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Impulsivity-like traits and smoking behavior in college students

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ABSTRACT

Recent research has deconstructed the concept of impulsivity by identifying five different traits that influence engagement in impulsive behaviors: positive urgency (tendency to act rashly in response to a positive mood), negative urgency (tendency to act rashly in response to a negative mood), sensation seeking, lack of planning, and lack of perseverance. The traits are only moderately related to each other. The aim of this study was to apply this advance to the study of smoking. We tested a two-stage hypothesis: Higher sensation seeking was hypothesized to differentiate current smokers from non-smokers, and negative and positive urgencies were expected to predict concurrent level of nicotine dependence among smokers. As anticipated, greater sensation seeking was associated with a higher odds of being a current smoker (odds ratio = 1.51). Greater positive urgency, but not other impulsivity-related traits, was associated with significantly higher levels of nicotine dependence, explaining 29% of the variance in level of nicotine dependence.

1. Impulsivity-like traits and smoking behavior

Recent research suggests that personality traits associated with impulsivity (e.g., sensation seeking, risk taking, and delay discounting), influence tobacco use and perhaps level of nicotine dependence (Bickel, Odum, & Madden, 1999; Doran, Cook, McChargue, & Spring, 2009; Mitchell, 2004; Perkins et al., 2008). Various self-report and behavioral measures of impulsivity-related traits are associated with aspects of smoking behavior, including current smoking status (Bickel, et al, 1999; Kassel, Shiffman, Gnys, & Paty, 1994; Lejuez et al., 2003; Mitchell, 1999), smoking initiation (Lipkus, Barefoot, Williams, & Siegler, 1994), and smoking cessation outcomes (Doran, Spring, McChargue, Pergadia, & Richmond, 2004; Kahler, Spillane, Metrik, Leventhal, & Monti, 2009; MacKillop & Kahler, 2009). However, the term impulsivity has been used broadly by many researchers to mean different things (Smith et al., 2007; Whiteside & Lynam, 2001), and more research is still needed to define the dimensions of impulsivity-like traits that are most relevant to smoking and smoking dependence.

In recent years, personality researchers have made considerable progress in parsing "impulsivity" into its component constructs (Cyders & Smith, 2007; Evenden, 1999; Petry, 2001; Whiteside & Lynam, 2001). At present, five different personality dispositions to engage in rash or impulsive action have been identified and have been found to be modestly related to each other (Cyders & Smith, 2007; Cyders et al., 2007; Smith et al., 2007; Whiteside & Lynam, 2001). The five traits are negative urgency (the tendency to act rashly in response to negative mood), positive urgency (the tendency to act rashly when experiencing intensely positive mood), sensation seeking (the tendency to seek out novel and thrilling experiences), lack of perseverance (the inability to remain focused on a task), and lack of planning (the tendency to act without thinking).

The five specific traits are distinct from each other and predict different components of risky behaviors (Cyders & Smith, 2007, 2008c; Smith et al., 2007; Whiteside & Lynam, 2001, 2003). Sensation seeking has consistently been shown to relate to the frequency of engaging in risky behaviors, such as alcohol consumption, gambling, and risky sex, in both cross-sectional and longitudinal research (Cyders & Smith, 2008b; Cyders, Flory, Rainer, & Smith, 2009; Smith et al., 2007; Zapolski, Cyders, & Smith, 2009). In contrast, positive and negative urgency consistently relate, both cross-sectionally and longitudinally, to problem levels of involvement in such behaviors, including problem drinking, pathological gambling, the use of illegal drugs, and binge eating (Anestis, Selby, & Joiner, 2007; Cyders & Smith, 2008b; Cyders et al., 2007, 2009; Zapolski et al., 2009). The purpose of the current study is to study the five impulsivity-like traits in relation to smoker status and level of nicotine dependence in college students.

1.1. Impulsivity and smoking

Of the impulsivity-like traits, sensation seeking has perhaps received the most attention in regards to smoking. Sensation seeking has been

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found to differentiate smokers from non-smokers, with smokers having higher sensation seeking scores than non-smokers (Carton, Jouvent, & Widlocher, 1994; Lejuez et al., 2003; Mitchell, 1999; Kahler, Daughters, et al., 2009); however, it does not appear to predict smoking dependence (Harmsen, Bischof, Brooks, Hohagen, & Rumpf, 2006; Kahler, Daughters, et al., 2009; Kahler, Spillane, et al., 2009). Higher sensation seeking has been found to predict reduced odds of abstinence from smoking during smoking cessation (Kahler, Spillane, et al., 2009). In addition to the research on sensation seeking, researchers have used a behavioral measure of risk taking, which correlates with sensation seeking and lack of planning (Lejuez et al., 2002), and differentiates smokers and non-smokers (Lejuez et al., 2003).

There are a number of possible mechanisms that may explain the relationship between sensation seeking/risk taking and smoking initiation. One of these mechanisms suggests that the novelty of smoking and the positive reinforcement one receives from smoking may attract someone who is high in sensation seeking to smoke (Clayton, Segress, & Caudill, 2007). However, as an individual continues to smoke, the novelty of the smoking experience wears off and therefore, the individual may lose interest in smoking, and seek out other novel and/or thrilling experiences to engage in. Thus, one would expect sensation seeking to have relatively little association with smoking dependence.

Whereas sensation seeking is likely to predict the likelihood of initiating smoking and choosing to smoke, we hypothesize that impulsivity-like traits related to urgency traits will be the stronger predictors of level of nicotine dependence. There are both empirical and theoretical reasons for this prediction. Smoking is likely to be particularly reinforcing during intense mood states, whether as part of a celebratory marking of positive events or as a means of reducing negative affect. A high-urgency individual who experiences reinforcement for smoking is more likely in the future to respond to an intense mood state with additional smoking because such individuals are more prone than others to act on their immediate needs, rather than their long-term interests (Cyders & Smith, 2008c). The repeated choice to smoke when emotional then facilitates the development of dependence (Baker, Brandon, & Chassin, 2004). Indeed, a significant portion of smoking lapses occur during positive affective states (Brandon, Tiffany, Obremski, & Baker, 1990; Shiffman, Paty, Gnys, Kassel, & Hickcox, 1996) and positive affect predicts urges to smoke during the course of ongoing smoking (Zinser, Baker, Sherman, & Cannon, 1992). In laboratory settings, positive affect imagery has been found to elicit stronger urges to smoke than neutral imagery (Tiffany & Drobes, 1990). These findings appear to suggest a role for positive urgency in predicting the level of nicotine dependence.

However, studies also suggest that positive reinforcement is not the major motivational pathway to nicotine dependence. Although positive affect imagery elicits smoking urges, it is less effective than negative affect imagery (Tiffany & Drobes, 1990). Research also suggests that among those who try cigarettes, those who progress to regular smoking status and nicotine dependence are more likely to report higher levels of negative mood states such as stress and negative affect (Chassin, Presson, & Sherman, 1984; Stein, Newcomb, & Bentler, 1996). Moreover, Nichter and Carkoglu (2007) found that smoking to alleviate distress was a common motivation for college student smokers, therefore suggesting a possible role for negative urgency.

The urgency traits predict problem involvement in several other addictive behaviors, as noted above (Cyders & Smith, 2008c; Cyders et al., 2009; Settles, Cyders, & Smith, in press; Zapolski et al., 2009). Although there have been few studies relating the five impulsivity-related traits to smoking, Billieux, Van der Linden, and Ceschi (2007) did find that among four of the traits (the study did not include positive urgency), only negative urgency predicted cigarette craving cross-sectionally. Similarly, Doran and colleagues (2009) also studied four of the five traits (the study did not include positive urgency), and found that, in smokers, negative affect craving was significantly associated with negative urgency and lack of perseverance. They found that this relationship became stronger when smokers were exposed to a smoking cue. These findings suggest that smokers higher in the negative urgency and lack of perseverance components of impulsivity have a greater negative affect craving response to smoking cues than those lower in negative urgency and lack of perseverance. The role of negative and positive urgency in differentiating smokers from non-smokers and differentiating levels of dependence among smokers has not yet been reported.

1.2. Hypotheses for the current study

In the present study, we tested a two-stage hypothesis of smoking behavior and impulsivity. First, we hypothesized that, in replication of prior research, sensation seeking would differentiate smokers from non-smokers. Second, we anticipated that positive and negative urgency would be associated with higher levels of dependence among those who smoke. These hypotheses were tested in a sample of college students. A large percentage of those who smoke, approximately 23%, are aged 18–24 (Centers for Disease Control, 2009). During the college years many students who have never previously smoked experiment with smoking and become social smokers (Wetter et al., 2004), with research suggesting that 25% of all smokers begin smoking in college (Everett et al., 1999). Constructs related to impulsivity may be especially relevant to smoking among college students as a willingness to take risks and seek new experiences and a tendency to be driven by immediate affective consequences of behavior may be especially strong in young adults and be especially important to the early course of individual's smoking careers.

2. Method

2.1. Participants

A total of 359 undergraduate college students participated in the study, including 210 women who ranged in age from 18 to 25 ($M = 18.8$ years; $SD = 1.08$) and 148 men who ranged in age from 18 to 36 ($M = 19.2$ years; $SD = 1.8$). The majority of the sample's (69.6%) self-reported household income was over $50,000.

We defined individuals as a current smoker if, on the Fagerström Nicotine Dependence Questionnaire (FTND; Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991), they reported that they smoked at least once a month. We defined individuals as negative for smoker status if they reported that they had never tried a single cigarette. Individuals classified into neither group were those that reported that they had smoked once or twice, just to try it, but not in the past month were excluded from the analyses because of their ambiguous status. We excluded past smokers because they did not currently smoke and therefore, did not complete the FTND. In all, 87 participants reported that they had never smoked a cigarette, 139 participants reported current smoker status (68% reported smoking 10 cigarettes or less; 12% reported smoking 11–20; 0% reported smoking 21–30; and 1% reported smoking 31 or more cigarettes per day), and the remaining 113 reported that they had smoked once or twice, but not in the past month or were past smokers and were excluded from these analyses.

2.2. Procedure

Participants were undergraduate students recruited from the General Psychology subject pool. Informed consent was obtained for every participant. Questionnaires were administered in a group format with approximately 25 people in each group, and were completed confidentially. Following completion of the measures, participants were debriefed, thanked, and received course credit for their participation.