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Situational fears: Association with negative affect-related smoking cognition among treatment seeking smokers

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Abstract

Despite the consistent clinically-significant relation between smoking and anxiety and its disorders, there is limited understanding of how specific fears relate to smoking processes. To isolate therapeutic targets for smoking-anxiety treatment development, there is a need to identify the underlying situational fears most related to smoking processes. Thus, the present study examined the association between interoceptive, agoraphobic, and social fears in terms of clinically significant negative affect-related smoking cognitions including negative affect reduction expectancies, coping motives, and perceived internal barriers to cessation. Participants were 469 treatment seeking smokers (48.2% female, $M_{age} = 36.59$, $SD = 13.58$) enrolled in a smoking cessation trial and completed baseline measures of smoking cognitions and situational fears. Results indicated that there was a significant effect for social fears, relative to interoceptive and agoraphobic fears, for each of the studied clinically relevant smoking variables. Overall, this study offers initial empirical evidence that social fears are significantly and consistently related to several clinically-significant types of smoking cognition.

Keywords

Smoking; Negative affect; Treatment seeking; Cognition; Situational fear; Panic

1. Introduction

Elevated anxiety symptoms and anxiety psychopathology co-occur with smoking at rates that exceed those found in non-psychiatric populations (Leventhal & Zvolensky, 2015). Reported rates of smoking are highest among individuals with panic-related problems and

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other disorders where panic attacks are particularly common (e.g., social anxiety disorder, posttraumatic stress disorder [PTSD]; Zvolensky & Bernstein, 2005). Moreover, the observed association between smoking and anxiety psychopathology is found after accounting for sociodemographic characteristics, other psychiatric comorbidities, or symptom overlap in diagnostic criteria for anxiety disorders and cigarette dependence (Piper et al., 2010). Further, studies indicate anxiety symptoms and disorders significantly impair cessation success (Tidey & Miller, 2015).

To isolate therapeutic targets for smoking-anxiety treatment development, there is a need to explore the underlying fears most related to smoking. Theory and research in anxiety suggests that specific fears and avoidance behavior are the signature of panic-related psychopathology (Brown, White, & Barlow, 2005). Additionally, fears and avoidance exist on a continuum, ranging from mild to extreme (Harb, Eng, Zaidar, & Heimberg, 2003). Although specific fears and avoidance frequently co-occur (Vervliet, Lange, & Milad, 2017), they are not perfectly coupled (Friedman, Stephens, & Thayer, 2014). For example, a person may have a fear of public situations, but may endure social situations while feeling anxious (Harb et al., 2003). In contrast, an individual may avoid a social situation to prevent feeling anxious arousal symptoms in that context (Thomas, Daruwala, Goepel, & De Los Reyes, 2012). Moreover, panic-related fears and avoidance are evident among persons with and without a panic attack history (Shin & Liberzon, 2010). Evidenced-based psychosocial therapies for anxiety psychopathology are frequently oriented on targeting specific fears and avoidance behavior (Botella et al., 2007). In fact, assessment of specific fears and avoidance behavior is used as the primary basis for exposure therapeutic activities (Abramowitz, Deacon, & Whiteside, 2012). Research suggests the core dimensions of situational panic-related fear include (a) fears of sensation-producing activities (e.g., activities, such as exercise, that produce anxious arousal symptoms such as running upstairs), (b) agoraphobia (e.g., walking alone in isolated areas, possibility of getting lost, going over a long, low bridge), and (c) fears of social situations leading to panic symptoms (e.g., giving a speech, talking to people, eating in front of others; Rapee, Craske, & Barlow, 1994). These fears are interrelated, but distinct from one another (Rapee et al., 1994).

Given the documented relation between panic-related problems among smokers (Zvolensky & Bernstein, 2005), there is theoretical and clinical utility in better understanding how situational panic-related fear is related to smoking processes. Existing research, albeit highly limited in scope, suggests that among these three fears, fear of social situations has shown the most consistent relation to smoking (Kimbrel, Morissette, Gulliver, Langdon, & Zvolensky, 2014; Morissette, Brown, Kamholz, & Gulliver, 2006). For example, although each of these three panic-related situational fears are associated with higher likelihood of being a smoker among persons with anxiety disorders, only the fear of social situations has shown to differentiate smokers from non-smokers (Morissette et al., 2006). Further, some work has found that among smokers only the fear of social situations is related to urge and craving following nicotine deprivation (Kimbrel et al., 2014). However, no previous investigations have explored any situational fear in terms of smoking-related cognition. This neglect is unfortunate, as smoking cognition, especially that focused on mood management (i.e., negative reinforcement motives and expectancies), is central to models of smoking maintenance and relapse (Brandon, Juliano, & Copeland, 1999; Kassel, Stroud, & Paronis,

2003). Indeed, elucidation of the role of situational fears in terms of smoking cognition is necessary for the development of targeted treatments for smokers with panic-related histories and fears (Zvolensky, Garey, Kauffman, & Manning, 2018). It is possible that smokers with greater situational social fears may perseverate on how they are being evaluated in public settings, increasing their internal distress and possibly their desire to smoke to manage such distress (Buckner, Farris, Schmidt, & Zvolensky, 2014).

Together, the purpose of the present investigation was to extend the limited existing work on situational fears by examining the role of interoceptive, agoraphobic, and social fears (Brown et al., 2005; Rapee et al., 1994) in terms of clinically significant negative affect-related smoking cognitions (negative affect reduction expectancies, coping motives, and perceived internal barriers to cessation; Buckner, Zvolensky, Jeffries, & Schmidt, 2014; Gregor, Zvolensky, McLeish, Bernstein, & Morissette, 2008). Based on the previously observed role of fear of social situations in predicting smoking characteristics and behavior (Kimbrel et al., 2014; Morissette et al., 2006), it was hypothesized that fear of social situations, relative to other situational fears, would be most strongly related to negative affect reduction expectancies (Brandon, 1994), coping motives (Ikard, Green, & Horn, 1969), and perceived internal barriers to cessation (Macnee & Talsma, 1995).

2. Method

2.1 Participants

Participants ($N = 469$) were adult treatment-seeking daily smokers (48.2% female, $M_{\text{age}} = 36.59$, $SD = 13.58$) enrolled in a clinical trial for smoking cessation (Schmidt, Raines, Allan, & Zvolensky, 2016). Regarding race and ethnicity, 85.3% of participants identified as White, 8.4% as Black, 3.3% as Hispanic, 1.1% as Asian, and 2.5% as “other.” Participants smoked an average of 16.6 ($SD = 9.96$) cigarettes in the week prior to beginning the study, reported an average lifetime use of 16.9 ($SD = 9.04$) cigarettes per day, and reported a moderate level of cigarette dependence (Fagerström Test for Cigarette Dependence: $M = 5.15$, $SD = 2.29$). Additionally, participants reported an average age of starting smoking of 14.9 ($SD = 3.44$), becoming a regular daily smoker at age 17.4 ($SD = 3.76$), and reported 18.3 ($SD = 13.36$) years of being a daily smoker. In terms of other substances of abuse, 32.4% of the participants endorsed problematic alcohol use according to the World Health Organization criteria (Alcohol Use Disorders Identification Test score of 8 and above; Saunders, Aasland, Babor, De la Fuente, & Grant, 1993) and 46.6% reported past-month cannabis use. Additionally, 44% of participants met criteria for at least one Axis 1 psychological disorder, as assessed by the Structured Clinical Interview- Non-Patient Version for DSM-IV (SCID-I/NP; First, Spitzer, Gibbon, & Williams, 2007). See Table 1.

3. Measures

3.1 Sample characteristics

Participants completed a demographic form assessing gender (coded: 1 = female and 0 = male), age, race/ethnicity.

3.2 Smoking history questionnaire (SHQ; Brown, Lejuez, Kahler, & Strong, 2002)

The SHQ is a self-report questionnaire used to assess smoking history (e.g., onset of regular daily smoking) and pattern (e.g., number of cigarettes consumed per day).

3.3 Structured clinical interview-non-patient version for DSM-IV (SCID-N/ P; First et al., 2007)

Diagnostic exclusions and prevalence/incidence of current (past month) Axis I diagnoses were assessed via the SCID-NP (First & Westen, 2007). The interviews were administered by trained staff and supervised by independent doctoral-level psychologists. All Interviews were audio-taped and the reliability of a random selection of approximately 12.5% of interviews were checked (MJZ) for accuracy; no cases of diagnostic coding disagreement were noted. Axis I diagnosis was coded in a binary fashion (coded: 1 = present and 0 = absent).

3.4 Medical history form (Scheftner & Endicott, 1984)

Current and lifetime medical illnesses and current use of prescribed medication were assessed using a medical history checklist (Foster, Allan, Zvolensky, & Schmidt, 2015; Schmidt et al., 2016). As in past work, for current and lifetime medical illnesses a composite variable was computed for the present study as an index of tobacco-related medical illnesses (Buckner, Langdon, Jeffries, & Zvolensky, 2016). Participants were asked about heart problems, hypertension, allergies, respiratory disease, and shortness of breath, and a dichotomous variable (1 = present and 0 = absent) was created to indicate the presence of any smoking-related health problem.

3.5 Fagerström test for cigarette dependence (FTCD; Fagerström, Russ, Yu, Yunis, & Foulds, 2012)

The FTCD is a 6-item scale that assesses gradations in tobacco dependence (e.g., “how soon after you wake up do you smoke your first cigarette;” (Fagerström et al., 2012). Scores range from 0 to 10, with higher scores reflecting high levels of physiological dependence on cigarettes. The FTCD has adequate internal consistency, positive relations with key smoking variables (e.g., saliva cotinine), and high test-retest reliability (Heatherton, Kozlowski, Frecker, & Fagerström, 1991; Pomerleau, Carton, Lutzke, Flessland, & Pomerleau, 1994). In the current study, the FTCD total score was used to characterize cigarette dependence with Cronbach’s α of 0.58, which is not uncommon for this measure (Korte, Capron, Zvolensky, & Schmidt, 2013).

3.6 Alcohol use disorders identification test (AUDIT; Saunders et al., 1993)

The AUDIT is a 10-item self-report measure developed to identify individuals with problematic drinking. Scores range from 0 to 40, with higher scores reflecting more problematic drinking. The AUDIT’s psychometric properties are well documented (Saunders et al., 1993). The AUDIT total score demonstrated good internal consistency (Cronbach’s α = 0.84).

3.7 Marijuana smoking history questionnaire (MSHQ; Bonn-Miller & Zvolensky, 2009)

The MSHQ is a self-report questionnaire used to measure respondents' cannabis use history. In the current study, the MSHQ was used to measure the past-month use of cannabis.

3.8 Albany panic and phobia questionnaire (APPQ; Rapee et al., 1994)

The APPQ is a 27-item self-report questionnaire with a 9-point Likert-type scale ranging from 0 (“no fear”) to 8 (“extreme fear”). This instrument measures fears of situations and activities often avoided by individuals. Three scales are generated from the items on the APPQ: interoceptive fears or fears of sensation-producing activities (e.g., activities, such as exercise, that produce anxious arousal symptoms such as running upstairs), agoraphobia (e.g., walking alone in isolated areas, possibility of getting lost, going over a long, low bridge), and social situational fear or fears of social phobic situations (e.g., giving a speech, talking to people, eating in front of others; 1994). The APPQ has demonstrated a good to excellent internal consistency and construct validity in past work (Brown et al., 2005). In the present study, all three subscales were employed (range of Cronbach α 's = 0.88–0.90 in the current sample).

3.9 The reasons for smoking (RFS; Ikard et al., 1969)

The RFS is a well-established 23-item self-report measure that assesses motivations for smoking. Participants rate their tendency to smoke in circumstances listed, rated on a 5-point Likert scale (1 = *never* to 5 = *always*). This questionnaire consists of six subscales including habitual (4 items; e.g., “I’ve found a cigarette in my mouth and didn’t remember putting it there”), addictive (5 items; e.g., “Between cigarettes, I get a craving that only a cigarette can satisfy”), negative affect-reduction (6 items; e.g., “I light up a cigarette when I feel angry about something”), pleasurable relaxation (2 items; e.g., “Smoking cigarettes is pleasant and relaxing”), stimulation (3 items; e.g., “I smoke cigarettes to stimulate me, to perk myself up”) and sensorimotor manipulation or “handling” (3 items; e.g., “When I smoke a cigarette, part of the enjoyment is watching the smoke as I exhale it”). The psychometric properties of the RFS are well established (De Wilde et al., 2017). The negative affect reduction subscale (RFS-NA) was used in the current study ($\alpha = 0.87$).

3.10 Smoking consequences questionnaire (SCQ; Brandon & Baker, 1991)

The SCQ is a 50-item self-report measure that assesses tobacco use outcome expectancies believed to underlie smoking motivation on a Likert-type scale, ranging from 0 (*completely unlikely*) to 9 (*completely likely*). Recent work provides evidence for a novel 35-item five-factor SCQ structure with strong validity and reliability (Garey et al., 2018). These five factors include: Negative Reinforcement/Negative Affect Reduction (NR; 12 items; e.g., “Smoking helps me deal with depression”), Long Term Negative Consequences (LTNC; 7 items; e.g., “The more I smoke, the more I risk my health”), Immediate Negative Consequences (STNC; 7 items; e.g., “Smoking irritates my mouth and throat”), Sensory Satisfaction (PR; 4 items; e.g., “I will enjoy the flavor of a cigarette”), and Appetite-Weight Control (AW; 5 items; e.g., “Smoking helps me control my weight”). In the current study, only the Negative Reinforcement/Negative Affect Reduction subscale was used (Cronbach's $\alpha = 0.87$).

3.11 Barriers to cessation scale (BCS; Macnee & Talsma, 1995)

The BCS assesses perceived barriers, or specific stressors, associated with smoking cessation (e.g., “Having strong feelings such as anger, or feeling upset when you are with other people”). The BCS is a 19-item measure on which respondents indicate, on a 4-point Likert-type scale (0 = “not a barrier” to 3 = “large barrier”), the extent to which they identify with each of the identified perceived barriers to cessation. The BCS has three lower order factors reflecting tobacco addiction stressors, such as “thinking about cigarettes all the time” (Addiction subscale); external stressors, such as “peer pressure to smoke” (External subscale); and internal stressors, such as “anxiety, irritability, or other negative affective states” (Internal subscale). Researchers report good internal consistency and good content and predictive validity of the measure and its subscales (Garey et al., 2017). In the current study, only the BCS internal subscale score was employed. This subscale demonstrated high internal consistency (Cronbach’s $\alpha = 0.90$).

4. Procedure

Participants were recruited for a randomized controlled trial examining the efficacy of two smoking cessation interventions in terms of smoking cessation (see Schmidt et al., 2016). Participants were recruited from the community via flyers, radio advertisements, free online postings, and word-of-mouth referrals. The current study is based on secondary analyses of data. Inclusion criteria for the original study included daily cigarette use (average 8 cigarettes per day for at least 1 year), between ages 18–65, and reported motivation to quit smoking of at least 5 on a 10-point scale. Exclusion criteria included: inability to give informed consent, current use of smoking cessation products or treatment, past-month suicidality, and history of psychotic-spectrum disorders. Individuals responding to study advertisements were scheduled for an in-person, baseline evaluation. All procedures were approved by the institutional review boards at the institutions conducting the research. Participants provided written informed consent prior to participation, then completed a computerized battery of baseline (pretreatment) self-report questionnaires and the SCID-I/NP.

5. Data analytic plan

Data analysis was conducted using SPSS version 24. First, descriptive and bivariate relations were examined among the variables. Then, two-step hierarchical regression models were conducted for each of the dependent variables including negative affect reduction motivations for smoking (RFS-NA), negative affect reduction expectancies from smoking (SCQ-NR), and perceived barriers to cessation (BCS-internal subscale). In the first step of the model, the following theoretically relevant covariates were entered: gender (Coded 0 = female; 1 = male; Sachs-Ericsson et al., 2009), cigarette dependence (Lerman & Berrettini, 2003), current alcohol use problems (McKee, Krishnan-Sarin, Shi, Mase, & O’Malley, 2006), history of Axis 1 psychopathology (Dimitriadis, Mamplekou, Dimitriadis, Dimitriadis, & Papageorgiou, 2016), and smoking-related health problems (Edwards, Anda, Gu, Dube, & Felitti, 2007).¹ In the second step of the model, the three subscales of APPQ were added to examine the unique variance accounted for by each of these subscales in each

of the dependent variables. Squared semi-partial correlations were used as a measure of effect size.

6. Results

6.1 Descriptive data and bi-variate correlations

Descriptive statistics and bivariate correlations are shown in Table 2. APPQ subscales were all significantly correlated with RFS-NA, SCQ-NR, and BCS-internal (r 's range from 0.13 to 0.41, p 's < 0.01). Additionally, presence of the current axis 1 psychopathology, gender (female), and higher levels of cigarette dependence were related to the criterion variables. Number of smoking-related medical illnesses and alcohol use problems were related to SCQ-NR.

6.2 Primary analyses

In terms of RFS-NA, gender, FTCD, current psychopathology, and AUDIT were significant predictors of the smoking criterion variable (Table 3). In step 2, the model was significant ($R^2 = 0.04$, $p < 0.001$). The APPQ social subscale ($B = 0.01$, $SE = 0.003$, $p < 0.001$) was the only factor significantly related to RFS-NA (see Table 3).

For SCQ-NR, gender, FTCD, current psychopathology, and AUDIT total score were significant predictors (Table 3). In step 2, the overall model was significant ($R^2 = 0.03$, $p = 0.001$) and only the APPQ social subscale ($B = 0.02$, $SE = 0.007$, $p = 0.001$) was a significant predictor (see Table 3).

For BCS-internal, gender, FTCD, current psychopathology, and the AUDIT total score were significant predictors (Table 3). In step 2, the overall model was significant ($R^2 = 0.04$, $p < 0.001$) and the APPQ social subscale ($B = 0.16$, $SE = 0.04$, $p < 0.001$) was significantly related to BCS-internal (see Table 3).

7. Discussion

Despite the consistent clinically-significant relation between smoking and anxiety and its disorders, there is limited understanding of how specific fears relate to smoking processes. To help bridge this gap in empirical knowledge, the present study examined the association between interoceptive, agoraphobic, and social fears in terms of negative affect-related smoking cognitions among treatment-seeking smokers. Consistent with prediction, there was a significant effect for social fears, relative to interoceptive and agoraphobic fears, for each of the studied clinically relevant smoking variables. Inspection of the observed effect sizes for social fears indicated that this construct explained between 2%–4% of unique variance in studied smoking criterion variables, which may have important clinical implications given the amount of variance explained in earlier levels in the model (Abelson, 1985). Further, the observed effects for social fears was not attributable to the shared variance between the studied situational fears and covariates.

¹We also re-ran the analyses including past-month use of cannabis (0=no, 1=yes) as an additional covariate. The pattern of the results stayed the same.

Although past work has reported consistent relations between social anxiety and social anxiety disorder and smoking (Buckner, Farris, et al., 2014), the current findings uniquely add to the existing empirical literature by suggesting *social fears* are related to important to affect-related smoking cognition implicated in smoking initiation maintenance and relapse. Theoretically, smokers with higher levels of fear of social situations are more likely to cope through smoking in an effort to reduce the distress caused by these situations (Buckner, Zvolensky, et al., 2014; Gehricke et al., 2007). From a behavioral perspective, the repeated pairings of these negative emotions and the emotion regulation behavior of smoking may lead to a learned expectation and subsequent motivation to reduce negative affect through smoking, as well as barriers to cessation due to overreliance on the tension reduction role of smoking in the face of social situations (Cheetham, Allen, Yucel, & Lubman, 2010). For example, a smoker who is fearful of talking to people may rely on cigarette to reduce their tension and function well in social settings. In the long term, such a smoker may also learn that smoking is effective for regulating affect across contexts. Clinically, social fears may provide a novel target for smoking cessation interventions. Decades of non-smoking research has demonstrated the clinical benefits of preparing socially anxious persons to engage in self-exposure to feared social situations (e.g., Rodebaugh, Holaway, & Heimberg, 2004). Drawing from such work, it may be clinically useful to assess and therapeutically target social fears among smokers to change maladaptive smoking cognition.

It is also important to mention that although both agoraphobic and interoceptive fear were not significant predictors of negative affect-related smoking cognition in the hierarchical model, both constructs showed significant association with the studied dependent variables at the bivariate level (r 's range: 0.12 to 0.33). Thus, it is not that these fears are not related to smoking cognition, but rather, that they do not maintain as relatively robust of an association when compared to social fears. Additionally, female gender emerged as the significant predictor of all three negative affect-related smoking cognitions, above the effects of other variables in the model. This finding, in line with the prior findings regarding the gender-based distinctions in sensitivity towards the negative impact of the smoking deprivation (Smith, Bessette, Weinberger, Sheffer, & McKee, 2016), highlights the potential need for tailored interventions among female smokers who maybe more vulnerable to negative affect reduction expectancies from smoking.

The current investigation has several limitations. First, the cross-sectional nature of the data limits causal interpretation of the findings. Thus, future longitudinal modeling is warranted to help explicate the time course and patterning of relations between situational fears and smoking cognition. For example, future work that can systematically build off these findings by testing smoking cognition as possible mediators/moderators of the relationship between situational fears and smoking cessation outcomes. Second, use of self-report measure may increase error related to common method variance. Thus, future experimental studies examining the impact of social fears on the positive effects of smoking (e.g., positive mood change) using biobehavioral measures as well as whether these cognitions predict actual in vivo smoking among those with greater social fears may be important next research steps. Second, the sample consisted of a predominantly Caucasian population which may limit the generalizability of the findings to other racial-ethnic groups. Finally, our sample consisted of community recruited, treatment-seeking daily smokers with moderate levels of cigarette

dependence. Future investigation of similar models among lighter and heavier smoking populations are warranted to ensure the generalizability of findings to those populations.

Overall, the present study adds to the growing literature indicating that social fears are significantly and consistently related to several clinically-significant types of smoking cognition. If replicated and extended to other smoking samples, these findings may suggest that social fears represent an important situational fear in need of further study in the context of smoking cognition and behavior.

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HIGHLIGHTS

- There is need in isolating therapeutic targets for smoking-anxiety treatment.
- There is need in identifying situational fears related to the smoking processes.
- Specific situational fears may include interoceptive, agoraphobic, and social fears.
- Social fears, relative to interoceptive and agoraphobic fears was significant.

Table 1

Psychopathology among the individuals with Axis I diagnosis.

Axis I diagnosis	N	%
Social phobia	48	23.1%
Generalized anxiety disorder	23	11.1%
MDD	21	10.1%
Alcohol abuse/dependence	21	10.1%
Specific Phobia	19	0.1%
Posttraumatic Stress Disorder	14	6.7%
Cannabis abuse/dependence	14	6.7%
Anxiety disorder not otherwise specified	13	6.2%
Panic disorder with/without agoraphobia	10	4.8%
Dysthymic Disorder	9	4.4%
Obsessive-compulsive disorder	5	2.4%
Depressive Disorder Not Otherwise Specified	2	1%
Cocaine dependence	2	1%
Bipolar I/II	2	1%
Non- alcohol substance dependence/poly dependence	2	1%
Agoraphobia without history of panic disorder	1	0.5%
anorexia nervosa binge eating/purging type	1	0.5%

Table 2

Bivariate correlations and descriptive statistics.

	1	2	3	4	5	6	7	8	9	10	11	Mean (SD) or %
1. Gender	1											48.2% female
2. FTCD Total	-0.009	1										5.15 (2.29)
3. Axis 1	0.157**	0.079	1									44%
4. Health problems	-0.003	-0.020	0.045	1								0.36(0.62)
5. AUDIT total	-0.104*	-0.120**	0.192**	-0.112*	1							6.21(6.00)
6. APPQ social	0.128**	0.097*	0.354**	-0.015	0.152**	1						16.50 (14.44)
7. APPQ agoraphobia	0.340**	0.141**	0.264**	0.061	0.074	0.588**	1					8.60 (10.21)
8. APPQ interoceptive	0.166**	0.213**	0.237**	0.098*	-0.058	0.407**	0.593**	1				10.22(4.11)
9. SCQ-NR	0.185**	0.181**	0.180**	-0.092*	0.157**	0.265**	0.213**	0.129**	1			5.70 (1.79)
10. RFS-NA	0.260**	0.367**	0.191**	-0.074	0.076	0.299**	0.285**	0.217**	0.714**	1		3.46 (0.81)
11. BCS-internal	0.232**	0.156**	0.202**	-0.043	0.048	0.274**	0.190**	0.330**	0.558**	0.519**	1	24.88 (11.03)

Note: FTCD - Fagerström Test for Cigarette Dependence (FTCD; Fagerström, 2011); AUDIT- Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993); APPQ - Albany Panic and Phobia Questionnaire (APPQ; Rapee et al., 1994); SCQ-NR - Smoking consequences questionnaire, negative affect reduction expectancy (SCQ; Brandon & Baker, 1991); RFS-NA - reasons for smoking, negative affect reduction (RFS; Ikard et al., 1969); BCS - Barriers to Cessation Scale (BCS; Macnee & Talsma, 1995).

*
p < 0.05

**
p < 0.01.

Table 3

Hierarchical multiple regression results. *

Step		R ² Change	b	SE	beta	t	pvalue	SI ²
SCQ-NR								
1	Constant	0.12 ***	3.532	0.334		10.577	< 0.001	
	Gender		0.660	0.159	0.185	4.138	< 0.001	0.032
	FTCD Total		0.154	0.035	0.197	4.460	< 0.001	0.037
	Axis I		0.371	0.164	0.103	2.264	0.024	0.009
	Health problems		-0.220	0.127	-0.076	-1.722	0.086	0.005
	AUDIT total		0.051	0.014	0.172	3.769	< 0.001	0.026
2	APPQ agoraphobia	0.03 **	0.002	0.011	0.014	0.215	0.830	< 0.001
	APPQ interoceptive		-0.003	0.011	-0.016	-0.289	0.773	< 0.001
	APPQ social		0.023	0.007	0.184	3.301	0.001	0.020
RFS-NA								
1	Constant	0.24 ***	2.013	0.140		14.392	< 0.001	
	Gender		0.416	0.067	0.259	6.232	< 0.001	0.064
	FTCD Total		0.133	0.014	0.378	9.182	< 0.001	0.139
	Axis I		0.157	0.069	0.097	2.289	0.023	0.008
	Health problems		-0.075	0.053	-0.057	-1.398	0.163	0.003
	AUDIT total		0.017	0.006	0.124	2.911	0.004	0.013
2	APPQ agoraphobia	0.04 ***	0.002	0.005	0.024	0.409	0.683	< 0.001
	APPQ interoceptive		0.002	0.005	0.017	0.333	0.739	< 0.001
	APPQ social		0.010	0.003	0.186	3.615	< 0.001	0.020
BCS-internal								
1	Constant	0.10 ***	0.844	0.530		1.593	0.112	
	Gender		1.160	0.253	0.207	4.585	< 0.001	0.040
	FTCD Total		0.191	0.055	0.156	3.485	0.001	0.023
	Axis I		0.840	0.260	0.149	3.232	0.001	0.020
	Health problems		-0.098	0.202	-0.021	-0.483	0.629	0.001
	AUDIT total		0.028	0.022	0.060	1.298	0.195	0.003

Step		R ² Change	b	SE	beta	t	pvalue	Sr ²
2	APPQ agoraphobia	0.06***	0.007	0.017	0.025	0.394	0.694	< 0.001
	APPQ interoceptive		0.003	0.017	0.010	0.177	0.859	< 0.001
	APPQ social		0.049	0.011	0.250	4.515	< 0.001	0.036

Note: FTCD - Fagerström Test for Cigarette Dependence (FTCD; Fagerström, 2011); AUDIT - Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993); APPQ - Albany Panic and Phobia Questionnaire (APPQ; Rapee et al., 1994); SCQ-NR - Smoking consequences questionnaire, negative affect reduction expectancy (SCQ; Brandon & Baker, 1991); RFS-NA - reasons for smoking, negative affect reduction (RFS; Ikard et al., 1969); BCS - Barriers to Cessation Scale (BCS; Macnee & Talsma, 1995).

Step 1 of each model only includes the relevant covariates (other non-significant covariates were removed from the model). Step 2 of the model includes all of the relevant covariates as well as the 3 sub-scales of Albany Panic and Phobia Questionnaire.

* p < 0.05.

** p < 0.01.

*** p < 0.001.