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Depressive symptoms, depression proneness, and outcome expectancies for cigarette smoking

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Abstract

The high rates of cigarette smoking among depressed persons may be partially explained by increased positive expectancies for cigarette smoking among this population. In view of theoretical and empirical work on depressed people's negative views of the future, though, it would be expected that depressed smokers would hold particularly negative expectancies about the effects of cigarette smoking. The two current studies examined the relations between depression and smoking outcome expectancies in (a) a general population of adult regular smokers and (b) adult smokers seeking to quit smoking. Depressive symptoms and depression proneness both showed significant positive correlations with positive expectancies for cigarette smoking. Several positive correlations with negative expectancies also emerged. Thus, experiencing depressive symptoms may serve to amplify both favorable and unfavorable expectancies about the effects of smoking.

According to cognitive theory of depression (Beck, 1987), depression is associated with pessimistic expectancies, a negative view of the future comprising one aspect of the negative cognitive triad. Numerous studies have corroborated this prediction, finding that generalized pessimism or hopelessness correlates positively with depressive symptom severity (Haaga, Dyck, & Ernst, 1991). Given this generalized pessimism, it would seem plausible that cigarette smokers prone to depression might also have particularly negative expectancies about the likely consequences of their smoking in particular. In other words, they might be more likely to expect to develop heart disease or cancer, or to experience negative physical sensations or social judgments from others as a result of their smoking habit.

However, negative expectancies would seem to discourage smoking behavior, yet depression is positively correlated with cigarette smoking (Kinnunen, Henning, & Nordstrom, 1999) as well as with difficulty in quitting smoking (Glassman, 1993). Even low levels of depressive symptoms predict increased difficulty in achieving abstinence from smoking (Niaura et al., 2001). The link between depression and smoking extends to measures of vulnerability to depression. In a five-year longitudinal study history of major depression at baseline was associated with increased risk of progression to daily smoking (Breslau et al., 1998). Likewise, in a study of nearly 500 adults, self-rated depression proneness was positively associated with having ever smoked cigarettes and with being a current smoker (Brody, Haaga, & Hamer, 2005).

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Relief from negative affect is a commonly reported motive for smoking (Brandon, 1994; Kassel, Stroud, & Paronis, 2003) and may be particularly important to understanding the comorbidity of depression and smoking. Depressed smokers (Lerman et al., 1996) and people prone to depression (Brody et al., 2005) are especially likely to cite negative affect regulation as a motive for smoking. It is understandable that depression prone people would be highly motivated by reduction of negative affect, but motivation would not necessarily translate into smoking behavior unless one believes that smoking will alleviate negative affect.

We therefore hypothesized that one reason depression and depression proneness are associated with increased smoking and difficulty quitting smoking might be that depression prone smokers are actually optimistic in the sense that they hold enhanced *positive* outcome expectancies for smoking. An outcome expectancy is an individual's estimate that a certain behavior will precipitate particular outcomes (Bandura, 1977). Several studies have shown that favorable outcome expectancies are associated with smoking (Brandon, Juliano, & Copeland, 1999). Indeed, such expectancies can be self-fulfilling. In an experiment employing the balanced placebo design, smokers with strong expectancies for negative affect reduction from smoking reported high levels of anxiety reduction after smoking only if they were told that the cigarette they had smoked contained nicotine, not if they were told the cigarette was denicotinized (Juliano & Brandon, 2002). In addition, a recent study found that expectancies of positive reinforcement from smoking were elevated among college students with a history of depression, and these expectancies appeared to mediate the link between history of depression and smoking status (McChargue, Spring, Cook, & Neumann, 2004).

Thus, the association between depression and pessimism leads to a prediction that, among smokers, those with elevated depressive symptoms would be especially pessimistic about the negative consequences of smoking. Conversely, the correlation between depression and cigarette smoking leads to a prediction that depression proneness would be associated with strong positive expectancies about the effects of smoking. Depression (or depression proneness) may thus serve to amplify *all* outcome expectations for smoking – negative and positive ones alike.

The present research tested this prediction in two samples. Study 1 involved a sample of adult cigarette smokers who volunteered for research on smoking and personality factors. Study 2 focused on smokers intending to quit--adult cigarette smokers who volunteered to participate in a smoking cessation trial. Smokers who intend to quit have different outcome expectancies from those who do not (Brandon et al., 1999)—in particular, strong negative expectancies for the effects of smoking predict initiation of quit attempts. Examining the hypotheses outlined above in both non-treatment-seeking and treatment-seeking populations thus seemed warranted.

Study 1: Depression Symptoms, Depression Proneness and Smoking Expectancies

Study 1 was designed to examine the relationships between depressive symptoms, depression proneness, and positive and negative expectancies for cigarette smoking in a sample of adult community members who reported smoking regularly. It was expected that depressive symptoms and depression proneness would be positively correlated with both positive and negative expectancies for cigarette smoking.

Method

Participants

Participants were 72 adult smokers recruited for one of several studies testing the relevance of self-regulatory focus theory for understanding smoking behavior. They were recruited through

newspaper advertisements. To be included in the study, participants had to be at least 18 years of age and had to smoke cigarettes daily. There were no exclusion criteria based on psychopathology; accordingly, we expected that there would be variability on depressive symptoms and depression proneness. Participants were remunerated for their time.

Of the 72 participants, 33 were women. One participant was biracial, while two were Asian, 46 Black or African-American, and 23 Caucasian. The average age was 45 years (range: 22–68). The median number of cigarettes smoked per day was 15 (range 3 to 40). See Table I for complete sample demographics.

Measures

Beck Depression Inventory-II (BDI-II)—The BDI-II is a 21-item measure designed to measure severity of depression (Beck, Rush, Shaw, & Emery, 1979). The items in the BDI-II reflect the diagnostic criteria for Major Depressive Disorder (Steer, Ball, Ranieri, & Beck, 1999), as defined by the DSM-IV (American Psychiatric Association, 1994).

Depression Proneness Inventory (DPI)—The DPI (Alloy, Hartlage, Metalsky, & Abramson, 1987) is a 10-item, face-valid questionnaire designed to assess depression vulnerability, or stress-sensitive proneness to depression. Items are answered on a seven-point Likert scale and include questions such as “Are you the type of person who easily becomes very depressed, sad, blue, or down in the dumps?” Coefficient alpha ratings for the DPI ranged from .90 to .92 in undergraduate samples (Alloy et al., 1987). One-month retest reliability was .88 (Alloy et al., 1987). Alloy and colleagues (1987) have also shown that the DPI has adequate construct, concurrent, discriminant, and criterion-related validity. For example, the DPI correlated significantly with measures of cognitive styles believed to be associated with depression. In addition, DPI scores correlated significantly with number of past depressive episodes (Alloy et al., 1987).

Smoking Consequences Questionnaire—Adult (SCQ-A)—The SCQ-A (Copeland, Brandon, & Quinn, 1995) measures smoking-related outcome expectancies. It contains 55 items forming ten subscales: Negative Affect Reduction, Negative Social Impression, Boredom Reduction, Stimulation/State Enhancement, Health Risk, Taste/Sensorimotor Manipulation, Social Facilitation, Weight Control, Craving/Addiction, and Negative Physical Feelings (Copeland et al., 1995). The SCQ-A was designed for use with adult, experienced smokers (Copeland et al., 1995). Although this study did not require participants to be heavy smokers, the sample was to include adults of all ages. The SCQ-A was thus deemed to be more appropriate than the original SCQ (Brandon & Baker, 1991), which was developed on a college-student population.

For the purposes of this study, the subscales of the SCQ-A were combined to form two higher-order subscales, positive and negative expectancies. The positive subscale consisted of the Negative Affect Reduction, Stimulation/State Enhancement, Taste/Sensorimotor Manipulation, Social Facilitation, Weight Control, and Boredom Reduction subscales. Internal consistency of this positive subscale was high (alpha = .94). The Health Risk, Negative Physical Feelings, and Negative Social Impression subscales comprised the negative subscale, for which internal consistency was moderate (alpha = .75). The Craving/Addiction subscale was not included, as it appeared to contain both positive and negative items.

Other Smoking-Related Measures—For descriptive purposes, information was gathered about participants’ smoking behaviors upon entering the study. The Fagerström Test for Nicotine Dependence (FTND) was used to assess nicotine dependence (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). Other descriptive information was gathered using

a face-valid smoking history questionnaire. Descriptive data on nicotine dependence, smoking rate, and other study measures appear in Table II.

Procedure

The measures relevant to the present study (BDI-II, DPI, SCQ-A) were administered in randomized order in an individual session that included several other questionnaires and a computer task.

Results & Discussion

Parametric statistics were used whenever all the variables in the analysis were found to be distributed normally (via the Kolmogorov-Smirnov test). For non-normally distributed variables, the median is given as an indicator of central tendency, with spread given as 25^{th} and 75^{th} percentiles. In analyses involving one or more non-normally distributed variable, non-parametric tests were used. In Study 1, SCQ-A Positive and Negative subscale scores and DPI scores were normally distributed, while all other variables had non-normal distributions. Only the SCQ-A Positive and Negative subscales were normally distributed in Study 2.

No significant correlations emerged between depressive symptoms or depression proneness and negative expectancies for cigarette smoking. Depressive symptoms were, however, positively associated with positive expectancies for cigarette smoking (rho = .34, $p < .01$), as was depression proneness (DPI; $r = .32$, $p < .01$) (see Table III). It is notable that depressive symptoms and depression proneness were highly correlated with each other (rho = .72, $p <$ .01)

In exploring the possible moderating effects of demographic variables, we looked for possible effects of race and gender on the relationships between expectancies and depression. Z-tests for the comparison of correlation coefficients revealed no significant differences among the relationships between African-Americans and Caucasians. Similarly, the correlations did not differ significantly according to gender.

Contrary to predictions, we did not find significant relations of depressive symptoms or depression proneness with negative outcome expectancies for smoking. The prediction that depression proneness and dysphoria might amplify positive thinking in the special case of outcome expectancies for smoking was corroborated, however. In this general community sample of adult smokers, those experiencing more depressive symptoms or reporting more depression proneness believed more strongly that smoking would lead to positive outcomes, such as alleviating negative affect, providing sensory stimulation, assisting weight control efforts, and facilitating social interaction. These stronger expectations that smoking will result in positive consequences may in part explain why increased smoking is found among those who are more prone to depression. People with symptoms of depression and/or a tendency towards depression may turn to smoking as a way of obtaining positive reinforcement and may be more reliant on smoking for these effects than are their non-depressed counterparts.

Study 2: Depressive Symptoms, Depression Proneness, and Outcome Expectancies in a Treatment-Seeking Sample of Smokers

Smokers who intend to quit smoking may be the ones especially likely to hold strong negative expectancies concerning the effects of smoking (Brandon et al., 1999). Thus, the results of Study 1 may not generalize to those smokers who intend to quit. Study 2, therefore, examined depression symptoms, depression proneness, and pre-treatment smoking expectancies among cigarette smokers who volunteered to participate in a smoking cessation trial.

Method

Participants

Participants were 55 adults enrolling in a smoking cessation trial comparing two approaches to group treatment (Thorndike, Friedman-Wheeler, & Haaga, in press). They were recruited through newspaper and radio advertisements and announcements and newsletters in the Washington, DC metropolitan area. Study information was also posted in the community and distributed at community events such as health fairs. Physicians and advocacy organizations (e.g., American Lung Association) referred participants to the study as well. Individuals who responded to these ads were screened over the phone to see if they were likely to be eligible to participate, and those who seemed to be eligible were invited to come to the American University campus for an initial (pre-treatment) assessment session. The final determination regarding eligibility was made at this session.

To be included in the study, participants had to be 18 or older, smoke daily (i.e., every day), and report no current or recent suicidal ideation at the time of the pre-treatment assessment. We excluded suicidal smokers as a safety measure in light of the potentially distressing nature of quitting. In addition, individuals who reported or showed signs of severe psychiatric disturbance (such as psychosis or dissociative disorders) were excluded and referred for appropriate treatment. Participants gave a deposit of $40.00 at the start of the study; the deposit was returned to them upon completion of the post-treatment assessment session.

Of the 55 participants who completed the pre-treatment assessment session, 37 were women. 44 were Caucasian, nine African-American, and one Asian-American. Three participants were Hispanic/Latino. The mean age was 42.2 years old (range: 18–70). See Table IV for complete demographic information.

Participants reported smoking an average of 19.0 cigarettes per day (range: 4.2–60.0). Table V includes pretreatment descriptive information on depression indicators and smoking variables.

Measures

Beck Scale for Suicide Ideation (BSI)—The BSI (Beck, Steer, & Ranieri, 1988), a 19-item paper-and-pencil scale, was used to assess suicidality. In reviewing the participants' responses to the BSI, the experimenter probed extensively about any nonzero answers to determine if any suicidal ideation was (or had recently been) present. Referrals were made when appropriate.

Beck Depression Inventory (BDI)—The BDI is a 21-item measure designed to measure severity of depression (Beck et al., 1979). The scale assesses such symptoms and attitudes as mood, pessimism, self-dissatisfaction, guilt, suicidal ideas, crying, loss of appetite, and somatic preoccupation.

Smoking-Related Measures—As in Study 1, the Fagerström Test for Nicotine Dependence (FTND) was used to assess nicotine dependence (Heatherton et al., 1991), and other descriptive information was gathered using a face-valid smoking history questionnaire. In addition, prior to beginning Study 2, participants were asked to monitor the number of cigarettes they smoked each day for a week. This information was used to estimate the average number of cigarettes each participant smoked per day when beginning the study.

The DPI and the SCQ-A were also included; both were described earlier in relation to Study 1. The Positive subscale of the SCQ-A again showed high internal consistency (alpha =.87), whereas the Negative subscale yielded lower internal consistency (alpha = .61).

Procedure

The measures relevant to the present study (BDI, DPI, SCQ-A) were administered at the pre-treatment assessment session. All measures were administered in randomized order, except those used for assessing inclusion/exclusion criteria, which were administered first.

Results & Discussion

Expectancies and Depression indicators

As in Study 1, both depressive symptoms and depression-proneness were correlated significantly with positive expectancies at pre-treatment (Spearman's rho=.31 and .30, respectively), whereas depression proneness was not significantly related to negative outcome expectancies for smoking. In contrast to the results with Study 1's non-treatment-seeking sample, however, depressive symptoms were also positively correlated with negative outcome expectancies (rho=.31; see Table VI). In this study, depressive symptoms and depression proneness were again strongly associated with each other (rho = .59, $p < .01$). Relationships between depression and expectancies were not significantly different between men and women.

General Discussion

In two samples of adults who smoke cigarettes daily, one seeking treatment and one not, we found both depressive symptoms and depression proneness to be positively correlated with positive outcome expectancies for smoking. Additionally, in the treatment-seeking sample depressive symptoms were positively correlated with negative expectancies regarding cigarette smoking, though this was not the case among current smokers not seeking treatment.

A relationship between depressive symptoms and negative expectancies is consistent with the general pessimism associated with depression. We are not certain why this association was not consistent across measures and studies. One possibility is that the negative subscale of the SCQ-A outcome expectancies measure showed only modest internal consistency (alpha = .75 in Study 1, .61 in Study 2).

The more consistent finding in our research, the direct correlation with positive expectancies, is striking, as increased positivity is not typically associated with depression or depression vulnerability. This enhanced positivity may, in turn, be a form of depression vulnerability in itself, in that it may lead depressed persons to rely too heavily on smoking for positive reinforcement, and may result in disappointment in the effects of smoking. Whereas smokers in general report that smoking improves their affect, it is unclear how or to what extent this phenomenon occurs (Kassel et al., 2003). If smoking is not durably effective as a mood management strategy, then depression-prone smokers who rely upon it are incurring an opportunity cost by foregoing other coping strategies that might have been more effective. Both correlational and experimental studies have documented inverse relationships between substance use and engagement in substance-free activities with potential for positive reinforcement. For example, in a 28-day study of a nonclinical sample, young adults assigned to increase the frequency of either exercise or artistic/creative activity significantly reduced their substance use behavior (Correia, Benson, & Carey, 2005).

One possible artifactual explanation of our findings would be that expectancies for positive smoking consequences tend to be higher among heavier, more dependent smokers, and might be more related to nicotine use than to depression proneness or dysphoria (Brandon et al., 1999). However, in our samples, nicotine dependence, length of smoking history, and daily cigarette smoking rate were not correlated with depression proneness or depressive symptoms.

In interpreting our results, it should be noted that depression symptoms and depression proneness are related indices. Both also share conceptual overlap with other constructs, such as general negative affectivity. Indeed, it is possible that negative affectivity or neuroticism might be the more relevant construct to smoking expectancies. Future research might evaluate this possibility. Likewise, future research with larger samples would be needed to test in a statistically powerful fashion the possibility that associations of depression or depression proneness with outcome expectancies are consistent across gender and racial subgroups. We found no significant moderator effects for demographic variables, but these null results are inconclusive given our modest sample sizes.

In addition to these suggestions, we see several other possible directions for future research to extend our findings. First, we have argued that depression-prone smokers' expectancies for the effects of smoking are overly optimistic, leaving them too dependent on cigarettes for positive reinforcement and perhaps subject to disappointment in the effects of smoking on mood. A prospective study of expectancies and, later, the actual perceived consequences of smoking could determine whether such a mechanism underlies the correlation we observed.

Second, it would be interesting to test whether changes in depressive symptoms lead to changes in either the content or the accessibility of outcome expectancies for smoking (Palfai, 2002). Third, future studies could explore whether depressive symptoms relate to implicit measures of smoking expectancies in the same manner as they do to explicit measures such as the SCQ (Hendricks & Brandon, 2005). Fourth, researchers could evaluate whether depression-prone smokers' enhanced positive expectations for smoking apply to other ways of coping with negative affect as well. For example, are their expectancies for other coping strategies also more optimistic than those of nondysphoric smokers? Such a finding would have implications for coping-skills training therapies.

Fifth, we speculate that one reason depression-prone persons may hold higher positive expectancies for cigarette smoking than their less depression-prone counterparts might be based in motivation. People who experience more depressive affect may be more motivated to believe that smoking will improve their affect and have other positive consequences than are people who experience negative affect less frequently or less intensely. Depression is also associated with decreased levels of positive reinforcement (Lewinsohn & Libet, 1972). Thus, those with depression may also be more motivated to believe that smoking will result in positive consequences in general (in addition to simply reducing negative affect). There is reason to believe that wanting to believe something (such as "smoking will make me feel better") can make it more likely that a person will believe it (Brandtstädter, 2000). The present study did not assess motivation directly; future research might explore this issue more fully.

Finally, we perceive our results as having important clinical implications that need to be studied empirically. Given that positive expectancies for cigarette use significantly predict failure to achieve abstinence, at least at short-term follow-ups (Hansen, Collins, Johnson, & Graham, 1985), our results may in part explain the difficulties often experienced by those vulnerable to depression when they attempt to quit smoking. Building on such findings, smoking cessation treatments targeted to depression-vulnerable smokers could benefit from incorporating expectancy challenge interventions (Brandon et al., 1999).

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Table I

Study 1: Sample Demographics (N = 72)

% Female	46%
Race	
% Caucasian	32%
% African-American or Black	64 %
% Asian	3%
% mixed race	1%
Ethnicity	
% Hispanic or Latino	0%
Age: M (SD)	44.9 (10.2)

Table II

Study 1 Descriptive Data on Smoking, Expectancies, and Depressive symptoms and Proneness

# of cigarettes smoked per day median (25 %ile, 75 %ile)	15.0 (10.0, 20.0)
FTND median (25^{th} %ile, 75^{th} %ile)	5.0 (3.0, 6.0)
BDI-II median (25^{th} %ile, 75^{th} %ile)	7.5 (3.0, 14.0)
DPI median (25^{th} %ile, 75^{th} %ile)	33.0 (13.67)
SCQ-A Positive Subscale: M (SD)	148.9 (58.8)
SCQ-A Negative Subscale: M (SD)	54.3 (14.8)

Note. Average No. of Cigarettes Smoked Per Day estimated by participant in smoking history questionnaire; FTND=Fagerstrom Test for Nicotine Dependence. Positive Subscale=Negative Affect Reduction, Stimulation/State Enhancement, Taste/Sensorimotor Manipulation, Social Facilitation, Weight Control, and Boredom Reduction subscales of the Smoking Consequences Questionnaire – Adult; Negative Subscale=Health Risk, Negative Physical Feelings, and Negative Social Impression subscales of the Smoking Consequences Questionnaire – Adult.

Table III

Study 1 Associations Between Depression Measures and Expectancies

SCQ-A scale	DPI (Pearson's r)	BDI-II (Spearman's rho)
Positive Subscale	.32**	.34**
Negative Subscale	.02	.19

Note. N = 72. BDI-II = Beck Depression Inventory; DPI = Depression Proneness Inventory; Positive Subscale = Negative Affect Reduction, Stimulation/State Enhancement, Taste/Sensorimotor Manipulation, Social Facilitation, Weight Control, and Boredom Reduction subscales of the Smoking Consequences Questionnaire – Adult; Negative Subscale = Health Risk, Negative Physical Feelings, and Negative Social Impression subscales of the Smoking Consequences Questionnaire – Adult.

* p<.05,

** p<.01

Table IV

Study 2: Sample Demographics(*n*=55)

% Female	64%
Race	
% Caucasian	76%
% African-American or Black	16%
% Asian	2%
% mixed race	0%
Ethnicity	
% Hispanic or Latino	5%
Age: M (SD)	42.2 (14.1)

Table V

Study 2 Descriptive Data on Smoking, Expectancies, and Depressive symptoms and Proneness

# of cigarettes smoked per day median (25 %ile, 75 %ile)	17.0 (13.1, 22.1)
FTND median (25^{th} %ile, 75^{th} %ile)	4.0 (2.0, 6.3)
BDI median (25^{th} %ile, 75^{th} %ile)	5.0 (3.0, 11.3)
DPI median (25^{th} %ile, 75^{th} %ile)	27.0 (19.0, 40.0)
SCQ-A Positive Subscale: M (SD)	195.8 (41.4)
SCQ-A Negative Subscale: M (SD)	67.0 (11.1)

Note. Average No. of Cigarettes Smoked Per Day estimated by participant in smoking history questionnaire; FTND=Fagerstrom Test for Nicotine Dependence. Positive Subscale=Negative Affect Reduction, Stimulation/State Enhancement, Taste/Sensorimotor Manipulation, Social Facilitation, Weight Control, and Boredom Reduction subscales of the Smoking Consequences Questionnaire – Adult; Negative Subscale=Health Risk, Negative Physical Feelings, and Negative Social Impression subscales -of the Smoking Consequences Questionnaire – Adult.

Table VI

Depression Measures and Positive and Negative SCQ-A Subscales at Pre-Treatment (N=55)

SCQ-A scale	DPI (Spearman's Rho) .	BDI
Positive Subscale	.30*	.31*
Negative Subscale	.16	.31*

Note. BDI=Beck Depression Inventory; DPI=Depression Proneness Inventory; Positive Subscale=Negative Affect Reduction, Stimulation/State Enhancement, Taste/Sensorimotor Manipulation, Social Facilitation, Weight Control, and Boredom Reduction subscales of the Smoking Consequences Questionnaire – Adult; Negative Subscale=Health Risk, Negative Physical Feelings, and Negative Social Impression subscales of the Smoking Consequences Questionnaire – Adult.

* p<.05,

** p<.01