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Cannabis-Related Impairment: The Impacts of Social Anxiety and Misconceptions of Friends' Cannabis-Related Problems

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Abstract

Objective—Socially anxious cannabis users are especially vulnerable to cannabis-related impairment, yet mechanisms underlying this vulnerability remain unclear. Socially anxious persons may use cannabis despite related problems if they believe such problems are common, and thus socially acceptable. Yet no known studies have examined the impact of beliefs regarding others' cannabis-related problems on one's own use-related problems.

Method—This study investigated the impact of beliefs about a close friend's experience with cannabis-related problems on the relationship between social anxiety and cannabis-related problems. The sample consisted of 158 (75% female) current (past-month) cannabis-using undergraduates.

Results—Believing one's friend experienced more cannabis problems was related to experiencing more cannabis-related problems oneself. In fact, perceived friend's problems accounted for 40% of the unique variance in one's own cannabis problems. Descriptive norms (others' use) and injunctive norms (others' approval of risky use) were unrelated to number of one's own problems. Social anxiety was related to experiencing more cannabis problems. This relation was moderated by perceived friend's problems such that greater social anxiety was related to more cannabis-related problems among participants who believed their friend experienced more cannabis-related problems. This was not the case among participants who believed their friend experienced fewer problems.

Conclusions—Normative beliefs regarding a close friend's cannabis problems were robustly and uniquely related to experiencing more cannabis-related impairment. Beliefs regarding friends' experience with cannabis-related problems may play an especially important role in the experience of cannabis-related problems among socially anxious users.

Keywords

cannabis; marijuana; cannabis-related problems; social anxiety; perceived norms

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Cannabis is the most commonly used illicit substance among young adults (Substance Abuse and Mental Health Services Administration, 2010). Cannabis use among this population is concerning given that nearly 25% of cannabis-using undergraduates meet criteria for cannabis use disorder (CUD; Caldeira, Arria, O'Grady, Vincent, & Wish, 2008). Social anxiety appears to be a risk factor for cannabis-related impairment given that it tends to onset prior to CUD among those with co-occurring social anxiety disorder (SAD; Buckner, Heimberg, et al., 2012). The cannabis-social anxiety co-occurrence is related to greater impairment than either condition alone (e.g., Buckner, Heimberg, et al., 2012), including greater suicidality (Buckner, Joiner, Schmdit, & Zvolensky, 2012). Thus, identification of potentially malleable cognitive vulnerability factors contributing to cannabis-related problems among socially anxious persons could inform personalized treatment protocols for these at-risk individuals (as per National Institute of Drug Abuse, 2010).

Socially anxious persons may use cannabis despite related problems if they believe such problems are common (and thus socially acceptable). In partial support of this hypothesis, individuals with greater social anxiety tend to use cannabis for conformity motives and when others are present (Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007; Buckner, Crosby, Wonderlich, & Schmidt, 2012). However, we know of no studies investigating whether believing that others experience more cannabis-related problems is related to one's own experience of cannabis-related impairment.

The current study sought to elucidate understanding of psychosocial factors related to cannabis-related impairment in several ways. First, we tested specificity in the relations between normative beliefs and cannabis-related variables such that beliefs regarding friend's problems were hypothesized to be positively correlated with one's own cannabis problems, whereas beliefs regarding frequency of friend's use (descriptive norms) and approval of risky use (injunctive norms) would be related to more frequent cannabis use. Second, we examined the relative contribution of specific norm type in the prediction of cannabis use frequency and cannabis-related problems. Consistent with our specificity hypothesis, we expected that perceived friend's problems would be strongly, uniquely related to participants' cannabis-related problems, whereas descriptive and injunctive norms would be uniquely related to cannabis use frequency. Third, we tested the hypothesis that perceived friend's problems would moderate the relationship between social anxiety and cannabis problems such that among participants who believed their friend experienced more cannabis problems, those with greater social anxiety would experience more cannabis-related problems than those with lower social anxiety and those who reported their friend experienced fewer cannabis problems. Participants reported normative beliefs regarding a same-sex friend given that gender differentially relates to beliefs regarding others' substance use (Lewis & Neighbors, 2004). Gender was included as a covariate in analyses given that gender is related to undergraduate cannabis use (Simons, Gaher, Correia, Hansen, & Christopher, 2005) and to social anxiety among cannabis users (Buckner, Heimberg, et al., 2012).

2. Method

2.1. Participants and procedures

The sample consisted of 158 undergraduates (75% female; $M_{age} = 20.28$, $SD = 2.41$) recruited from the psychology undergraduate participant pool who were at least 18 years old. The study was approved by the university's institutional review board, and informed consent was obtained before data collection. Participants completed an online survey via [surveymonkey.com](https://www.surveymonkey.com) and received research credit for completion of the survey. Exclusion criteria included denial of past-month cannabis use ($n = 558$). The racial/ethnic composition was 8.9% African American, 5.1% Asian, 77.2% Caucasian, 8.2% Mixed, and 0.6% other, with 8.2% Hispanic/Latino.

2.2. Measures

2.2.1. Marijuana Use Form—(MUF; Buckner et al., 2007) assessed cannabis use in the past three months from 0 (*less than once per month including never*) to 9 (*21 or more times per week*) (Buckner et al., 2007). This measure has demonstrated convergent validity with daily ratings of cannabis use (Buckner, Crosby, Silgado, Wonderlich, & Schmidt, 2012).

2.2.2. Daily Drug-Taking Questionnaire—(Parks, 2001) was modified to assess descriptive norms. Participants were asked to think of one close, same-sex close friend and indicate how many joints that friend used each day in a typical week in the past month. Perceived friend use frequency was calculated by totaling the number of days cannabis was believed to have been used by the friend.

2.2.3. Marijuana Problems Scale—(MPS; Stephens, Roffman, & Curtin, 2000) consists of 19 items assessing severity of a given problem from 0 (*no problem*) to 2 (*serious problem*). A dichotomous scoring procedure was used in this study such that any level of severity indicated having experienced the given problem. The MPS has achieved good internal consistency in prior work (Lozano, Stephens, & Roffman, 2006) and demonstrated acceptable internal consistency in the current study ($\alpha = 0.92$). Participants also rated the problems they believed that their same-sex close friend experienced. Internal consistency of the MPS-perceived was acceptable in the current study ($\alpha = 0.95$).

2.2.4. Injunctive norms—Modified from a measure of injunctive norms of alcohol (Baer, 1994), four items assessed how the participant's friend would respond if the friend knew the participant engaged in risky cannabis use behaviors (e.g., smoking cannabis daily). Participants rated each item from 1 (*strong disapproval*) to 7 (*strong approval*). Items were summed. The scale demonstrated adequate internal consistency in our sample ($\alpha = 0.89$).

2.2.5. Social Phobia Scale—(SPS; Mattick & Clarke, 1998) is a 20-item self-report questionnaire that assesses social anxiety, specifically, anxiety related to performance or observation. Anxiety in each situation is rated from 0 (*not at all*) to 4 (*extremely*). The SPS has achieved good internal consistency in prior work (Mattick & Clarke, 1998) and in the current study ($\alpha = 0.92$).

3. Results

3.1. Sample Descriptives

Participants used cannabis twice per week, on average (Table 1). Participants believed their friends experienced significantly fewer problems than the participants experienced, $t(157) = 4.25, p < .001, d = 0.28$. Forty-one participants (26%) scored in the clinical range for social anxiety (see Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992).

3.2. Relationships among study variables

Means, standard deviations, and correlations among study variables are in Table 1. Perceived friend's problems were strongly, positively related to one's own cannabis-related problems, but unrelated to injunctive norms and cannabis use frequency. Social anxiety was positively correlated with cannabis-related problems, and unrelated to cannabis use frequency. Social anxiety, cannabis use and problems, and norms did not differ by gender as evaluated by analyses of variance (ANOVAs), $ps > .11, ds = 0.01-0.29$.

3.3. Normative beliefs as predictors of cannabis-related problems

Descriptive, injunctive, and problem norms were simultaneously entered into two linear regression equations to test the unique relations of each type of normative belief with cannabis use frequency and cannabis-related problems. Separate models were run for each dependent variable. Gender was included as a covariate.¹ Independent variables were centered to address multicollinearity. The overall model for cannabis-use frequency was significant, $F(4,153) = 10.57, p < .001$, accounting for 21.0% of the variance. Descriptive, $\beta = 0.32, p < .001, sr^2 = 0.08$, and injunctive, $\beta = 0.14, p < .001, sr^2 = 0.06$ (but not perceived problems, $\beta = -0.05, p = .923, sr^2 = 0.00$) norms significantly predicted cannabis use frequency, accounting for 8% and 6% of the unique variance respectively. The overall model for cannabis-related problems was also significant, $F(4,153) = 29.03, p < .001$, accounting for 43.2% of the variance. Perceived friend's problems were the strongest predictor of participants' own problems, $\beta = 0.69, p < .001, sr^2 = 0.40$, accounting for 40% of the variance. Descriptive norms were negatively related to participants' cannabis problems, $\beta = -0.13, p < .01, sr^2 = 0.03$, accounting for 3% of the variance. Injunctive norms were not significantly related to participants' cannabis-related problems, $\beta = 0.09, p < .138, sr^2 = 0.01$.

3.4. Moderation analyses

Hierarchical linear regression tested whether perceived friends' problems moderated the relationship between social anxiety and cannabis-related problems (Cohen & Cohen, 1983). Predictor variables were centered. In addition to gender, participants' cannabis use frequency was entered as a covariate in Step 1, given that use frequency significantly correlated with cannabis-related problems (Table 1). Main effects of social anxiety and perceived friend's problems were entered in Step 2 and their interaction was entered in Step 3. This strategy ensures that effects of the interaction in Step 3 are not attributable to the

¹Regressions for cannabis use frequency and cannabis-related problems were also conducted without gender as a covariate, and a similar pattern of results was obtained.

covariates and main effects (Cohen & Cohen, 1983). The interaction at Step 3 was significant, $F(4,153) = 8.02, p = .005$. Predictors accounted for 50.1% of the variance, with covariates accounting for 9.4% ($F(4,153) = 8.00, p < .001$), main effects accounting for 38.7% ($F(4,153) = 58.06, p < .001$), and the interaction accounting for an additional 2.6%. Simple slopes of the regression lines (Figure 1) were examined (Aiken & West, 1991). The simple slope for greater perceived friend's problems was significant, $\beta = 0.334, p < .01$, suggesting that among participants reporting that their friend experienced more problems, greater social anxiety was related to more participant cannabis-related problems. This was not the case among those reporting that their friend experienced fewer cannabis problems, $\beta = 0.03, p = .67$.

4. Discussion

This is the first known study to investigate the impact of beliefs about a close, same-sex friend's experience with cannabis-related problems on one's own cannabis use and use-related problems. Beliefs about friend's problems were robustly related to experiencing more cannabis problems oneself. There is evidence of specificity in that problem norms were unrelated to participants' cannabis use frequency whereas descriptive and injunctive norms were related to cannabis use frequency but not related to problems. Further, problem norms were the normative belief that was most strongly related to cannabis-related problems, uniquely accounting for a large portion (40%) of the variance in problems.

Our findings add to a growing body of work indicating that individuals with social anxiety experience more cannabis-related problems (e.g., Buckner, Heimberg, et al., 2012; Ecker & Buckner, 2014). The current study extended this work by determining that among those who believe their friend experiences more problems, those with greater social anxiety endorsed the most cannabis-related problems. When considered in light of data suggesting that descriptive and injunctive norms do not appear to impact the relation of social anxiety to cannabis problems (Ecker & Buckner, 2014), our findings suggest that beliefs about other's problems rather than beliefs about other's use or approval of use are especially salient for socially anxious users.

In brief motivational interventions (BMI) for college cannabis users, therapists provide data about how patients' use compares to national descriptive norms (Lee et al., 2013). However, given that beliefs about a friend's problems were more strongly associated with cannabis-related impairment than descriptive norms, testing whether targeting perceived friends' problems results in better outcomes will be an important next step. Further, socially anxious students have worse BMI outcomes (Terlecki, Buckner, Larimer, & Copeland, 2011) and do not respond as well as less socially anxious students to cognitive restructuring targeting descriptive norms (Terlecki, Buckner, Larimer, & Copeland, 2012). It may be that for socially anxious undergraduates, highlighting beliefs regarding close friends' cannabis-related problems may be a useful target for exploration.

4.2. Limitations and Future Directions

Findings should be considered in light of limitations. First, data were cross-sectional and collected via self-reporting using a computer-based survey. Future research may benefit

from clinical interviewing and prospective designs. Second, the present sample was comprised of predominantly female, Caucasian undergraduate psychology students and future research could benefit from recruitment of more diverse samples. Despite these limitations, the present study offers novel insight into cognitive and emotional factors related to cannabis use and use-related problems.

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Highlights

- Undergraduates reported how many cannabis-related problems a friend experienced.
- Students overestimated friend problems related to cannabis.
- Perceived friend problems were strongly, uniquely related to one's own cannabis problems.
- Social anxiety was positively related to cannabis-related problems.
- Friend problems moderated the relation between social anxiety and cannabis problems.
- Greater social anxiety and perceived friend problems were related to more impairment.

Figure 1. Interaction between social anxiety and perceived friend's problems in the prediction of cannabis-related problems. $*p < .05$

Table 1

Means, standard deviations, and correlations among study variables.

	1	2	3	4	5	<i>M</i>	<i>SD</i>
1. Cannabis use frequency	-					3.46	2.86
2. Social anxiety	-.09	-				17.29	12.51
3. Number of cannabis-related problems	.29**	.23*	-			3.64	4.82
4. Perceived friend's problems	.12	.14	.63**	-		2.28	4.40
5. Injunctive norms	.34**	-.04	.08	.03	-	12.96	5.45
6. Descriptive norms	.38**	-.09	.12	.38**	.23*	1.65	2.56

*
 $p < .05$.**
 $p < .01$.