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Neuroticism moderates the effect of maximum smoking level on lifetime panic disorder: A test using an epidemiologically defined national sample of smokers

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Abstract

The present study evaluated a moderational model of neuroticism on the relation between smoking level and panic disorder using data from the National Comorbidity Survey. Participants ($n = 924$) included current regular smokers, as defined by a report of smoking regularly during the past month. Findings indicated that a generalized tendency to experience negative affect (neuroticism) moderated the effects of maximum smoking frequency (i.e., number of cigarettes smoked per day during the period when smoking the most) on lifetime history of panic disorder even after controlling for drug dependence, alcohol dependence, major depression, dysthymia, and gender. These effects were specific to panic disorder, as no such moderational effects were apparent for other anxiety disorders. Results are discussed in relation to refining recent panic–smoking conceptual models and elucidating different pathways to panic-related problems.

Keywords: Smoking; Panic disorder; National Comorbidity Survey; Anxiety; Neuroticism

1. Introduction

There has been a long-standing recognition that rates of cigarette smoking are greater among persons with certain types of psychopathology than in persons without a history of psychopathology. To date, most of the investigations in this domain have focused on individuals with schizophrenia, alcohol and drug dependencies, attention deficit hyperactivity disorder, and depressive disorders (e.g., Black et al., 1999; Merikangas et al., 1998). There has been a recent focus on addressing associations between smoking and panic disorder (Zvolensky and Schmidt,

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2004). This attention is due, in part, to a number of studies documenting a relation between panic psychopathology and smoking status (Amering et al., 1999; Degenhardt et al., 2001; Hayward et al., 1989; Himle et al., 1988; Kandel et al., 1997; McCabe et al., 2004; Pohl et al., 1992). In a recent epidemiological study, for instance, approximately 43% of respondents diagnosed with panic disorder in the past month were current smokers compared with approximately 22% observed among individuals with no mental illness (Lasser et al., 2000). Moreover, the observed associations between smoking and panic problems are not attributable to sociodemographic characteristics, other psychiatric conditions, or symptom overlap in diagnostic criteria for panic attacks and nicotine dependence (Zvolensky et al., 2003c).

Aside from high rates of smoking among those with panic disorder, a number of studies suggest that cigarette smoking increases the chance of developing panic attacks and panic disorder. Using data from the Epidemiologic Study of Young Adults and the National Comorbidity Survey Tobacco Supplement, Breslau and Klein (1999) found that self-reported daily smoking was associated with retrospective report of the first occurrence of a panic attack as well as panic disorder. On the other hand, panic attacks or panic disorder did not increase the risk for subsequent smoking behavior. In another study, Johnson et al. (2000) investigated the longitudinal association between cigarette smoking and anxiety disorders among adolescents and young adults using a community-based sample ($n=688$). Heavy smoking (≥ 20 cigarettes per day) during adolescence ($M_{Age}=16$) was associated with higher risk of developing panic disorder and agoraphobia during early adulthood ($M_{Age}=22$) even after controlling for a variety of theoretically relevant factors (e.g., alcohol and other drug use). More specifically, adolescents who were heavy smokers were 15.5 times more likely to develop panic disorder in early adulthood than non-smokers, suggesting heavier smoking levels impart a substantial panic-related risk. Similar results recently were found in a longitudinal study conducted over a 4-year period in Germany with over 2500 participants (aged 14–24 years at baseline; Isensee et al., 2003). In this study, nicotine-dependent smokers were at greater risk for later onset of panic attacks.

Although initial work suggests that smoking, particularly heavy amounts, is associated with increased risk for developing panic-related problems, there has been little focus on potential moderators of this relation. In a moderational model, the effects of smoking level on panic vary as a function of another vulnerability factor (Baron and Kenny, 1986). In a recent study, Zvolensky et al. (2003a) examined whether anxiety sensitivity, a cognitive-based risk factor for anxiety psychopathology defined as the fear of anxiety and anxiety-related sensations (McNally, 1990; Reiss and McNally, 1985), moderated the effects of level of smoking in regard to prototypical panic outcome variables (assessed via self-report) in an epidemiologically defined sample of regular smokers from Moscow, Russia. According to theory and research on anxiety sensitivity, individuals with fears of anxiety and anxiety sensations may be more apt to respond with anxiety to smoking-related interoceptive cues, and catastrophize the potential negative consequences of such stimuli. As expected, results indicated that anxiety sensitivity moderated the effects of smoking (as indexed by cigarettes smoked per day) on self-reported agoraphobic avoidance; this effect was observed above and beyond variance attributed to problematic alcohol use and negative affectivity. No moderating effect of anxiety sensitivity was found for panic attacks, however, perhaps due to the restriction of the assessment of panic attacks to the most recent week. Overall, these initial findings suggest that smokers are not a homogeneous group in regard to panic problems, and that anxiety sensitivity is one of perhaps several individual difference factors that may be important in accounting for such differences.

Although the results of Zvolensky et al. (2003a) are promising, it is noteworthy that only the cognitive-based risk factor of anxiety sensitivity has been examined as a moderator of the smoking level–panic relation. Thus, it is currently unclear whether more general psychological vulnerability factors also may function as moderators of smoking level in terms of panic-related problems. A large body of empirical work has identified personality variables (e.g., neuroticism) that reflect a generalized disposition to experience negative affect (i.e., negative affectivity), which provides a common and relatively stable diathesis for anxiety- and mood-related disorders (Brown et al., 1998; Clark et al., 1994; Fowles, 1995; Trull and