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The relationship between smoking motives and smoking urges experienced in response to a negative affect induction

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HIGHLIGHTS

- Self-reported smoking motives as related to lab-based mood induction and urge
- Examine three self-report measures of cigarette smoking urge
- Positive Reinforcement predictive of urge post-negative affect induction
- Automaticity predictive of urge post-negative affect induction

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ABSTRACT

Introduction: The present study attempted to further elucidate the relationship between self-reported smoking motives and affect in college students.
Method: Smoking motives were measured via self-report, and following a laboratory negative affect (NA) mood induction, urge to smoke was assessed via three questions. Participants were college students ($N = 84$) who reported smoking an average of 8.74 ($SD = 5.36$) cigarettes per day.
Results: Results indicated that smoking motives for Positive Reinforcement and Automaticity significantly predicted participants' responses on two measures of urge to smoke immediately following the NA induction. Positive Reinforcement motives were predictive of urge to smoke, and Automaticity motives were predictive of the number of cigarettes participants stated that they would smoke if cigarettes were provided for free.
Conclusions: These findings indicate that (1) the association between NA and smoking is perhaps more complex than previously thought; and (2) merely two (Positive Reinforcement, Automaticity) of possibly thirteen smoking motives were identified as predictive of smoking urges. It is particularly surprising that other smoking motives (e.g., Negative Reinforcement) were not significant predictors of urge following the NA induction. Implications for relapse risk and treatment considerations among smokers experiencing elevated NA are considered.
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1. Introduction

Tobacco use is the leading cause of preventable death in the United States (Centers for Disease Control [CDC], 2011) and is related to lung disease, respiratory illness, heart disease and other medical conditions (National Institute of Drug Abuse [NIDA], 2010). In the general population, 26.5% of individuals over the age of 12 endorse smoking, with estimates being as high as 39.5% in adults, ages 18–24 years (Substance Abuse and Mental Health Services Administration, Office of Applied Studies [SAMHSA], 2008). Despite many smokers being dissatisfied with their smoking status (NIDA, 2010), less than 10% who attempt to quit are successful each year (CDC, 2002). This indicates that a better understanding of the addiction processes related to tobacco is necessary.

The importance of establishing an understanding of smoking motivation and relapse has driven researchers to investigate theorized and empirical mechanisms of action, one of which has been the experience of negative affect (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Brandon, 1994). The Affective Model of Drug Motivation is one of many theories indicating that over time, individuals learn that using a substance will alleviate negative mood states (Baker et al., 2004). Empirical work has also shown that NA and smoking are strongly linked (e.g., Conklin & Perkins, 2005; Parrott & Garnham, 1998; Vinci, Copeland, & Carrigan, 2012; Willner & Jones, 1996), and that relapse rates are higher for those reporting increases in NA (Kodl et al., 2008; Shiffman et al., 2007). Thus, smoking to regulate affect appears to be

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an important factor regarding the maintenance of smoking behaviors and is also implicated in risk of relapse.

Many studies have found support for a relationship between NA and nicotine dependence when exploring self-reported motives for smoking in adults (e.g., Copeland, Brandon, & Quinn, 1995; Kahler et al., 2010; Lerman et al., 1996). Upon examining young adults, previous work regarding smoking motives has found that daily college student smokers report smoking to manage affect, boredom, and self-confidence when compared to non-daily smokers (Berg et al., 2012). Further, an inverse relationship has been found between positive affect and urge in young adults (Leventhal, 2010). Schleicher, Harris, Catley, & Nazir (2009) examined depression and NA in college smokers and discovered that expectations that smoking would alleviate NA fully mediated the relationship between level of smoking (i.e., number of cigarettes smoked in the past month) and depression. Continued research on the identification of smoking motives predictive of smoking behavior in young adults may assist in explaining the reasons why they smoke at higher rates than the rest of the population.

Much of the literature examining the relationship between affect and smoking motives has been based on participants' retrospective self-report. The present study attempted to extend these findings by having participants undergo a laboratory-based NA-exposure manipulation and subsequently have them provide ratings on three different urge to smoke measures. The primary goal was to identify which motives were predictive of certain smoking outcome variables when a NA state has been induced in the laboratory. It is important to note that we were measuring self-reported urge to smoke and not actual smoking behaviors, though we did attempt to make our urge measures more ecologically valid than the typical Likert scale measure by including two additional urge to smoke measures. Since nicotine dependence is often considered a multi-dimensional concept (Shadel, Shiffman, Niaura, Nichter, & Abrams, 2000; Shiffman, Waters, & Hickcox, 2004), motives for smoking are often assessed via multi-faceted measures (Piper et al., 2004). Thus, the Wisconsin Inventory of Smoking Motives-68 (WISDM-68; Piper et al., 2004) was utilized in the present study to measure smoking motives.

Based on previous research, we expected positive and negative reinforcement motives to be endorsed by participants who reported elevated urge following the NA induction, as both of these motives are generally endorsed by those who smoke to manage distress-related emotions/mood (Piasecki, Piper, & Baker, 2010; Piper et al., 2004). We did not expect the following motives to be significant, as they are not generally thought to be related to mood management: Loss of Control, Cognitive Enhancement, Weight Control, or Social-Environment Goads (Piper et al., 2004).

2. Method

2.1. Participants

Participants ($N = 84$) were undergraduates recruited from a large southern University's Department of Psychology participation pool in which students sign up for experiments for course credit. Participants were recruited as part of a larger cue exposure study consisting of multiple sessions.[1] Inclusion criteria were: (1) being 18 years of age or older, and (2) presently being a cigarette smoker (i.e., smoking at least one cigarette per week). Exclusion criteria included: (1) currently trying to quit smoking, as this may have caused participants to suppress urges to smoke (Lazev, Herzog, & Brandon, 1999); (2) severe depressive symptomatology; and/or (3) suicidal ideation (see below for rationale regarding this exclusion criteria).

2.2. Materials

2.2.1. Demographic Questionnaire

Demographic information regarding sex, age, race, education status, and current smoking behaviors (e.g., cigarettes smoked per day) was gathered with this questionnaire.

2.2.2. Center for Epidemiological Studies Depression Scale (CES-D)

The CES-D is a 20-item self-report measure assessing depressive symptoms in the past week (Radloff, 1977) on a 0–3 Likert scale. It was used to determine eligibility for the present study. This measure has demonstrated good test–retest reliability ($r = .85$) and adequate to good concurrent validity (ranging from .30–.80; Radloff, 1977). Individuals scoring 26 or higher (indicating severe depressive symptoms) were ineligible for the study, as participants would be viewing disturbing and potentially distressing images. There was also a question added to the end of the CES-D form to screen for individuals with current suicidal ideation; individuals endorsing such thoughts were ineligible for the study. Anyone who endorsed this item was further assessed regarding the nature of his/her suicidal thoughts and provided with counseling referrals.

2.2.3. The Fagerström Test for Nicotine Dependence (FTND)

The FTND is a 6-item self-report measure that assesses level of nicotine dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). The measure has adequate reliability (e.g., $r = .61$) and is widely used to assess dependence level (Heatherton et al., 1991).

2.2.4. The Wisconsin Inventory of Smoking Dependence Motives (WISDM-68)

The WISDM-68 is a 68-item self-report measure used to assess nicotine dependence as a multi-dimensional construct via 13 different smoking motives including: Affiliative Attachment, Automaticity, Behavior Choice–Melioration, Cognitive Enhancement, Craving, Cue Exposure-Associative Processes, Loss of Control, Negative Reinforcement, Positive Reinforcement, Social–Environmental Goads, Taste and Sensory Properties, Tolerance, and Weight Control (Piper et al., 2004). The WISDM-68 has demonstrated good reliability (.73–.95) and moderate concurrent validity (.15–.78, depending on compared measures; Piper et al., 2004). This measure was used to assess smoking motives for participants in the present study.

2.2.5. Positive and Negative Affect Schedule (PANAS)

The PANAS is a 20-item self-report measure of positive and negative affect at a given point in time (Watson, Clark, & Tellegen, 1988). Participants respond to 20 adjectives describing affect using a 5-point Likert scale. The PANAS has demonstrated good internal consistency (.84–.90) and moderate concurrent validity (.51–.74; Watson et al., 1988).

2.2.6. Smoking measures

Three independent measures of self-reported urge to smoke were collected. Prior research has indicated that while both single- and multi-item measures have been used in the literature to assess smoking urge, additional research is needed to better understand the construct (Berlin, Singleton, & Heishman, 2013) as it is often considered multi-dimensional (Heishman, Singleton, & Pickworth, 2008; Singleton, Anderson, & Heishman, 2003). The present study conceptualized urge as multi-faceted and included two additional brief measures aimed specifically at capturing the multi-dimensional nature of urge, as well as possibly enhancing the ecological validity of measuring urge to smoke in the laboratory. Thus, we utilized three single-item measures in an attempt to better capture the construct of urge.

[1] The larger study consisted of a total of four sessions. Session one was the screening session to determine eligibility. If eligible, participants were invited to attend three exposure sessions, where they underwent the mood induction. The mood induction consisted of participants watching four separate sets of affective images while listening to music. Participants in the NA group viewed NA images and listened to NA music for all four trials, while participants in the control group viewed NA images during trials one and four and neutral images during trials two and three. The present study examined data collected from the first two sessions (the screening session and first exposure session).

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