Marijuana protective behavioral strategies as a moderator of the effects of risk/protective factors on marijuana-related outcomes

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HIGHLIGHTS

- Examined risk/protective factors of marijuana use frequency and consequences.
- Examined marijuana-PBS use as a moderator among marijuana using college students.
- Marijuana-PBS use was strongly negatively associated with marijuana outcomes.
- Marijuana-PBS use buffered risk factors and enhanced protective factors among users.

ARTICLE INFO

ABSTRACT

Given that both marijuana use and cannabis use disorder peak among college students, it is imperative to determine the factors that may reduce risk of problematic marijuana use and/or the development of cannabis use disorder. From a harm reduction perspective, the present study examined whether the use of marijuana protective behavioral strategies (PBS) buffers or amplifies the effects of several distinct risk and protective factors that have been shown to relate to marijuana-related outcomes (i.e., use frequency and consequences). Specifically, we examined marijuana-PBS use as a moderator of the effects of impulsivity-like traits, marijuana use motives, gender, and marijuana use frequency on marijuana-related outcomes in a large sample of college students ($n = 2093$ past month marijuana users across 11 universities). In all models PBS use was robustly related with use frequency and consequences (i.e., strongly negatively associated with marijuana outcomes). Among interactions, we found: 1) unique significant interactions between specific impulsivity-like traits (i.e., premeditation, perseverance, and sensation seeking) and marijuana-PBS use in predicting marijuana consequences, 2) unique significant interactions between each marijuana use motive and marijuana-PBS use in predicting marijuana use frequency and 3) marijuana-PBS use buffered the risk associated with male gender in predicting both marijuana outcomes. Our results suggest that marijuana-PBS use can buffer risk factors and enhance protective factors among marijuana using college students. Future research is needed to understand context-specific factors and individual-level factors that may make marijuana-PBS use more effective.

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1. Introduction

Not only is marijuana (or cannabis) the most widely used illicit drug in the United States in the population at large (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2015), but both marijuana use and cannabis use disorder peak among college students or traditional college aged individuals (Caldeira, Arria, O'Grady, Vincent, & Wish, 2008; Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2015). From a harm reduction perspective, it is imperative to determine the factors that may reduce risk of problematic marijuana use and/or the development of cannabis use disorder. In the present study, we examine one such factor, the use of protective behavioral strategies (PBS).

A substantial, growing alcohol literature evinces that using alcohol-PBS can reduce alcohol use and the experience of alcohol-related problems among college students (Pearson, 2013; Prince, Carey, & Maisto, 2013). Pedersen and colleagues recently extended the literature by developing and validating a measure of Protective Behavioral Strategies for Marijuana (PBSM; Pedersen, Hummer, Rinker, Traylor, & Neighbors, 2016). In this study, they found that use of marijuana-PBS was robustly associated with lower marijuana use frequency and marijuana-related consequences. Essentially, these results provide good evidence of a "main effect" of use of marijuana-PBS on marijuana-related outcomes. An important next step is to determine whether use of marijuana-PBS can buffer or amplify the effects of other known risk or protective factors.

Several risk and protective factors for marijuana use have been identified and examined, including impulsivity, marijuana use motives, and gender. The UPPS-P (Lynam, Smith, Whiteside, & Cyders, 2006) was developed to disentangle the aspects of impulsivity into five distinct constructs (Cyders et al., 2007; Whiteside & Lynam, 2001). Positive and negative urgency describe tendencies to behave impetuously when experiencing positive and negative affect, respectively. Individuals low in premeditation behave without engaging in much forethought, those low in perseverance have difficulty completing tasks, and individuals high in sensation seeking prefer and seek out novel stimuli. Each of these impulsivity-like traits have been found to be associated with college student marijuana use and related consequences (Dvorak & Day, 2014; Kaiser, Milich, Lynam, & Charnigo, 2012; Simons, Gaher, Correia, Hansen, & Christopher, 2005; Zapolski, Cyders, & Smith, 2009). Among the UPPS-P factors, negative urgency has emerged as the strongest predictor of marijuana use over and above the effects of the other factors in some samples (Kaiser et al., 2012). However, other studies have found negative urgency to be related to consequences, but not use (Dvorak & Day, 2014).

Motives for marijuana use describe individual differences in self-reported reasons for engaging in use (Simons, Correia, Carey, & Borsari, 1998), and have also been found to be strong predictors of marijuana outcomes. The five-factor marijuana use model developed by Simons et al. (1998) includes enhancement (i.e., to enjoy one's self), conformity (i.e., to fit in with a group), expansion (i.e., increase cognitive awareness), coping (i.e., to reduce distress), and social motives (i.e., lubricate social interaction) for marijuana use. Although these motives have been associated with increased marijuana use (Bonn-Miller & Zvolensky, 2009; Bonn-Miller, Zvolensky, & Bernstein, 2007; Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007; Simons et al., 1998; Zvolensky et al., 2007), some research has indicated that coping (Zvolensky et al., 2007) and conformity (Bonn-Miller et al., 2007) motives are not associated with marijuana use, or even associated with decreased use (Zvolensky et al., 2007).

Research has also indicated gender differences in marijuana outcomes. Some research indicates that men report more marijuana use (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2015) and consequences (White, Labouvie, & Papadaratsakis, 2005) than women, but other studies find no gender differences in use (Simons et al., 2005) or consequences (Day, Metrik, Spillane, & Kahler, 2013; Dvorak & Day, 2014). Altogether, the relationships between marijuana outcomes and

these impulsivity-like traits, motives, and gender may be complex. The degree to which each of these factors operate to predict use and consequences may vary as a function of PBS use. Among college student athletes, Weaver, Martens, and Smith (2012) found specific facets of alcohol-PBS to buffer the effects of negative urgency on alcohol use and consequences, suggesting that PBS use is more protective for those with poor impulse control and/or a tendency to act impulsively when experiencing elevated negative affect. Among college students, Pearson, Prince, and Bravo (in press) failed to replicate these specific interaction effects, but found a different facet of alcohol-PBS to buffer the effect of negative urgency on alcohol consequences. Thus, PBS use may interact with negative urgency, but other impulsivity-like traits have not been thoroughly examined.

Patrick, Lee, and Larimer (2011) found that alcohol-PBS had a stronger protective effect on abuse/dependence consequences among individuals high in coping motives, and a stronger protective effect on social, personal, and overall consequences among individuals high in conformity motives. They found no interaction effects with enhancement or social motives in predicting any alcohol outcomes, and no interactions in predicting alcohol use. Thus, the motives most directly associated with negative consequences (i.e., coping and conformity motives) may interact with PBS use.

Some evidence suggests that the associations between PBS use and alcohol outcomes are stronger among men (Benton et al., 2004), but other studies have found stronger associations among women (Lewis, Rees, Logan, Kaysen, & Kilmer, 2010; Sutfin et al., 2009). Thus, it is unclear the direction in which gender and PBS use may interact. Multiple studies have demonstrated that the positive association between alcohol use and consequences is weaker among individuals who report high alcohol-PBS use (Benton et al., 2004; Borden et al., 2011), suggesting that alcohol-PBS use buffers this association.

1.1. Purpose of study

The purpose of the present study is to determine whether marijuana-PBS use moderates the effects of several risk/protective factors on marijuana-related outcomes including impulsivity-like traits, marijuana use motives, gender, and marijuana use frequency. Although the alcohol literature is equivocal in terms of how PBS use may moderate the effects of gender, if marijuana-PBS operate similar to alcohol-PBS, we would expect marijuana-PBS to moderate (i.e., buffer) the effects of marijuana use frequency, negative urgency, coping motives, and conformity motives. Given the relatively recent emergence of the marijuana-PBS construct, we examined all interaction effects on both marijuana use frequency and marijuana consequences.

2. Method

2.1. Participants and procedure

Adult college students ($n = 8141$) were recruited from the Psychology Department Participant Pools at 11 participating universities in 11 different states throughout the United States (for more information, see Pearson, Liese, Dvorak & Marijuana Outcomes Study Team, 2017). Although current marijuana use was not an exclusionary criterion for this study, we limited our analytic sample to 2093 current marijuana users (i.e., reported consuming marijuana at least one day in the previous month) who disclosed their gender given our focus on past 30-day marijuana use/consequences (see Table 1 for demographics).

2.2. Measures

2.2.1. Impulsivity-like traits

Five impulsivity-like traits were assessed with the 59-item UPPS-P (Lynam et al., 2006): positive urgency (14 items), negative urgency (12 items), premeditation (11 items), perseverance (10 items), and