained doctoral and master's-level interviewers. A sample of 14% of interviews (n = 19) was reviewed by an independent rater. Kappa coefficients for current PTSD, major depressive disorder (MDD), and panic disorder (with and without agoraphobia) were 0.73 (94.74% agreement), 1.0 (100% agreement), and 0.95 (94.74% agreement), respectively. These data were used to document rates of these disorders in the sample.

Smoking History Questionnaire

The Smoking History Questionnaire[35] is a widely used self-report questionnaire which assess smoking history and patterns of smoking behavior.[36,37] The Smoking History Questionnaire includes items pertaining to smoking rate, prior quit attempts, and problematic symptoms during such attempts. For this analysis, we tallied the 18 symptom-based quit problems (eg, weight gain, insomnia, craving etc.) listed under item number 17 to create a "prior quit problems" score.

Fagerstrom Test for Nicotine Dependence

The Fagerstrom Test for Nicotine Dependence (FTND)[38] is a 6-item scale considered the standard for assessment of nicotine dependence. Scores range from 0–10, with higher scores reflecting greater physiological dependence. The FTND demonstrates positive correlations with physiological measures of tobacco use (eg, saliva cotinine), and high test–retest reliability. Cronbach's alpha for the items in the current sample was 0.46, which is typical for this index.[39,40]

Reasons for Smoking

The reasons for smoking (RFS)[41] is a 23-item self-report measure that assesses motivations for smoking. Participants are asked to rate their tendency to smoke in each of the circumstances listed using a 5-point Likert-style scale (1 = *never* to 5 = *always*). The psychometric properties of this scale, including measures of factor validity, are well established.[25,42,43] Consistent with past work,[23] only the 6-item negative affect reduction subscale (RFS-NA, eg, "When I feel uncomfortable or upset about something, I light up a cigarette") was analyzed in these analyses (α = 0.84).

The Barriers to Cessation Scale

The Barriers to Cessation Scale[44] is a 19-item scale that assesses barriers associated with smoking cessation. Participants are asked to rate the extent to which they identify each item as a barrier on a 4-point Likert-style scale (0 = *not a barrier* to 3 = *large barrier*). This scale has good content and predictive validity[45] and good internal consistency (α's = 0.81–0.87[44]; α = 0.86 in current sample). The total score was used in this report to maintain consistency with previous research.[23,45,46]

Data Analytic Strategy

Preliminary analyses were conducted to examine bivariate associations between clinical symptoms (ie, PTSD, depression, and panic symptoms symptoms), RFS-NA and smoking related criterion variables (ie, FTND, Barriers to Cessation Scale-Total and Quit Problems). Next, the indirect effect of PTSD symptoms through RFS-NA was examined in three separate regression models, one for each criterion variable—FTND, Barriers to Cessation Scale-Total, and Quit Problems—using INDIRECT, a conditional modeling macro that uses an ordinary least squares–based analytical framework to test for both direct and indirect effects.[47] All relative and total indirect effects were subjected to follow-up bootstrap analyses with 10 000 samples. Bootstrapping provides higher power while maintaining control over the Type I error rate.[48] A 95-percentile confidence interval (CI) estimate was derived for significance testing.[49,50] Parallel models were constructed with depression and panic symptoms as independent variables. Previous work has found that men are more likely to smoke and to smoke at higher rates than women and, significant interactions have been detected between nicotine dependence and age.[51,52] Thus, age and sex were included as covariates in all models.

Results

Descriptive Statistics for Demographic, Smoking and Mental Health Variables

On average, participants were 49.1 (SD = 10.3) years old. The sample was 64.4% male and predominately identified as white/Caucasian 60.1% or black/African American 29.0%. The majority were married/living with a partner (42.8%) or single (38.4%). Participants initiated smoking at 14.8 years of age (SD = 3.3), had smoked for 28.9 years (SD = 11.7), smoked 15.5 (SD = 7.7) cigarettes per day and had made 4.4 (SD = 5.2) prior quit attempts. Participants generally reported moderate to severe levels of 9/11-related PTSD symptoms as measured by the PCL-S (M = 46.7, SD = 14.3). Based on the

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SCID-I/NP, 40.6% of the sample had current *DSM-IV* WTC-related PTSD, 29.5% had current major depressive disorder and 14.8% had current panic disorder (with or without agoraphobia). Female smokers generated higher scores on the RFS-NA. Age was not correlated with any of the same study variables. Means and standard deviations for all study variables are presented in Table 1.

PTSD symptoms were significantly correlated with nicotine dependence (r = 0.24), barriers to cessation (r = 0.36), and prior quit problems (r = 0.21). Depression and panic symptoms were also positively correlated with barriers to cessation (depression r = 0.34; panic symptoms r = 0.27) and prior quit problems (depression r = 0.21; panic symptoms r = 0.31). Neither depression nor panic symptoms, however, were correlated with nicotine dependence. Correlations between the three smoking criterion variables were small to moderate in magnitude (rs = 0.22 to 0.39). Psychological symptoms across all three domains were strongly correlated (rs = 0.43 to 0.70). As such, a similar pattern and strength of relations was observed between all three symptom categories, RFS-NA, and the criterion smoking variables. Zero order correlations for all mental health and smoking related variables are presented in Table 1.

Indirect Models

A total of nine analyses were conducted to test indirect association of each type of symptom with each criterion variable through RFS-NA. Visual diagrams of these models, grouped by symptom, are presented with standardized regression weights in Figure 1 for PTSD (measured by PCL-S), Figure 2 for depression (measured by IDAS General Depression) and Figure 3 for panic symptoms (measured by IDAS Panic).

Nicotine Dependence

The full model for the relationship between PCL-S total score and FTND total score, including the indirect effect of RFS-NA, was significant (R^2 = 0.151, F (4, 122) = 5.422, P < .001). All three direct effects were also significant (Figure 1) as was the indirect effect through RFS-NA (b = 0.017, 95% CI = 0.003% to 0.039%). A different pattern of findings, however, was observed for IDAS General Depression. Notably, although the overall model was significant (R^2 = 0.129, F (4, 120) = 4.455, P < .001), and general depression was significantly related to RFS-NA, general depression was not directly related to FTND. Instead, the relationship was only indirect, via RFS-NA (b = 0.017, 95% CI = 0.003% to 0.045%; Figure 2). Similarly, the overall model for panic symptoms was significant (R^2 = 0.130, F (4, 120) = 4.498, P < .001), but the direct relationship between panic symptoms and FTND total score was not. Nonetheless, the indirect effect of panic symptoms on dependence through RFS-NA was significant (b = 0.032, 95% CI = 0.005% to 0.078%; Figure 3). All indirect effects between the three symptom dimensions and dependence through RFS-NA remained significant after controlling for demographic covariates (ie, age and sex).

Prior Quit Problems

The overall model for the relationship between PCL-S and prior quit problems, including the indirect effect through RFS-NA, was significant (R^2 = 0.158, F (4, 121) = 5.669, P < .001). All three direct paths were significant, however, the indirect path from PCL-S to quit problems through RFS-NA was not statistically significant (b = 0.028, 95% CI = –0.000% to 0.070%). The overall model for IDAS General Depression and prior quit problems, including the indirect effect via RFS-NA, was also significant (R^2 = 0.131, F (4, 119) = 4.502, P < .01) as were all three direct paths. In contrast to the previous model, however, the indirect effect through RFS-NA (b = 0.032, 95% CI = 0.000% to 0.073%) was also significant. Likewise, the overall model for IDAS Panic symptoms and prior quit problems, including the indirect effect through RFS-NA, was also significant (R^2 = 0.178, F (4, 119) = 6.423, P < .001). All three direct paths were significant, as was the indirect effect through RFS-NA (b = 0.049, 95% CI = 0.001% to 0.141%). The indirect effects for the latter two models remained significant after controlling for covariates (ie, age and sex).

Perceived Barriers to Smoking Cessation

The overall model for the relationship between PCL-S and barriers to cessation, including the indirect effect via RFS-NA, was significant (R^2 = 0.200, F (4, 129) = 8.075, P < .001). All three direct effects and the indirect effect via RFS-NA were significant (b = 0.077 (95% CI = 0.011% to 0.176%). Similarly, the overall model for the relationship between IDAS General Depression and perceived barriers to cessation, including the indirect effect through RFS-NA, was also significant (R^2 = 0.198, F (4, 127) = 7.430, P < .001). All three direct effect and the indirect effect for this relationship were also significant (b = 0.071, 95% CI = 0.008% to 0.179%). Finally, the overall model for IDAS Panic symptoms and barriers to cessation, including the indirect effect through RFS-NA, was also significant (R^2 = 0.167, F (4, 127) = 6.363, P < .001). All three direct effects and the indirect effect via RFS-NA (b = 0.157, 95% CI = 0.018% to 0.398%) were significant. The indirect effects for all three of these models remained significant after controlling for covariates (ie, age and sex).

Discussion

The current study examined the role of negative affect reduction smoking motives in the PTSD-smoking association among treatment seeking smokers with elevated PTSD symptoms related to the WTC disaster (40.6% with current WTC-related *DSM-IV* PTSD). Specifically, the indirect effect of PTSD via negative affect reduction smoking motive was examined in terms of on nicotine dependence, perceived barriers to smoking cessation, and problems during prior quit attempts. Consistent with expectation, an indirect effect was observed for nicotine dependence, even after accounting for the effects of sex and age. This finding extends previous work that has established a link between negative affect reduction smoking motives and PTSD symptoms[53] and other research indicating that negative affect reduction smoking motives may, in part, indirectly account for the effect of number of past traumatic exposures on nicotine dependence.[23] Consistent with theoretical models regarding the smoking-stress reactivity link,[50] individuals with trauma-related psychopathology may have heightened levels of nicotine dependence, in part, because they believe smoking will ameliorate negative mood states and are thus motivated to smoke more to reduce negative affect. These findings underscore the importance of assessing RFS, restructuring maladaptive cognitive biases (ie, motivations to smoke for coping purposes), and providing skills for managing affect in the context of smoking cessation treatment, especially among those with PTSD symptoms.

Negative affect reduction smoking motives indirectly explained the association between PTSD symptoms and perceived barriers to smoking cessation; however, no significant indirect effect was observed for prior quit problems. These findings are partially in line

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Table 1. Descriptive Statistics and Zero Order Correlations for Smoking Motives, Smoking Related Problems and Psychological Symptoms

Variable	Mean (*SD*)/*N* (%)	1	2	3	4	5	6	7	8	9	10
Reasons for smoking											
1. Negative affect reduction	3.57 (0.86)	1.00									
Smoking variables											
2. Quit problems (SHQ)	9.15 (4.04)	**0.33**	1.00								
3. Barriers to cessation	28.40 (10.50)	**0.39**	0.24	1.00							
4. Dependence (FTND)	5.34 (1.94)	**0.31**	0.22	**0.39**	1.00						
5. Average cig. per day	15.53 (7.73)	0.05	–0.04	0.24	**0.42**	1.00					
Psychological symptoms											
6. Depression symptoms	49.09 (14.02)	0.28	0.21	**0.34**	0.15	0.25	1.00				
7. Panic symptoms	14.07 (5.63)	0.25	**0.31**	0.27	0.15	0.08	**0.70**	1.00			
8. 9/11 PTSD symptoms	46.52 (13.89)	**0.34**	0.27	**0.36**	0.24	0.26	**0.56**	**0.43**	1.00		
Covariates											
9. Age	49.12 (10.28)	–0.05	–0.03	–0.01	0.12	0.13	0.08	0.02	–0.12	1.00	
10. Sex (Female)	48 (35.60)	0.21	0.04	0.10	–0.05	0.00	–0.02	0.00	0.11	–0.13	1.00

FTND = Fagerstrom Test for Nicotine Dependence; PTSD = posttraumatic stress disorder; SHQ = Smoking History Questionnaire. All correlations greater than 0.17 are significant at $P \leq .05$. All correlations greater than 0.30 are bolded. Sex was coded as 1 = female and 0 = male. Average cig. per day reflects average self-reported daily smoking rate over the past week.

with those of Farris and colleagues,[23] which indicated that negative affect reduction smoking motives and negative affect together accounted for the relation between number of traumatic event exposures and barriers to cessation. As such, the current findings suggest that motivations to smoke for affect regulation may impact or coincide with perceived difficulties that smokers with PTSD symptoms associate with cessation efforts. In contrast to the findings of Farris and colleagues,[23] we did not find a significant indirect effect for prior quit problems. It is possible that this finding is due to either methodological differences (eg, the use of additional indirect predictors by Farris et al.[23]), or suggests that PTSD symptoms do not add, beyond trauma exposure, to a negative affect reduction smoking motives path to quit attempt problems.

A secondary aim of this investigation was to evaluate whether negative affect reduction smoking motives also partially accounted for the relationships between the symptoms of other emotional disorders, such as depression and panic, and these smoking related variables—nicotine dependence, perceived barriers to cessation and problems during prior quit attempts. Negative affect reduction smoking motives indirectly explained the relationship between depression and panic symptoms and all three smoking related variables. The shared importance of negative affect reduction smoking motives across PTSD, depression and panic symptoms is in line with prior studies suggesting that these disorders are highly comorbid and share a common higher order factor—that is, negative affectivity.[54–57] Therefore, it is logical that smokers with symptoms of all three of these disorders might share a common set of cognitive vulnerabilities (negative affect) that contribute to smoking motives, which in turn, are associated with greater nicotine dependence and (perceived or actual) difficulties with cessation.[23] It less clear why negative affect reduction smoking motives emerged as an indirect predictor of the association between depression and panic symptoms (but not PTSD symptoms) and prior quit problems. Perhaps, the negative emotional states associated with quit attempts (eg, irritability or dysphoria) are more salient during quit attempts for those with depression and panic symptoms, and thus activation of beliefs that smoking will ameliorate distress may also be more common. In vivo measures of quit related problems may help to disentangle this.

There are several limitations and future directions that ought to be considered. First, the sample was limited to individuals with elevated PTSD symptoms related to the WTC disaster who were seeking to participant in a smoking cessation study; thus, findings may not generalize to smokers who are not seeking to quit and those experiencing PTSD related to other traumas (eg, combat, assault/violence, etc.), and trauma-exposed individuals with less severe PTSD symptoms. Additionally, because this data was collected as part of a larger treatment trial, participants were excluded on the basis of having co-occurring alcohol dependence in the last 6 months or severe mental illness. This limits our ability to draw conclusions about the relations between these variables in such vulnerable populations. Second, the data are cross-sectional and smoking histories represent retrospective accounts. As such, inferences cannot be made in terms of the directionality of these relations. Longitudinal studies are needed to examine the effects of negative affect reduction smoking motives on nicotine dependence and perceptions of problems interfering with smoking cessation in the context of the development of trauma-related psychopathology. Third, as an initial test of the question, the total severity score on the PCL-S was modeled, however previous work indicates that specific PTSD symptom clusters may be differentially related to these cognitive smoking processes

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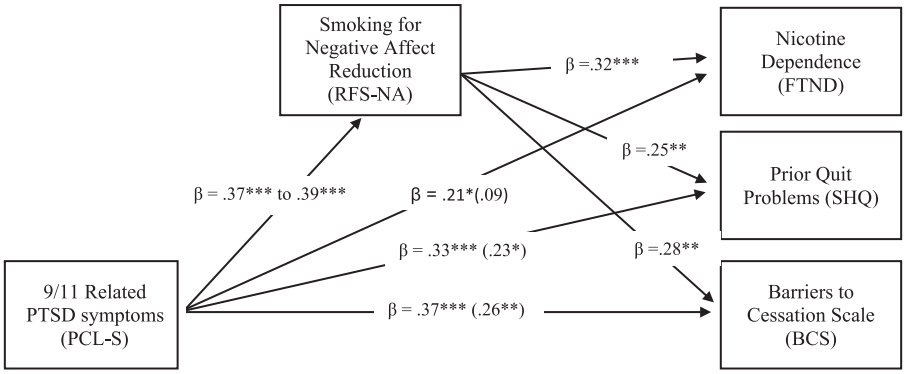

Figure 1. The indirect effect of posttraumatic stress disorder (PTSD) symptoms on smoking related criterion variables via negative affect reduction motives. *$P \leq .05$; **$P < .01$; ***$P \leq .001$. $N = 126$ to 134. Standardized regression coefficients (β) for the relationship between PTSD symptoms and smoking criterion variables as mediated by smoking for negative affect reduction motives. Coefficient in parentheses reflects relationship between Posttraumatic Stress Disorder Checklist Specific Version (PCL-S) score and the criterion variable score after controlling for RFS-NA smoking motives (ie, the indirect or path). Dashed line reflects nonsignificant indirect effect.

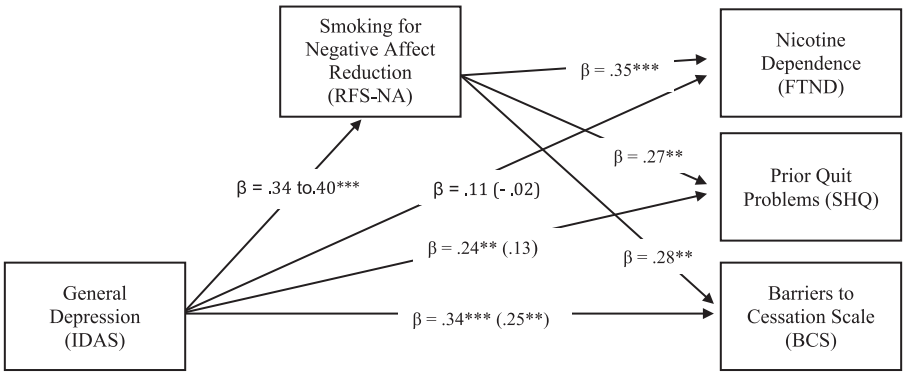

Figure 2. The indirect effect of depression symptoms on smoking related criterion variables via negative affect reduction motives. *$P \leq .05$; **$P < .01$; ***$P < .001$. $N = 124$ to 132. Standardized regression coefficients (β) for the relationship between depression symptoms and smoking criterion variables as mediated by smoking for negative affect reduction motives. Coefficient in parentheses reflects relationship between IDAS General Depression score and the criterion variable score after controlling for RFS-NA smoking motives (ie, the indirect path).

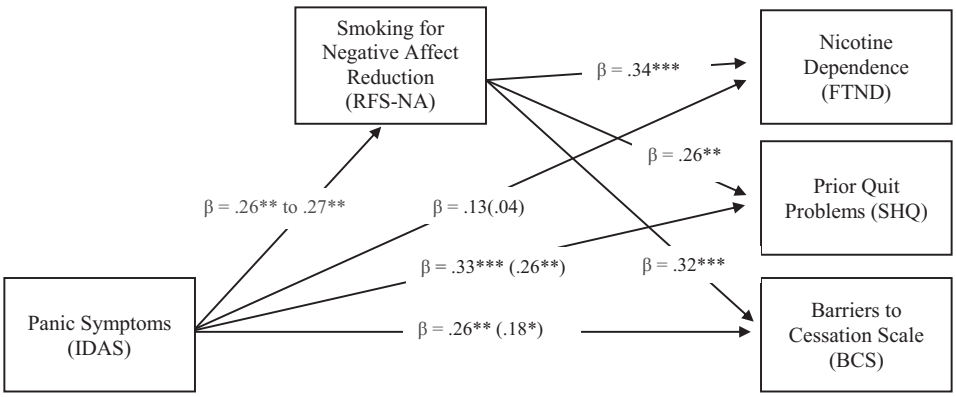

Figure 3. The indirect effect of panic symptoms on smoking related criterion variables via negative affect reduction motives. *$P \leq .05$; **$P \leq .01$; ***$P \leq .001$. $N = 124$ to 132. Standardized regression coefficients (β) for the relationship between panic symptoms and smoking criterion variables as mediated by smoking for negative affect reduction motives. Coefficient in parentheses reflects relationship between Inventory of Depression and Anxiety Symptoms (IDAS) Panic score and the criterion variable score after controlling for RFS-NA smoking motives (ie, the indirect path).

and nicotine dependence.[53,58–60] Future research might test indirect predictor models with specific PTSD symptom clusters. Fourth, the current study focused on a motivational smoking process to better understand relations between emotional disorders and smoking outcomes. There is a body of research supporting the significance of cognitive-emotional vulnerability factors, such as anxiety sensitivity and distress tolerance in terms of PTSD, anxiety and depression more broadly, with smoking outcomes.[61] Future work might evaluate the role of cognitive-emotional vulnerability factors in the relationship between PTSD symptom severity and smoking cessation outcomes.

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Overall, this investigation suggests negative affect reduction smoking motives help to explain the relationship of PTSD, depression, and panic symptoms to nicotine dependence, severity of problems experienced during prior quit attempts and perceived barriers to cessation. These results highlight the importance of assessing motivations for smoking in the context of cessation treatment, especially among those with emotional disorder symptoms. Future interventions might seek to utilize motivational interviewing and cognitive restructuring techniques to address coping-oriented motives for smoking, in addition to skills for managing negative affect, as a means of improving quit outcomes. Additional work is needed to evaluate the possibility of developing transdiagnostic tobacco cessation protocols that can address shared and unique cognitive vulnerabilities across the emotional disorders.

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Declaration of Interests

None declared.

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