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Distress Tolerance and Cannabis Craving: The Impact of Laboratory-Induced Distress

Julia D. Buckner and Katherine A. Walukevich

Louisiana State University

Michael J. Zvolensky

University of Houston and The University of Texas MD Anderson Cancer Center

Abstract

Low levels of distress tolerance have been identified as an important vulnerability factor for negative cannabis outcomes. The current study is the first known experimental manipulation of state distress to test whether distress tolerance interacts with state distress to predict urge to use cannabis. Current cannabis users ($N = 126$; 88.9% with cannabis use disorder; 54.0% non-Hispanic Caucasian) were randomly assigned to a distress task condition or neutral (reading) task condition. Participants in the two conditions did not differ on distress tolerance, negative affect (NA), or craving at baseline. The distress tolerance $\times$ condition interaction significantly predicted task NA, such that low (but not high) distress tolerance was related to greater state NA throughout the task. The distress tolerance $\times$ condition interaction significantly predicted cannabis craving during the task, such that the distress condition was related to greater cannabis craving at lower (but not higher) levels of distress tolerance. In the distress condition, those who endorsed coping motives during the task reported lower distress tolerance. Together, these findings suggest that individuals with lower distress tolerance experienced greater NA during a laboratory-induced distress and reported greater cannabis craving when NA was greatest during the task. This experimental study adds to a growing, but limited, literature implicating lower levels of distress tolerance to the maintenance and relapse of cannabis use.

Keywords

cannabis; marijuana; craving; distress tolerance; experimental

Given the high rates of psychopathology among cannabis users (Agosti, Nunes, & Levin, 2002; Hasin et al., 2016; Stinson, Ruan, Pickering, & Grant, 2006), emerging research has focused on transdiagnostic vulnerability factors that may play a role in cannabis use and related problems. One such factor is distress tolerance. Distress tolerance refers to an individual's perceived or behavioral capacity to withstand negative psychological states,

Correspondence concerning this article should be addressed to Julia D. Buckner, Department of Psychology, Louisiana State University, 236 Audubon Hall, Baton Rouge, LA 70803, USA. Phone: 1-225-578-4096; Fax: (225) 578-4125; jrbuckner@lsu.edu.

Julia D. Buckner, Department of Psychology, Louisiana State University; Katherine A. Walukevich, Department of Psychology, Louisiana State University; Michael J. Zvolensky, Department of Psychology and the and Health Institute, University of Houston and Department of Behavioral Science, The University of Texas MD Anderson Cancer Center.

with perceived distress tolerance typically being measured by self-report measures and behavioral distress tolerance measured by observed ability to tolerate aversive states. Lower levels of perceived and behavioral distress tolerance are associated with greater negative affect (NA) and the use of maladaptive coping strategies, such as using substances to mitigate negative emotions (for review see Leyro, Zvolensky, & Bernstein, 2010). To illustrate, lower perceived distress tolerance among cannabis users is associated with greater NA (Manning et al., 2018) and greater coping-motivated cannabis use (Buckner, Jeffries, Terlecki, & Ecker, 2016; Bujarski, Norberg, & Copeland, 2012; Farris, Metrik, Bonn-Miller, Kahler, & Zvolensky, 2016; Semcho, Bilsky, Lewis, & Leen-Feldner, 2016; Zvolensky et al., 2009). Importantly, individuals with lower perceived distress tolerance tend to evidence greater clinically-significant negative consequences, such as more cannabis-related problems (Buckner, Jeffries, et al., 2016; Buckner, Keough, & Schmidt, 2007; Bujarski et al., 2012; Farris et al., 2016), cannabis dependence symptoms (Farris et al., 2016), and craving (Farris et al., 2016).

Individuals with lower perceived distress tolerance may be especially likely to want to use cannabis during times of elevated NA in an attempt to cope with or lessen that NA. This may place those with lower distress tolerance at risk for more negative cannabis-related problems if they rely on cannabis to cope with NA at the exclusion of more adaptive coping methods. In partial support of this hypothesis, lower distress tolerance is related to more cannabis use to cope with NA (e.g., Buckner, Jeffries, et al., 2016). However, the extant literature has relied on retrospective self-report measures of NA and we know of no studies testing whether, in fact, those with lower distress tolerance desire to use cannabis during periods of elevated state NA. In one of the few laboratory-based studies of distress tolerance among cannabis users, lower perceived distress tolerance was associated with greater distress (i.e., post-task panic symptoms) following carbon-dioxide administration (Zvolensky et al., 2009). Although initial work suggests that measures of behavioral distress tolerance (e.g., breath holding task) are positively correlated with perceived distress tolerance among cannabis users (Farris et al., 2016), only perceived distress tolerance is related to severity of cannabis craving and cannabis-related problems (Farris et al., 2016) and quantity of cannabis used during a quit attempt (Hasan, Babson, Banducci, & Bonn-Miller, 2015).

The present study set out to address clinically and theoretically-significant gaps in the literature in several ways. First, we sought to extend prior work (Borges, Dahne, Lim, & MacPherson, 2017) finding that low behavioral distress tolerance is related to greater NA during a distress task by testing whether individuals with lower perceived distress tolerance would report greater state NA during a laboratory-induced distress task. Second, we sought to extend self-report work finding a relation between perceived distress tolerance and cannabis craving (Farris et al., 2016) by testing whether baseline perceived distress tolerance moderated the relationship between condition and state craving, such that those with lower distress tolerance in the distress condition would evince the greatest cannabis craving. Third, we sought to extend retrospective self-reports of a relation between perceived distress tolerance and coping motives (Buckner, Jeffries, et al., 2016; Bujarski et al., 2012; Farris et al., 2016; Semcho et al., 2016; Zvolensky et al., 2009) by testing whether distress tolerance was related to coping motives during periods of elevated distress.

Method

Participants

Participants were recruited via community advertisements (e.g., newspaper and on-line ads, flyers) for a study on the relationship between cannabis and anxiety (Buckner, Zvolensky, et al., 2016). Eligibility criteria included being between 18–45 years old, past-month cannabis use (confirmed via urine sample using a 50 ng/ml positive cutoff, which detects cannabis use up to 78 hours post-ingestion), cannabis as drug of choice, and no interest in or current receipt of substance use disorder treatment. Participants were asked to refrain from cannabis use on the day of their appointment. A screening (on-line or telephone) and baseline appointment determined eligibility. Of the 144 who attended an appointment, 17 were excluded for the following reasons: urine samples that were negative for THC ($n = 5$), a history of hallucinations or delusions ($n = 4$), psychiatric disorder that contraindicated participation (e.g., primary non-cannabis illicit substance dependence; $n = 4$), cannabis was not their not drug of choice ($n = 2$), denial of current cannabis use ($n = 1$), and reported using cannabis the day of the appointment ($n = 1$). One participant dropped out of the study during the clinical interview. The current study is a secondary analysis of the study reported in Buckner et al. (2016).

Measures

Baseline assessments.—The *Structured Clinical Interview for DSM-IV Disorders* (Patient Edition, with psychotic screening module; SCID-I/P [w/Psychotic Screen]; First, Spitzer, Gibbon, & Williams, 2007) was used to determine diagnostic status. Percent agreement between the two raters for primary CUD diagnosis was 92.3% (Buckner, Zvolensky, et al., 2016). Past 90 day cannabis use frequency was assessed with the *Timeline Follow back* (TLFB; Sobell & Sobell, 1996) for cannabis. To ensure that the two conditions did not differ at baseline on trait distress tolerance, or cannabis use motives, distress tolerance was assessed with the 15-item *Distress Tolerance Scale* (DTS; Simons & Gaher, 2005). Participants rated items concerning participants' perceived ability to withstand negative psychological states from 1 (*strongly agree*) to 5 (*strongly disagree*). Thus, lower scores indicated less tolerance of distress. The DTS has shown good psychometric properties in prior work (Simons & Gaher, 2005; Zvolensky et al., 2009) and in the present sample ($\alpha = .93$). The coping scale of the *Marijuana Motives Measure* (MMM; Simons, Correia, Carey, & Borsari, 1998) is a 5-item scale assessing on a 1 (*almost never/never*) to 5 scale (*almost always/always*) the degree to which they have smoked cannabis for coping motives (e.g., to forget my worries). MMM subscales have demonstrated adequate internal consistency in prior work (Chabrol, Ducongé, Casas, Roura, & Carey, 2005), and the coping scale demonstrated good internal consistency in the current sample ($\alpha = .86$).

Task assessments.—Task assessments were completed three times: in anticipation of the task (after being informed of condition assignment; Time 1), 90 seconds into the task (Time 2), and immediately after the task (Time 3). At each time, via a voice recording, participants were instructed “Please click the star, and then complete the questions on the laptop in front of you. When you are finished, continue (talking to the confederate [distress task] or reading the magazine [control task])”. Cannabis craving was rated on an 11-point (0 to 10) visual

analog scale (VAS) that correlates with longer measures of cannabis craving (e.g., Buckner, Silgado, & Schmidt, 2011). State NA was assessed at baseline and throughout the task using the NA scale of the *Positive and Negative Affect Scale* (PANAS; Watson, Clark, & Tellegen, 1988) on which participants rated each of 10 emotions felt in the moment from 1 (*very slightly or not at all*) to 5 (*extremely*). This scale has achieved acceptable internal consistency in prior work with cannabis users (Buckner, Zvolensky, & Ecker, 2013) and in the current sample ($\alpha = .89$). Cannabis use motives were assessed by asking participants to write their reasons for wanting to use cannabis or not wanting to use cannabis at each assessment point during the task. These motives were classified by two raters and inter-rater reliability was excellent (Buckner, Zvolensky, et al., 2016). Assessments were designed to be completed quickly to minimize disruption with the task. In fact, the Time 2 (midway through task) assessments took less than one minute to complete.

Experimental conditions

Distress task.—Consistent with prior work (Abrams & Wilson, 1979; Borkovec, Stone, O'Brien, & Kaloupek, 1974; de Boer, Schippers, & van der Staak, 1993), participants were asked (via recorded instructions) to relax and imagine a calm, pleasant scene. Next, they were informed that they would speak to a confederate and try to make as favorable impression as possible. They were informed that the confederate was a research assistant who was trained to listen attentively but to not talk. The participant was instructed to begin the interaction after the confederate entered the room. Participants were told that the task was video recorded, although this did not increase anxiety in either condition and in fact across conditions anxiety decreased over time, $F(1, 117) = 4.15$, $p = .044$, $d = 1.48$, most likely due to increased familiarity with the study setting over time. This task has successfully increased NA among substance users (e.g., Abrams & Wilson, 1979; de Boer et al., 1993; Keane & Lisman, 1980; Niaura, Shadel, Britt, & Abrams, 2002) including cannabis users (Buckner, Ecker, & Vinci, 2013). The task lasted three minutes.

Control task.—Participants were told that their task was to silently read a *Popular Mechanics* magazine at their own pace. Participants were instructed when to begin reading and when to complete assessments via recorded instructions. As in the Distress task, participants were told they were being video recorded during the task and this task also lasted three minutes. Reading tasks have been shown to produce significantly less NA than distress-induction tasks among cannabis users (Buckner et al., 2011).

Confederate training and adherence

As reported elsewhere (Buckner, Zvolensky, et al., 2016), confederates were graduate and undergraduate students trained to keep a neutral yet interested facial expression (de Boer et al., 1993). If a participant asked questions, confederates responded “Please stick to the instructions”. If the participant was silent for more than five seconds, the confederate asked either “Do you have any hobbies?” or “Is there anything you are specifically interested in?” Mean neutrality and interest ratings were high (Buckner, Zvolensky, et al., 2016).

Procedure

Study procedures were approved by the university's Institutional Review Board and informed consent was obtained prior to data collection. Given that in vivo cues increase marijuana craving (Gray, LaRowe, & Upadhyaya, 2008), participants met individually with study staff in a simulated living room that contained visual cannabis cues (i.e., ashtray, lighter, glass handheld pipe, water pipe). After completing baseline measures, participants were randomly assigned to condition using urn randomization to ensure equal distribution of relevant variables (i.e., cannabis use frequency, employment, race, gender, diagnostic status) between the distress condition ($n = 60$) and neutral condition ($n = 66$). Following the task, participants were debriefed and provided referrals for local mental health and substance use disorder treatment clinics.

Data analytic strategy

To evaluate the success of the experimental manipulation of state NA (measured via the state version of the PANAS), a 3 (Time: Times 1–3) X 2 (Condition: Distress vs Control) repeated measures analysis of covariance (ANCOVA) was conducted. Significant interactions were graphed using estimated marginal means. To test whether the time X condition interaction varied as a function of distress tolerance, a 3 (Time) X 2 (Condition) X distress tolerance repeated measures ANCOVA was conducted. For each repeated measures ANCOVA, trait social anxiety was included as a covariate given that it was related to craving in this sample in the original study (Buckner, Zvolensky, et al., 2016) and Greenhouse-Geisser corrections applied when appropriate based on Mauchly's Test of Sphericity.

To test whether distress tolerance interacted with condition to predict cannabis craving at each timepoint, moderation was tested using PROCESS, a macro used with SPSS 23.0 that utilizes an ordinary least squares regression-based analytical framework to test for main and conditional effects (Hayes, 2013) using bootstrap analyses with 10,000 resamples from which bias-corrected 95-percentile confidence intervals (CI) were estimated. Trait social anxiety was included as covariates to isolate the effects of DTS.

To test whether, during times of elevated distress, coping motives would be related to greater trait levels of distress intolerance, an ANOVA was conducted among participants in the distress condition to test whether those that endorsed any coping motives (yes vs no) reported lower DTS scores than those that did not endorse any coping motives.

Results

Sample characteristics

The final sample of 126 current cannabis users was aged 18–36 year and nearly all (95.2%) endorsed past-month alcohol use (26.2% endorsed past-week tobacco smoking). The race/ethnicity of the sample was: 54.0% non-Hispanic Caucasian, 28.6% African American/Black, 8.7% multiracial, 3.2% Asian, 3.2% "other", and 2.4% Hispanic Caucasian. The majority met DSM-IV-TR (American Psychiatric Association, 2000) criteria for a current cannabis use disorder (CUD; 17.5% cannabis abuse, 71.4% cannabis dependence). The most

common methods of cannabis use reported were pipe/bowl (47.1%), joint (25.9%), bong (16.5%), edibles (1.2%), and other (9.4%).

As described elsewhere (Buckner, Zvolensky, et al., 2016), conditions did not differ on social anxiety disorder or CUD diagnostic status, anxiety or substance use disorder treatment history, frequency of cannabis use, demographic variables, or baseline cannabis craving (Table 1). Participants in the distress condition did not significantly differ from those in the control condition on baseline levels of distress tolerance, negative affect, or coping motivated cannabis use (Table 1).

Effect of condition on negative affect

The 3 (Time) X 2 (Condition) interaction was significant, $F(1.59, 186.49) = 9.47, p < .001$ (Figure 1). Compared to control participants, participants in the distress condition reported significantly greater NA before ($F(1, 117) = 5.30, p = .023, 95\% CI[0.26, 3.47]$), during ($F(1, 117) = 19.45, p < .001, 95\% CI[2.52, 6.62]$), and after ($F(1, 117) = 7.87, p = .006, 95\% CI[0.87, 5.07]$) the task. Significant interaction contrasts suggests that the rate of change in NA was significantly greater among participants in the distress condition relative to participants in the control condition from Time 1 to Time 2, $F(1, 117) = 17.50, p < .001$, and from Time 1 to Time 3, $F(1, 117) = 12.28, p = .001$.

Impact of distress tolerance on negative affect

The 3 (Time) X 2 (Condition) X distress tolerance interaction was significant, $F(1.63, 188.50) = 5.42, p = .009$. To probe the nature of this significant interaction, we tested whether distress tolerance interacted with condition at each time point to predict NA. The overall model was significant at Time 1, $R^2 = .36, F(4, 115) = 16.27, p < .001$, Time 2, $R^2 = .46, F(4, 115) = 24.96, p < .001$, and Time 3, $R^2 = .38, F(4, 115) = 17.38, p < .001$. As evidenced in Table 2, the distress tolerance X condition interaction was significant at all three-time points. The form of all three interactions was similar in nature. Thus, data from Time 2 are depicted in Figure 2 as an illustrative example. DTS values are presented at lower (1 SD below the sample mean) and higher (1 SD below the sample mean). At Time 1, at lower levels of distress tolerance, the distress condition was related to greater NA, $b = 2.11, SE = 0.76, p = .007, 95\% CI[0.59, 3.62]$. This was not the case at higher levels of distress tolerance, $b = 0.48, SE = 1.08, p = .659, 95\% CI[-1.67, 2.63]$. At Time 2, at lower levels of distress tolerance, the distress condition was related to greater NA, $b = 8.36, SE = 1.36, p < .001, 95\% CI[5.68, 11.05]$. This was not the case at higher levels of distress tolerance, $b = 1.46, SE = 1.33, p = .274, 95\% CI[-1.18, 4.10]$. At Time 3, at lower levels of distress tolerance, the distress condition was related to greater NA, $b = 6.48, SE = 1.40, p < .001, 95\% CI[3.70, 9.25]$. This was not the case at higher levels of distress tolerance, $b = 0.15, SE = 1.38, p = .912, 95\% CI[-2.58, 2.88]$.

Impact on cannabis craving

Next, a series of moderation analyses tested whether distress tolerance interacted with condition at each timepoint to predict cannabis craving. The overall model was significant at Time 1, $R^2 = .11, F(4, 115) = 3.38, p = .012$, Time 2, $R^2 = .16, F(4, 115) = 5.50, p < .001$, and Time 3, $R^2 = .11, F(4, 115) = 3.58, p = .009$. As evidenced in Table 3, the distress

tolerance X condition interaction was significant at Time 2. The nature of this interaction is depicted in Figure 3. At lower levels of distress tolerance, the distress condition was related to greater craving, $b = 2.92$, $SE = 0.84$, $p < .001$, 95% $CI[1.26, 4.57]$. This was not the case at higher levels of distress tolerance, $b = 0.46$, $SE = 0.82$, $p = .579$, 95% $CI[-1.17, 2.09]$. Although the interaction was not significant at Time 3 ($.10 < p < .05$), at lower levels of distress tolerance, the distress condition was related to greater craving, $b = 2.37$, $SE = 0.86$, $p = .007$, 95% $CI[0.67, 4.07]$. This was not the case at higher levels of distress tolerance, $b = 0.34$, $SE = 0.84$, $p = .690$, 95% $CI[-1.33, 2.01]$.

3.5 Cannabis use motives

Among participants in the distress condition, those that endorsed any coping motives during the task reported significantly lower DTS scores ($M = 33.35$, $SD = 14.17$) than those that did not endorse coping motives ($M = 55.25$, $SD = 10.37$), $F(1, 39) = 7.49$, $p = .009$, $d = .89$.

Discussion

This is the first known study examining the role of distress tolerance cannabis use vulnerability factors during an experimental manipulation of state distress. Findings from this study contribute to our understanding of the relation of these variables in several novel and significant ways. First, consistent with prior work examining distress tolerance among non-cannabis using samples (Borges et al., 2017; Cogle, Timpano, Fitch, & Hawkins, 2011), individuals with less perceived distress tolerance reported greater NA in response to a laboratory stressor. Second, the current study extended prior studies of distress tolerance and craving (Farris et al., 2016) by testing whether perceived distress tolerance predicts negative proximal outcomes, such as distress-induced craving. Individuals with less distress tolerance reported greater cannabis craving when state NA was greatest (Time 2), supporting the contention that those with less distress tolerance are vulnerable to wanting to use substances during periods of elevated NA to manage that NA (e.g., Farris et al., 2016). Third, this is the first known study to assess whether coping motives are proximally related to desire to use cannabis during periods of elevated distress among those with less distress tolerance. Consistent with reports using cross-sectional, retrospective self-report data (Buckner, Jeffries, et al., 2016; Bujarski et al., 2012; Farris et al., 2016; Semcho et al., 2016; Zvolensky et al., 2009), among those in the distress condition, cannabis users who endorsed coping-oriented reasons for wanting to use cannabis evinced lower distress tolerance. Future work is necessary to test whether the levels of distress experienced during real-world situations is also associated with greater craving among those with less distress tolerance.

Although the current study identified perceived distress tolerance as an antecedent vulnerability factor, distress tolerance may be impacted by cannabis use. To illustrate, THC increases pain tolerance (Cooper, Comer, & Haney, 2013; Cooper & Haney, 2016) and reduces pain unpleasantness (Wilsey et al., 2008). However, other evidence suggests that pain tolerance decreases following THC administration (Amerongen, Siebenga, Kam, Hay, & Groeneveld, 2018; Naef et al., 2003) and cannabis use acutely decreases physical distress tolerance, particularly among infrequent cannabis users (Farris & Metrik, 2016), suggesting

a need for further research to demarcate the nature of the relations of cannabis use with distress and discomfort tolerance.

Findings have clinical implications. First, clinicians are encouraged to assess for distress tolerance during treatment of CUD, as clients with lower distress tolerance may benefit from learning more adaptive skills to manage elevated NA to prevent relapse of cannabis use. Second, as some evidence suggests that cannabis use may actually decrease distress tolerance and tolerance of pain administration (Amerongen et al., 2018; Farris & Metrik, 2016; Naef et al., 2003), providing psychoeducation about the acute effects of cannabis on distress tolerance may be helpful for those who use cannabis to cope with negative affective or physical states may be beneficial. Third, given that distress tolerance can increase during treatment (Bornovalova, Gratz, Daughters, Hunt, & Lejuez, 2012; Brown et al., 2008; Brown et al., 2013; Cougle et al., 2011), clinicians may consider teaching patients with CUD skills to increase distress tolerance to improve cannabis-related outcomes.

This study should be considered in light of limitations that can inform additional avenues of work in this area. First, the sample was comprised of non-treatment-seeking cannabis users recruited from the community. Although this strategy reflects that most cannabis users with a CUD do not seek treatment (Stinson et al., 2006), an important next step will be to test whether observed relations generalize to treatment-seeking cannabis users. Second, although craving has been found to be strongly related to cannabis use (e.g., Buckner, Crosby, Silgado, Wonderlich, & Schmidt, 2012), future work would benefit from examination of whether individuals with less distress tolerance use cannabis in response to increases in NA. Third, time since last cannabis use was not controlled for and future research could benefit from ensuring that all participants are in a similar state of cannabis withdrawal during the distress-induction task. Fourth, completion of assessments during the task may have distracted participants from the task itself and thus the observed difference between conditions on state distress may have been even greater without such distraction. Fifth, we did not match participants to confederate based on sex and future work is necessary to determine whether gender of confederate plays a role in distress during social interaction-based distress tasks.

Overall, the present study provides important experimental evidence suggesting that individuals with lower distress tolerance are especially vulnerable to wanting to use cannabis during periods of elevated NA. Thus, interventions may benefit by targeting NA broadly and NA among individuals with lower distress tolerance specifically in the management of risky cannabis use and CUD.

Acknowledgments

The current study is a secondary analysis of the study reported in Buckner et al. (2016).

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Public Health Significance

Data from this study indicate that individuals with lower distress tolerance experienced greater NA during distressing events and experience greater urge to use cannabis when NA is elevated. Data have important implications for understanding the nature and treatment of cannabis use and related problems.

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Figure 1. Condition X Time interaction predicting Negative Affectivity, controlling for state social anxiety. Conditions significantly differ, * $p < .05$, ** $p < .01$

Figure 2. Condition X Distress Tolerance interaction predicting Negative Affectivity, controlling for state social anxiety. Distress condition related to significantly greater negative affectivity only among those with lower distress tolerance, ** $p < .01$

Figure 3. Condition X Distress Tolerance interaction predicting Cannabis Craving, controlling for state social anxiety. ** Distress condition related to significantly greater craving only among those with lower distress tolerance, ** $p < .01$

Table 1

Characteristics of the total sample and by experimental condition

Dependent variable	Total (N = 126)	Condition			p	d or Cramer's V
		Control (n = 66)	Distress (n = 60)	F or χ^2		
Age (years)	21.2 (3.3)	21.0 (3.2)	21.4 (3.4)	0.43	.513	0.12
Gender (% male)	65.6	60.6	71.2	1.55	.214	0.11
Race (% Caucasian)	56.8	59.1	54.2	2.17	.704	0.13
Ethnicity (% non-Hispanic/Latino)	92.1	89.4	95.0	1.35	.245	0.10
Employed (%)	59.7	59.1	60.3	0.02	.887	0.13
Anxiety treatment history (%)	18.3	19.7	16.7	0.19	.660	0.04
Substance use disorder treatment history (%)	8.7	7.6	10.0	0.23	.630	0.04
Past-month cannabis use (# days)	21.7 (9.0)	21.1 (9.4)	22.3 (8.6)	0.5	.482	0.13
Age of first cannabis use	16.2 (2.1)	16.5 (2.0)	16.0 (2.2)	1.71	.193	0.23
Cannabis use disorder (%)	88.3	88.1	88.5	0.01	.935	0.01
Alcohol use disorder (%)	32.5	16.7	15.9	0.03	.856	0.02
Other (non-cannabis) illicit substance use disorder (%)	6.3	3.2	3.2	0.02	.889	0.01
Baseline negative affect	19.1 (7.3)	19.7 (7.6)	18.5 (7.1)	0.91	.342	0.17
Baseline cannabis craving	49.4 (14.0)	48.9 (14.1)	49.8 (14.0)	0.13	.717	0.07
Baseline distress tolerance	51.4 (13.1)	50.5 (13.0)	52.45 (13.1)	0.71	.401	0.15
Baseline coping motives	12.8 (5.1)	12.9 (5.3)	12.8 (4.9)	0.02	.888	0.03

Table 2

Interaction between distress tolerance and condition in the prediction of negative affectivity at each task timepoint

Dependent variable	<i>b</i>	<i>SE</i>	<i>p</i>	95% <i>CI</i>
Time 1: Anticipatory Phase				
Trait social anxiety	0.09	0.03	.002	0.03, 0.14
Distress tolerance	−0.08	0.04	.079	−0.16, 0.01
Condition	2.11	0.76	.007	0.59, 3.62
Condition X distress tolerance	−0.13	0.06	.040	−0.25, −0.01
Time 2: During Task				
Trait social anxiety	0.10	0.03	.003	0.04, 0.17
Distress tolerance	−0.06	0.05	.241	−0.16, 0.04
Condition	4.91	0.94	<.001	3.05, 6.77
Condition X distress tolerance	−0.27	0.07	<.001	−0.41, −0.12
Time 3: Post-task				
Trait social anxiety	0.08	0.03	.021	0.01, 0.15
Distress tolerance	−0.07	0.05	.177	−0.18, 0.03
Condition	3.32	0.97	<.001	1.39, 5.24
Condition X distress tolerance	−0.25	0.08	.002	−0.40, −0.09

Note. Condition was dummy coded (0 = control, 1 = distress condition).

Table 3

Interaction between distress tolerance and condition in the prediction of cannabis craving at each task timepoint

Dependent variable	<i>b</i>	<i>SE</i>	<i>p</i>	95% <i>CI</i>
Time 1: Anticipatory Phase				
Trait social anxiety	0.00	0.02	.851	−0.033, 0.039
Distress tolerance	−0.03	.03	.335	−0.083, 0.039
Condition	1.11	0.51	.031	0.106, 2.114
Condition X distress tolerance	−0.05	0.04	.186	−0.133, 0.026
Time 2: During Task				
Trait social anxiety	0.00	0.02	.914	−0.039, 0.043
Distress tolerance	−0.03	0.03	.409	−0.091, 0.043
Condition	1.69	0.58	.409	0.540, 2.83
Condition X distress tolerance	−0.10	0.05	.040	−0.187, −0.004
Time 3: Post-task				
Trait social anxiety	0.01	0.02	.731	−0.035, 0.050
Distress tolerance	−0.018	.033	.580	−0.084, 0.047
Condition	1.36	0.59	.025	0.178, 2.534
Condition X distress tolerance	−0.08	0.05	.097	−0.173, 0.015

Note. Condition was dummy coded (0 = control, 1 = distress condition).