



Short communication

## Frequent marijuana use is associated with greater nicotine addiction in adolescent smokers



Mark L. Rubinstein<sup>a,\*</sup>, Michelle A. Rait<sup>a</sup>, Judith J. Prochaska<sup>b</sup>

<sup>a</sup> Division of Adolescent Medicine at the University of California, San Francisco, San Francisco, CA, USA

<sup>b</sup> Stanford Prevention Research Center at Stanford University, Stanford, CA, USA

### ARTICLE INFO

#### Article history:

Received 21 February 2014

Received in revised form 1 May 2014

Accepted 18 May 2014

Available online 2 June 2014

#### Keywords:

Adolescent  
Marijuana  
Cannabis  
Tobacco  
Nicotine addiction

### ABSTRACT

**Background:** Marijuana and tobacco are the substances used most commonly by adolescents and co-occurring use is common. Use of one substance may potentiate the addictive properties of the other. The current study examined the severity of nicotine addiction among teen smokers as a function of co-occurring marijuana use.

**Methods:** Participants were 165 adolescents (13–17 years old) who reported smoking at least 1 cigarette per day (CPD) in the past 30 days. General linear models examined the association of marijuana use with multiple measures of nicotine addiction including the Modified Fagerström Tolerance Questionnaire (mFTQ), Hooked on Nicotine Checklist (HONC), ICD-10, and the Nicotine Dependence Syndrome Scale (NDSS).

**Results:** The adolescent sample (mean age = 16.1 years, SD = 0.95) averaged 3.0 CPD (SD = 3.0) for 1.98 years (SD = 1.5). Most (79.5%) also smoked marijuana in the past 30 days. In models controlling for age, daily smoking status, and years of tobacco smoking, frequency of marijuana use accounted for 25–44% of the variance for all four measures of adolescent nicotine dependence.

**Conclusions:** Marijuana use was associated with greater reported nicotine addiction among adolescent smokers. The findings suggest a role of marijuana in potentiating nicotine addiction and underscore the need for treatments that address both smoked substances.

© 2014 Elsevier Ireland Ltd. All rights reserved.

## 1. Background

Marijuana is the most widely used illicit substance worldwide (UNDOC, 2010). In 2010, more US high school students used marijuana in the prior 30 days than tobacco (Johnston et al., 2011). Co-use with tobacco is of increasing interest (Akre et al., 2010; Ramo et al., 2012; Soldz et al., 2003). Smoking marijuana with tobacco, either in a tobacco leaf (i.e. blunt) or mixed with tobacco, is an increasingly common practice among adolescents (Golub et al., 2005) thought by some users to prolong the effects (Tullis et al., 2003) and/or increase the high from marijuana (Cooper and Haney, 2009). A recent national online, anonymous survey of young smokers reported that roughly half also smoked marijuana in the past 30 days (Ramo et al., 2013). Co-use of marijuana and tobacco may

contribute to the development of nicotine dependence (Agrawal et al., 2012; Ramo et al., 2012) and thus, is an important area of research for the investigation.

Adult co-users of tobacco and marijuana have an increased risk of developing nicotine dependence (Agrawal et al., 2012; Behrendt et al., 2009; Okoli et al., 2008; Timberlake et al., 2007; Tullis et al., 2003) and have worse tobacco cessation outcomes (Agrawal et al., 2012; Gourlay et al., 1994; Humfleet et al., 1999; Richter et al., 2002; Stapleton et al., 2009). While overall rates of tobacco use and co-use with marijuana are lower in adolescents compared with adults (Ramo et al., 2013), most addicted adults develop nicotine dependence during adolescence. Therefore, adolescence is a critical period to study the effects of marijuana on tobacco.

Although the transition from experimentation with tobacco to addiction is likely multifactorial, marijuana use may play a role for some adolescents and has been identified as a risk for nicotine addiction in a study of young adults (Patton et al., 2005). Possible mechanisms of action include common routes of administration (e.g., smoking being the most common route for both); hence, one behavior may reinforce the other. Furthermore, both nicotine and cannabis affect similar pathways within the mesolimbic

\* Corresponding author at: University of California, San Francisco, 3333 California Street, Suite 245, San Francisco, CA 94118, USA. Tel.: +1 415 476 5763; fax: +1 415 476 6106.

E-mail addresses: [RubinsteinM@peds.ucsf.edu](mailto:RubinsteinM@peds.ucsf.edu) (M.L. Rubinstein), [RaitM@peds.ucsf.edu](mailto:RaitM@peds.ucsf.edu) (M.A. Rait), [jpro@stanford.edu](mailto:jpro@stanford.edu) (J.J. Prochaska).

addiction pathways, suggesting similar and overlapping mechanisms for addiction (Filbey et al., 2009; Goldman et al., 2013). Finally, smoking cues are also similar between the two substances, which may contribute to the poorer tobacco cessation outcomes observed in adult co-users of marijuana (Agrawal et al., 2012; Gourlay et al., 1994; Humfleet et al., 1999; Stapleton et al., 2009).

Despite the increasing prevalence of marijuana use in adolescents, particularly among smokers, and evidence of harm from marijuana–tobacco co-use in adults, little is known about the interaction between marijuana and tobacco in adolescents. The goal of this study was to examine the severity of nicotine addiction among teen smokers as a function of co-occurring marijuana use. Given the literature on adult smokers, we hypothesized marijuana would contribute to symptoms of nicotine dependence among adolescents.

## 2. Methods

### 2.1. Participants

Adolescents between the ages of 13–17 from the San Francisco Bay Area who smoked at least 1 cigarette in the past 30 days were recruited as part of an ongoing smoking trajectory study detailed elsewhere (Rubinstein et al., 2013). Adolescents responding to online, school and clinic-based advertising were invited to complete the study visit. Participants were screened to exclude those who had used any form of nicotine replacement in the prior month. Females with positive pregnancy tests were excluded from the study.

### 2.2. Informed consent

The research design and procedures were reviewed and approved by the University of California, San Francisco Institutional Review Board. Informed, written assent from the adolescent subject and consent from one parent were obtained for each subject before data collection.

### 2.3. Measures

Adolescent tobacco smokers completed in-person surveys of smoking behaviors and dependence scales. Tobacco use was measured by asking adolescents how many cigarettes they smoked on each day of the week. Participants who reported smoking on fewer than 30 of the previous 30 days were considered intermittent smokers (DiFranza et al., 2007; Husten, 2009; Lindstrom and Isacson, 2002). Given the lack of consensus regarding optimal measurement of nicotine dependence in adolescents, (Colby et al., 2000a,b) the study administered the following four measures at study entry: (1) the modified Fagerström Tolerance Questionnaire (mFTQ; Prokhorov et al., 1996), (2) the Hooked on Nicotine Checklist (HONC; O'Loughlin et al., 2002), (3) the Nicotine Dependence Syndrome Scale (NDSS; Shiffman and Sayette, 2005), and (4) the *International statistical classification of diseases and related health problems*, 10th revision (ICD-10) criteria for nicotine dependence (World Health Organization, 1992). All of the nicotine dependence measures were scored continuously with the total score on each measure used to quantify nicotine addiction.

Participants were also queried about their alcohol, smoked marijuana, and other drug use during the past 3 months, with possible responses of “Never”, “Not in last 3 months”, “Once a month or less”, “More than once a month, but less than once a week”, “One or more times a week but not every day”, “Every day”, and “I don't want to answer.” Those who declined to answer ( $n=5$ ) were not included

in the current analyses. For the purposes of analyses, possible responses were collapsed into four categories (1 = never to less than once every 3 months, 2 = monthly to quarterly, 3 = weekly, and 4 = daily). Symptoms of depression were measured using the Center for Epidemiologic Studies Depression Scale (CESD; Faulstich, 1986).

### 2.4. Data analyses

Frequency of marijuana use was categorized as: (1) never or no use in past 3 months, (2) Once a month or less plus once a week or less, (3) one or more times a week, and (4) every day. Spearman's rho correlations examined associations between frequency of our ordinal measure of marijuana use with demographic variables, cigarettes per day and alcohol use. To examine the association between marijuana and measures of nicotine addiction (mFTQ, HONC, NDSS, ICD-10), we ran general linear models with key variables that in the literature have been associated with nicotine addiction (i.e., age, gender, years of smoking, daily/nondaily smoker) and marijuana use (i.e., race and alcohol use).

## 3. Results

Two hundred adolescents consented into the study and completed the baseline visit. Of those, 28 denied smoking cigarettes in the past 30 days and 7 declined to answer the question about marijuana use and were thus excluded from the analysis. The resulting sample ( $N=165$ , 64% female) had a mean age of 16.1 years ( $SD=0.95$ ) and was racially diverse, with 28% participants identifying as White, 19% African American, 19% Hispanic and 34% other. Participants averaged 3.01 CPD ( $SD=3.0$ ) for a duration of 1.98 years ( $SD=1.49$ ). Fifty-one participants (31.5%) reported daily cigarette smoking and 111 (68.5%) reported non-daily smoking (i.e., smoking cigarettes on fewer than 30 days in the past month). Mean scores were 2.56 on the mFTQ ( $SD=1.42$ ), 4.52 on the HONC ( $SD=3.24$ ),  $-1.75$  on the NDSS ( $SD=1.39$ ), and 10.13 on the ICD-10 ( $SD=6.21$ ).

Most participants (79.5%) reported marijuana use in the past 30 days with 43 (26.1%) using weekly, and 62 (37.6%) reporting daily use. Frequency of marijuana use was correlated with CPD ( $r=0.16$ ,  $p=0.04$ ), but not with the frequency of alcohol use ( $r<-0.01$ ,  $p=0.99$ ). Participant CESD scores were not associated with frequency of marijuana use ( $r=.06$ ,  $p=.44$ ) or cigarette use (CPD;  $r=.04$ ,  $p=.65$ ).

In general linear models controlling for age, years of smoking, and daily versus non-daily smoking, frequency of marijuana use was significantly and positively associated with nicotine addiction (Table 1). The findings were consistent across all four measures of dependence and remained significant for the mFTQ after removing the question on CPD. When examining the NDSS subscales, only the drive and priority subscales were significantly associated with marijuana frequency. Older age, more years smoking, and daily smoking were associated with greater nicotine dependence in all models. The total percent of variance predicted ranged from 25% for the HONC to 44% for the mFTQ and NDSS.

**Table 1**

General linear models of adolescent nicotine dependence (values shown are the % variance accounted for by each variable in the model).

	mFTQ <sup>a</sup> N = 159	mFTQ <sup>a</sup> N = 159	HONCN = 156	NDSSN = 144	ICD-10N = 123
Age	.059**	.059**	.033*	.064**	.046*
Sex	.002	.002	.013	.001	.013
Race/ethnicity	.018	.017	.031	.024	.023
Years of smoking <sup>a</sup>	.029*	.032*	.067**	.150**	.038*
Daily/Intermittent <sup>b</sup>	.328**	.321**	.105**	.210**	.116**
Alcohol <sup>c</sup>	.006	.005	.004	.003	.012
Marijuana <sup>c</sup>	.049**	.047**	.035*	.039*	.048*
Full Model	Adj-R <sup>2</sup> = .44**	adj-R <sup>2</sup> = .44**	adj-R <sup>2</sup> = .25**	adj-R <sup>2</sup> = .44	adj-R <sup>2</sup> = .27

mFTQ<sup>a</sup> does not include the item on cigarettes per day.

<sup>a</sup> Number of years since first cigarette smoked.

<sup>b</sup> Daily versus intermittent smoking.

<sup>c</sup> Frequency of use in past 3 months.

\*  $p < .05$ .

\*\*  $p < .001$ .

Download English Version:

<https://daneshyari.com/en/article/1069857>

Download Persian Version:

<https://daneshyari.com/article/1069857>

[Daneshyari.com](https://daneshyari.com)