Distress Tolerance among Students Referred for Treatment Following Violation of Campus Cannabis Use Policy: Relations to Use, Problems, and Motivation

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Abstract

Students referred to treatment after violating campus drug policies represent a high-risk group. Identification of factors related to these students' cannabis use could inform prevention and treatment efforts. Distress tolerance (DT) is negatively related to substance-related behaviors and may be related to high-risk cannabis use vulnerability factors that can impact treatment outcome. Thus, the current study tested whether DT was related to cannabis use frequency, cannabis-related problems, and motivation to change cannabis use among 88 students referred for treatment after violating campus cannabis policies. DT was robustly, negatively related to cannabis use and related problems. DT was also significantly, negatively correlated with coping, conformity, and expansion motives. DT was directly and indirectly related to cannabis problems via coping (not conformity or expansion) motives. Motives did not mediate the relation of DT to cannabis use frequency. DT may be an important target in treatment with students who violate campus cannabis policies.

Keywords: mandated students; cannabis; marijuana; distress tolerance; motivation

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Over one-third of college students endorse current cannabis use, a rate comparable to non-college same-age peers (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2014). Further, nearly one-fourth of past-year cannabis using first-year students meet DSM-IV criteria for a cannabis use disorder (Caldeira, Arria, O'Grady, Vincent, & Wish, 2008) and frequent cannabis use among college students is associated with greater problems academically, as well as poorer physical health and psychosocial functioning (Buckner, Ecker, & Cohen, 2010; Caldeira et al., 2008). Despite the high rates of cannabis use and use-related problems among college students, the vast majority of students with cannabis-related impairment are not interested in treatment to help them manage their cannabis use (Buckner et al., 2010; Caldeira et al., 2008). Thus, the campus judicial process has become a point of intervention for many students who misuse alcohol and/or drugs.

Yet little is known about the students that are referred for treatment after violating campus cannabis use policies. This is unfortunate given that students who violate campus drug and alcohol policies tend to engage in more substance use and experience more substance-related problems (Clements, 1999; Merrill, Carey, Lust, Kalichman, & Carey, 2014; O'Hare, 1997) relative to other students. Identification of cognitive vulnerability factors could inform campus-wide and personalized prevention and treatment efforts. One such vulnerability factor that may be especially relevant is distress tolerance (DT). DT is a capacity to withstand negative emotional states. Lower DT is associated with more cannabis-related problems (Buckner, Keough, & Schmidt, 2007; Bujarski, Norberg, & Copeland, 2012). Consistent with the notion that cannabis users with low DT may use cannabis to decrease distress, cannabis users with lower DT report more coping motives for cannabis use (Bujarski et al., 2012; Simons & Gaher, 2005; Zvolensky et al., 2009). Yet, such use is problematic, as coping motives are robustly related to cannabis-related impairment among college students (Buckner, 2013). In fact, in a community

sample of non-treatment-seeking cannabis users, coping (but not conformity) motives mediated the association between DT and cannabis-related problems (Bujarski et al., 2012).

The current study tested whether DT would be related to cannabis use frequency, use-related problems, and motivation to change cannabis use behaviors among students referred for treatment following a violation of campus cannabis use policies. Identification of whether DT is related to baseline predictors of treatment outcome among students referred for treatment following violation of campus drug and alcohol policies is important given that low DT is related to substance use disorder treatment attrition (Daughters, Lejuez, Bornovalova, et al., 2005; Daughters, Lejuez, Kahler, Strong, & Brown, 2005) including pre-treatment attrition (MacPherson, Stipelman, Duplinsky, Brown, & Lejuez, 2008), shorter abstinence duration (Daughters, Lejuez, Kahler, et al., 2005), and greater lapse following smoking cessation (Brown, Lejuez, Kahler, & Strong, 2002; Brown et al., 2009). To test whether DT was robustly related to these cannabis-related outcomes, we also examined whether these relations remained after controlling for other substance use (smoking and alcohol use) and gender, given that these variables are related to DT and cannabis (e.g., Buckner, Keough, et al., 2007; Leyro, Bernstein, Vujanovic, McLeish, & Zvolensky, 2011; Stinson, Ruan, Pickering, & Grant, 2006). To further understand DT's relations with these cannabis vulnerability factors, we also tested whether relevant cannabis use motives (e.g., coping motives) mediated the relations of DT to these cannabis-related outcomes. Per prior work with non-treatment seeking community adults (Bujarski et al., 2012), it was hypothesized that coping motives would mediate the relationship between DT and cannabis-related problems.

Method

Participants and Procedures

Undergraduates were invited to participate in an on-going study of the utility of brief motivational interventions for students referred by the university for violation of campus policies regarding cannabis use. Students who were observed violating the university's policies

regarding cannabis use were informed of the study by staff in the university's Office of Student Advocacy and Accountability or the Office of Residential Life. Students who engaged in "predatory dealing" (i.e., selling cannabis to students other than one's friends) were not referred to the intervention study, as these students were usually expelled from the university. Inclusion criteria were: (1) having received a campus disciplinary referral following a recent cannabis policy violation; (2) being at least 18 years of age; (3) being a current student at the university; and (4) endorsing lifetime cannabis use. Students who refused to participate were re-referred to their referring office to arrange an alternate treatment program. Participants were charged $60 total for the baseline intake and treatment appointments. They were not compensated for study participation. The study was approved by the university's institutional review board. The confidentiality of research data was assured with a Certificate of Confidentiality from the U.S. Department of Health and Human Services.

Of the 118 students who were referred for treatment, 18 refused to schedule an intake appointment, 7 dropped out after scheduling an intake appointment, 4 did not respond to attempts to contact, and 1 was ineligible due to not being a current student at the university. Thus, 88 completed the baseline appointment and were included in the current study. The racial/ethnic composition of the sample was: 80.7% Caucasian, 10.2% African American, 4.5% Asian, and 2.3% Native American, and 2.3% Hispanic/Latino/a. Participants were ethnically representative of the university during recruitment which included 76% Caucasian students. Compared with the larger university sample, participants were more likely to be male (88% vs. 49%). The majority (65.9%) lived in their own residence, with 17.0% in dorms, 11.4% with parents, and 5.7% in fraternity housing. The mean age was 19.5 (*SD* = 3.1) and 40.9% were employed.

The majority (81.8%) endorsed past-month drinking, with 44.3% endorsing at least weekly drinking and 2.3% endorsing daily drinking. Although most (65.9%) endorsed lifetime tobacco use, 25.0% endorsed current smoking. The majority (69.3%) endorsed at least monthly

cannabis use, 46.6% endorsed at least weekly use, and 9.1% endorsed daily use. Offenses leading the treatment referral were as follows: cannabis possession (77.3%), cannabis paraphernalia possession (40.9%), and "other" (13.6%). Examples of other charges include being in the presence of cannabis, resisting arrest, trespassing, synthetic cannabis possession, and obstruction of justice. The majority (68.2%) were charged with one offense, 28.4% with two offenses, and 2.3% with three or more offenses.

Measures

Distress intolerance 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 greater intolerance of distress. The DTS has shown good psychometric properties in prior work (Simons & Gaher, 2005; Zvolensky et al., 2009) and in the present sample (α = .95)

Typical frequency of cannabis and alcohol use was assessed per the Core Institute's Campus Assessment of Alcohol and Other Drug Norms assessed. Participants were asked to rate how often they typically use cannabis and alcohol. Response options ranged from 0 (never) to 4 (*2-3 times per* month) to 8 (*daily*). Participants were also asked to report whether they ever and currently smoke cigarettes.

Cannabis problems were assessed via the *Marijuana Problems Scale* (MPS; Stephens, Roffman, & Curtin, 2000), a 19-item list of negative consequences related to cannabis use (e.g., memory loss, financial difficulties, legal and medical problems) in the past 90 days. Participants rated cannabis use problems on a 0 (*no problem*) to 2 (*serious problem*) scale. Endorsed items (i.e., scores of 1 or 2 on each item) were summed to create an index of total number of cannabis-related problems. The MPS has demonstrated adequate internal consistency in prior work (Buckner et al., 2010; Lozano, Stephens, & Roffman, 2006; Stephens et al., 2000; Stephens et al., 2004) and in the present sample (α = .84).

Cannabis use motives were assessed with the *Marijuana Motives Measure* (Simons, Correia, Carey, & Borsari, 1998), a 25-item measure assessing the following cannabis use motives: enhancement (e.g., to get high), coping (e.g., to forget my worries), social (e.g., to be more sociable), conformity (e.g., to fit in with a group I like), and expansion (e.g., to expand my awareness). Participants indicated from 1 (*almost never/never*) to 5 (*almost always/always*) the degree to which they have smoked cannabis for particular reasons. MMM subscales have demonstrated good internal consistency in prior work (Chabrol, Ducongé, Casas, Roura, & Carey, 2005) and in the present sample (conformity α = .72; enhancement α = .91; social α = .84; coping α = .81; and expansion α = .94).

Motivation was assessed using the *Importance/Confidence Form (ICF)* adapted from Miller and Rollnick (2002)'s importance/confidence rulers. The first item asked "On a scale of 0-10, rate how important it is for you to change your marijuana use" in which 0=*not at all important* and 10=*most important*. The second item asked "On a scale of 0-10, rate how confident you are that you can change your marijuana use" in which 0=*not at all confident* and 10=*most confident*. Similar scales correspond with changes in cannabis use (Gates, Norberg, Copeland, & Digiusto, 2012) and to increase as a result of a motivation enhancement intervention (Buckner & Schmidt, 2009).

Data Analyses

First, bivariate correlations were conducted to examine relations between study variables and to determine whether DT was related to cannabis factors (frequency of use, problems, motivation to change, use motives). Second, to test the robustness of the observed relations between DT and cannabis criterion variables, a series of hierarchical linear regression models was conducted. Separate regressions were conducted for each relevant cannabis criterion variable. Predictor variables were: Step 1: gender, past-month drinking frequency, tobacco smoking status, cannabis use frequency (for the cannabis problems model); and Step

2: DT. This strategy ensured that effect at Step 2 cannot be attributed to variance shared with variables in Step 1 (Cohen & Cohen, 1983). Third, mediational analyses were conducted using PROCESS, a macro used with SPSS 22.0 that utilizes an ordinary least squares regression-based path analytical framework to test for both direct and indirect effects (Hayes, 2013) using bootstrap analyses with 10,000 resamples from which bias-corrected 95-percentile confidence intervals (CI) were estimated (Hayes, 2009; Preacher & Hayes, 2004, 2008).

Results

Table 1 presents means, standard deviations, and correlations among study variables. DT was significantly correlated with frequency of typical cannabis use, number of cannabis-related problems, and coping, conformity, and expansion motives. The correlation between DT and confidence to change cannabis use was small-to-medium (p = .058). DT was unrelated to importance to change cannabis use behaviors or to social or enhancement motives.

Next, the robustness of the relations between DT and cannabis variables was tested. As evidenced in Table 2, covariates accounted for 4.6% of the variance in cannabis use frequency. After accounting for this variance, DT accounted for an additional 4.8% of the variance. Covariates accounted for 11.8% of the variance in cannabis-related problems. After accounting for this variance, DT accounted for an additional 10.9% of the variance.

Cannabis-Related Problems

Coping, Conformity, and Expansion motives were the only motives correlated with cannabis problems and DT and were thus evaluated as mediators. Smoking and drinking variables, cannabis frequency, and gender were included as covariates.[1] For the relation between DT and cannabis-related problems, the total effects model accounted for significant variance (R^2=.230, df=5, 82, F=4.90, p < .001) and the full model with coping motives accounted for significant variance (R^2=.539, df=6, 81, F=5.52, p = .0001). The direct effect of DT and cannabis-related problems remained significant after controlling for coping motives (B = -.09, SE = .03, p = .001). The indirect effect was estimated and revealed that DT was predictive of more

cannabis problems indirectly through greater coping motivated use (B = -.02, *SE* = .012, 95% CI = -.052, -.004).

For the analyses concerning conformity motives, the total effects model accounted for significant variance (R^2=.480, *df*=5, 82, *F*=4.90, *p* < .001) and the full model with conformity motives accounted for significant variance (R^2=.244, *df*=6, 81, *F*=4.36, *p* < .001). The direct effect of DT and cannabis-related problems remained significant after controlling for conformity motives (B = -.08, *SE* = .03, p = .009). The indirect effect was estimated and revealed that DT was not indirectly related to cannabis problems through greater conformity motivated use (B = -.01, *SE* = .01, 95% CI = -.041, .007).

For the analyses concerning expansion motives, the total effects model accounted for significant variance (R^2=.230, *df*=5, 82, *F*=4.90, *p* < .001) and the full model with expansion motives accounted for significant variance (R^2=.233, *df*=6, 81, *F*=4.11, *p* = .001). The direct effect of DT and cannabis-related problems remained significant after controlling for enhancement motives (B = -.0, *SE* = .03, p = .002). The indirect effect was estimated and revealed that DT was not indirectly related to cannabis problems through greater enhancement motivated use (B = -.002, *SE* = .006, 95% CI = -.023, .004).

Cannabis Use Frequency

Coping motives were the only motives significantly correlated with cannabis use frequency and were thus tested as a putative mediator of the relations between DT and cannabis use frequency. Smoking and drinking variables and gender were included as covariates.[1] For the relation between DT and cannabis use frequency, the total effects model accounted for significant variance (R^2=.112, *df*=4, 83, *F*=2.62, *p* = .040) and the full model with coping motives was marginally significant (R^2=.117, *df*=5, 82, *F*=2.18, *p* = .065). The direct effect of DT and cannabis frequency was no longer significant after controlling for coping motives (B = -.04, *SE* = .02, p = .115). The indirect effect was estimated and revealed that DT

was not predictive of more frequent cannabis use indirectly through greater coping motivated use (B = -.005, *SE* = .008, 95% CI = -.024, .008).

Discussion

The current study is the first known study to identify personality factors related to cannabis use and use-related problems among students referred by the university for treatment after violating campus cannabis use policies. Consistent with prior work with volunteer undergraduate students who endorsed lifetime cannabis use (Simons & Gaher, 2005) and young adult community current cannabis users (Zvolensky et al., 2009), DT among these students was negatively related to coping motives and unrelated to enhancement motives. Also consistent with young adult cannabis users, DT was negatively correlated with conformity motives (Zvolensky et al., 2009). Consistent with prior work with volunteer undergraduates, DT was negatively related to cannabis-related problems (Buckner, Keough, et al., 2007). Contrary to studies with young adult cannabis users and volunteer undergraduates (Buckner, Keough, et al., 2007; Zvolensky et al., 2009), low DT among students referred for treatment for violating campus cannabis use policies was related to more frequent cannabis use.

The current findings further extend the extant literature in several key ways. First, the current study extends prior work (Simons & Gaher, 2005; Zvolensky et al., 2009) by determining that DT is significantly related to cannabis problems indirectly through coping motives (but not conformity or expansion motives). Thus, students referred for treatment after violating campus cannabis policies may benefit from cognitive-behavioral skills (see Steinberg et al., 2002) to help them manage negative affectivity using more adaptive emotion regulation skills. Notably, DT was no longer related to cannabis use frequency after controlling for coping motives, although DT was not indirectly related to frequency via coping motives. These data suggest that the relation of DT to cannabis use frequency is not robust, which is consistent with prior work (Buckner, Keough, et al., 2007; Potter, Vujanovic, Marshall-Berenz, Bernstein, & Bonn-Miller, 2011; Zvolensky et al., 2009). Taken together, this pattern of findings is consistent with prior

work suggesting that individuals with higher levels of emotional reactivity (e.g., those with elevated social anxiety; Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007; Buckner et al., 2010; Buckner & Schmidt, 2008; Ecker, Richter, & Buckner, 2014) may not be using cannabis more frequently than other individuals, but something about the way in which they are using is placing them at risk for experiencing more problems related to their use.

Unexpectedly, DT was unrelated to importance to change cannabis use and the relation of DT to confidence to change cannabis was of a small-to-medium effect, suggesting that DT's relation to these two components of motivation were not strong. This is somewhat inconsistent with data from other substance use treatment samples in which lower DT was associated with proxy measures of motivation such as greater perceived barriers to smoking cessation (Kraemer, McLeish, Jeffries, Avallone, & Luberto, 2013) and substance use disorder treatment attrition (Daughters, Lejuez, Kahler, et al., 2005; MacPherson et al., 2008). However, a unique feature of our sample is that the patients were referred for treatment by the university following a violation of campus cannabis use policies. Thus, our sample may have been more extrinsically motivated to change their cannabis use than prior samples which may have impacted DT's relation to motivation. This line of research could benefit from testing whether motivation to change cannabis use among these students is related to more objective measures of DT (i.e., paced auditory serial addition task; Lejuez, Kahler, & Brown, 2003), which have been associated with proxy measures of motivation in prior work (i.e., treatment attrition; Daughters, Lejuez, Bornovalova, et al., 2005) and which have not been found to correlate with self-report measures of DT (McHugh et al., 2011).

The present study should be considered in light of limitations that can inform future work in this area. First, the sample was comprised solely of students referred for treatment following a violation of campus cannabis use policies and future work comparing these students to cannabis using students who have not been caught violating campus policies or other cannabis using populations will be an important next step. Second, a large proportion of students referred

for treatment following a violation of campus policies did not present for intake. Given data finding low DT to be related to greater pre-treatment attrition (MacPherson et al., 2008), future work could benefit from testing whether pre-treatment drop-outs differ from students who do comply with treatment recommendations on DT. Third, data were self-report and future work could benefit from multi-method (e.g., biological verification of cannabis use, behavioral measures of DT, prospective designs such as ecological momentary assessment) and multi-informant (e.g., collateral reports of cannabis use and problems) approaches. Fourth, the sample was predominantly male. Although this probably reflects that cannabis use is greater among college men than women (Johnston et al., 2014), future work could benefit from inclusion of more women to examine whether results generalize to women or whether the relations of DT to cannabis vary as a function of gender.

In sum, the current study identified a cognitive vulnerability factor related to more frequent cannabis use and cannabis-related problems among students referred by the university for treatment following violations of campus cannabis use policies. DT was robustly associated with more frequent cannabis use and cannabis-related problems. Thus, future work testing whether targeting DT directly during treatment improves outcomes for these high-risk students will be an important next step.

Footnote

[1] A similar pattern was obtained when analyses conducted without these covariates.

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