



Associations of personality traits with marijuana use in a nationally representative sample of adolescents in the United States

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ARTICLE INFO

Keywords:

Marijuana
Personality
Adolescents
Zuckerman-Kuhlman Personality
Questionnaire (ZKPQ)
The National Comorbidity Survey: Adolescent
Supplement (NCS-A)

ABSTRACT

Introduction: Identifying adolescents at risk for marijuana use who can be targeted for intervention efforts is critical. Certain personality traits are strongly associated with substance use, including marijuana use. We investigated the associations of impulsivity (and its subscales sensation seeking and lack of planning), aggression, and neuroticism with marijuana use (lifetime and frequency of past 12-month use) in a national sample of adolescents.

Methods: We used data from the National Comorbidity Survey: Adolescent Supplement, a nationally representative, cross-sectional study of 8495 U.S. adolescents aged 14 to 18 years. We calculated adjusted prevalence ratios and odds ratios to assess associations of the five personality scales with lifetime use and frequency of past 12-month use and examined gender as a potential moderator of these associations.

Results: Each of the personality traits was positively associated with lifetime use (all $p < 0.001$). Impulsivity (the total scale and both subscales) and aggression (all $p < 0.05$) were positively associated with frequency of past 12-month use. The neuroticism–lifetime use association was stronger among girls ($p < 0.001$) than boys ($p < 0.05$), and the associations of impulsivity and lack of planning with frequency of use were significant only among girls, with moderate female users reporting higher levels of the personality scales than infrequent users (both $p < 0.01$).

Conclusions: Our study highlights the potential importance of identifying personality traits, specifically disinhibition-related traits such as impulsivity and aggression, to reduce and prevent adolescent marijuana use.

1. Introduction

Marijuana remains the most widely used illicit drug among adolescents (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2016). Most people initiate marijuana use in adolescence (Schulden, Thomas, & Compton, 2009), highlighting the importance of prevention and early intervention. Personality, an individual's behavioral, cognitive, and emotional response tendencies (Shiner & Caspi, 2003), has been proposed as a key risk factor for youth substance use (Conrod, 2016; Sher, Bartholow, & Wood, 2000; Woicik, Stewart, Pihl, & Conrod, 2009).

A recent meta-analysis identified conscientiousness, agreeableness, and neuroticism as key correlates of adult substance use (Kotov, Gamez, Schmidt, & Watson, 2010). Findings from cross-sectional and prospective studies with non-nationally representative samples of adolescents suggest that disinhibition-related personality traits such as conscientiousness and agreeableness are strongly associated with marijuana use (Flory, Lynam, Milich, Leukefeld, & Clayton, 2002; Kong et al., 2013; Malmberg et al., 2012; Muro & Rodríguez, 2015;

VanderVeen, Hershberger, & Cyders, 2016). Assessing personality traits and their relationships with marijuana use in a nationally representative adolescent sample is a key next step in solidifying the evidence regarding these associations, which in turn guide intervention efforts. Evidence suggests altering the trajectory of maladaptive personality traits is possible with cost-effective, early psychological interventions (Barlow, Sauer-Zavala, Carl, Bullis, & Ellard, 2014; Kennedy, Rapee, & Edwards, 2009; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2010).

We used cross-sectional, nationally representative data from the National Comorbidity Survey: Adolescent Supplement (NCS-A) (Kessler, Avenevoli, Costello, et al., 2009; Kessler, Avenevoli, Green, et al., 2009; Merikangas, Avenevoli, Costello, Koretz, & Kessler, 2009). We examined impulsivity, aggression, and neuroticism as assessed by the Zuckerman Kuhlman Personality Questionnaire (ZKPQ) (Zuckerman, Michael, Joireman, Teta, & Kraft, 1993), which was adapted for use in the NCS-A. These ZKPQ personality traits correspond with NEO-PI-R (Costa & McCrae, 1992)'s conscientiousness, agreeableness, and

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neuroticism, respectively (Zuckerman, 2002; Zuckerman et al., 1993). We explored gender as a potential moderator of personality–marijuana use associations.

2. Material and methods

2.1. Study design and participants

The NCS-A (2001–2004) (Kessler, Avenevoli, Costello, et al., 2009; Kessler, Avenevoli, Green, et al., 2009; Merikangas et al., 2009) is a nationally representative, cross-sectional dataset containing information on prevalence and correlates of major mental disorders for 10,148 U.S. adolescents aged 13 to 18. We excluded 13 year olds because they had very low levels of marijuana use, yielding a sample of 8495 adolescents. We received authorization to access restricted NCS-A data from the Interuniversity Consortium for Political and Social Research and also obtained university IRB approval.

2.2. Measures

2.2.1. Marijuana use

Interviewers asked, “Have you ever used marijuana or hashish, even once?”, to determine *lifetime marijuana use* (yes: $n = 2214$, never: $n = 6262$). For *frequency of past 12-month marijuana use*, interviewers asked “How often did you use marijuana or hashish in the past 12 months- nearly every day, 3 to 4 days a week, 1 to 2 days a week, 1 to 3 days a month, or less than once a month?” to adolescents who responded affirmatively to marijuana use in the past 12 months ($n = 1379$). We categorized the data into three groups: frequent use (nearly every day or 3–4 days a week: $n = 380$), moderate use (1–2 days a week or 1–3 days a month: $n = 410$), and infrequent use (less than once a month: $n = 580$).

2.2.2. Personality scales

The adapted version of the ZKPQ was used in the NCS-A to assess adolescents' personality. The ZKPQ has good test/retest reliability as well as good convergent and discriminant validity (Zuckerman, 2002; Zuckerman et al., 1993). We utilized five ZKPQ personality scales: 1) *impulsivity-sensation seeking* (11 items; 2) *sensation seeking* (a 7-item subscale of impulsivity); 3) *lack of planning* (a 4-item subset of impulsivity); 4) *aggression-hostility* (7 items); and 5) *neuroticism-anxiety* (8 items) (labeled ‘impulsivity’, ‘sensation seeking’, ‘lack of planning’, ‘aggression’, and ‘neuroticism’ hereafter). Internal consistencies of each scale were acceptable (Cronbach's alpha for impulsivity = 0.77; sensation seeking = 0.71; lack of planning = 0.66; aggression = 0.80; neuroticism = 0.77).

We separately assessed sensation seeking and lack of planning—subscales of ZKPQ impulsivity—to better understand the “active ingredients” of impulsivity, as evidence for the association of impulsivity and marijuana use among adolescents is mixed, possibly due to differential associations of separate features of impulsivity with marijuana use (VanderVeen et al., 2016).

2.2.3. Sociodemographic variables

Adolescents' self-reported age (range: 14–18 years), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, “other”), gender (girl, boy), and educational attainment of either parent (less than high school, high school graduate, some college, college graduate) were covariates.

2.3. Statistical analyses

Lifetime prevalence of marijuana use and frequency of past 12-month marijuana use were dependent variables. Impulsivity, sensation seeking, lack of planning, aggression, and neuroticism were independent variables; each was examined in a separate regression

model.

We calculated descriptive statistics for age, race/ethnicity, gender, and parent education and identified their associations with the personality scales and marijuana use variables using weighted Chi-square and adjusted Wald tests. We used generalized linear modeling to calculate adjusted prevalence ratios in assessing associations between the five personality scales and lifetime use. We used multinomial logistic regression to calculate relative risk ratios in examining associations between the five personality scales and frequency of use. We adjusted for age, race/ethnicity, gender, and parent education, as these variables were associated with substance use in previous studies (Dierker et al., 2012; Keyes et al., 2015; Muro & Rodríguez, 2015). To examine gender as a potential moderator, we created terms to represent the interaction between each personality scale and gender and entered these interaction terms into our regression models. We planned gender-stratified analyses in the event that the coefficient for an interaction term was significant. As < 1% of responses were missing, we used listwise deletion by default to handle missing data. Complex survey weights were applied prior to analyses to account for the NCS-A sampling method. Statistical significance was set at p -values < 0.05. Analyses were conducted using Stata13 (StataCorp, 2013).

3. Results

3.1. Sample characteristics

Adolescents aged 15 and older ($\chi^2 = 71.63$, $p < 0.001$) and those whose parents had not graduated college ($\chi^2 = 10.55$, $p < 0.001$) were more likely to report lifetime marijuana use. More boys than girls ($\chi^2 = 4.98$, $p = 0.01$) and more adolescents in the “other” race/ethnicity group than their non-Hispanic White counterparts ($\chi^2 = 3.03$, $p = 0.03$) reported high frequency of past 12-month marijuana use.

As displayed in Table 1, impulsivity-lack of planning differed by age ($p < 0.05$), impulsivity (total and both subscales) and neuroticism differed by gender ($p < 0.001$), impulsivity (total and both subscales) differed by race/ethnicity ($p < 0.05$), and impulsivity-lack of planning, aggression, and neuroticism differed by parent education level ($p < 0.05$).

3.2. Personality scales and marijuana use

All five personality scales were positively associated with lifetime prevalence of marijuana use (all $p < 0.001$). Impulsivity (including both sensation seeking and lack of planning), and aggression were positively associated with higher frequency of past 12-month marijuana use (all $p < 0.01$) (see Table 2).

3.3. Moderation by gender

Gender was a significant moderator of the neuroticism–lifetime use association ($\beta = 1.05$, 95% confidence interval [CI] = 1.01, 1.08, $p = 0.013$), the impulsivity–frequency of use association (moderate vs. infrequent: $\beta = 1.08$, CI = 1.02, 1.14, $p = 0.013$), and the lack of planning–frequency of use association (moderate vs. infrequent: $\beta = 1.23$, CI = 1.07, 1.42, $p = 0.006$). The neuroticism–lifetime use association was stronger in girls (aPR = 1.05, CI = 1.03, 1.06, $p < 0.001$) than boys (aPR = 1.02, CI = 1.01, 1.04, $p = 0.021$). Among girls, moderate users showed higher impulsivity (aOR = 1.09, CI = 1.05, 1.14, $p < 0.001$) and higher lack of planning (aOR = 1.18, CI = 1.06, 1.31, $p = 0.003$) than infrequent users. Among boys, moderate users did not differ from infrequent users in impulsivity (aOR = 1.02, CI = 0.98, 1.07, $p = 0.240$) and lack of planning (aOR = 0.97, CI = 0.88, 1.08, $p = 0.577$).

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