



## The association between perceived distress tolerance and cannabis use problems, cannabis withdrawal symptoms, and self-efficacy for quitting cannabis: The explanatory role of pain-related affective distress

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### HIGHLIGHTS

- Perceived distress tolerance via pain distress predicted cannabis use problems.
- Perceived distress tolerance via pain distress predicted cannabis withdrawal.
- Perceived distress tolerance via pain distress predicted lower self-efficacy.
- Perceived pain life control was a significant influential factor.

### ARTICLE INFO

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### ABSTRACT

Rates of cannabis use and related problems continue to rise, ranking as the third most common substance use disorder in the United States, behind tobacco and alcohol use. Past work suggests that perceived distress tolerance is related to several clinically significant features of cannabis use (e.g., coping-oriented use). However, there has been little exploration of the mechanisms that may underlie relations between perceived distress tolerance and cannabis use problems, withdrawal severity, and self-efficacy for quitting. The current study sought to examine the experience of pain, which frequently co-occurs with cannabis use (Ashrafioun, Bohnert, Jannausch, & Ilgen, 2015), as an underlying factor in the relation between perceived distress tolerance and cannabis related problems among 203 current cannabis-using adults (29.2% female,  $M = 37.7$  years,  $SD = 10.2$ , 63% African American). Results indicated that perceived distress tolerance via pain related affective distress significantly predicted the severity of cannabis use problems ( $P_m = 0.60$ ), degree of cannabis withdrawal ( $P_m = 0.39$ ), and lower self-efficacy for quitting cannabis ( $P_m = 0.36$ ). Future work may usefully explore the role of pain-related affective distress as a mechanistic factor in the context of perceived distress tolerance-cannabis relations.

### 1. Introduction

Cannabis is among the most widely used substances in the United States and worldwide (Johnston, O'Malley, Bachman, & Schulenberg, 2013; United Nations Office on Drugs and Crime (UNODC), 2012), with approximately 3.8% of the world's population reporting past year cannabis use in 2015 (United Nations Office on Drugs and Crime (UNODC), 2017). In addition, the United States has seen one of the largest

increases in cannabis use, with the annual prevalence rate increasing by 34% from 2007 to 2015 among those aged 12 years and older (UNODC, 2017). With this increase, the number of daily cannabis users grew by 67% in the United States from 2007 to 2015 (UNODC, 2017). Additionally, rates of past year cannabis use disorder have nearly doubled in the United States compared to the previous decade (i.e., 1.5% to 2.9%), based on DSM-IV diagnostic criteria (Hasin et al., 2015; Hasin et al., 2016). Taking into consideration the DSM-V diagnostic criteria

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for cannabis use disorder, this increase is still maintained, only slightly dropping to 2.5% (Hasin et al., 2016).

One important construct potentially involved in the development and maintenance of cannabis use problems is distress tolerance (Leyro, Zvolensky, & Bernstein, 2010). Distress tolerance reflects the perceived or behavioral capacity to withstand distress related to affective, cognitive, and/or physical states (e.g., negative affect, physical discomfort; Simons & Gaher, 2005; Zvolensky, Bernstein, & Vujanovic, 2011). Conceptually, distress tolerance is related to cannabis use through negative reinforcement learning processes (Zvolensky et al., 2011). In this model, a core motivational basis of problematic cannabis use is escape and avoidance from negative affect states (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004).

Given that cannabis can produce both analgesic and anxiolytic effects (Hosking & Zajicek, 2008; Iskedjian, Bereza, Gordon, Piwko, & Einarson, 2007; Lucas, 2012), cannabis users with lower distress tolerance may be more likely to use cannabis when distressed (e.g., trying to abstain or quit), at least in part, to alleviate abstinence-induced increases in affective distress. Thus, individuals with lower levels of distress tolerance are at greater risk for problematic patterns of use (Bujarski, Norberg, & Copeland, 2012). In fact, perceived distress tolerance is related to several cannabis problems, including using cannabis as a coping mechanism (Julia D. Buckner, Jeffries, Terlecki, & Ecker, 2016; Bujarski et al., 2012; Farris, Metrik, Bonn-Miller, Kahler, & Zvolensky, 2016; Potter, Vujanovic, Marshall-Berenz, Bernstein, & Bonn-Miller, 2011; Zvolensky et al., 2009), more frequent cannabis use (Julia D. Buckner et al., 2016), and greater severity of cannabis related problems (Julia D. Buckner et al., 2016; Julia D. Buckner, Keough, & Schmidt, 2007; Dvorak & Day, 2014; Farris et al., 2016). It has also been found that lower perceived distress tolerance is related to low perceived self-efficacy for quitting cannabis and greater perceived barriers to cessation (Manning et al., 2018). In addition, lower perceived, but not behavioral, distress tolerance has been associated with less reduction of cannabis use during a quit attempt (Hasan, Babson, Banducci, & Bonn-Miller, 2015) and a greater number of cannabis dependence symptoms and severity of craving following deprivation (Farris et al., 2016).

Despite the relevance of perceived distress tolerance to cannabis use and cessation-relevant processes, investigations of potential mechanisms in relations between this transdiagnostic construct and cannabis use are highly limited. Yet, the experience of pain is one possible candidate (Hill, Palastro, Johnson, & Ditre, 2017). Indeed, cannabis has analgesic properties, and is commonly employed to manage pain (Hosking & Zajicek, 2008; Iskedjian et al., 2007; Lucas, 2012). Research further suggests that the experience of pain is associated with greater rates of cannabis use problems (Hefner, Sofuoglu, & Rosenheck, 2015) and one study found that 15% of individuals in substance use treatment reported using cannabis specifically for pain management (Ashrafoun et al., 2015). Indeed, research suggests that cannabis may be effective in managing pain, however, it also may be used as a method of coping among individuals with the experience of pain across both clinical and nonclinical samples (Abrams, Couey, Shade, Kelly, & Benowitz, 2011).

Notably, those with lower perceived distress tolerance would also be expected to experience an increase in subjective experience of pain, and thus, be more likely to experience problems associated with cannabis use. Specifically, to the extent cannabis users are relatively more intolerant to the experience of pain, they may be expected to evince greater threat-related beliefs about the experience of pain, thus exacerbating the severity of affective pain experience (i.e., distress related to pain; Gatchel, Peng, Peters, Fuchs, & Turk, 2007). To illustrate, perceived distress tolerance is associated with greater pain catastrophizing among healthy young adults (Emami, Woodcock, Swanson, Kappahn, & Pulvers, 2016). Further, lower perceived distress tolerance is significantly related to greater pain-related anxiety among persons living with HIV/AIDS (Brandt, Gonzalez, Grover, & Zvolensky, 2013). However, no previous studies have explored perceived distress

tolerance in the context of the multidimensional experience of pain among cannabis users.

The goal of the current study was to explore distinct aspects of pain experience (i.e. affective distress and life control) in relations between distress tolerance and cannabis use problems, severity of cannabis withdrawal, and self-efficacy for quitting cannabis among a sample of low income, urban cannabis users; a population that has demonstrated some of the highest rates of cannabis use problems (Hasin et al., 2015; Hasin et al., 2016). Specifically, we hypothesized that lower levels of perceived distress tolerance would be associated with greater cannabis use problems, cannabis withdrawal, and self-efficacy for quitting cannabis via pain-related affective distress. These results were expected over and above the effects of sex, cigarette use, alcohol use, any axis 1 diagnosis, and pain severity.

## 2. Method

### 2.1. Participants

Current cannabis-using adults were recruited through newspaper and community flyer advertisements targeting individuals interested in participating in research related to their daily cannabis use and their past quit experiences in Houston, Texas. Cannabis has not been legalized in Texas for medical or recreational use. Participants were eligible if they were between the ages 18–65, reported daily cannabis use (defined as smoking at least 25 days a month for the past 6 months), and reported at least two previous self-defined cannabis quit attempts, with one of the attempts occurring in the past year. Exclusion criteria included current suicidal or homicidal ideation, expressed limited mental competency (not oriented to person, place, or time), inability to give informed, voluntary, written consent to participate, current professional treatment for cannabis use disorder or other substance use problems, recent legal mandate limiting cannabis use, use of cannabis explicitly for a medical disorder, or pregnancy or current breastfeeding.

### 2.2. Measures

Demographics Questionnaire (Manning et al., 2018; Paulus, Manning, Hogan, & Zvolensky, 2016). Participants completed a demographics form, which was used to document sex and current tobacco use.

*Structured Clinical Interview-Non-Patient Version for DSM-IV* (SCID-IV-NP; First, Spitzer, Gibbon, & Williams, 1995). The SCID-IV-NP is a structured diagnostic interview that assesses DSM-IV-TR psychopathology. Assessments were conducted by trained and supervised post-baccalaureate research assistants or doctoral-level clinical psychology graduate students. Random reliability checks of 20% of cases were conducted to establish diagnostic agreement rates between interviewers. No cases of disagreement were observed. The SCID was used to classify Axis 1 disorders for use as a covariate.

*Marijuana Smoking History Questionnaire* (MSHQ; Bonn-Miller & Zvolensky, 2009). The MSHQ is a self-report questionnaire used to measure respondents' cannabis use history. In the current study, the MSHQ was used to measure age of cannabis use onset, years as a regular cannabis user, preferred method of consuming cannabis, and typical context of use.

*Distress Tolerance Scale* (DTS; Simons & Gaher, 2005). The DTS (Simons & Gaher, 2005) is a 15-item self-report measure that assesses perceived evaluation and expectation of experiencing negative emotion (e.g. "There's nothing worse than feeling distressed or upset") on a five-point Likert scale (1 = Strongly Agree to 5 = Strongly Disagree, example item). Lower scores reflect less distress tolerance (possible range 14–70). The DTS yields good internal consistency with stable measurement over a 6-month period in previous studies (alpha coefficient = 0.89; Simons & Gaher, 2005), including cannabis using samples (Manning et al., 2018). The DTS total score showed excellent internal

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