



Indirect effects of smoking motives on adolescent anger dysregulation and smoking



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HIGHLIGHTS

- Aim to better understand correlates of adolescent smoking behavior
- Negative affect reduction motives are one of the most common reasons for smoking.
- Found indirect effect of this motive on anger dysregulation and smoking association
- Findings discussed in terms of youth smoking, anger, and negative affect reduction

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ABSTRACT

Cigarette smoking is one of the leading causes of disease and death in the United States, and smoking typically begins in adolescence. It is therefore important to understand factors that relate to increased risk for cigarette smoking during this stage of development. Adolescence is a period when emotion regulatory capacities are still emerging and a common affective state to be regulated is anger, which adult research has linked to nicotine use. Drawing from work suggesting that negative affect reduction motives are one of the most common reasons for cigarette smoking, the current study was designed to evaluate the indirect effects of negative affect reduction motives on the relation between anger dysregulation and nicotine use within a sample of 119 treatment-seeking adolescents enrolled in group-based residential therapy. Results were generally consistent with hypotheses, suggesting significant indirect effects of negative affect reduction smoking motives on the relation between anger dysregulation and smoking outcomes. Findings are discussed in terms of negative affect reduction motives for cigarette use in the context of anger regulation among youths.

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1. Introduction

1.1. Nature and scope of the problem

Smoking among adolescents is a pressing public health concern. Tobacco use, including cigarette smoking, is one of the leading causes of disease and mortality in the United States (Jemal, Ward, Hao, & Thurn, 2005; Mokdad, Marks, Stroup, & Gerberding, 2004), and approximately 70% of adult cigarette smokers began smoking by the age of 18 years (SAMHSA, 2011). By 12th grade, nearly half of youths report having tried smoking, with 9.3% being daily smokers and 4.0% smoking 10 or more cigarettes daily (Centers for Disease Control and Prevention (CDC), 2012; Johnston, O'Malley, Bachman, & Schulenberg, 2012). These statistics are alarming given that adolescent cigarette smoking

is associated with a number of problematic physical (U.S. Department of Health and Human Services, 2010) and mental health (Chang, Sherritt, & Knight, 2005; Lawrence, Mitrou, Sawyer, & Zubrick, 2010) outcomes. It is therefore imperative to better understand processes that may contribute to tobacco use among youths.

1.2. Smoking motives

Smoking motives are a widely studied, promising factor with relevance to understanding smoking-related behaviors. Factor analyses of Tomkins' (1966) initial model suggest a six-factor model of smoking motives, consisting of stimulation, pleasurable relaxation, sensorimotor manipulation, habit, negative affect reduction, and addiction motives (Coan, 1973; Ikard, Green, & Horn, 1969; McKennell, 1970). A large body of adult research indicates that a key reason for smoking is to reduce negative affective states (e.g., Kassel, Stroud, & Paronis, 2003; Shiffman, 1993), a process that negatively reinforces smoking behavior. Similarly, among adolescents, empirical work suggests that a) youths

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with elevated negative affectivity are more likely to endorse cigarette smoking and smoking urges (Stein, Newcomb, & Bentler, 1996; Whalen, Jamner, Henker, & Delfino, 2001), b) negative affect reduction motives are among the most commonly cited reasons for smoking (Stevens, Colwell, Smith, Robinson, & McMillan, 2005), and c) nicotine withdrawal itself elicits negative affectivity (e.g., Kassel et al., 2007). These data are consistent with adult work underscoring a robust linkage between cigarette smoking and the reduction of negative affective states, although the preponderance of work has focused on the affective states of anxiety and depression.

1.3. Anger and anger dysregulation

Harmon-Jones and colleagues suggest that affective states are composed of three dimensions: valence (i.e., the strength of positive and negative evaluation associated with a stimulus), arousal (i.e., the subjective and physiological activation associated with affective motivation), and motivational intensity (i.e., the strength of the appetitive or aversive motivation to move toward or away from a stimulus; Harmon-Jones, Gable, & Price, 2013). There are several negative affective states that individuals might seek to reduce via smoking, including sadness and anxiety. Anger may be a particularly important negative affective state in relation to smoking and smoking motives and has been understudied in the smoking literature. Data from multiple sources link anger with nicotine use among adults, including epidemiologic findings (Cogle, Zvolensky, & Hawkins, 2013), nicotine administration experiments (Pang & Leventhal, 2013), diary studies (Jamner, Shapiro, & Jarvik, 1999), and neuropsychological work (e.g., Gehricke et al., 2009). Collectively, these studies converge to suggest that anger and the regulation thereof play an important role in tobacco use. Nevertheless, more research regarding anger in the context of smoking motives, especially among adolescents, is necessary.

1.4. Emotion regulation and anger among adolescents

Negative affect, particularly anger, is a critical state that adolescents must learn to effectively regulate. Adolescence is a developmental stage marked by profound biopsychosocial change (Hayward, 2003), including increased emotionality, enhanced reactivity to emotionally-relevant stimuli, negative affectivity, and emotional lability (Brooks-Gunn, Graber, & Paikoff, 1994; Buchanan, Eccles, & Becker, 1992; Dahl, 2004; Hare et al., 2008; Larson & Lampman-Petratis, 1989; Silk et al., 2009; Spear, 2003; Susman, Dorn, & Chrousos, 1991). Anger is frequently experienced during this period (Blanchard-Fields & Coats, 2008; Larson & Asmuquessen, 1991), due in part to conflict between efforts to obtain autonomy and obstructions to such endeavors (e.g., Granic, Dishion, & Hollenstein, 2003; Saarni, Campos, Camras, & Witherington, 2006). Adolescence is a crucial time for development of regulatory strategies, as well as a period of vulnerability for maladaptive emotion regulation, due to continued development of appropriate emotion regulatory strategies and maturation of related neurological substrates (Garnefski & Kraaij, 2006; Gross, 2001; Gross & Muñoz, 1995; Southam-Gerow & Kendall, 2002; Spear, 2000; Steinberg, 2005; Weinstein, Mermelstein, Shiffman, & Flay, 2009; Zeman, Cassano, Perry-Parrish, & Stegall, 2006). Emotion regulatory capacities are important given that poorer emotion regulation strategies are linked with increased problems (Silk, Steinberg, & Morris, 2003; Southam-Gerow & Kendall, 2002; Weinstein et al., 2009).

1.5. Anger and smoking among adolescents

Dysregulated anger has been identified as a key factor related to substance use (Colder & Stice, 1998; Cogle et al., 2013). While the literature base among youths is in its infancy, initial work suggests that elevated hostility relates positively to smoking onset and frequency (Weiss et al., 2005). Further, Wills, DuHamel, and Vaccaro (1995)

found that the relation between temperament and substance use among youth was mediated by maladaptive anger regulation strategies (e.g., breaking others' possessions). Theorists suggest that some adolescents may engage in substance use, including cigarette smoking, as a means of dealing with such anger-related distress (Cooper, Shaver, & Collins, 1998; Wills et al., 1995). Although these findings are informative, the relative lack of research pertinent to dysregulated anger and nicotine use among youths, particularly in terms of the role of smoking motives, is a critical gap in the extant literature.

1.6. The current study

The current study was designed to address the hypothesis that there would be significant indirect effects of elevated negative affect reduction motives on the relation between anger dysregulation and both lifetime frequency and recent quantity of nicotine use. A meditation (cf., moderation) approach was selected for three key reasons. First, Ikard and Tomkins' early conceptual work regarding smoking motives suggests a mediational model, hypothesizing smoking motives as a casual link between negative emotion and cigarette smoking (Ikard et al., 1969; Ikard & Tomkins, 1973; Tomkins, 1966). Second, in line with recommendations suggesting that predictors should temporally precede mediators and are typically more stable characteristics than mediators (Kraemer, Kiernan, Essex, & Kupfer, 2008; Wu & Zumbo, 2008), the nature of the variables in the current study are consistent with a mediational approach. Specifically, anger dysregulation is related to effectiveness of general self-regulation processes and effortful control, both of which are relatively stable across time within individuals, even during childhood and adolescence (Caspi, 2000; Eisenberg, 2000; Kochanska, Murray, & Coy, 1997; Raffaelli, Crockett, & Shen, 2005). The emergence of these emotion regulation characteristics should thus precede the formation of beliefs related to smoking (smoking motives), and are likely more stable than smoking motives (Emery et al., 2005; Mayhew, Flay, & Mott, 2000; Siegel & Biener, 2000). Additionally, the presence of anger-related distress logically precedes regulatory efforts to manage such negative affective states (e.g., via smoking). Finally, given the correlation between levels of negative affect, as well as affect regulation, and negative affect reduction smoking expectancies (Copeland, Brandon, & Quinn, 1995; Wetter et al., 2004), we expected an association between anger dysregulation and negative affect reduction smoking motives, which indicates that mediation, rather than moderation, should be tested (Wu & Zumbo, 2008). For these reasons, a mediation model was used to test the current hypotheses.

As a test of specificity, stimulation motives were also evaluated. Adolescents with dysregulated anger characterized, in part, by elevated arousal, may seek to reduce this negative affective state via smoking (Carver & Harmon-Jones, 2009). Conversely, stimulation smoking motives (e.g., to perk oneself up or keep from slowing down) would likely be relevant for adolescents seeking to regulate states on the opposite, or low, end of the affective arousal dimension (Coan, 1973; Harmon-Jones et al., 2013; Ikard et al., 1969). Given these opposing motives for smoking, no significant indirect effects of stimulation on the relation between anger dysregulation and nicotine use were expected.

2. Method

2.1. Participants

One hundred nineteen adolescents (80 males) between the ages of 14 and 17 years ($M_{\text{age}} = 15.73$, $SD = 1.07$) were drawn from a larger study of treatment-seeking adolescents enrolled in group-based residential therapy. The purpose of the parent study was to examine predictors and moderators of treatment response. All adolescents enrolled in the residential therapy program, regardless of smoking status, were

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