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Emotional Disorders and Smoking: Relations to Quit Attempts and Cessation Strategies among Treatment-seeking Smokers

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Abstract

The cross-sectional associations between lifetime emotional disorder status (anxiety/depressive disorders) among smokers in relation to historical quit processes were examined. Adult treatment-seeking daily cigarette smokers (n=472) received structured psychiatric interviews and completed a survey that included in-depth questions on cessation history. Having a lifetime emotional disorder was significantly associated with greater number of quit prior attempts and cessation strategies used, including increased use of both non-pharmacological and pharmacological quit methods. These smokers may still require complimentary specialty care to address their specific affective vulnerabilities given that their use of commonly-applied strategies did not result in lifetime abstinence.

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Contributors

Drs. Zvolensky and Schmidt designed the study and wrote the protocol. Drs. Zvolensky, Leventhal, and Ms. Farris conducted literature searches and provided summaries of previous research studies. Ms. Farris conducted the statistical analysis. Drs. Zvolensky and Ms. Farris wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of Interest

Dr. Zvolensky, Ms. Farris, Dr. Leventhal, Dr. Ditte, and Dr. Schmidt declare that they have no conflict of interest.

Keywords

anxiety; depressive disorders; smoking; cigarettes; cessation; quit attempt

1. Introduction

There is now broad-based recognition employing representative and clinical samples that smokers are more likely to have a psychiatric disorder than are non-smokers, and individuals with a psychiatric disorder are significantly more likely to smoke compared to persons without a psychiatric disorder (CDCP, 2013). Additionally, smokers with psychiatric symptoms and conditions consume a disproportionately higher number of cigarettes in the overall population relative to their prevalence (Lasser et al., 2000). Among the various psychiatric disorders implicated in smoking, depressive and anxiety syndromes (i.e., emotional disorders) are particularly important to study because they are highly prevalent in the general population and remarkably comorbid with smoking (Grant, Hasin, Chou, Stinson, & Dawson, 2004; Hughes, 2011). Smoking incidence and maintenance generalizes across various emotional disorders, including major depression (Leventhal et al., 2012), dysthymia and minor depression (Weinberger & McKee, 2012), posttraumatic stress disorder (Zvolensky et al., 2008), and other anxiety disorders including panic disorder, social anxiety disorder, and generalized anxiety disorder (Piper, Cook, Schlam, Jorenby, & Baker, 2011). There is also robust empirical evidence that elevated depressive and anxiety symptoms and emotional disorders increase risk of smoking experimentation (Leventhal, Ray, Rhee, & Unger, 2011), progression to daily smoking (Audrain-McGovern, Rodriguez, Rodgers, & Cuevas, 2011), development of nicotine dependence (McKenzie, Olsson, Jorm, Romaniuk, & Patton, 2010), and contribute to maladaptive cognitive-emotional reactions to tobacco (Brandon, Tiffany, Obremski, & Baker, 1990; Peasley-Miklus, McLeish, Schmidt, & Zvolensky, 2012). Moreover, daily smoking prospectively increases the risk for developing clinically significant depressive (Khaled et al., 2012) and anxiety symptoms (Johnson et al., 2000) and can exacerbate the severity of such symptoms (Zvolensky, Lejuez, Kahler, & Brown, 2004).

Although there are well-documented clinically significant bi-directional associations between emotional disorders and smoking, there is presently little known about how smokers with emotional disorders compared to smokers without such disorder *approach* quitting. Given that smokers with emotional disorders generally experience more cessation failure (Hitsman et al., 2013; Piper et al., 2011; Zvolensky et al., 2008) and greater nicotine withdrawal (Leventhal, Ramsey, Brown, LaChance, & Kahler, 2008), these smokers may be more likely to try to quit smoking and use more strategies in such efforts to quit, possibly because they anticipate greater difficulty abstaining from tobacco. For example, they may suffer from greater negative effects of smoking (psychological and physical) because they are more apt to be 'reactive' to aversive internal sensations and experiences (Leventhal & Zvolensky, in press). However, there has been limited systematic investigation of the quitting histories of smokers with emotional disorders. Understanding the number and types of cessation attempts and strategies used among smokers with emotional disorders might provide clinically-useful information that could guide smoking cessation practice for this

population. Furthermore, given some evidence that successful sustained abstinence following a quit attempt is associated with lower emotional symptom levels (e.g., Kahler, Spillane, Busch, & Leventhal, 2011), advancing knowledge of cessation among smokers with a history of emotional disorder could down-the-line enhance remission or relapse prevention of emotional disorders.

With this background, the primary aims of the current study were to examine cross-sectional relations between lifetime emotional disorders among treatment-seeking smokers in relation to (1) number of lifetime quit attempts, (2) number of strategies used to quit, including (3) number of nonpharmacological methods (e.g., behavior modification, gradual reduction, quitting with friends), as well as (4) number of pharmacological methods used (e.g., nicotine replacement strategies, varenicline). It was hypothesized that smokers with a lifetime history of emotional disorder(s) compared to those without such a history would be more apt to have made more quit attempts, and tried more strategies to help them quit, including both more non-pharmacological and pharmacological methods.

2. Material and methods

2.1. Participants

Participants ($n = 472$) were adult treatment-seeking daily cigarette smokers ($M_{age} = 36.6$, $SD = 13.60$; 48.3% female). Participants primarily identified as White (85.6%), while fewer identified as African-American (8.3%), Hispanic (2.5%), Asian (1.1%), and other (2.5%). Participants were generally well-educated (73.9% indicated completing at least part of college) and the majority of the sample reported their relationship status as never married (44.1%) or married/cohabitating (33.3%). The current study is based on secondary analyses of baseline (pre-treatment) data for a clinical trial examining the efficacy of standard smoking cessation care versus an integrated treatment for smoking and anxiety. The study protocol was approved by the IRB (clinicaltrials.gov # NCT01753141). Inclusion criteria for the parent study included daily cigarette use (average 8 cigarettes per day for at least one year), between ages 18-65, and 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.

The average daily smoking rate of this sample was 16.7 ($SD = 9.95$), and on average, participants reported daily smoking for 18.4 years ($SD = 13.37$) and a moderate level of nicotine dependence. Regarding emotional disorders, 51.9% met criteria for a lifetime anxiety and/or depressive disorder, and 73.7% of the sample met criteria for any Axis I disorder. Please see Table 1 for complete descriptive details of the full sample and by lifetime emotional disorder status.

2.2. Measures

The Structured Clinical Interview-Non-Patient Version for DSM-IV (SCID-I/NP; First, Spitzer, Gibbon, & Williams, 2007) is a diagnostic assessment used to assess current (12 months) and past Axis I psychopathology. The SCID-I/NP was administered by trained

research assistants or doctoral-level staff. A random selection of interviews were checked for accuracy; no cases of diagnostic disagreement were noted. A dichotomous variable was created to reflect those who met criteria for a lifetime history (current [past 12 months] or past [successfully treated/remitted]) of any depressive or/or anxiety disorder (1 = lifetime emotional disorder). All other participants were coded as the reference group (0 = no history of emotional disorder); this variable was the predictor in all analyses.

The Smoking History Questionnaire (SHQ; Brown, Lejuez, Kahler, & Strong, 2002)) is a self-report questionnaire used to assess smoking and cessation history. The SHQ was used to create three criterion variables. First, number of lifetime quit attempts were coded using a single item on the SHQ (“How many times in your life have you made a serious attempt to quit smoking?”; observed range: 0-15). Second, the number of quit strategies used was computed from the question “In your attempts to quit smoking, what methods have you used?”; a list of 12 quit smoking strategies (e.g., cold turkey, smoke-enders, behavior modification, American Cancer Society/Lung Association Program, hypnosis, acupuncture, quitting with friends/relatives, gradual reduction, telephone counseling, substitute other tobacco product, nicotine patch, nicotine gum), plus an “other” option in which participants could write in additional quit strategies used (e.g., electronic cigarette, wellbutrin, varenicline). This text was coded based on responses. The observed range was 0-12. Third, the type of quit strategies were further coded into pharmacological and non-pharmacological quit methods, thus creating two additional continuous variables.

Study covariates were assessed as follows: The *Fagerström Test for Nicotine Dependence* (FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991) is a 6-item scale that assesses gradations in tobacco dependence; internal consistency was found to be acceptable (Cronbach's $\alpha = .65$). The Alcohol Use Disorders Identification Test (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1992)) is a 10-item self-report measure developed to identify individuals with current alcohol problems; internal consistency was good (Cronbach's $\alpha = .84$). The Marijuana Smoking History Questionnaire (MSHQ; Bonn-Miller & Zvolensky, 2009)) is a 40-item measure that was used to assess cannabis use. One item (“Please rate your cannabis use in the past 30 days”) was used to create a dichotomously coded variable (1 = past 30-day use) or no use (0 = No use). A *Medical History Checklist* was used to compute an index of tobacco-related disease (heart problems, hypertension respiratory disease and asthma; all coded 0 = no, 1 = yes). These items were summed and a total score was created. An item from the *Smoking History Questionnaire* was used to covary for duration of smoking: “For how many years, altogether, have you been a regular daily smoker?”.

2.3 Procedure

Adult daily smokers were recruited from the community (via flyers, newspaper ads, radio announcements) to participate in a randomized controlled dual-site clinical trial examining the efficacy of two smoking cessation interventions. After providing written informed consent, participants were interviewed using the SCID-I/NP and completed a battery of computerized self-report assessments. The study protocol was approved by the Institutional

Review Board at each study site. Cases were included in the current analyses on the basis of having all available data on studied variables.

2.4 Data Analytic Strategy

First, the distribution of the data was examined to determine whether the data fulfilled the required assumptions of parametric, regression-based analyses (i.e., normality, linear; skewness and kurtosis for all predictor and criterion variables was < 1.0). Next, primary analyses included descriptive statistics and zero-order correlations among study variables. Finally, hierarchical regression models were constructed for each criterion variable: number of (1) prior quit attempts, (2) quit strategies used, (3) nonpharmacological methods, and (4) pharmacological methods. Participant gender, level of nicotine dependence (FTND), alcohol use (AUDIT), cannabis use (per MSHQ), tobacco-related medical problems were, and years as a regular smoker (per SHQ) included as covariates in step 1 of each model. These covariates were chosen on an *a priori* basis as factors that could theoretically affect relations between the predictor and criterion variables. At step 2 of each model, emotional disorder history was entered.

3. Results

Participants reported an average of 3.4 ($SD = 2.42$) previous smoking quit attempts and the average number of strategies utilized was 3.3 ($SD = 2.12$). Approximately 92% of the sample reported use of at least one non-pharmacological method ($M = 2.4$, $SD = 1.57$; observed range 0-9), and about half of the sample (55.1%) reported use of at least one pharmacological quit strategy ($M = 0.9$, $SD = 0.96$; observed range 0-4). Consistent with prediction, bivariate associations (presented in Table 2) between emotional disorder status and all four criterion variables were significant (p 's $< .01$), with emotional disorder history associated with greater number of quit attempts, greater use of quit methods, both pharmacological and non-pharmacological. Additionally, emotional disorder status was significantly and positively associated with female gender, higher levels of nicotine dependence, AUDIT total scores, and tobacco-related medical problems.

The incremental relations of emotional disorder status to the dependent measures are presented in Table 3. The model for previous number of quit attempts accounted for 9.1% of the overall variance [$F(7,463) = 6.638$, $p < .0001$]. Step 1 including covariates accounted for 7.5% of variance, with past month cannabis use being a significant predictor of fewer quit attempts and years as a regular smoker associated with more quit attempts. Step 2 accounted for an additional 1.7% of incremental variance. As predicted, emotional disorder status was significantly related to a greater number of lifetime smoking cessation attempts.

The model of number of quit strategies accounted for 11.0% of the overall variance [$F(7,463) = 8.140$, $p < .0001$]. Step 1 accounted for 7.9% of variance, alcohol use and years as a smoker significantly predicting use of more strategies and past month cannabis use predicting use of fewer strategies. Step 2 accounted for an additional 3.0% of variance. As predicted, emotional disorder status was significantly predictive of greater number of overall quit strategies used.

The model of number of non-pharmacological cessation strategies accounted for 4.9% of the overall variance [$F(7,463) = 3.411, p = .001$]. Step 1 accounted for 2.9% of variance, with alcohol use predicting use of more non-pharmacological quit strategies. Step 2 accounted for an additional 2.0% of variance, with emotional disorder status significantly predictive of greater number of nonpharmacological cessation strategies used. Subsequent chi-square analyses revealed significant differences between groups, with those smokers with a lifetime history of an emotional disorder being more likely to report use of smoke enders ($\chi^2(1)=5.712, p = .017$), behavior modification ($\chi^2(1)=3.890, p = .049$), quitting with others ($\chi^2(1)=5.697, p = .017$), gradual reduction ($\chi^2(1)=9.963, p = .002$), and telephone counseling ($\chi^2(1)=4.462, p = .035$). Please see Table 4 for a descriptive overview and chi square results.

The model of number of pharmacological quit strategies accounted for 16.1% of the overall variance [$F(7,463) = 12.662, p < .0001$]. Step 1 accounted for 13.8% of variance, with nicotine dependence and years as a smoker significantly predicting use of more pharmacological quit methods and past month cannabis use predicting use of fewer pharmacological strategies. Step 2 accounted for an additional 2.2% of variance. Emotional disorder status was significantly predictive of greater number of pharmacological quit strategies used. Specifically, as presented in Table 4, chi-square analyses indicated a significant difference between groups, with those smokers with a lifetime history of an emotional disorder being more likely to report use of the nicotine patch ($\chi^2(1)=16.948, p < .0001$), nicotine lozenge ($\chi^2(1)=6.863, p = .009$), and nicotine inhaler ($\chi^2(1)=7.540, p = .006$).

4. Discussion

The current study examined how smokers with lifetime emotional disorders approach quitting by examining historical cessation attempts and quit strategies used. Results indicated that smokers with a history of emotional disorders (relative to those with no history of emotional disorders) engaged a greater number of lifetime quit attempts, employed a greater number of quit strategies, and were more likely to utilize both pharmacological and non-pharmacological cessation aids. Although the overall observed effect sizes in general were small, there was consistent empirical evidence that lifetime emotional disorders were significantly associated with the dependent measures. These observed effects were evident above and beyond the variance accounted for by numerous 'third variables,' such as gender, nicotine dependence, alcohol use, cannabis use, tobacco-related medical problems, and years as a smoker.

Clinically, these findings are important because they document that while emotional disorders are frequently chronic in nature (Depue & Monroe, 1986), they do not appear to be linked with impaired willingness to make quit attempts, or use of specific strategies when trying to abstain from smoking. Previous quit attempts are a strong predictor of future quit attempts (Vangeli, Stapleton, Smit, Borland, & West, 2011), which suggest that smokers with (versus without) an emotional disorder history may be more likely to enter treatment for smoking having made a larger number of prior failed quit attempts and may be more likely try again in the future if the current attempt leading to treatment also fails. In concert with well-documented problems in quit success among smokers with emotional disorders

previously documented (Ziedonis, Hitsman, Beckham, Zvolensky, Adler, Audrain-McGovern, Breslau, Brown, George, Williams, et al., 2008), and recent evidence that smokers with comorbid physical disorders are more likely to utilize pharmacotherapy for smoking cessation (Zale & Ditre, 2013), our results suggest that the use of common strategies that may be successful for the general population of smokers (e.g., behavioral strategies, pharmacotherapy) may be *less useful* for smokers with emotional disorders who may have tried these methods without success. Given these findings coupled with current evidence that smokers with (vs. without) emotional disorders made more quit attempts and hence appear to be genuinely interested in quitting, efforts should likely be focused on specialized treatment development (rather than solely the application of commonly applied strategies) to identify those treatment strategies to be maximally efficacious for this high-risk subpopulation.

Importantly, past work indicates that, in general, smokers who make more quit attempts, use different strategies for quitting, especially pharmacotherapy, often maintain higher levels of nicotine dependence, report greater symptom intensity during abstinence, as well as perceive more challenges in quitting (Shiffman, Brockwell, Pillitteri, & Gitchell, 2008). This work sits on the backdrop of empirical evidence that smokers with emotional disorders often have higher levels of nicotine dependence (Goodwin, Zvolensky, & Keyes, 2008), report less self-efficacy for abstinence (Zvolensky et al., 2005) and often struggle to maintain abstinence even early in the quit attempt (Zvolensky et al., 2008). Accordingly, the current findings might be consistent with the hypothesis that smokers with some comorbid disorders may be more likely to try different strategies for quitting because they anticipate, and in fact, experience greater problems maintaining abstinence (e.g., Zale & Ditre, 2013)).

There are a number of interpretive caveats to the present study. Given the cross-sectional nature of these data, it is unknown whether lifetime emotional disorders are causally related to historical quit attempts and strategies used. For example, it is possible that emotional disorder status did not overlap with quit behavior. However, because emotional disorders and smoking are generally conceptualized as chronic, relapsing disorders (e.g., Depue & Monroe, 1986; Fiore et al., 2008), some overlap between these conditions is likely to have occurred. Specific information about the age of onset of emotional disorders and age of first quit attempts was unavailable from this sample; thus, further detail regarding the extent of overlap is unknown. Still, future prospective studies are necessary to determine the directional effects of these relations. Additionally, the current sample consisted of community-recruited, treatment-seeking daily cigarette smokers with moderate levels of nicotine dependence, who were racially homogenous. Future studies may benefit by sampling from lighter and heavier smoking populations, and recruiting ethnically/racially diverse smokers to ensure the generalizability of the results to the general smoking population. Also, the present sample had relatively high rates of psychopathology. Future work could benefit from exploring whether these findings generalize to less severe smoking populations (e.g., smokers expressing moderate, subclinical levels of anxiety/depression).

Overall, the present study serves as an initial investigation into the nature of the association between emotional disorders and quit attempts and strategies used in such attempts among adult treatment-seeking smokers. Future work is needed to explore the mechanisms

underlying relations between emotional disorders and quit behavior in order to further inform treatment-planning for this high-risk population. It is noteworthy that the present findings suggest smokers with emotional disorders appear interested in quitting and try many different strategies for doing so. Thus, although these smokers may be receptive to a variety of evidenced-based treatment modalities (Hooten et al., 2009), they may still require complimentary specialty care to address their specific affective vulnerabilities (Ziedonis, Hitsman, Beckham, Zvolensky, Adler, Audrain-McGovern, Breslau, Brown, George, & Williams, 2008) given that their use of commonly-applied strategies did not result in lifetime abstinence.

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Highlights

1. Cigarette smoking is common among adults with anxiety and depressive psychopathology
2. Smokers with a history of emotional disorders are more likely to try to quit smoking
3. Smokers with emotional disorders employ a greater number of quit strategies
4. These smokers use of both pharmacological and non-pharmacological cessation aids

Table 1

Descriptive overview of sample characteristics by emotional disorder history.

Descriptive Summary	Total Sample N = 472	Emotional DX N = 245	No Emotional DX N = 227	χ^2 or t
Age M (SD)	36.6 (13.60)	36.8 (13.06)	36.4 (14.19)	-.264
Gender n (%)				
Female	228 (48.3)	140 (61.4)	88 (38.6)	15.934**
Male	244 (51.6)	105 (43.0)	139 (57.0)	
Smoking History M (SD)				
Cigarettes per day	16.7 (9.95)	16.8 (10.32)	16.4 (9.55)	-.434
Age started smoking	14.9 (3.43)	14.7 (3.46)	15.1 (3.40)	.935
Years as regular smoker	18.4 (13.37)	18.8 (13.03)	17.9 (13.73)	-.721
FTND	5.2 (2.29)	5.4 (2.27)	4.9 (2.28)	-2.556*
Quit History M (SD)				
# quit attempts	3.4 (2.42)	3.7 (2.49)	3.1 (2.30)	-2.661**
# quit strategies	3.3 (2.12)	3.7 (2.29)	2.8 (1.79)	-4.615**
# Pharm.	0.9 (0.96)	1.0 (1.03)	0.7 (0.86)	-3.891**
# Non-Pharm.	2.4 (1.57)	2.7 (1.69)	2.1 (1.38)	-3.715**
Other Key Variables				
GAF score M (SD)	73.4 (11.12)	68.2 (10.94)	79.4 (7.83)	11.485**
AUDIT total score M (SD)	6.2 (5.99)	6.9 (6.91)	5.4 (4.71)	-2.700**
Cannabis /30 days n (%) Y	263 (55.7)	141 (57.6)	122 (53.7)	.692
Medical problems n (%) Y	139 (29.4)	81 (33.1)	58 (25.6)	3.199
Number of Axis I Dx. M (SD)	1.7 (1.55)	2.7 (1.39)	0.7 (0.88)	-19.078**
Psychiatric Disorders n (%)				
No disorder	124 (26.3)	--	124 (54.6)	
Depressive Disorders				
<i>Major Depressive Disorder</i>	143 (30.3)	143 (58.4)	--	
<i>Dysthymic Disorder</i>	23 (4.9)	23 (9.4)	--	
<i>Depressive disorder NOS</i>	7 (1.5)	7 (2.9)	--	
Anxiety Disorder				
<i>Panic disorder w/wo Agor.</i>	18 (3.8)	18 (7.3)	--	
<i>Agoraphobia</i>	1 (0.2)	1 (0.4)	--	
<i>Social Phobia</i>	72 (15.3)	72 (29.4)	--	
<i>Specific Phobia</i>	42 (8.9)	42 (17.1)	--	
<i>OCD</i>	13 (2.8)	13 (5.3)	--	
<i>PTSD</i>	42 (8.9)	42 (17.1)	--	
<i>GAD</i>	41 (8.7)	41 (16.7)	--	
<i>Anxiety Disorder NOS</i>	10 (2.1)	10 (4.1)	--	
Substance Use Disorder				
<i>Alcohol</i>	184 (39.0)	108 (44.1)	76 (33.4)	
<i>Cannabis</i>	107 (22.7)	62 (25.3)	43 (18.6)	
<i>Cocaine</i>	44 (9.3)	28 (11.4)	16 (7.0)	

Descriptive Summary	Total Sample N = 472	Emotional DX N = 245	No Emotional DX N = 227	χ^2 or t
<i>Hallucinogens</i>	5 (1.1)	3 (1.2)	2 (0.9)	
<i>Opioids</i>	15 (3.2)	10 (4.1)	5 (2.2)	
<i>Sedative/ Anxiolytic</i>	5 (1.1)	5 (2.0)	0 (0)	
<i>Stimulant</i>	12 (2.5)	8 (3.3)	4 (1.8)	
<i>Poly-Substance/Other</i>	15 (3.2)	12 (4.9)	3 (1.3)	
Eating disorders	6 (1.3)	4 (1.6)	2 (0.9)	
Other disorders	18 (3.8)	13 (5.3)	5 (2.2)	

Table 2

Correlations between key study variables ($n = 472$).

Variable	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Gender (% F)	-.008	-.104*	-.060	.003	.093*	.184**	.011	.045	.018	.049
2. FTND	1	-.124**	-.063	-.011	.368**	.117*	.029	.147**	.236**	.053
3. AUDIT total		1	.196**	-.118*	-.296**	.122**	-.046	.024	-.034	.054
4. Cannabis (% Y)			1	.026	-.211**	.038	-.170**	.129**	.180**	-.063
5. Medical Prob.				1	.249**	.091*	.031	.095*	.081	.077
6. Years smoker					1	.033	.232**	.228**	.318**	.110*
7. Emotional Dx						1	.122**	.206**	.177**	.169**
8. # Quit attempts							1	.513**	.395**	.447**
9. # Quit strat.								1	.718**	.903**
10. # Non-Pharm.									1	.350**
11. # Pharm.										1

Note:

Gender = % listed are females (coded 0 = male; 1 = female); FTND = Fagerström Test for Nicotine Dependence – total score; A UDIT Total = Alcohol Use Disorders Identification Test; Cannabis = Past 30 days cannabis use status per the Marijuana Smoking History Questionnaire (coded 0 = no; 1 = yes); Medical Problems = Tobacco-related medical problems as indicated by the a medical history form (range 0-4); Years Smoker = Number of years as a regular daily smoker from the Smoking History Questionnaire; Emotional DX = lifetime history of an anxiety and/or depressive disorder per the SCID-I/NP (coded=1, all other coded 0); # Quit Attempts = Number of lifetime serious quit attempts per the Smoking History Questionnaire; # Quit Strat. = Number of strategies used to quit per the Smoking History Questionnaire (range 0-12); # Non-Pharm methods = Number of non-pharmacological quit strategies per the Smoking History Questionnaire; # Pharm. Methods = Number of pharmacological quit strategies used per the Smoking History Questionnaire. Columns numbers 1 – 10 correspond to the variables numbers in the far left column.

* $p < .05$

** $p < .01$

Table 3

Emotional disorder history predicting smoking quit history variables.

Criterion Variable		R ²	Predictors	B	SE	t	p
# of Quit Attempts	1	.075	Gender	-.082	.218	-.375	.708
			FTND	-.071	.051	-1.390	.165
			AUDIT	.015	.019	.759	.448
			Cannabis use	-.625	.226	-2.769	.006
			Medical Problems	-.093	.182	-.513	.608
			Years Smoker	.045	.010	4.722	.000
	2	.017	Emotional DX	.656	.224	2.930	.004
# of Quit Strategies	1	.079	Gender	.136	.190	.716	.474
			FTND	.079	.044	1.775	.077
			AUDIT	.043	.017	2.551	.011
			Cannabis use	-.446	.196	-2.273	.023
			Medical Problems	.217	.158	1.370	.171
			Years Smoker	.030	.008	3.644	.000
	2	.030	Emotional DX	.765	.193	3.963	.000
# of Non-Pharm. Methods	1	.029	Gender	.146	.145	1.010	.313
			FTND	.018	.034	.536	.592
			AUDIT	.029	.013	2.241	.026
			Cannabis use	-.186	.150	-1.244	.214
			Medical Problems	.168	.121	1.388	.166
			Years Smoker	.012	.006	1.848	.065
	2	.020	Emotional DX	.464	.148	3.130	.002
# of Pharm. Methods	1	.138	Gender	-.011	.084	-.125	.900
			FTND	.061	.020	3.083	.002
			AUDIT	.014	.007	1.897	.058
			Cannabis use	-.260	.087	-2.987	.003
			Medical Problems	.049	.070	.700	.484
			Years Smoker	.018	.004	5.042	.000
	2	.022	Emotional DX	.301	.086	3.507	.000

Note: B = regression coefficient, SE = standard error

Table 4

Use of specific quit strategies by emotional disorder status

Quit Strategy n (%) yes	Total Sample N = 472	Emotional DX N = 245	No Emotional DX N = 227	χ^2
Non-Pharmacological				
Cold turkey	391 (82.8)	201 (82.0)	190 (83.7)	.228
Smoke enders	16 (3.4)	13 (5.3)	3 (1.3)	5.712 *
Behavior Modification	97 (20.6)	59 (24.1)	38 (16.7)	3.890 *
ACS/Lung Assoc. program	28 (5.9)	19 (7.8)	9 (4.0)	3.034
Hypnosis	48 (10.2)	29 (11.8)	19 (8.4)	1.55
Acupuncture	17 (3.6)	9 (3.7)	8 (3.5)	.008
With friends/relatives,exc	165 (35.0)	98 (40.0)	67 (29.5)	5.277
Gradual reduction	260 (55.1)	152 (62.0)	108 (47.6)	9.963 **
Telephone counseling	20 (4.2)	15 (6.1)	5 (2.2)	4.462 *
Substitute other tobacco	78 (16.5)	45 (18.0)	33 (14.5)	1.253
Electronic-Cigarette	5 (1.1)	3 (1.2)	2 (0.9)	.133
Other non-pharmacological	11 (2.3)	9 (3.7)	2 (0.9)	4.036 *
Pharmacological				
Nicotine patch	189 (40.0)	120 (49.0)	69 (30.4)	16.948 **
Nicotine gum	147 (31.1)	81 (33.1)	66 (29.1)	.873
Nicotine lozenge	11 (2.3)	10 (4.1)	1 (0.4)	6.863 **
Nicotine inhaler	8 (1.7)	8 (3.3)	0 (0)	7.540 **
Varenicline	35 (7.4)	23 (9.4)	12 (5.3)	2.887
Bupropion/Zyban	13 (2.8)	7 (2.9)	6 (2.6)	.020
Other pharmacological	9 (1.9)	5 (2.0)	4 (1.8)	.049

*
p < .05**
p < .001