



Cannabis problem experiences among users of the tobacco–cannabis combination known as blunts



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ABSTRACT

Background: In most of the world, cannabis smokers mix loose tobacco inside a joint, pipe, spliff, or cone. More recently, a 'blunt' formulation combines these two drugs by inserting cannabis into a hollowed-out cigar. Epidemiological research linking simultaneous use of these two drugs and the development of cannabis use disorders (CUD) remains unclear. This study estimates associations linking blunt smoking with levels and subtypes of cannabis problems.

Methods: Cross-sectional data on 27,767 past-year cannabis users were analyzed from the US National Survey on Drug Use and Health (NSDUH) conducted from 2009 to 2012. Ten self-reported items of DSM-IV CUD features elicited a single latent trait of cannabis problem (CP) severity, which was then regressed on past-year blunt smoking and past-month blunt frequency measures within the context of a conceptual model. Differential item functioning (DIF) analysis evaluated potential bias in CP feature response by blunt smoking history.

Results: Past-year blunt smoking was associated with higher CP severity compared to cannabis users who did not smoke blunts. Days of blunt smoking in the past month also predicted higher CP severity than less frequent blunt use. Those smoking blunts experienced more subjectively felt tolerance and having spent more time obtaining or using cannabis, but were less likely to experience other problems, even at the same level of CP severity.

Conclusions: These findings suggest smoking blunts might promote the development of problematic cannabis use. Responses to cannabis problems differed by history of blunt smoking, possibly implicating an influence of tobacco on measurement of cannabis use disorders.

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1. Introduction

The nature and extent tobacco, combined with cannabis, contributes to the experience of cannabis use disorders (CUDs) deserves considerably more attention. Tobacco and cannabis co-use is highly common, and 90% of cannabis users have smoked tobacco in their lifetime (Agrawal et al., 2012; Ramo et al., 2013). In many countries, users consume cannabis by mixing it with loose tobacco (Akre et al., 2010; Amos et al., 2004; Burns et al., 2000; Hammersley and Leon, 2006; Highet, 2004; Ream et al., 2006). In Switzerland, four out of five users mix tobacco with cannabis and expose themselves to significant levels of nicotine – even if they do not self-identify as cigarette smokers (Belanger et al., 2013, 2011). Further, pre-clinical research supports functional interactions between nicotine and cannabinoids suggesting

potential harmful effects of this drug combination over-and-above either drug's additive effects (Viveros et al., 2006). In the United States, the 'blunt' formulation is a popular method of mixing tobacco and cannabis (i.e., made by rolling cannabis inside a cheap cigar shell). Thus, this study seeks to add new evidence of the degree to which the tobacco–cannabis combination known as blunts contributes to the experience of cannabis problems (CP).

Cannabis users in the US typically do not mix loose tobacco with cannabis in a joint or pipe, and may shun tobacco altogether, in contrast to smoking practices elsewhere in the world (Johnson et al., 2006; Ream et al., 2006; Sifanek et al., 2003). Therefore, blunt smoking represents a uniquely American way of combining tobacco and cannabis (although the popularity of blunts outside of the US has not been empirically examined). Half of adolescents who currently smoke cannabis have also smoked a blunt in the past month (Golub et al., 2005; Substance Abuse and Mental Health Services Administration, 2007). Blunt smoking tends to be over-represented among males, African-Americans, older youths, more recent birth cohorts, and urban residents (Golub et al., 2005; Timberlake, 2013).

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Prevalence has increased steadily over the past decade, and blunt use has become more widely diffused across racial/ethnic groups (Soller and Lee, 2010; Timberlake, 2013). Cigars used for blunts and 'blunt wraps' (i.e., cigar rolling papers) are widely available in tobacco shops, convenience stores, and liquor stores (Lipperman-Kreda et al., 2014; Sifaneck et al., 2005). Youths may prefer blunts to joints (i.e., cannabis rolled in cigarette paper) because blunts hold a larger quantity of cannabis, it burns slower, is easier to transport and conceal, and it culturally distinguishes their cannabis use from the older "hippie" generation of cannabis users (Mariani et al., 2011; Sifaneck et al., 2005).

Tobacco and cannabis co-use, including blunt smoking, is a health concern. Compared to cannabis-only use, co-use is associated with increased risk of CUDs, poorer psychological outcomes, and difficulties quitting cannabis (Peters et al., 2012; Ramo et al., 2012). Compared to tobacco cigarettes, blunts are perceived as safer and less addictive, yet evidence suggests smoking blunts is associated with being more nicotine dependent, thus potentially increasing the risk of tobacco-related illnesses (Dunlap et al., 2006; Sinclair et al., 2013; Timberlake, 2009). There is further concern that users may add other dangerous drugs to blunts (e.g., codeine, cocaine, ecstasy, hallucinogens; Elwood, 1998; Soldz et al., 2003).

Another significant health concern is the degree to which combining tobacco and cannabis leads to more severe cannabis problems, as an estimated 1 in 11 cannabis users become dependent at some point in their lives (Anthony et al., 1994). One twin study found that females who used tobacco and cannabis simultaneously (not necessarily in blunt form) were more likely to be frequent cannabis users and experience cannabis abuse, but not dependence (Agrawal et al., 2009). Two studies have focused specifically on blunt smoking. One study of a non-probability sample of cannabis users found that their frequency of blunt smoking in the past month was independently associated with several cannabis dependence symptoms, but unfortunately, CUD diagnostic outcomes were not evaluated (Ream et al., 2008). A second study did use a probability sample of recent cannabis users and reported that current blunt smoking was linked to a twofold excess occurrence of CUDs, but found no differences by the degree blunt smoking was preferred over overall cannabis smoking (Timberlake, 2009). Considering the widespread and increasing use of blunts to consume cannabis, replication of these findings among nationally representative samples is needed to understand the extent blunt smoking may affect the overall experience of cannabis problems.

In order to shed new light on this topic, this project turned to recent, nationally representative samples of active cannabis users with and without a history of blunt smoking. In contrast to the clinical diagnostic approach that assumes a binary case or non-case status in the experience of cannabis problems (e.g., Timberlake, 2009), this paper takes a psychometric measurement approach that assumes the experience of cannabis problems varies along a continuum of severity, defined within the framework of DSM-IV clinical features. Item response theory (IRT) is an approach that posits responses to a domain of related items may be observable manifestations of an underlying latent dimension or "trait" (Embretson and Reise, 2000). Within the context of substance use disorders, the IRT literature supports a single latent trait underlying substance abuse and dependence (Gillespie et al., 2007; Langenbucher et al., 2004; Martin et al., 2006; Saha et al., 2006), including CUDs (Compton et al., 2009; Gillespie et al., 2012; Wu et al., 2012); the current DSM-V has likewise endorsed CUD as a single construct comprised of multiple clinical features with severity levels (American Psychiatric Association, 2013). A latent trait approach has distinct advantages. It permits comparisons across levels of CP severity, the contribution of each CP feature to overall severity is allowed to vary, and it allows for identification of potential response bias across groups (i.e., differential item functioning, DIF). Presence of DIF would suggest

that the measurement of cannabis problems behaves differently by blunt smoking status. A multiple indicators, multiple causes (MIMIC) modeling approach used in this paper has been used previously by others to show DIF in CP features by age and race/ethnicity (Chen and Anthony, 2003; Muthen, 1984; Wu et al., 2012).

To summarize, this paper aims to estimate the degree to which blunt smoking (past-year use and past-month frequency) is associated with CP severity among recently active cannabis users within a conceptual model. Smoking blunts is hypothesized to be associated with higher levels of CP severity compared to those who do not smoke blunts. Likewise, frequent blunt use is expected to be related to higher CP severity. Exploratory analyses probe for possible DIF in the response to individual CP features by past-year blunt smoking status. The purpose of these exploratory analyses is to explore the possibility that responses to individual CP features vary by blunt smoking, over-and-above what the level of CP severity can explain.

2. Methods

2.1. Study design and sample

The US National Survey on Drug Use and Health (NSDUH) is an ongoing series of annual, cross-sectional surveys designed to produce nationally representative estimates on the prevalence and correlates of tobacco, alcohol, cannabis, and other drug use. Publicly available data from four surveys conducted from 2009 to 2012 were used ($n = 227,310$). This study focused on a subsample that used cannabis six days or more in the past year, and who started smoking blunts for the first time more than a year prior to interview ($n = 27,767$; 12% of total sample). Excluded were respondents who never smoked cannabis ($n = 136,945$; 60% of total sample), or used cannabis on fewer than six days in the past year ($n = 60,211$; 27% of total sample); neither group was asked about cannabis problems. Also excluded were individuals who started smoking blunts for the first time in the past year ($n = 2,387$; 1% of total sample) because blunt onset may have followed the occurrence of cannabis problems.

Surveys were designed to target all civilian, non-institutionalized US persons aged 12 years or older in the population. This excluded active-duty military and persons living within institutionalized group quarters (e.g., hospitals, prisons, nursing homes, and treatment centers). An independent, multi-stage area probability sampling design selected respondents from each of the 50 US states and the D.C. Trained field staff interviewed respondents using computer assisted interviewing (CAI) methods, and offered \$30 cash for participation. Average participation levels based on completed interviews among sampled households were 67%. The local institution review board (IRB) for the protection of human subjects study deemed the analyses of anonymous NSDUH public use data exempt from full review. Further details of NSDUH methodology are published online (<http://www.samhsa.gov/data/Methodological.Reports.aspx>, accessed 13.10.14).

2.2. Measures

2.2.1. Cannabis problems. Outcome measures of cannabis problems were based on CUD clinical features in the Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 1994). Cannabis problems measured in the past year included: (1) spent a great deal of time over a period of a month getting, using, or getting over the effects of cannabis; (2) used cannabis more often than intended or was unable to keep set limits on cannabis use; (3) needed to use cannabis more than before to get desired effects or noticed that same amount of cannabis use had less effect than before; (4) inability to cut down or stop using cannabis every time tried or wanted to; (5) continued to use cannabis even though it was causing problems with emotions, nerves, mental health, or physical problems; (6) cannabis use reduced or eliminated involvement or participation in important activities; (7) serious problems at home, work, or school caused by using cannabis; (8) used cannabis regularly and then did something that might have put them in physical danger; (9) use of cannabis caused them to do things that repeatedly got them in trouble with the law; and (10) problems with family or friends caused by using cannabis and continued to use cannabis even though they thought using cannabis caused these problems. Responses were coded as either 'yes' or 'no' (non-responses were imputed as 'no'; $n = 242$, or less than 1% of the sample).

2.2.2. Past-year blunt smoking and past-month blunt frequency. Blunt smoking was assessed specifically from general cannabis use, and items about blunt smoking were asked regardless of prior responses to cannabis use. Individuals giving inconsistent answers to cannabis and blunt questions were asked for clarification. The definition provided for blunts read: "Sometimes people take some tobacco out of a cigar and replace it with marijuana. This is sometimes called a 'blunt.'" Past-year blunt smoking was defined as smoking a blunt at least once in the past 12 months: "How long has it been since you last smoked part or all of a cigar with marijuana in it?" Days of blunt smoking in the past month were defined from the item: "On how many of the past 30 days... did you smoke part or all of a cigar with marijuana in it?"

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