



Specific dimensions of impulsivity are differentially associated with daily and non-daily cigarette smoking in young adults

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HIGHLIGHTS

- We examined the association between UPPS impulsivity and smoking in young adults.
- All UPPS dimensions were positively correlated with daily smoking.
- Lack of premeditation was uniquely associated with non-daily smoking.
- Negative urgency was uniquely associated with daily smoking.

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ABSTRACT

Young adults are at risk for initiation of tobacco use and progression to tobacco dependence. Not every person who smokes cigarettes becomes tobacco dependent, however, and non-daily smoking is becoming more prevalent among those who use tobacco. It is likely that individual differences in psychosocial and behavioral factors influence risk for engaging in non-daily and daily cigarette smoking. The objective of this study was to investigate the associations between impulsivity and smoking status in young adults who vary in frequency of cigarette smoking. Young adult first-year college students between the ages of 18–24 (512) were classified to one of three groups: non-smokers, non-daily smokers, or daily smokers, and impulsivity was assessed using the UPPS-P (negative and positive urgency, lack of premeditation, lack of perseverance, sensation seeking). When all impulsivity dimensions were used simultaneously to predict smoking status, negative urgency predicted increased risk of membership in the daily smoking group and lack of premeditation predicted increased risk of membership in the non-daily smoking group. These results suggest that dimensions of impulsivity may contribute differentially to forms of smoking behavior in young adults.

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1. Introduction

Entry into college is a period of increased vulnerability to a variety of risk-related behaviors (e.g. Fromme, Corbin, & Kruse, 2008), including cigarette smoking. Up to 25% of college students begin smoking after turning eighteen (Everett et al., 1999; Foldes et al., 2010), and approximately 28% of college students who smoke intermittently escalate to heavier patterns of use at the age of nineteen or older (Wechsler, Rigotti, Gledhill-Hoyt, & Lee, 1998). However, it is important to note that not every young adult who initiates smoking transitions to daily use (Henningfield et al., 2003), and intermittent, or non-daily smoking is prevalent in young adult cigarette smokers (Berg et al., 2012; Sutfin, Reboussin, McCoy, & Wolfson, 2009). Nevertheless, while the negative

health-related effects of smoking are greatest in those who smoke daily, non-daily smokers are also at risk for increases in negative health-related effects (Caldeira et al., 2012; Schane, Ling, & Glantz, 2010) and have similar relapse rates as daily smokers during cessation attempts (Tindle & Shiffman, 2011). Given the host of health problems associated with tobacco use, including non-daily smoking, it is critical to understand risk factors that predict these different patterns of tobacco use in young adults transitioning to college to better guide prevention and treatment efforts.

Impulsivity, broadly defined, is associated with multiple aspects of cigarette smoking behavior (i.e. initiation and dependence); however, given the multidimensional nature of impulsivity, identifying the key components contributing to tobacco use is crucial. The UPPS model of impulsivity (Lynam, Smith, Whiteside, & Cyders, 2006; Whiteside & Lynam, 2001) includes five distinct pathways to impulsive and risky behavior (positive and negative urgency, lack of premeditation, lack of

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perseverance, and sensation seeking). Some of these dimensions appear to play specific roles in the etiology of cigarette smoking and nicotine dependence. For instance, sensation seeking (defined as the tendency to enjoy and pursue exciting, risky activities) is associated with initiation of cigarette smoking (e.g. Lipkus, Barefoot, Williams, & Siegler, 1994; Perkins et al., 2008), greater positive effects of nicotine (Perkins, Gerlach, Broge, Grobe, & Wilson, 2000), positive dimensions of craving (craving the positive effects of nicotine; Doran, Cook, McChargue, & Spring, 2009), status as a current smoker (Spillane, Smith, & Kahler, 2010), and initiation of daily smoking in high school (Spillane et al., 2012). Negative and positive urgency (the tendency to engage in rash action in response to strong negative or positive affective experiences, respectively) however, are both associated with tobacco dependence (Pang et al., 2014; Spillane et al., 2010), and negative urgency is associated with dimensions of tobacco craving (craving relief from the negative effects of tobacco deprivation; Billieux, Van der Linden, & Ceschi, 2007; Doran et al., 2009). Taken together, this evidence suggests that sensation seeking is associated with tobacco initiation and status as a current smoker, whereas urgency is more closely associated with heavier use and tobacco dependence.

While there is substantial evidence that dimensions of impulsivity, particularly sensation seeking and urgency, influence consumption and problematic use patterns of cigarette use, the independent influence of these risk factors on smoking frequency (daily vs non-daily smoking) is unknown. Therefore, the objective of this study was to investigate the associations between impulsivity dimensions and smoking behavior in young adults who vary in frequency of cigarette smoking, in order to better understand risk factors associated with non-daily and daily tobacco use prior to entry into college. It was hypothesized that UPPS-P impulsivity (specifically sensation seeking and urgency) would be positively correlated with smoking frequency. In addition, when all variables were simultaneously entered in the model, it was hypothesized that sensation seeking would predict membership in the non-daily smoking group, while urgency would predict membership in daily smoking group, compared to both non-daily and non-smokers. This pattern of results would suggest that specific dimensions of impulsivity primarily contribute to different forms of cigarette smoking behavior.

2. Method

2.1. Participants and procedure

Data for this study were collected as part of a three-year longitudinal study investigating individual differences in personality and drug use among college students enrolled at a large public university. Participants were 512 young adults between the ages of 18–24 (52% female, mean age = 18.49), who were recruited from two successive freshman classes. During two consecutive academic years, all freshman students in an Introductory Psychology course were invited to provide demographic information (i.e. sex, ethnicity, home state, and home country) in an in-class screening session for class credit. Inclusion criteria included: 1) between 18 and 24 years of age, 2) willingness to participate in the longitudinal study, and 3) in-state residence. Only data from the first year of the study (Wave 1) were analyzed in the present study. The sample included individuals who identified as White (82.8%), African American (12.4%), Latino/a (1.3%), Asian American (2.0%), Native American (0.2%), and Biracial (1.3%).

Each participant completed one, 2.5-hour session that involved completion of computer-based questionnaires, behavioral tasks, and a structured interview assessing drug use. All measures were administered by extensively trained research personnel. All procedures were reviewed and approved by the Institutional Review Board at the university. For complete details on subject screening and session procedures, see Adams, Kaiser, Lynam, Charnigo, and Milich (2012), and Kaiser, Milich, Lynam, and Charnigo (2012).

2.2. Smoking group classification

Smoking group status was determined by using a Life History Calendar (LHC; Caspi, Moffitt, Thornton, & Freedman, 1996). The LHC is a retrospective method for collecting data on a wide range of life events and behaviors. Participants were asked to report on their substance use from age 13 to the time of the interview. Each year was divided into three four-month intervals that correspond roughly to the two semesters of the school year and the summer. The most recent 4-month period at the time each participant completed the study was used to determine smoking group status.

Participants rated smoking frequency using a 0–5 scale: 0 = no smoking, 1 = once per month or less, 2 = once per week, 3 = two or three times per week, 4 = four or five times per week, and 5 = every day. Non-smokers ($N = 399$; 53% female) were defined as those who did not use cigarettes in the most recent period, and who did not report quitting smoking prior to assessment. Non-daily smokers ($N = 60$; 40% female) were those who reported using ≤ 5 days per week. Daily smokers ($N = 41$; 51% female) reported smoking cigarettes daily. Twelve participants were daily smokers but had recently quit smoking in the most recent period and were excluded from the study, resulting in a final sample of 500.

2.3. Impulsivity

The UPPS-P Impulsive Behaviors Scale (Lynam et al., 2006; Whiteside & Lynam, 2001) is a 59-item inventory designed to measure five distinct personality pathways to impulsive behavior: negative urgency, (lack of) perseverance, (lack of) premeditation, sensation seeking, and positive urgency. Items were rated on a 4-point scale from Strongly Agree to Strongly Disagree. Average scores were calculated for each item. Internal consistency was good across all UPPS-P dimensions in the present sample ($\alpha = .82-.93$).

2.4. Data analysis

Analyses were conducted using SPSS version 21.0. Multinomial logistic regression (MLR) allows for the simultaneous examination of effects of several independent variables (UPPS-P dimensions) on a categorical variable with more than two discrete outcomes (smoking status: non-smoker, non-daily smoker, or daily smoker). The model estimated the effects of the independent variables on the log odds (or logit) of belonging to 1) either non-daily or daily smoking categories compared to the non-smoking category as a reference, and 2) daily smoking category compared to the non-daily smoking category. Coefficients for each variable were exponentiated to provide an odds-like ratio for risk of a smoking category membership compared to the reference group; this value is not a true odds ratio due to the portion of the sample being excluded for either smoking outcome (see Peng & Nichols, 2003, and Tabachnick & Fidell, 2012, for further details on the application of multinomial regression modeling to behavioral data).

3. Results

3.1. Correlations between smoking and impulsivity

Table 1 summarizes means, standard deviations, and correlations between study variables. In order to control for multiple comparisons, a cutoff of $p < .01$ was used to determine significance for correlations. Consistent with previous literature, UPPS-P variables are significantly intercorrelated, with few exceptions. Correlations with tobacco use categories were computed using the data from: 1) non-smokers and non-daily smokers, 2) non-smokers and daily smokers, and 3) non-daily smokers and daily smokers, with smoking status dummy-coded. Non-daily smoking, compared to non-smoking status, was correlated with all dimensions of the UPPS-P except sensation seeking and lack of

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