Drug and Alcohol Dependence 132 (2013) 63–68

Contents lists available at SciVerse ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep

Marijuana withdrawal and aggression among a representative sample of U.S. marijuana users

Philip H. Smith[a,*], Gregory G. Homish[a,b], Kenneth E. Leonard[b,c], R. Lorraine Collins[a,b]

[a] Department of Community Health and Health Behavior, University at Buffalo, the State University of New York, Buffalo, NY 14214, United States
[b] Research Institute on Addictions, University at Buffalo, the State University of New York, Buffalo, NY 14203, United States
[c] Department of Psychiatry, University at Buffalo, the State University of New York, Buffalo, NY 14214, United States

ARTICLE INFO

Article history:
Received 9 August 2012
Received in revised form 3 January 2013
Accepted 5 January 2013
Available online 4 February 2013

Keywords:
Marijuana
Withdrawal
Aggression
Cannabis
THC
NESARC

ABSTRACT

Background: Previous laboratory-based research suggests that withdrawal from marijuana may cause increased aggression. It is unclear whether this finding extends beyond the laboratory setting to the general population of marijuana users. The purpose of this study was to test a cross-sectional association between marijuana withdrawal symptoms and aggression among a representative sample of U.S. adult marijuana users, and to test whether this association was moderated by previous history of aggression.
Methods: Data were analyzed from the National Epidemiologic Survey on Alcohol and Related Conditions. Wave Two data (2004–2005) were used for all variables except for history of aggression, which was assessed during the Wave One interview (2001–2002). Two outcomes were examined: self-report general aggression and relationship aggression. Odds ratios for aggression based on withdrawal symptoms and the interaction between withdrawal symptoms and history of aggression were calculated using logistic regression, adjusting for covariates and accounting for the complex survey design.
Results: Among marijuana users with a history of aggression, marijuana withdrawal was associated with approximately 60% higher odds of past year relationship aggression ($p < 0.05$). There was no association between withdrawal symptoms and relationship aggression among those without a history of aggression, and no association with general aggression regardless of history of aggression.
Conclusions: The findings from this study support the notion that laboratory-based increases in aggression due to marijuana withdrawal extend to the general population of marijuana users who have a previous history of aggression.

1. Introduction

Researchers and policy makers have long debated the relation between marijuana use and aggression (Taylor and Hulsizer, 1998). To date, a large body of research has examined this relationship using pre-clinical animal samples (Cherek and Thompson, 1973; Kilbey et al., 1973; Miczek et al., 1994), human experimental studies (Cherek and Dougherty, 1995; Cherek et al., 1993; Myerscough and Taylor, 1985), and observational study designs (Arseneault et al., 2000; Hammer and Pape, 1997; Sussman et al., 1996). Pre-clinical animal studies tend to find that delta-9-tetrahydrocannabinol (THC) administration either has a null or inhibitory effect on aggressive behavior (Cherek and Thompson, 1973; Miczek and Barry, 1974). Human experimental studies have found both null results and positive associations (Cherek and Dougherty, 1995; Cherek et al., 1993; Myerscough and Taylor, 1985; Taylor et al., 1976), and are thus inconclusive (Moore and Stuart, 2005).

Findings from observational research are largely mixed. For example, Arseneault et al. (2000) conducted a study of mental disorders and violence among 961 members of the 1972–1973 New Zealand birth-cohorts, and found that those who reported violent crime were approximately four times more likely to report marijuana dependence than those who were not violent. Conversely, White et al. (1999) conducted a longitudinal investigation of substance use and aggression among 506 males from 7th to 12th grade, and found that the predictive association between marijuana use and aggression was non-significant after controlling for history of aggression and alcohol use. Multiple researchers have summarized these findings in empirical reviews, and due to the inconsistent nature of the results, have come to varying conclusions (Hoaken and Stewart, 2003; Moore and Stuart, 2005; Sussman et al., 1996; Taylor and Hulsizer, 1998).

The majority of previous research on the topic of marijuana and aggression has focused on marijuana use as the behavior of interest;

* Corresponding author at: 329 Kimball Tower, Department of Community Health and Health Behavior, University at Buffalo, the State University of New York, 3435 Main Street, Buffalo, NY 14214, United States. Tel.: +1 716 829 5702; fax: +1 716 829 6040.
E-mail address: psmith3@buffalo.edu (P.H. Smith).

0376-8716/$ – see front matter © 2013 Elsevier Ireland Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.drugalcdep.2013.01.002

however, marijuana may be tied to aggression through withdrawal symptoms (Hoaken and Stewart, 2003; Moore and Stuart, 2005). There is a growing body of empirical evidence that a portion of heavy marijuana users experience substantial changes in mood and behavior during periods of abstinence, including symptoms of irritation and aggression (Budney and Hughes, 2006; Budney et al., 2004, 2003, 1999; Haney et al., 1999; Kouri et al., 1999). For example, Kouri et al. (1999) conducted a laboratory experiment among heavy, chronic marijuana users, in which participants were randomized to control or abstinence conditions. The abstinence group exhibited higher levels of aggression at days three and seven when compared to the control group and to their pre-abstinence aggression levels. Allsop et al. (2011) measured cannabis withdrawal among 49 dependent cannabis users with the Cannabis Withdrawal Scale, and found that withdrawal-related angry outbursts were intense and associated with high levels of distress.

These previous studies of marijuana withdrawal have been conducted in highly controlled experimental settings using samples of chronic marijuana users, and it is unclear whether marijuana withdrawal may be related to aggression in the general population of marijuana users using observational study designs. The effect of marijuana withdrawal on aggression found in laboratory studies may not be discernible in the context of the many other inhibiting and facilitating factors in observational research settings (Leonard, 1993; Moore and Stuart, 2005). Further, it may be the case that although marijuana withdrawal increases aggressive responding in laboratory settings among chronic marijuana users, other risk factors for aggression moderate the association in observational studies of community or population samples. One important potential moderator is the general tendency to be aggressive (Chermack and Giancola, 1997; White and Hansell, 1996). A history of aggression strongly predicts the recurrence of current aggression (Elbogen and Johnson, 2009; Monahan and Steadman, 1996), and marijuana withdrawal symptoms may be more strongly related to aggression among those who have acted aggressively in the past.

1.1. General aggression versus relationship aggression

The impact of marijuana withdrawal on general aggression can be placed in the context of Anderson and Bushman (2002) heuristic model of general aggression. In this model, inputs from both person factors (e.g., traits, gender, beliefs, attitudes) and situational factors (e.g., aggressive cues, provocations) interact to create a person's present internal state, which then influences the behavioral outcome of a situation. One of the primary "present internal states" in this model is the individual's affect. Hostility, anger, and other negative affective states are strongly linked to aggression. Thus, if a smoker is experiencing these affective states as a result of their withdrawal, this individual may be more likely to act aggressively in a given circumstance.

A similar pathway may link marijuana withdrawal to relationship aggression. However, evidence suggests that there are important differences between general aggression and partner aggression with regard to their risk factors and etiology (Babcock et al., 2003; Moffitt et al., 2000). For example, general aggression is often rooted in a pattern of antisocial behavior. While this is true for a portion of those who act aggressively toward their romantic partners, a larger proportion of relationship aggression results from poor conflict resolution tactics that are not the result of antisocial tendencies (Kelly and Johnson, 2008). This is reflected in a study by Moffitt et al. (2000) who found that negative emotionality increased propensity for both relationship aggression and general crime, while low constraint, a symptom of antisocial personality, was only found among perpetrators of general crime. It is important to note that this study examined general crime, and not aggression, although the findings likely extend to general aggression as crime and aggression are often both rooted in antisocial behaviors. Given these differences in etiology, it is reasonable to hypothesize that associations with marijuana withdrawal may differ between relationship aggression and general aggression, although these differences have not been previously studied.

1.2. Objectives

The current study examined whether marijuana withdrawal symptoms were associated with reports of general and relationship aggression in a U.S. nationally representative sample of marijuana users. We examined these associations using data from Wave Two of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), while adjusting for relevant covariates. We also tested the interaction between withdrawal symptoms and a history of aggression. Given that differences between relationship aggression and general aggression with regard to substance use withdrawal have not been empirically examined, we hypothesized significant associations with both outcomes. We also hypothesized that the associations would be stronger for those with a history of aggression.

2. Methods

A detailed account of the NESARC methodology can be found elsewhere (Grant and Kaplan, 2005; Grant et al., 2003). Briefly, the Wave One NESARC data were collected during 2001 and 2002, and Wave Two during 2004 and 2005. The response rate for Wave One was 81%, and the sample of 43,093 represented the civilian, non-institutionalized adult population in the United States. Wave Two included 34,653 (80%) of the original respondents. For both waves, surveys were administered face-to-face, using computer-assisted personal interviews. African Americans, Hispanics, and young adults were oversampled, and the data were weighted to adjust for non-response at the household and person levels. Based on the 2000 Census, the data were adjusted on socio-demographic variables to ensure an accurate representation of the U.S. population. We chose to examine aggression reported at Wave Two of the NESARC survey as our outcome because relationship aggression was assessed in more detail at Wave Two than during the Wave One interview.

We limited the sample to respondents who reported marijuana use at the Wave Two interview. This was done to generate a comparison group that was functionally similar to the exposure group (marijuana users with withdrawal symptoms compared to marijuana users without withdrawal symptoms). In the NESARC survey, relationship aggression was measured as past year occurrence, and general aggression was measured as occurrence since the Wave One interview; thus, when relationship aggression was the outcome of analyses, we limited the sample to those who reported marijuana use during the past year and reported being in a relationship ($n = 1461$). When general aggression was the outcome, we limited the sample to those who reported marijuana use since the Wave One NESARC interview ($n = 1712$). The sample was limited in this fashion to maintain a consistent time-frame between the marijuana withdrawal exposure variables and the aggression outcome variables. Past year marijuana users were similar to those who used since the last interview with regard to age (means = 34.47 and 34.31 years, respectively), gender (percent female = 32.3 and 32.4), household income (means = 10.34 and 10.39; representing the income range of $35,000–$50,000), and education level (means = 9.77 and 9.82; between high school/GED and some college).

2.1. Measures

2.1.1. General aggression. General aggression was assessed in the Wave Two NESARC survey as part of the Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV version (AUDADIS-IV; Grant and Dawson, 2000) measure for Antisocial Personality Disorder. Four items assessed physical aggression since the previous interview: (1) hit someone so hard that you injured them or they had to see a doctor, (2) physically hurt another person in any way on purpose, (3) got into a lot of fights that you started, and (4) used a weapon like a stick, knife, or gun in a fight. Responses for these items were yes/no. For the purposes of this investigation, we created a binary variable in which we classified an affirmative response to any one of these four items as a report of general aggression. We chose a binary classification over a count variable because of substantial overlap between the four items. Sensitivity analyses showed that the nature of our findings did not vary by classification scheme, and the binary variable was simpler for purposes of analyses and interpretation. A similar binary measure was utilized by Elbogen and Johnson (2009), who demonstrated that this operationalization of aggression related to dispositional, historical, and contextual risk factors for aggressive behavior, supporting the validity of the measure.