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Smoking and Social Anxiety: The Roles of Gender and Smoking Motives

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Abstract

Although social anxiety appears to be a risk factor for smoking and nicotine dependence, little work has identified factors that may play a role in these relationships. The current study examined the role of gender and smoking motives in these relationships among 945 (73.0% female) undergraduates, 91 of whom were current daily smokers. Among women, social anxiety was related to daily smoking status, whereas it was related to dependence severity among men. After controlling for past-week smoking frequency, social anxiety was related to affiliative attachment and behavioral choice-melioration smoking motives. Both motives mediated the relationship between social anxiety and nicotine dependence severity, although affiliative attachment motives uniquely mediated this relationship. Results suggest that socially anxious individuals who view cigarettes as having some of the same characteristics as social interactions may be particularly vulnerable to more severe nicotine dependence. Results also highlight the importance of considering gender in the relationships between social anxiety and smoking behaviors.

Keywords

smoking; nicotine dependence; social anxiety; social phobia; gender; motives

1. Introduction

Social anxiety is related to nicotine dependence (Sonntag, Wittchen, Höfler, Kessler, & Stein, 2000) and smokers with social anxiety disorder (SAD) are more vulnerable to nicotine dependence, heavy smoking, and unsuccessful quit attempts relative to those without SAD after controlling for anxiety disorders, depression, and other substance use disorders (Cogle, Zvolensky, Fitch, & Sachs-Ericsson, 2010). Further, among smoking cessation patients, those with SAD report more severe nicotine dependence (Piper, Cook, Schlam, Jorenby, & Baker, 2011). Importantly, social anxiety may be unique among the anxiety

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Contributors

Author Buckner designed the current study and conducted statistical analyses. Authors Buckner and Vinci contributed to and have approved the final manuscript.

Conflict of Interest

Both authors declare that they have no conflicts of interest.

disorders as a risk factor for smoking and/or nicotine dependence given that SAD tends to onset prior to smoking, whereas smoking tends to onset prior to other anxiety disorders (Cougle et al., 2010).

Despite mounting evidence of a robust and potentially unique link between social anxiety and smoking, there are several gaps in this literature. First, it is unclear why socially anxious individuals are at risk for smoking and nicotine dependence. Identification of cognitive vulnerability factors could inform treatment and prevention efforts. Given that smoking increases during periods of negative affect (e.g., Conklin & Perkins, 2005; Vinci, Copeland, & Carrigan, 2012), people with chronically elevated negative affect (e.g., socially anxious persons) could be vulnerable to smoking more often and thus, developing dependence. In partial support of this hypothesis, social anxiety is related to smoking to cope in social situations (i.e., situations in which socially anxious people tend to experience elevated negative affect) (Watson, VanderVeen, Cohen, DeMarree, & Morrell, 2012).

Yet, there may be other reasons that socially anxious smokers are vulnerable to dependence. They may smoke for affiliative attachment motives (viewing cigarettes as a friend and as having some of the same characteristics as social stimuli; Piper et al., 2004) to fill the void left by social avoidance. Socially anxious individuals may also use cigarettes because they find the effects of smoking more reinforcing than other stimuli (e.g., social interactions) (i.e., for behavioral choice-melioration motives). They may also smoke to control their weight, given social anxiety's link to body dissatisfaction (e.g., Rodgers, Salès, & Chabrol, 2010).

A second limitation to understanding of the smoking-social anxiety relationship is that prior work has paid little attention to gender. Although we know of no studies of the impact of gender on the smoking-social anxiety relationship, women with strong expectations that smoking will decrease negative affect smoke more and smoke more intensely than men (Wainberge & McKee, 2012). Further, compared to men, women smokers reported greater craving and negative affect in response to a negative mood induction (Saladin et al., 2012). Thus, socially anxious women may be especially vulnerable to smoking and nicotine dependence.

The present study sought to elucidate the smoking-social anxiety relationship in several ways. First, we tested our hypothesis that social anxiety would be more strongly related to smoking variables among women. Second, we tested our hypothesis that social anxiety would be related to negative reinforcement, positive reinforcement, affiliative attachment, behavioral choice-melioration, and weight control motives. Third, we tested whether relevant motives would mediate the smoking-social anxiety relationship. These hypotheses were tested among college students given that young adults have the highest rates of current tobacco use (Substance Abuse and Mental Health Services Administration [SAMHSA], 2011).

2. Method

2.1 Participants and Procedures

Participants were recruited through the psychology undergraduate participant pool from September-November 2011 for a study of individual difference variables related to substance use (Buckner, Ecker, & Welch, 2013). They completed measures on [surveymonkey.com](http://www.surveymonkey.com) and informed consent was obtained prior to data collection. Upon completion of the survey, participants received research credit and referrals for university-affiliated outpatient substance use and behavioral health clinics.

Of the 969 participants that began the survey, 2.5% were deemed ineligible due to being under 18 years old ($n=2$), incomplete responses ($n=18$), and questionable validity ($n=4$; detailed below). The final sample consisted of 945 (73.0% female) participants aged 18–67 ($M=19.8$, $SD=2.7$). The majority (95.6%) was non-Hispanic/Latino and the racial composition was: 9.5% African American/Black, 0.4% Native American, 3.1% Asian American, 82.6% Caucasian/White, 2.8% “mixed”, and 1.6% “other”. Lifetime smoking was endorsed by 369 (39%) with 168 (17.8%) smoking in the past three months and 91 (52.6%) reporting current (past-week) daily smoking. Daily smokers reported smoking 1–25 cigarettes per day in the past week ($M=5.5$, $SD=5.8$) and 52 (57.1%) were female.

2.2 Measures

2.2.1 Smoking—Participants reported whether they ever smoked a cigarette and if so, if they smoked a cigarette in the past three months. Past three-month smokers then completed the following measures: the *Smoking History Questionnaire* (SHQ; Brown, Lejuez, Kahler, & Strong, 2002) assessed typical daily smoking in the past week. The *Fagerström Test for Nicotine Dependence* (FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991), a 6-item self-report questionnaire with good psychometric properties, measured severity of nicotine dependence (Heatherton et al., 1991). Internal consistency (α) among daily smokers in our sample was .70. The 68-item *Wisconsin Inventory of Smoking Dependence Motives-68* (WISDM-68; Piper et al., 2004) assessed smoking motives. The subscales used in the current study demonstrated adequate internal consistency among current daily smokers: Affiliative Attachment ($\alpha=.93$), Behavior Choice-melioration ($\alpha=.94$), Negative Reinforcement ($\alpha=.90$), Positive Reinforcement ($\alpha=.87$), and Weight Control ($\alpha=.92$).

2.2.2 Social Anxiety—Social anxiety was assessed continuously with the *Social Interaction Anxiety and Social Phobia Scales* (Mattick & Clarke, 1998). The measures demonstrate good internal consistency and test-retest reliability across clinical, community, and student samples (e.g., Osman, Gutierrez, Barrios, Kopper, & Chiro, 1998). In the present study, the scales demonstrated adequate internal consistency among all participants ($\alpha=.96$) and among daily smokers ($\alpha=.97$).

2.2.3 Infrequency Scale—To identify responders who provided random or invalid responses, we included four questions from the *Infrequency Scale* (Chapman & Chapman, 1983). As in similar studies (e.g., Buckner, Ecker, & Cohen, 2010), those who endorsed three or more infrequency items were excluded ($n=4$).

3. Results

3.1 Smoking Status and Social Anxiety

Logistic regression analyses indicated that social anxiety was not significantly related to ever smoking among all participants, $OR=1.00$, 95% $CI=.99-1.00$, $p=.763$, or to smoking at all in the past three months among lifetime smokers, $OR=1.00$, 95% $CI=.99-1.01$, $p=.694$. Gender did not moderate the relationship of social anxiety to ever, $OR=1.00$, 95% $CI=.99-1.01$, $p=.774$, or past 3-month, $OR=0.99$, 95% $CI=.97-1.01$, $p=.223$, smoking status.

Social anxiety was related to past-week daily smoking among past 3-month smokers, $OR=1.02$, 95% $CI=1.01-1.04$, $p=.001$. Gender did not moderate this relationship, $OR=1.02$, 95% $CI=.99-1.04$, $p=.282$. However, among women, social anxiety was significantly related to daily smoking status, $OR=1.03$, 95% $CI=1.01-1.05$, $p=.003$. This was not the case for men, $OR=1.01$, 95% $CI=.99-1.03$, $p=.216$.

3.2 Severity of Nicotine Dependence and Social Anxiety

A hierarchical linear regression was conducted to examine whether social anxiety was related to severity of nicotine dependence among daily smokers after accounting for the variance attributable to smoking frequency. This model was significant, $\Delta F(1, 87)=6.60$, $\Delta p=.012$, $\Delta R^2=.033$. Gender moderated this relationship, $\Delta F(1, 85)=8.54$, $\Delta p=.004$, $\Delta R^2=.038$. Post-hoc probing (per Holmbeck, 2002) indicated that among men, social anxiety was significantly, positively related to severity of dependence, $\beta=.47$, $p<.001$. Among women, social anxiety was unrelated to dependence severity, $\beta=.06$, $p=.485$.

3.3 Social Anxiety and Smoking Motives

Controlling for smoking frequency, partial correlations between social anxiety and smoking motives among daily smokers were as follows: affiliative attachment, $pr=.28$, $p=.009$, behavioral choice-melioration, $pr=.35$, $p=.001$, weight control, $pr=.20$, $p=.061$, positive reinforcement, $pr=.18$, $p=.084$, and negative reinforcement, $pr=.14$, $p=.194$. Among women, social anxiety was significantly correlated only with behavioral choice-melioration ($pr=.32$, $p=.027$). Among men, social anxiety was significantly correlated with affiliative attachment ($pr=.47$, $p=.003$), behavioral choice-melioration ($pr=.45$, $p=.005$), and weight control motives ($pr=.32$, $p=.049$).

3.4 Impact of Smoking Motives on Social Anxiety's Links to Nicotine Dependence

We tested whether motives significantly related to social anxiety mediated the relationship between dependence severity and social anxiety among daily smokers (controlling for smoking frequency) using maximum likelihood bootstrapping (5,000 samples were drawn) within the structural equation modeling program AMOS 20 (Arbuckle, 2011). Estimated standard errors and confidence intervals (90%) were calculated for all indirect, direct, and total effects. Three fully mediated models were tested (Figure 1): the mediational effects of affiliative attachment (Model A), behavioral choice-melioration (Model B), and the two proposed mediators simultaneously (Model C). In Model C, the motives' error terms were co-varied. For each model, three measures of model fit were calculated; χ^2 , CFI, and SRMR. A non-significant χ^2 indicates good model fit; however, χ^2 is sensitive to sample size. A CFI value of .95 or higher and an SRMR value of .08 or lower are indicative of good model fit (Hu & Bentler, 1999). Using these criteria, Models A, B, and C demonstrated acceptable fit. Standardized path estimates are reported for each model (Figure 1). When these two mediators were combined in Model C, only affiliative attachment motives demonstrated a direct effect on severity of nicotine dependence (Figure 1). These results suggest that the primary mediational effect is via affiliative attachment motives.

4. Discussion

This study contributes to our understanding of the relationship between social anxiety and smoking in several ways. First, social anxiety was related to daily smoking among current smokers but not to ever smoking or to current (past-three months) smoking. Second, social anxiety was related to more severe nicotine dependence among daily smokers. Third, this study is one of the very few to identify cognitive vulnerability factors related to severity of nicotine dependence among socially anxious smokers. Specifically, social anxiety was significantly correlated with affiliative attachment and behavioral choice-melioration among daily smokers even after controlling for smoking frequency. Importantly, these motives mediated the relationship of social anxiety to nicotine dependence severity. Fourth, results highlight the importance of examining gender in the relationships between smoking behaviors and social anxiety.

It is noteworthy that the affiliative attachment motive uniquely mediated the relationship between social anxiety and nicotine dependence severity. Conceptualizing cigarettes as a “friend” and as having some of the same characteristics as social interactions may help socially anxious smokers cope with feelings of loneliness or social rejection. Interestingly, affiliative attachment motives predicted depressive symptoms (above and beyond positive and negative reinforcement motives) (Vinci et al., 2012). Given that depressed persons also experience loneliness (Lasgaard, Goossens, & Elklit, 2011), these findings, when considered in light of our mediational results, suggest that lonely young adults may be at particular risk for relying on cigarettes to fill their social void. Future work is necessary to test whether loneliness accounts for these relationships. Further, clinicians may consider assessing and targeting loneliness as well as affiliative attachments motives during smoking cessation treatment, especially amongst socially anxious smokers.

In line with prior work finding behavioral choice melioration to be particularly strongly correlated with more severe nicotine dependence (Piper et al., 2004), we found that this motive also mediated the relationship between social anxiety and nicotine dependence. This suggests that socially anxious smokers may derive greater satisfaction from smoking than they do from other reinforcers which seems to play an important role in their experience of nicotine dependence. Socially anxious smokers seeking smoking cessation treatment may therefore benefit from techniques to help them value other reinforcers.

Although social anxiety was related to daily smoking status among women (but not men), it was related to severity of nicotine dependence among men (but not women). These differences may be due, at least in part, to observed differences in smoking motives. Women reported smoking for behavioral choice melioration whereas men also reported smoking affiliative attachment motives (which uniquely mediated the dependence-social anxiety relation). Future work with larger samples will be an important next step in determining whether differences in smoking motives accounts for gender differences in smoking frequency and dependence severity.

This study should be considered in light of limitations. First, the sample was comprised of undergraduates. Second, the cross-sectional design limits our ability to test causal relations. Third, diagnostic status was not assessed and future work is necessary to ascertain whether findings generalize to clinical populations. Fourth, for the most part, our daily smokers were relatively light smokers. Despite these, this study provides novel insight into cognitive vulnerability factors related to smoking dependence among socially anxious smokers.

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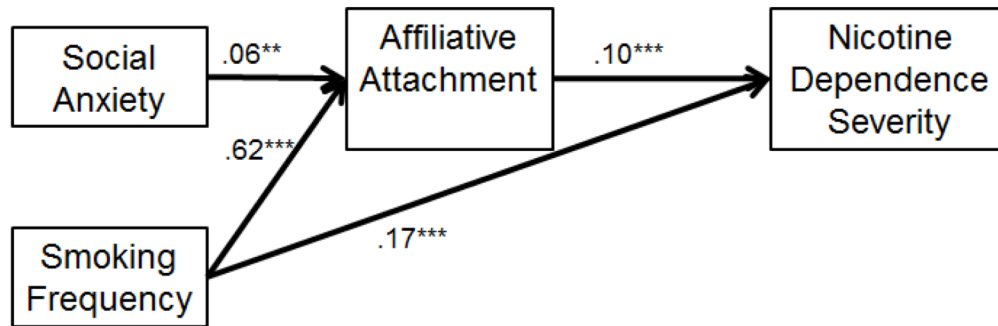
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Highlights

- Social anxiety was related to daily smoking among women.
- Social anxiety was related to severity of nicotine dependence among men.
- Social anxiety was related to theoretically relevant smoking motives.
- Affiliative attachment motives played a unique mediational role.

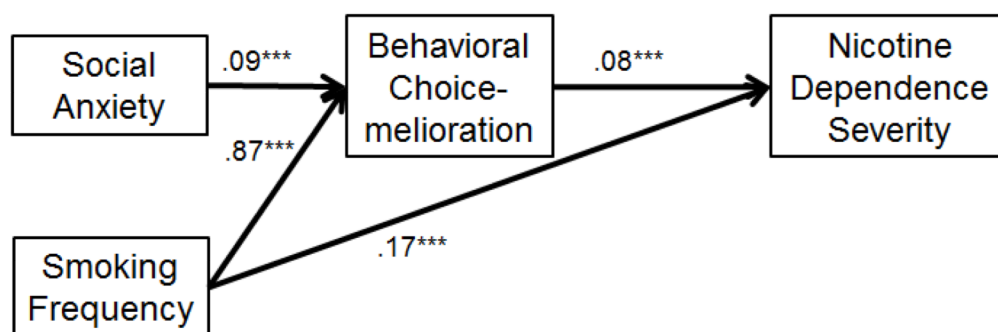
Model A

$\chi^2 (2) = 3.51, p > .05, CFI = 0.99, SRMR = 0.04$



Model B

$\chi^2 (2) = 2.77, p > .05, CFI = 1.00, SRMR = 0.04$



Model C

$\chi^2 (2) = 2.95, p > .05, CFI = 1.00, SRMR = 0.04$

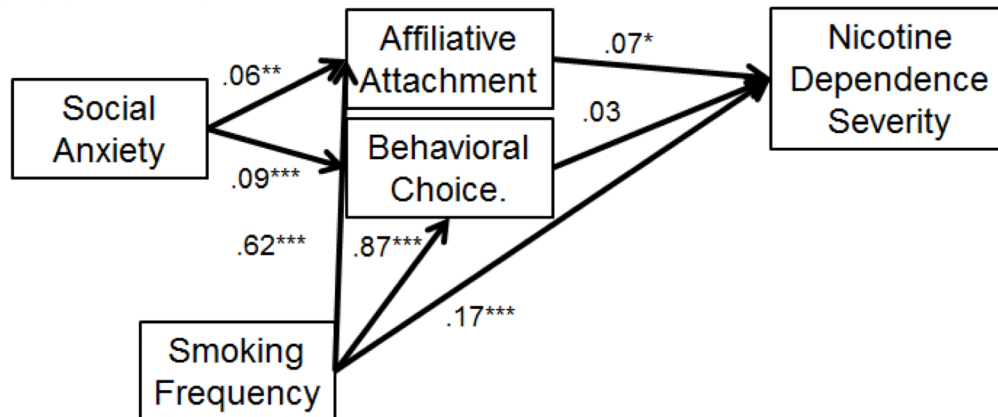


Figure 1. Standardized direct effects and fit statistics for mediational models for Affiliative Attachment Motives (Model A), Behavioral Choice-melioration Motives (Model B), and Affiliative Attachment and Behavioral Choice-melioration Motives combined (Model C) among Daily Smokers.
 * $p < .06$, ** $p < .01$, *** $p < .001$