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Relationships between Social Anxiety and Smoking-Specific Experiential Avoidance

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Abstract

Objectives—Although social anxiety is associated with higher prevalence of smoking and lower cessation rates, little is known about the underlying mechanisms of these relationships. Research suggests that socially anxious smokers have higher levels of smoking-specific experiential avoidance and are inclined to smoke to avoid internal smoking cues. However, it is unknown which types of internal smoking cues they avoid. Thus, this study aimed to address this gap in the literature.

Methods—Participants ($N = 450$) were adult smokers from a group-based trial for smoking cessation. Bivariate correlations and hierarchical linear regression models examined relationships between baseline levels of social anxiety and acceptance of internal smoking cues—physical sensations, emotions, and cognitions.

Results—Social anxiety was associated with lower levels of acceptance of thoughts, sensations, and emotions that cue smoking. After controlling for levels of nicotine dependence, depression, generalized anxiety, and post-traumatic stress disorder (PTSD), social anxiety still explained unique variability in overall acceptance of internal smoking cues and in acceptance of physical sensations and emotions that serve as smoking cues. Social anxiety no longer explained unique variability in acceptance of thoughts that trigger smoking.

Conclusions—Smokers with high levels of social anxiety are less accepting of internal smoking cues. For physical and emotional cues, this effect was independent of level of dependence and mental health comorbidity. Results help explain why smokers with social anxiety are less likely to quit and can inform the development of targeted cessation treatments for smokers with social anxiety.

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Declaration of Interests

None of the authors have competing interests to disclose.

Keywords

social anxiety; smoking; smoking-specific experiential avoidance

INTRODUCTION

An estimated 14.3 million (36%) of the 40 million smokers in the United States (Jamal et al., 2015) have a lifetime diagnosis of social anxiety disorder (SAD) (Lasser et al., 2000). Individuals with SAD also have double the lifetime (33% vs 17%) and 12-month (27% vs 12.5%) prevalence rates of nicotine dependence compared to those without SAD (Grant et al., 2005) and are significantly less likely to be abstinent 6 months after treatment than individuals without an anxiety disorder (28.6% vs. 36%) (Piper, Cook, Schlam, Jorenby, & Baker, 2011).

Despite the importance of this subgroup of smokers, they have historically been neglected in the treatment literature. In order to inform targeted treatments for smokers with social anxiety, research has begun to examine the mechanisms underlying the smoking-social anxiety relationship and determine the unique barriers to quitting faced by socially anxious smokers. For example, smokers with social anxiety who smoke cigarettes to cope with their social anxiety symptoms and negative affectivity (i.e., negative affect reduction motives) may be particularly vulnerable to continued smoking and relapse (Buckner, Heimberg, Ecker, & Vinci, 2013; Buckner, Zvolensky, Jeffries, & Schmidt, 2014; Morissette, Tull, Gulliver, Kamholz, & Zimering, 2007; Watson, VanderVeen, Cohen, DeMarree, & Morrell, 2012).

Relatedly, there is also evidence suggesting that social anxiety is associated with smoking-specific experiential avoidance (Buckner, Farris, Schmidt, & Zvolensky, 2014)—which is the tendency to avoid or be unwilling to experience aversive internal stimuli associated with smoking (e.g., thoughts, feelings, and physical sensations). That is, smokers with high smoking-specific experiential avoidance have a proclivity to avoid these internal states by smoking. Because smoking-specific experiential avoidance is associated with continued smoking and poorer cessation outcomes (J. B. Bricker, Bush, Zbikowski, Mercer, & Heffner, 2014; Gifford et al., 2004; Minami, Bloom, Reed, Hayes, & Brown, 2015; Morissette et al., 2007), further exploring these relationships may provide insight into modifiable mechanisms linking social anxiety to difficulty quitting. Specifically, internal smoking cues can be divided into three categories: physical sensations (e.g., urges, withdrawal symptoms), feelings (e.g., distress, dysphoria), or thoughts (e.g., “I need a cigarette right now”). However, no studies have explored whether smokers with social anxiety are more avoidant of all types of internal smoking triggers or just a subset, such as affective triggers—an important consideration for developing interventions for socially anxious smokers. Accordingly, the current study aimed to not only replicate the previous finding that social anxiety is associated with less acceptance of internal smoking cues overall (Buckner, Farris, et al., 2014), but also to determine if social anxiety is related to avoiding specific types of internal cues. Finally, we sought to determine whether these relationships remain after

controlling for other predictors of poor cessation outcomes such as nicotine dependence and other mental health symptoms.

METHODS

Participants

Participants ($N = 450$) were adult smokers from a randomized controlled trial of group-delivered smoking cessation treatment designed for the general population of smokers. Eligibility criteria included: (1) aged 18 and older; (2) smoke at least 10 cigarettes per day; (3) want to quit smoking within 30 days; (4) able to speak and read in English; (5) enrolled as a member of Group Health, a large healthcare organization based in Seattle, and living in western Washington; (6) not currently participating in other smoking interventions; (7) not currently using other nicotine products (e.g., smokeless tobacco); (8) willing to attend five 90-minute group sessions and receive nicotine replacement therapy; (9) no medical contraindications for nicotine replacement therapy use (i.e., pregnant, breastfeeding, recent heart attack); (10) no significant cognitive or physical impairment that would preclude full participation. The current study is a secondary analysis of cross-sectional, pre-randomization data collected at baseline.

There was a complete discussion of the study with potential participants and written informed consent was obtained after this discussion. All study procedures were reviewed and approved by the Institutional Review Boards of Fred Hutchinson Cancer Research Center and Group Health Research Institute.

Measures

The Mini-Social Phobia Inventory (Mini-SPIN) (Connor, Kobak, Churchill, Katzelnick, & Davidson, 2001), a 3-item screening tool for social anxiety disorder, was administered as part of the baseline survey. Responses for each item are rated on a 5-point scale, where 0 = “not at all” and 4 = “extremely,” with higher scores indicating higher levels of social anxiety symptoms. We assessed social anxiety continuously because data indicate that social anxiety is a continuous construct (Merikangas, Avenevoli, Acharyya, Zhang, & Angst, 2002; Rapee & Spence, 2004; Ruscio, 2010) and because individuals with elevated or subthreshold levels of social anxiety are also at risk for smoking (Sonntag, Wittchen, Hofler, Kessler, & Stein, 2000) and often report smoking to cope with symptoms of social anxiety (Watson et al., 2012).

A modified version of the Avoidance and Inflexibility Scale (AIS) (Gifford et al., 2004) was administered to measure smoking-specific experiential avoidance. The original scale was modified to improve comprehensibility. The modified version of this scale has 27 items and three subscales: (1) physical sensations (9 items), (2) thoughts (9 items), and (3) emotions (9 items) that trigger smoking. Responses for each item range from 1 (*not at all willing*) to 5 (*very willing*). Higher scores represent a greater willingness to experience (rather than avoidance of) these smoking cues without acting upon them. The psychometric properties of the modified AIS were established in our prior work (Bricker, Wyszynski, Comstock, & Heffner, 2013).

Covariates—All covariates were assessed with commonly used, validated self-report measures. Covariates included levels of nicotine dependence (Fagerström Test for Nicotine Dependence; FTND) (Heatherton, Kozlowski, Frecker, & Fagerström, 1991), depression (Center for Epidemiologic Studies-Depression; CES-D) (Radloff, 1977), generalized anxiety (Generalized Anxiety Disorder 7-item Scale; GAD-7) (Spitzer, Kroenke, Williams, & Lowe, 2006), and post-traumatic stress (Abbreviated PTSD Checklist; PCL-6) (Lang et al., 2012). All covariates were assessed continuously.

Analysis

To examine the baseline relationships between social anxiety and smoking-specific experiential avoidance, we conducted bivariate correlations with the four AIS scores (total, physical, thoughts, and emotions). To determine if social anxiety remained associated with AIS scores after controlling for relevant covariates, we conducted hierarchical linear regression models for each AIS score. To ensure that the effects of social anxiety are not attributable to the covariates, covariates were entered in Step 1 and Mini-SPIN scores were entered in Step 2 (Cohen, Cohen, West, & Aiken, 2003).

RESULTS

Demographic characteristics and baseline descriptive statistics can be found in Table 1. Bivariate correlations between social anxiety and each of the AIS scores as well as results from the hierarchical linear regression models are shown in Table 2.

With Pearson correlations ranging from $-.164$ to $-.249$, social anxiety was significantly associated with all four AIS scale scores ($p < .001$). After controlling for levels of nicotine dependence, depression, generalized anxiety, and PTSD, social anxiety still explained unique variability in overall smoking-specific experiential avoidance ($R^2 = .01, p < .05$). Social anxiety also explained unique variability in experiential avoidance of physical sensations ($R^2 = .013, p < .05$) and emotions ($R^2 = .012, p < .05$) that serve as smoking cues, such that higher levels of social anxiety were associated with more avoidance of these internal smoking cues. However, social anxiety no longer significantly explained unique variability in experiential avoidance of thoughts that trigger smoking ($p > .05$).

DISCUSSION

This study sought to develop a more thorough understanding of the relationship between social anxiety and smoking-specific experiential avoidance—the proclivity to inflexibly respond to aversive internal stimuli via smoking. Results are in line with previous findings that social anxiety is associated with greater levels of smoking-specific experiential avoidance (Buckner, Farris, et al., 2014), but also extend these findings by demonstrating that the relationship between social anxiety and avoidance of internal smoking cues is observed across multiple domains of cues—physical, emotional, and cognitive. With the exception of cognitive cues, these relations remain after controlling for level of nicotine dependence and other mental health.

Findings from the unadjusted models have important implications for developing treatments for smokers with social anxiety. For example, smokers with social anxiety may be well-suited to smoking cessation treatments that cultivate greater acceptance of these internal experiences (e.g., programs based on acceptance and commitment therapy) as there is evidence that individuals who have low levels of acceptance (greater avoidance) of internal smoking cues demonstrate significantly greater quit rates in acceptance and commitment therapy-based cessation programs compared to programs based in cognitive-behavior therapy (Bricker et al., 2014). Additionally, socially anxious smokers may benefit from targeted programs that focus on developing more adaptive ways to cope with all types of internal triggers, perhaps prioritizing physical and emotional triggers (e.g., incorporating strategies for developing more adaptive ways to respond to cravings and manage symptoms of social anxiety).

Findings from the multivariate models contribute to our understanding of the mechanisms underlying the relationship between social anxiety and smoking and may help explain why smokers with social anxiety are less likely to successfully quit smoking. Specifically, the finding that social anxiety remained a significant predictor of smoking in response physical and emotional cues after controlling for dependence and other mental health symptoms indicates that there is likely something unique about social anxiety contributing to these relationships. Greater experiential avoidance of internal cues to smoke—especially physical sensations and emotions—is in line with previous work and appears to be particularly important for this subgroup of smokers. Regarding avoidance of physical cues, smokers with high levels of social anxiety experience particularly high levels of craving (a physical trigger) during abstinence relative to their less socially anxious counterparts (Kimbrel, Morissette, Gulliver, Langdon, & Zvolensky, 2014; Watson et al., 2012) and individuals with other anxiety disorders (Kimbrel et al., 2014). And, regarding avoidance of emotions that trigger smoking (e.g., acute experiences of social anxiety, negative affect), socially anxious smokers often report smoking to cope with symptoms of social anxiety (Watson et al., 2012) and negative affect (Buckner, Farris, et al., 2014; Buckner, Zvolensky, et al., 2014). Finally, although socially anxious smokers may smoke to avoid thoughts that trigger smoking, this may not be unique to social anxiety as social anxiety was no longer a significant predictor in the multivariate model for AIS-cognitions.

Findings from this study should be considered in light of a few limitations. First, participants in this study were smokers who were motivated to quit and volunteered for a group-based smoking cessation intervention. Relative to the general population of smokers, treatment-seeking smokers may report lower avoidance of internal smoking cues and report being more willing to experience these triggers as a part of treatment or the quitting process. Thus, we do not know if these findings would generalize to the larger population of smokers, as the relationship between social anxiety and acceptance of internal smoking cues may be stronger in among smokers who are not attempting to quit. Second, this study did not assess the extent to which participants inflexibly smoke in order to specifically avoid symptoms of social anxiety. It is possible that these relationships would be stronger if we specifically assessed acceptance of symptoms of social anxiety that serve as cues to smoke rather than acceptance of internal smoking cues more broadly. Finally, given their willingness to participate in a group-based treatment, it is also possible that the smokers in this sample

have less social anxiety symptomatology compared to the general population of smokers. To further our understanding of these relationships, future research should address these limitations.

In conclusion, this study adds to the growing body of research aimed at developing a better understanding of the relationship between smoking and social anxiety and can inform the development of targeted treatments for smokers with social anxiety. For example, it may be particularly helpful to better understand the unique physical sensations and emotions they avoid and subsequently focus on increasing their willingness to experience these internal cues to smoke without acting upon them.

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Table 1

Baseline Characteristics

Variable	<i>M (SD) or n (%)</i>
Age	53.1 (12.1)
Female	237 (53%)
Race/Ethnicity	
Caucasian	369 (83%)
African American	29 (6%)
More than one race	30 (7%)
Hispanic	17 (4%)
Married	246 (56%)
Employed	326 (72%)
Greater than high school education	349 (78%)
Nicotine Dependence (FTND)	4.85 (1.99)
Smoke < 1 pack per day	337 (75%)
Smoking for 10 years	395 (88%)
Social Anxiety (Mini-SPIN)	2.86 (2.63)
Depression (CES-D)	11.91 (9.19)
PTS symptoms (PCL-6)	11.09 (4.31)
Generalized Anxiety (GAD-7)	4.07 (4.14)

Note. FTND = Fagerström Test for Nicotine Dependence; Mini-SPIN = Mini-Social Phobia Inventory; CES-D = Center for Epidemiologic Studies-Depression; PCL-6 = Abbreviated PTSD Checklist; GAD-7 = Generalized Anxiety Disorder 7-item Scale.

Table 2

Bivariate Correlations and Hierarchical Linear Regressions of Social Anxiety Predicting AIS Scores

Bivariate Correlations with Mini-SPIN	<i>r</i>	<i>p</i>		
AIS-total	-.249	<.001		
AIS-sensations	-.164	.001		
AIS-emotions	-.244	<.001		
AIS-thoughts	-.197	<.001		
Hierarchical Linear Regression Models				
Variable and regression step	R^2	β	<i>t</i>	<i>p</i>
<u>DV: AIS-Total</u>				
Step 1	.092			<.001
FTND		-.117	-2.522	.012
CES-D		-.039	-.499	.618
PCL-6		-.187	-2.574	.010
GAD-7		-.068	-.909	.364
Step 2	.013			<.001
Social Anxiety		-.138	-2.532	.012
<u>DV: AIS-Sensations</u>				
Step 1	.034			.005
FTND		-.105	.2197	.029
CES-D		.038	.480	.632
PCL-6		-.177	-2.537	.019
GAD-7		.003	.035	.972
Step 2	.010			.002
Social Anxiety		-.118	-2.090	.037
<u>DV: AIS-Emotions</u>				
Step 1	.088			<.001
FTND		-.056	-1.213	.226
CES-D		-.065	-.839	.402
PCL-6		-.123	-1.692	.091
GAD-7		-.126	-1.664	.097
Step 2	.012			<.001
Social Anxiety		-.133	-2.435	.015
<u>DV: AIS-Cognitions</u>				
Step 1	.082			<.001
FTND		-.122	-2.619	.009
CES-D		-.074	-.944	.346
PCL-6		-.151	-2.070	.039
GAD-7		-.047	-.618	.537
Step 2	.005			<.001

Bivariate Correlations with Mini-SPIN	<i>r</i>	<i>p</i>		
Social Anxiety		-.082	-1.484	.138

Note. *FTND* = Mini-SPIN = Mini-Social Phobia Inventory; *AIS* = modified version of the Avoidance and Inflexibility Scale; Fagerström Test for Nicotine Dependence;; *CES-D* = Center for Epidemiologic Studies-Depression; *PCL-6* = Abbreviated PTSD Checklist; *GAD-7* = Generalized Anxiety Disorder 7-item Scale.