Incremental Predictive Validity of the Dualistic Model of Passion for Cannabis Use Among College Undergraduate Students With and Without a Cannabis Use Disorder

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ABSTRACT

Introduction: We examined whether the Dualistic Model of Passion (DMP; i.e., obsessive passion [OP] and harmonious passion [HP]) for cannabis use was prospectively associated with cannabis use and use-related outcomes, and with academic performance, relationship attachment style, and social connectedness among college students. We also explored whether the DMP was associated with outcomes when included in a model using established constructs (e.g., coping motives, refusal self-efficacy, cannabis use disorder [CUD] symptoms) as predictors of cannabis use and outcomes. **Methods**: Using a longitudinal cohort design (baseline, 5-month, 10-month [timepoints chosen to better correspond to 9-month academic year]), 513 undergraduate students from two universities who reported using cannabis at least four times in the past month completed a baseline survey (308 meeting criteria for CUD). We used Generalized Estimating Equations to assess longitudinal associations between OP/HP and cannabis use and academic/social outcomes at 5-month and 10-month. **Results**: At baseline, participants were young adults (Mean age = 20.57, SD = 2.51), 78.8% non-Hispanic, 83.8% White, 55.0% female, and 72.3% heterosexual. Greater HP was not associated with greater past month cannabis use or cannabis-related problems. Greater OP was associated with greater past month cannabis use and more cannabis-related problems. There were no significant passion by time interactions. Greater HP was associated with more anxious attachment. OP was associated with less social connection. **Conclusion**: This research suggests that the DMP provides novel information about factors associated with cannabis use and use-related consequences, which can aid in our understanding of cannabis use, misuse, and CUD among college students.

Key words: = cannabis; harmonious passion; obsessive passion; cannabis use disorder; college students

Cannabis is the most frequently consumed federally illicit substance in the United States (U.S.) and other countries (Johnston et al., 2022; United Nations Office on Drugs and Crime, 2022).

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Although cannabis use has benefits for several health conditions (e.g., chronic pain, multiple sclerosis; National Academies of Sciences, Engineering, and Medicine, 2017), frequent use is also associated with consequences (Volkow et al., 2016) including increased risk the development of cannabis use disorder (CUD; American Psychiatric Association, 2013; Connor et al., 2021). As of 2020, cannabis use prevalence was 42% of young adults in the last 12 months, 27% in the last 30 days, and 9.8% using daily or near-daily use in the U.S. (Schulenberg, 2021). Among college students in the U.S., lifetime prevalence of CUD is 9%; for those who report past-year consumption of cannabis, lifetime CUD prevalence rises to 25% (Arterberry et al., 2019; Caldeira et al., 2008).

Symptoms of CUD include craving, difficulty controlling use, tolerance, withdrawal, interference with everyday life, and continued use despite physical or psychosocial impairments (American Psychiatric Association, 2013). Short- and long-term consequences associated with CUD include psychosocial and physical consequences such as memory loss, interpersonal conflict, academic and occupational interference, reduced self-care, anxious/depressed mood, impaired driving ability, myocardial infarction, impaired brain connectivity, and chronic bronchitis (Patel & Marwaha, 2022; Pearson, 2019; Simmons et al., 2022; Simons et al., 2012; Volkow et al., 2016). College students also are at risk for experiencing academic disruptions such as missing more classes and gradual GPA decline over time (Arria et al.,2015; Pritschmann, et al., 2022). Therefore, understanding ways to engage college students in preventative interventions could help decrease the risk of problematic cannabis use and associated problems (e.g., academic performance), but there is little evidence for reduction in frequency of cannabis use or CUD symptoms among young adults despite intervention (Halladay et al., 2019; O'Connor et al., 2020). For example, a review conducted by O'Connor et al. (2020) found that interventions were not significantly associated with cannabis use outcomes in this population (Standeven et al., 2020). Therefore, there is a critical need for more research to better understand how to engage college students in addressing their cannabis misuse and CUD.

Given the limited efficacy and adherence to current CUD preventative interventions (Halladay et al., 2019; O'Connor et al., 2020), it is likely that several barriers exist that may limit students' CUD treatment initiation and engagement (e.g., access/availability of treatment, stigma). For example, a key barrier could be stigma associated with the pathological language that professionals or programs have used to describe cannabis misuse (e.g., words like "abuse" and "addiction"). Moreover, this language may not reflect students' typical language when describing their own cannabis use or associated behaviors, values, and perspectives. This discrepancy could hinder students' willingness to seek out treatment, engage in meaningful recovery efforts, or achieve an abstinence or reduction goal. Therefore, a deeper understanding of how best to approach the language of cannabis use and associated consequences among college students could improve preventative interventions designed to meet students' needs, attract them into CUD care, and increase treatment retention.

The Dualistic Model of Passion (DMP) of cannabis use is a conceptual model that could help address this goal because it can elucidate key components in understanding one's relationship with cannabis use. According to the DMP (Vallerand et al., 2003), it is more likely for individuals to develop passion for an activity when they devote more time and energy to engaging in it. There are two types of passion hypothesized in the DMP, harmonious passion (HP) and obsessive passion (OP). HP refers to a relationship with an activity that enhances and is well integrated in one's life. Conversely, OP refers to a relationship with an activity that has become so compelling that it causes conflicts with other activities or creates dissonance between the activity and one's values. The DMP was first applied to behaviors such as gambling (Ratelle et al., 2004; Rousseau et al., 2002), gaming (Lafreniere et al., 2009; Stoeber et al., 2011; Wang & Chu, 2007), and pornography (Rosenberg & Kraus, 2014). In this prior research, greater HP was typically associated with positive outcomes (e.g., positive affect, life satisfaction) and sometimes positively related to frequency of addictive behaviors. In contrast, greater OP was typically associated with negative outcomes (e.g., frequency and duration of behavioral engagement, negative affect, behavior-related

consequences) and unrelated to life satisfaction (Lafreniere et al., 2009; Ratelle et al., 2004; Rosenberg & Kraus, 2014; Rousseau et al., 2002; Stoeber et al., 2011; Wang & Chu, 2007).

In terms of cannabis use, prior studies have shown differential associations between cannabis use and related consequences and OP (e.g., greater cannabis use, more consequences) and HP (e.g., greater cannabis use, fewer consequences; Davis, 2017; Davis et al., 2018; Steers et al., 2015). Additionally, findings have shown OP for cannabis use had a stronger relationship with frequency of cannabis use and associated consequences compared to cannabis use motives (refers to reasons or motivations for an individual's decision to use cannabis) and refusal self-efficacy (refers to participants' confidence in their ability to refuse offers of cannabis in various contexts; Davis, 2017; Davis & Arterberry, 2019). Given limited evidence in support of current treatments in this population (Halladay et al., 2019; O'Connor et al., 2020), it is possible that these treatments may be more acceptable if the DMP were incorporated into them, because it uses language about cannabis use that avoids pathologizing words (e.g., risky, abuse, addict, addiction), and instead discusses cannabis use in terms of how well one's relationship with cannabis fits into their lives. However, research examining the DMP is limited by cross-sectional retrospective survey designs. Therefore, prospective research is needed to understand the predictive validity of the DMP on cannabis use to inform treatment development. Prospective research might also be able to explore whether passion for cannabis use changes over time, which could occur with repeated exposure to the drug and exposure to potential consequences of use, which has yet to be explored.

College students who misuse cannabis might also have other characteristics such as relationship style and social connections that related to their ability or desire to engage in preventative interventions. For example, one's attachment style (e.g., anxious or avoidant) has been associated with substance misuse and use disorder (Dassa et al., 2013; Kpelly et al., 2022) and cannabis use (Schindler et al., 2009). Because passion could be described as a relationship to cannabis use and how well that relationship fits into one's life, it is possible that college students with more anxious forms of attachment and less

social connection may be more at risk for developing OP compared to those with more secure connections. However, there has been no research examining attachment style and social connection in relation to passion for cannabis use, which could advance understanding of the construct validity of the DMP.

We designed the current study to explore the predictive validity of DMP by using a longitudinal cohort of undergraduate college students who completed assessments at three timepoints. We address three main aims in this paper: *Aim 1)* we evaluate the DMP as a predictor of future cannabis use and use-related consequences, *Aim 2)* we examine whether passion for cannabis use is prospectively associated with academic performance, relationship attachment style, and social connectedness, and *Aim 3)* we examine whether the DMP is associated with cannabis use and related consequences while accounting for other use-related variables, such as coping motives and cannabis refusal self-efficacy. Because of the associations between cannabis use and demographics, such as sex, gender, race, ethnicity, and socioeconomic status (Greaves & Hemsing, 2020; McCabe et al., 2007; Patrick et al., 2012), we included these as control variables in this study.

METHODS

Participants and Procedure

Using a longitudinal cohort design, we collected data separately from two Midwestern institutions. Neither institution was in a state with recreational cannabis laws, while Site 1 was located in a state with medical cannabis laws. This study was approved by IRBs at the two sites, and both received a Certificate of Confidentiality from the National Institutes of Health. Baseline assessments were administered from November 2020 through January 2021; 5-month follow-up occurred from March 2021 to June 2021; and 10-month follow-up occurred from August 2021 to November 2021. The university registrar either provided email addresses from a random sample of undergraduate students (Site 1), or sent emails to all undergraduates for recruitment (Site 2). The email invited students to the study and provided a link to an informed consent page and eligible screening survey. Inclusion criteria for the study were to 1) be 18 years or older, 2) be able to read,

write, and speak English fluently, 3) be a college undergraduate student, 4) have used cannabis flower at least 4 times in the past month, and 5) ~50% of participants at each institution who met criteria for CUD and 50% of participants who did not meet criteria for CUD. After completing the screening questionnaire, we invited eligible participants to participate in the follow-up phase of the study via email with a secure web-based survey link. At baseline, 5-month, and 10-month follow-ups, participants were asked to complete a series of online questionnaires. Participants received a $25 incentive for completing the baseline questionnaires, another $25 for the 5-month assessment, and $40 for the 10-month assessment.

The target enrollment for this study was 300 participants from Site 1 and 300 participants from Site 2. In total, 47,726 undergraduate students at the two study sites were emailed the screening link and 2,174 viewed the email, clicked a link to the online study, and completed the screening survey. There were 617 students that did not meet inclusion criteria. A total of 1,220 (930 that met criteria for CUD and 290 that did not meet criteria for CUD) were sent the baseline survey, with 578 who subsequently enrolled in the study (96.3% of the target enrollment). A total of 513 students completed the entire baseline survey (CUD=308; non-CUD=205). Of the 513 who enrolled, 431 participants completed the 5-month follow-up survey, and 434 participants completed the 10-month follow-up survey. The retention rate was 84.0% at 5-month and 84.6% at 10-month. Participants that were enrolled in college at baseline were included in these analyses. Bivariate analyses indicated there were no significant differences in sociodemographic characteristics between those lost to follow-up vs. those who stayed in the study with one exception, baseline GPA was lower among those that were lost at follow-up (p=.02). Those that were lost at follow-up had greater baseline obsessive passion (p = .02) and lower baseline social connectedness (p = .01) than those that remained in the study. Participants were young adults, mean age = 20.57 (SD = 2.51), 78.8% were non-Hispanic White (see Table 1), 55.0% reported their biological sex was female, 52.2% self-identified their gender identity as female, 72.3% self-identified as heterosexual, 51.8% reported a family household income greater than $100,000, 89.9% participants were enrolled

in college full-time, and 80.7% reported a GPA higher than 3.0.

Measures

Cannabis use frequency. Cannabis use frequency was measured by asking participants "How many times in the past month have you used cannabis flower?" Responses were open-ended.

Cannabis - Harmonious and Obsessive Passion Scale. This 13-item measure assessed the DMP, which differentiates HP (well-integrated with lifestyle) and OP (conflicted with lifestyle) as it relates to recreational cannabis use (Davis, 2017). The original measure was modified by changing the term "marijuana" to "cannabis". Participants reported how much they agree or disagree with each statement about their cannabis use (e.g., "Using cannabis allows me to live memorable experiences" "I have almost an obsessive feeling for using cannabis") on a 5-point Likert scale ranging from 0 (Strongly disagree) to 4 (Completely agree). Mean HP subscale (item 1-6) and mean OP subscale (item 7-13) were calculated. Internal consistency for each scale score was good. (HP: α's range = .82-.86; OP: α's range = .90-.92; see Supplemental Table 1).

Brief Marijuana Consequences Questionnaire (B-MACQ). The 21-item B-MACQ was included in this study to measure cannabis-related consequences (Simons et al., 2012). Participants were asked to select whether they experienced any consequences (e.g., "The quality of my work or schoolwork has suffered because of my cannabis use") related to their cannabis use in the past 5-months by indicating either YES (1) or NO (0). Internal consistency reliability of the total scale was good (α's range= .85-.86; see Supplemental Table 1).

Experiences in Close Relationships-Relationship Structure (ECR-RS). The 9-item ECR-RS assessed participants' attachment style including anxious and avoidant dimensions. We used a general version of the scale as opposed to romantic, peer, or parental versions (Fraley et al., 2011). Participants were asked to rate the extent to which they believe each statement best described their feelings about close relationships (e.g., "It helps to turn to people in times of need," "I often worry that other people do not really care for me") on a 7-point Likert scale ranging from 1

(Strongly disagree) to 7 (Strongly agree). Internal consistency was adequate for both subscales (Avoidance: α's range = .78-.80; Anxiety: α's range = .87-.88; see Supplemental Table 1).

Cannabis Use Disorder (CUD). Based on the DSM-5, we included an 11-item list of symptoms to assess likely presence of a CUD (American Psychiatric Association, 2013). Participants were asked to report their cannabis use behaviors and related experiences in the past 12 months by answering Yes (1) or No (0) through questions such as "In the last 12 months, I often used larger amounts of cannabis or used over a longer period than intended." Internal consistency was good: α = .81.

Modified Cannabis Refusal Self-Efficacy Questionnaire (Modified-CRSEQ). The modified 3-item CRSEQ was included in this study to measure participants' confidence in their ability to refuse offers of cannabis in various contexts. Modification included combining items from the original CRSEQ measure (Young et al., 2012) to assess how confident participants were they could resists offers of cannabis for emotional relief (e.g., "…you are feeling negative emotions [e.g., worried, sad, down, upset, restless]"), when they have the opportunity to use (e.g., "…you are around your friends [e.g., at a party, at a friend's house, or hanging out]"), and for social facilitation ("…you are in new social situations [e.g., meeting people for the first time, wanting to feel confident or accepted in social situations]"). Participants were asked to rate their confidence in refusing cannabis use on a 10-point scale ranging from 1 (Not at all) to 10 (Very).

The Social Connectedness Scale (SCS). The 8-item SCS was measured participants' degree of feeling connected to others in the social environment (Lee & Robbins, 1995). Participants were asked to rate how much they agree or disagree with each statement (e.g., "I feel disconnected from the world around me") on a 6-point scale ranging from 0 (Never True) to 5 (Almost Always True). Internal consistency reliability was excellent (α's range=.94-.95; see Supplemental Table 1).

Demographic Information: Participants were asked to report their age, gender identity, biological sex assigned at birth, race/ethnicity, family income (i.e., used as a proxy for socioeconomic status: SES), relationship status, education, GPA, college enrollment status, sexual orientation (identity, attraction, and behavior).

Table 1. *Demographic Information of the sample at baseline, 5-months, and 10-months.*

	Baseline		5 Months		10 Months	
	N	%	N	%	N	%
Total Sample Size	513		431		434	
Site						
Site 1	275	53.6%	241	55.9%	238	54.8%
Site 2	238	46.4%	190	44.1%	196	45.2%
Race/Ethnicity						
Non-Hispanic, White	404	78.8%	344	79.8%	344	79.3%
Hispanic	36	7.0%	32	7.4%	30	6.9%
Other (includes other racial identities and multiple racial identities)	73	14.2%	55	12.8%	60	13.8%
Biological Sex						
Male	231	45.0%	187	43.4%	196	45.2%
Female	282	55.0%	244	56.6%	238	54.8%
Gender Identity						
Male	228	44.4%	183	42.5%	191	44.0%
Female	268	52.2%	230	53.4%	226	52.1%
Trans male	2	0.4%	1	0.2%	0	
Trans female	1	0.2%	0	0	0	
Non-Binary	10	1.9%	11	2.6%	13	3.0%
Other	4	0.8%	6	1.4%	4	0.9%
Sexual Orientation						
Heterosexual	371	72.3%	304	70.5%	303	69.8%
Lesbian	15	2.9%	15	3.5%	14	3.2%

Gay	15	2.9%	14	3.2%	17	3.9%
Bisexual	94	18.3%	77	17.9%	80	18.4%
Pansexual	13	2.5%	16	3.7%	14	3.2%
Asexual	1	0.2%	2	0.5%	2	0.5%
Other	4	0.8%	3	0.7%	4	0.9%
Family Income						
<$10,000-$99,999	247	48.2%	203	47.2%	215	49.4%
$100,000 - $149,999	138	27.0%	118	27.4%	116	26.7%
>$150,000	126	24.7%	109	25.3%	103	23.7%
College Enrollment						
Full-time	461	89.9%	376	87.2%	348	80.2%
Part-time	21	4.1%	26	6.0%	18	4.1%
On Break (e.g., summer)	30	5.8%	11	2.6%	1	0.2%
Graduated	1	0.2%	15	3.5%	58	13.4%
Dropped Out	0	0	3	0.7%	9	2.1%
Grade Point Average						
3.5 to 4.0	234	45.6%	209	48.6%	219	50.7%
3.0 to 3.4	180	35.1%	150	34.9%	146	33.8%
2.5 to 2.9	76	14.8%	55	12.8%	58	13.4%
2.0 to 2.4	17	3.3%	9	2.1%	7	1.6%
1.5 to 1.9	5	1.0%	6	1.4%	2	0.5%
1.0 to 1.4	1	0.2%	1	0.2%	0	0

Note: Participants' age was on average 20.57(SD = 2.5) at baseline, 20.97(SD = 2.5) at five months, and 21.35(SD = 2.4) at ten months. SES=socioeconomic status.

Analytic Strategy

We calculated descriptive analyses of demographic and background characteristics (e.g., age, sex, race, gender identity, sexual orientation, school enrollment, GPA, family income; see Table 1) and primary study variables (e.g., past month cannabis use, CUD symptoms, cannabis use-related consequences, HP, OP, social connectedness, attachment; see Supplemental Table 2). We compared demographic information differences between two sites and different timepoints using Chi-Square, see details in Supplemental Table 3. Bivariate correlations with Pearson correlation coefficients between primary study variables are presented in Supplemental Tables 4 and 5.

We estimated generalized estimating equation (GEE) models using SAS 9.4 with a normal distribution, identity link, and first-degree autoregressive covariance structure to account for repeated measures within individuals. GEE was used to account for autocorrelation and varying observations across individuals (Zeger et al., 1988). GEE models, unlike repeated measures

ANOVA, can utilize all available data and the population-average parameters are relatively robust to overdispersion that may occur (Wang, 2014). We fit two models that included either HP or OP as predictors for each outcome (frequency of cannabis use, cannabis problems, GPA, social connectedness, and attachment) controlling for site, CUD symptoms at baseline, biological sex, race/ethnicity (e.g., Non-Hispanic White, Hispanic, Other), SES (e.g., <$10,000-$99,999; $100,000-$150,000, >$150,000), and past month cannabis use (i.e., cannabis problems models only). Each model entered time (5-month and 10-month follow-up) as a predictor to examine time-varying associations with outcomes. To do this, we centered and included baseline HP and OP in the model as an interaction with time to examine these time-varying associations with outcomes (Aim 1 and Aim 2). For Aim 3, we entered passion and the coping motives scale or CRSEQ items (i.e., emotional relief, opportunistic, and social facilitation) into GEE models separately to determine whether passion constructs would predict cannabis outcomes after controlling for site, past month cannabis use, CUD symptoms at

baseline, biological sex, race/ethnicity, and socioeconomic status after including coping motives/CRSEQ scales in the model. We used a Bonferroni correction p-value of .005 to determine significance due to multiple comparisons.

RESULTS

As Supplemental Table 2 shows, past month cannabis use frequency stayed relatively stable across time points, with the most frequent use reported at baseline ($M = 19.97$, $SD = 20.18$), 5-month ($M = 19.24$, $SD = 20.68$), and 10-month ($M = 18.69$, $SD = 20.93$). The mean number of cannabis use-related consequences were also stable across time: baseline ($M = 4.49$; $SD = 4.0$), 5-month ($M = 4.39$, $SD = 4.03$), and 10-month ($M = 4.24$, $SD = 4.07$).

Aim 1: DMP as a predictor of cannabis outcomes

All models controlled for biological sex, race/ethnicity, site, CUD symptoms at baseline, and socioeconomic status (see Table 2). Greater baseline HP was not significantly associated with greater past month cannabis use or cannabis-related problems. Greater baseline OP was associated with greater past month cannabis use overall ($ß = 9.01$, $SE = 1.52$, $p < .001$) and more cannabis-related problems overall ($ß = 2.53$, $SE = 0.27$, $p < .001$). There were no significant passion by time interactions.

Aim 2: DMP as predictor of GPA, social connectedness, and attachment

All models controlled for biological sex, race/ethnicity, site, past month cannabis use, CUD symptoms at baseline, and socioeconomic status (see Table 3). Greater HP was not significantly associated with more anxious attachment. OP was associated with less social connection overall ($ß = -2.34$, $SE = 0.51$, $p < .001$), but not with anxious attachment. There were no significant time interactions.

Aim 3: Passion, coping motives, and CRSEQ associations with cannabis outcomes

After controlling for biological sex, race/ethnicity, site, past month cannabis use, CUD symptoms at baseline, and socioeconomic

status, after including coping motives, HP was not associated with cannabis use overall ($ß = 1.72$, $SE = 0.90$, $p = .055$) or related consequences overall ($ß = .001$, $SE = 0.23$, $p = .997$; see Table 4); however, coping motives were associated with more cannabis-related problems overall ($ß = 1.10$, $SE = 0.24$, $p < .001$). Greater baseline OP was associated with greater cannabis use overall ($ß = 9.09$, $SE = 1.92$, $p < .001$), but coping motives were not associated with overall cannabis use frequency ($ß = -0.03$, $SE = 1.26$, $p = .979$). Although both greater OP and coping motives were associated with more cannabis-related problems overall, OP was associated with overall cannabis-related problems at a greater magnitude than coping motives (OP: $ß = 2.12$, $SE = 0.29$, $p < .001$; Coping: $ß = 0.58$, $SE = 0.24$, $p < .015$). There were no significant time interactions.

After controlling for biological sex, race/ethnicity, site, past month cannabis use, CUD symptoms at baseline, and socioeconomic status, and after including the emotional relief item from the CRSEQ, HP was not associated with cannabis outcomes ($ß = 2.01$, $SE = 0.84$, $p = .017$) see Table 5); however, the emotional relief item was associated with fewer cannabis-related problems ($ß = -0.39$, $SE = 0.07$, $p < .001$). Even after including the CRSEQ emotional relief item, OP was associated with greater cannabis use frequency ($ß = 9.11$, $SE = 1.75$, $p < .001$) and more cannabis-related problems ($ß = 2.07$, $SE = 0.29$, $p < .001$), while the emotional relief item was associated with fewer cannabis-related problems ($ß = -0.23$, $SE = 0.07$, $p = 0.001$). There were no significant time interactions.

In Table 6, after including the opportunistic item from the CRSEQ, HP was not significantly associated with greater cannabis use frequency. Although the opportunistic item was associated with fewer cannabis-related problems ($ß = -0.20$, $SE = 0.06$, $p = .002$), HP was not significantly associated with cannabis-related problems ($ß = 0.23$, $SE = 0.21$, $p = .278$). Even after including the opportunistic item, OP was associated with greater cannabis use frequency ($ß = 9.22$, $SE = 1.79$, $p < .001$) and more cannabis-related problems ($ß = 2.42$, $SE = 0.27$, $p < .001$). There were no significant time interactions.

In Table 7, after including the social facilitation item from the CRSEQ, HP was not significantly associated with greater cannabis use frequency or cannabis-related problems.

Table 2. *GEE for relation between passion and cannabis outcomes at 5- and 10-months.*

	Past month cannabis use					Cannabis-related problems				
	ß	SE	95% CI		p-value	ß	SE	95% CI		p-value
Harmonious Passion										
HP	2.11	0.82	0.51	3.71	0.01	0.21	0.21	-0.19	0.62	0.297
Time	-0.53	0.44	-1.39	0.33	0.228	-0.10	0.09	-0.27	0.07	0.248
HP X Time	0.44	0.35	-0.26	1.13	0.218	0.02	0.09	-0.16	0.19	0.860
Past month cannabis use	-	-	-	-	-	0.03	0.01	0.02	0.04	**<.001**
Site	**-5.68**	**1.55**	**-8.73**	**-2.64**	**<.001**	0.89	0.28	0.34	1.44	0.002
Baseline CUD symptoms	**8.35**	**1.44**	**5.52**	**11.18**	**<.001**	2.96	0.28	2.42	3.50	**<.001**
Sex	-3.32	1.54	-6.35	-0.30	0.031	0.16	0.28	-0.38	0.70	0.564
Race/Ethnicity	1.69	1.74	-1.72	5.09	0.333	0.14	0.35	-0.55	0.84	0.684
SES	-6.78	2.55	-11.78	-1.79	0.008	-0.25	0.42	-1.07	0.58	0.557
Obsessive Passion										
OP	**9.01**	**1.52**	**6.02**	**11.99**	**<.001**	2.53	0.27	2.00	3.07	**<.001**
Time	-0.60	0.41	-1.40	0.21	0.147	-0.14	0.08	-0.29	0.02	0.086
OP X Time	0.17	0.64	-1.08	1.41	0.794	-0.19	0.11	-0.40	0.02	0.081
Past month cannabis use	-	-	-	-	-	0.00	0.01	-0.01	0.01	0.971
Site	**-6.45**	**1.38**	**-9.16**	**-3.74**	**<.001**	0.55	0.22	0.11	0.99	0.014
Baseline CUD symptoms	2.61	1.28	0.11	5.12	0.041	**1.73**	**0.24**	**1.26**	**2.21**	**<.001**
Sex	**-4.08**	**1.35**	**-6.73**	**-1.43**	**0.003**	-0.06	0.22	-0.50	0.38	0.798
Race/Ethnicity	0.84	1.61	-2.32	4.00	0.601	-0.06	0.27	-0.60	0.47	0.812
SES	-6.27	2.56	-11.30	-1.25	0.014	-0.19	0.42	-1.01	0.63	0.648

Note. Bold denotes significance at $p<.005$; CUD = Cannabis use disorder; SES=Socioeconomic status; HP=Harmonious Passion; OP = Obsessive Passion.
Race/ ethnicity coded as Non-Hispanic White vs. Hispanic. Socioeconomic staus coded as <$10,000-$99,000; $100,000-$150,000, >$150,000.

Table 3. *GEE for the relation between passion and GPA, social connectedness, and attachment at 5- and 10-months.*

	GPA			Social Connectedness			Avoidant Attachment			Anxious Attachment		
	ß	SE	95% CI	ß	SE	95% CI	ß	SE	95% CI	ß	SE	95% CI
Harmonious Passion												
HP	0.04	0.04	-0.04, 0.11	-1.08	0.54	-2.14, -0.02	0.48	0.41	-0.33, 1.29	**0.77**	**0.28**	**0.22, 1.32**
Time	-0.04	0.01	-0.07, -0.01	-0.20	0.18	-0.55, 0.14	-0.34	0.15	-0.62, -0.05	-0.15	0.11	-0.36, 0.06
HP X Time	-0.001	0.02	-0.03, 0.03	0.15	0.22	-0.27, 0.57	-0.27	0.17	-0.60, 0.07	-0.16	0.12	-0.40, 0.07
Past month cannabis use	0.001	0.00	0.00, 0.00	0.01	0.01	-0.01, 0.04	0.01	0.01	-0.01, 0.02	0.00	0.01	-0.01, 0.01
Site	**0.29**	**0.07**	**0.15, 0.43**	0.38	0.74	-1.08, 1.84	**2.14**	**0.55**	**1.07, 3.21**	**-2.85**	**0.38**	**-3.61, -2.10**
Baseline CUD symptoms	0.13	0.07	0.00, 0.26	**-3.51**	**0.69**	**-4.87, -2.15**	0.44	0.57	-0.67, 1.55	0.75	0.40	-0.03, 1.53
Sex	-0.02	0.08	-0.18, 0.14	**-3.05**	**0.74**	**-4.50, -1.60**	-0.22	0.55	-1.31, 0.86	**2.86**	**0.38**	**2.12, 3.60**
Race/Ethnicity	-0.02	0.08	-0.18, 0.14	1.30	0.84	-0.34, 2.94	-0.29	0.66	-1.59, 1.00	0.72	0.39	-0.05, 1.49
SES	-0.16	0.09	-0.34, 0.02	1.04	1.12	-1.15, 3.23	0.39	0.75	-1.08, 1.86	0.05	0.62	-1.16, 1.27
Obsessive Passion												
OP	0.07	0.05	-0.02, 0.16	**-2.34**	**0.51**	**-3.34, -1.34**	0.69	0.43	-0.15, 1.52	0.72	0.31	0.11, 1.33
Time	**-0.04**	**0.01**	**-0.07, -0.01**	-0.17	0.17	-0.51, 0.17	-0.35	0.15	-0.63, -0.06	-0.16	0.11	-0.37, 0.05
OP X Time	-0.004	0.02	-0.04, 0.03	0.29	0.19	-0.09, 0.66	-0.03	0.16	-0.33, 0.28	-0.05	0.12	-0.28, 0.18
Past month cannabis use	0.001	0.00	0.00, 0.00	0.03	0.01	0.00, 0.06	0.00	0.01	-0.03, 0.02	-0.01	0.01	-0.02, 0.01
Site	**0.28**	**0.07**	**0.14, 0.42**	0.65	0.73	-0.77, 2.08	**2.05**	**0.54**	**0.99, 3.12**	**-2.94**	**0.38**	**-3.69, -2.19**
Baseline CUD symptoms	0.11	0.07	-0.02, 0.23	**-2.71**	**0.71**	**-4.10, -1.32**	0.04	0.59	-1.12, 1.19	0.53	0.41	-0.27, 1.33
Sex	-0.03	0.08	-0.19, 0.13	**-2.82**	**0.73**	**-4.24, -1.40**	-0.29	0.55	-1.36, 0.78	**2.77**	**0.38**	**2.03, 3.51**
Race/Ethnicity	-0.02	0.08	-0.18, 0.14	1.43	0.84	-0.21, 3.07	-0.37	0.65	-1.65, 0.91	0.68	0.40	-0.10, 1.46
SES	-0.17	0.09	-0.35, 0.01	1.14	1.15	-1.12, 3.39	0.41	0.74	-1.03, 1.85	0.03	0.62	-1.18, 1.25

Note: Bold denotes significance at p<.005; HP=Harmonious passion; OP=Obsessive Passion, CUD=Cannabis use disorder; SES=Socioeconomic status. Race/ethnicity coded as Non-Hispanic White vs Hispanic. Socioeconomic status coded as <$10,000-$99,999; $100,000-$150,000, >$150,000.

Table 4. *GEE for the relation between passion, coping motives, and cannabis outcomes at 5- and 10-months.*

	Past month cannabis use				Cannabis-related problems			
	ß	SE	95% CI		p-value	ß	SE	95% CI		p-value
					Harmonious Passion				
HP	1.72	0.90	-0.04	3.47	0.055	0.001	0.23	-0.45	0.45	0.997
Time	-0.56	0.44	-1.42	0.31	0.209	-0.07	0.08	-0.23	0.09	0.386
HP X Time	0.40	0.40	-0.39	1.18	0.320	-0.03	0.10	-0.22	0.17	0.789
Coping motives	1.80	1.17	-0.50	4.10	0.126	**1.10**	**0.24**	**0.62**	**1.58**	**<.001**
Coping motives X Time	0.11	0.53	-0.93	1.15	0.834	0.11	0.10	-0.09	0.31	0.277
Past month cannabis use	-	-	-	-	-	**0.02**	**0.01**	**0.01**	**0.04**	**<.001**
Site	**-5.70**	**1.56**	**-8.75**	**-2.64**	**<.001**	**0.79**	**0.26**	**0.29**	**1.29**	**0.002**
Baseline CUD symptoms	**7.07**	**1.49**	**4.16**	**9.99**	**<.001**	**2.21**	**0.27**	**1.69**	**2.73**	**<.001**
Sex	-3.76	1.56	-6.82	-0.69	0.016	-0.16	0.26	-0.67	0.35	0.540
Race/Ethnicity	1.52	1.77	-1.95	4.99	0.390	0.09	0.33	-0.56	0.73	0.788
SES	-6.54	2.63	-11.69	-1.38	0.013	0.07	0.34	-0.60	0.74	0.838
					Obsessive Passion				
OP	**9.09**	**1.92**	**5.32**	**12.86**	**<.001**	**2.12**	**0.29**	**1.54**	**2.69**	**<.001**
Time	-0.64	0.42	-1.47	0.19	0.130	-0.10	0.08	-0.25	0.05	0.183
OP X Time	0.32	0.83	-1.30	1.95	0.698	-0.21	0.12	-0.44	0.02	0.079
Coping motives	-0.03	1.26	-2.51	2.45	0.979	0.58	0.24	0.11	1.05	0.015
Coping motives X Time	-0.31	0.58	-1.44	0.82	0.592	0.11	0.11	-0.10	0.32	0.292
Past month cannabis use	-	-	-	-	-	0.00	0.01	-0.01	0.01	0.675
Site	**-6.39**	**1.38**	**-9.10**	**-3.68**	**<.001**	0.56	0.22	0.12	0.99	0.012
Baseline CUD symptoms	2.73	1.30	0.19	5.27	0.035	**1.48**	**0.24**	**1.00**	**1.96**	**<.001**
Sex	**-3.95**	**1.35**	**-6.59**	**-1.31**	**0.003**	-0.20	0.23	-0.64	0.24	0.380
Race/Ethnicity	0.79	1.61	-2.37	3.95	0.623	-0.05	0.28	-0.60	0.50	0.852
SES	-6.51	2.62	-11.64	-1.37	0.013	0.03	0.35	-0.66	0.72	0.930

*Note.*Bold denotes significance at p<.005; CUD = Cannabis use disorder; SES=Socioeconomic status; HP=Harmonious Passion; OP=Obsessive Passion. Race/ethnicity coded as Non-Hispanic white vs Hispanic. Socioeconomic status coded as <$10,000-$99,999; $100,000-$150,000, >$150,000.

Table 5. *GEE for the relation between passion, cannabis-refusal self-efficacy-emotional relief, and cannabis outcomes at 5- and 10-months.*

	Past month cannabis use					Cannabis-related problems				
	ß	SE	95% CI		p-value	ß	SE	95% CI		p-value
Harmonious Passion										
HP	2.01	0.84	0.36	3.66	0.017	0.10	0.21	-0.31	0.52	0.626
Time	-0.62	0.45	-1.50	0.25	0.163	-0.08	0.09	-0.25	0.09	0.352
HP X Time	0.32	0.38	-0.43	1.06	0.407	0.03	0.09	-0.16	0.21	0.765
Emotional relief	-0.78	0.40	-1.57	0.01	0.052	**-0.39**	**0.07**	**-0.53**	**-0.26**	**<.001**
Emotional relief X Time	-0.04	0.18	-0.39	0.32	0.845	0.05	0.03	-0.01	0.11	0.129
Past month cannabis use	-	-	-	-	-	0.02	0.01	0.01	0.04	**<.001**
Site	**-5.65**	**1.55**	**-8.68**	**-2.61**	**<.001**	0.82	0.26	0.31	1.34	0.002
Baseline CUD symptoms	**6.82**	**1.45**	**3.98**	**9.66**	**<.001**	**2.47**	**0.27**	**1.95**	**2.99**	**<.001**
Sex	-3.59	1.53	-6.58	-0.59	0.019	0.05	0.26	-0.46	0.56	0.842
Race/Ethnicity	1.60	1.74	-1.82	5.02	0.359	0.13	0.34	-0.54	0.81	0.697
SES	-6.87	2.60	-11.97	-1.77	0.008	-0.16	0.42	-0.99	0.67	0.699
Obsessive Passion										
OP	**9.11**	**1.75**	**5.69**	**12.54**	**<.001**	**2.07**	**0.29**	**1.50**	**2.63**	**<.001**
Time	-0.67	0.42	-1.50	0.15	0.110	-0.11	0.08	-0.26	0.05	0.176
OP X Time	0.02	0.74	-1.43	1.47	0.979	-0.07	0.12	-0.30	0.16	0.526
Emotional relief	-0.01	0.40	-0.80	0.78	0.976	**-0.23**	**0.07**	**-0.37**	**-0.09**	**0.001**
Emotional relief X Time	-0.08	0.18	-0.43	0.28	0.673	0.03	0.03	-0.03	0.10	0.348
Past month cannabis use	-	-	-	-	-	0.00	0.01	-0.01	0.01	0.951
Site	**-6.36**	**1.39**	**-9.09**	**-3.64**	**<.001**	0.55	0.22	0.11	0.98	0.014
Baseline CUD symptoms	2.42	1.29	-0.11	4.95	0.061	**1.59**	**0.24**	**1.12**	**2.06**	**<.001**
Sex	**-4.11**	**1.35**	**-6.76**	**-1.47**	**0.002**	-0.09	0.22	-0.53	0.35	0.684
Race/Ethnicity	0.80	1.63	-2.38	3.99	0.622	-0.05	0.28	-0.60	0.50	0.866
SES	-6.38	2.62	-11.51	-1.25	0.015	-0.09	0.41	-0.90	0.72	0.831

Note. Bold denotes significance at p<.005; CUD=Cannabis use disorder; SES=Socioeconomic status; HP=Harmonious Passion; OP=Obsessive Passion. Race/ethnicity coded as Non-Hispanic white vs. Hispanic. Socioeconomic status coded as <$10,000-$99,999; $100,000-$150,000, >$150,000.

Table 6. *GEE for the relation between passion, cannabis-refusal self-efficacy-opportunistic, and cannabis outcomes at 5- and 10-month.*

	Past month cannabis use					Cannabis-related problems				
	ß	SE	95% CI		p-value	ß	SE	95% CI		p-value
Harmonious Passion										
HP	2.20	0.83	0.58	3.82	0.008	0.23	0.21	-0.18	0.63	0.278
Time	-0.61	0.45	-1.49	0.27	0.174	-0.07	0.08	-0.24	0.10	0.404
HP X Time	0.22	0.38	-0.54	0.97	0.571	-0.02	0.09	-0.19	0.16	0.841
Opportunistic	-0.67	0.38	-1.41	0.07	0.074	**-0.20**	**0.06**	**-0.33**	**-0.07**	**0.002**
Opportunistic X Time	-0.11	0.17	-0.44	0.23	0.538	-0.01	0.03	-0.07	0.05	0.669
Past month cannabis use	-	-	-	-	-	0.03	0.01	0.01	0.04	**<.001**
Site	**-5.58**	**1.54**	**-8.61**	**-2.56**	**<.001**	0.85	0.27	0.32	1.38	0.002
Baseline CUD symptoms	**6.71**	**1.44**	**3.90**	**9.53**	**<.001**	2.58	0.27	2.05	3.11	**<.001**
Sex	-3.17	1.53	-6.17	-0.17	0.038	0.18	0.26	-0.34	0.70	0.492
Race/Ethnicity	1.65	1.74	-1.75	5.06	0.341	0.15	0.34	-0.53	0.82	0.668
SES	-6.83	2.64	-12.02	-1.65	0.01	-0.15	0.41	-0.96	0.66	0.715
Obsessive Passion										
OP	**9.22**	**1.79**	**5.70**	**12.73**	**<.001**	2.42	0.27	1.88	2.95	**<.001**
Time	-0.68	0.42	-1.51	0.15	0.110	-0.10	0.08	-0.26	0.05	0.178
OP X Time	-0.13	0.78	-1.65	1.39	0.868	-0.21	0.11	-0.42	0.01	0.059
Opportunistic	-0.02	0.42	-0.84	0.79	0.955	-0.05	0.06	-0.16	0.07	0.444
Opportunistic X Time	-0.16	0.19	-0.53	0.20	0.378	-0.04	0.03	-0.10	0.02	0.158
Past month cannabis use	-	-	-	-	-	0.00	0.01	-0.01	0.01	0.913
Site	**-6.33**	**1.39**	**-9.05**	**-3.61**	**<.001**	0.55	0.22	0.11	0.98	0.013
Baseline CUD symptoms	2.15	1.30	-0.39	4.69	0.097	**1.59**	**0.24**	**1.12**	**2.06**	**<.001**
Sex	**-3.99**	**1.36**	**-6.66**	**-1.31**	**0.004**	-0.03	0.22	-0.47	0.41	0.903
Race/Ethnicity	0.84	1.62	-2.34	4.02	0.605	-0.05	0.27	-0.58	0.49	0.865
SES	-6.40	2.66	-11.61	-1.19	0.016	-0.10	0.42	-0.91	0.72	0.817

Note: Bold denotes significance at p<.01; CUD=Cannabis use disorder; SES=Socioeconomic status; HP=Harmonious Passion; OP=Obsessive Passion. Race/ethnicity coded as non-Hispanic White vs Hispanic. Socioeconomic status coded as <10,000-99,999; 100,000-150,000, >150,000.

Table 7. *GEE for the relation between passion, cannabis-refusal self-efficacy-social facilitation, and cannabis outcomes at 5- and 10-month.*

	Past month cannabis use					Cannabis-related problems				
	ß	SE	95% CI		p-value	ß	SE	95% CI		p-value
	Harmonious Passion									
HP	2.22	0.85	0.56	3.89	0.009	0.19	0.21	-0.22	0.60	0.371
Time	-0.60	0.45	-1.47	0.28	0.181	-0.07	0.09	-0.23	0.10	0.441
HP X Time	0.24	0.38	-0.50	0.98	0.528	-0.01	0.09	-0.19	0.17	0.933
Social facilitation	-0.37	0.42	-1.19	0.45	0.375	**-0.22**	**0.07**	**-0.36**	**-0.08**	**0.003**
Social facilitation X Time	-0.16	0.18	-0.51	0.19	0.378	-0.01	0.03	-0.07	0.06	0.808
Past month cannabis use	-	-	-	-	-	0.03	0.01	0.02	0.04	**<.001**
Site	**-5.56**	**1.54**	**-8.58**	**-2.55**	**<.001**	**0.86**	**0.27**	**0.34**	**1.39**	**0.001**
Baseline CUD symptoms	**7.38**	**1.43**	**4.57**	**10.18**	**<.001**	**2.65**	**0.27**	**2.12**	**3.18**	**<.001**
Sex	-3.28	1.53	-6.29	-0.28	0.032	0.16	0.26	-0.36	0.68	0.540
Race/Ethnicity	1.66	1.72	-1.71	5.02	0.334	0.16	0.34	-0.50	0.83	0.631
SES	**-6.88**	**2.60**	**-11.97**	**-1.79**	**0.008**	-0.15	0.43	-0.99	0.70	0.735
	Obsessive Passion									
OP	**9.31**	**1.67**	**6.03**	**12.59**	**<.001**	**2.35**	**0.28**	**1.80**	**2.90**	**<.001**
Time	-0.67	0.42	-1.50	0.16	0.113	-0.10	0.08	-0.25	0.05	0.194
OP X Time	-0.05	0.72	-1.47	1.37	0.946	-0.17	0.11	-0.40	0.05	0.125
Social facilitation	0.13	0.39	-0.63	0.89	0.734	-0.07	0.07	-0.20	0.07	0.341
Social facilitation X Time	-0.14	0.17	-0.47	0.20	0.422	-0.03	0.03	-0.10	0.04	0.422
Past month cannabis use	-	-	-	-	-	0.00	0.01	-0.01	0.01	0.972
Site	**-6.34**	**1.39**	**-9.06**	**-3.63**	**<.001**	0.56	0.22	0.12	0.99	0.012
Baseline CUD symptoms	2.47	1.29	-0.06	5.01	0.055	**1.65**	**0.24**	**1.19**	**2.12**	**<.001**
Sex	**-4.06**	**1.37**	**-6.73**	**-1.38**	**0.003**	-0.04	0.22	-0.48	0.40	0.865
Race/Ethnicity	0.80	1.62	-2.38	3.97	0.623	-0.04	0.27	-0.57	0.49	0.880
SES	**-6.40**	**2.63**	**-11.56**	**-1.24**	**0.015**	-0.09	0.42	-0.90	0.73	0.837

Note: Bold denotes significance at p<.005; CUD=Cannabis use disorder; SES=Socioeconomic status; HP=Harmonious Passion; OP=Obsessive Passion. Race/ethnicity coded as Non-Hispanic white vs. Hispanic. Socioeconomic status coded as <$10,000-99,999; $100,000-$150,000, >$150,000.

The social facilitation item, however, was associated with fewer cannabis-related problems ($\beta = -0.22$, *SE* = 0.07, *p* = .003). After including the social facilitation item, OP was still associated with greater cannabis frequency ($\beta = 9.31$, *SE* = 1.67, *p* < .001) and more cannabis-related problems ($\beta = 2.35$, *SE* = 0.28, *p* < .001). There were no significant time interactions.

DISCUSSION

In this prospective college student cohort study of cannabis use and use-related problems among those with and without a CUD, the results from this study support the growing body of evidence that shows the DMP is not a substitute for other measures of problematic cannabis use (Davis, 2017; Davis & Arterberry, 2019; Steers et al., 2015). Indeed, in this study, we found that HP and OP are differentially associated with recent cannabis use and use-related consequences. Additionally, we discovered that when HP and OP were included as predictors along with coping motives, refusal self-efficacy, and CUD symptoms, that OP was either predictive of cannabis use and use-related consequences at a higher magnitude compared to these other constructs, or these other constructs were not significant predictors in the models. These data extend the currently available literature on this topic in several ways outlined below.

The findings that greater HP was not associated with greater past month cannabis use or cannabis-related problems among college students with minimal cannabis use history are consistent with one study investigating this topic using retrospective and cross-sectional designs (Steers et al., 2015). However, these findings are inconsistent with two studies among people who use cannabis regularly (e.g., Davis, 2017; Davis & Arterberry, 2019). Findings are also consistent with a study investigating the DMP model among young risky drinkers enrolled in a clinical trial (Davis et al., 2019), wherein HP was not associated with binge drinking or alcohol use-related consequences. That HP has consistently been shown unrelated to use-related consequences among those engaging in risky cannabis use further supports this construct in these populations, and the hypothesis that HP may not be associated with increased consequences.

We also found that greater baseline OP was associated with greater past month cannabis use and more cannabis-related problems, and that OP was associated with cannabis-related problems at a greater magnitude than coping motives. These results are consistent with retrospective and cross-sectional studies among frequent cannabis users (Davis, 2017; Davis & Arterberry, 2019; Davis et al., 2018) and among college students who use cannabis infrequently (Steers et al., 2015). Furthermore, because OP was associated with cannabis use-related consequences at a greater magnitude than coping motives, future research should continue to explore whether OP is a better predictor of cannabis use outcomes compared to other psychological and behavioral characteristics (e.g., motives, refusal self-efficacy) among young adults. Nevertheless, that OP has consistently been shown to be associated with cannabis use and use-related consequences establishes the importance of using this measure of passion for cannabis use in future studies in this population.

To date, no studies have evaluated whether levels of OP or HP for cannabis use vary over time. In this study, there were no significant passion by time interactions, which could be explained in multiple ways. This could mean that passion may vary at the within-person level on a daily or momentary basis, thus more frequent assessment techniques such as ecological momentary assessments could determine variations in passion. Alternatively, it could also be that passion may change more slowly and that we were not able to detect such variations in a study designed to examine only 5- and 10-month outcomes. Alternatively, it is also possible that passion is stable over time once it develops. That said, these hypotheses await future research to assess whether passion fluctuates over time using methodology that addresses these measurement challenges.

To our knowledge, this is the first study to assess elements of relational functioning as correlates of HP and OP. Notably, several studies have found a relationship between dysfunctional or less secure forms of attachment and behavioral addictions (Tas, 2019), substance misuse and use disorder (Dassa et al., 2013; Kpelly et al., 2022), alcohol use-related consequences (Molnar et al., 2010), and cannabis use (Schindler et al., 2009). Conversely, stronger family attachment and

social support have been associated with less risky substance use (Hamme et al., 2010). Interestingly, although we expected that those college students with more anxious forms of attachment and less social connection may be more at risk for developing OP compared to those with more social support, we found that OP was only associated with less social support in this sample. That we found an association between OP and less social connection suggests that for those high in OP, relational functioning may already be a source of concern, and possibly contributing to their problematic cannabis use. If addressing OP could be facilitated by addressing other relational aspects of one's functioning (e.g., increasing positive social connections), then it is possible that one's level of HP for cannabis use might increase while levels of OP decrease. Thus, we might expect that although cannabis use may continue, the function of cannabis use may change, and one might experience fewer, if any, use-related consequences, even if they experience anxious forms of attachment. Additionally, that the passion measure appears to be more strongly related to cannabis use and use-related problems compared to other assessment tools (e.g., coping motives; refusal self-efficacy), suggests that this measure should be included in clinical settings in order to best determine for whom further screening or intervention may be useful. However, more research is needed to elucidate the ways in which attachment style, social connection, and passion for cannabis use are related.

Study findings should be considered in light of limitations. For example, although we recruited students from two campuses, the sample is not necessarily representative of students at all campuses (e.g., historically Black campuses, private colleges, community colleges) across geographic regions; however, this investigation sets the stage for future, more generalizable studies. Next, all data are self-reported, thus are subject to potential recall biases and demand characteristics; however, self-report of substance use is reliable and valid (Simons et al., 2015) and our study's procedures to promote valid reporting via confidentiality assurances and private, web-based administration. The full measure for the CRSEQ was not used in this study to reduce participant burden in completing the survey; thus, the single item representations of the CRSEQ scales may not capture fully the

dimensions measured and findings should be interpreted with caution. Further, we did not examine types and methods of cannabis use in this study, but future studies would benefit from examining whether differing cannabis use methods are associated with passion constructs. Additionally, the recruitment strategy did not allow for assessment of the number of emails that were opened or read, nor did it allow for examination of who did not click a link to screen for the study, which limits our ability to examine to what extent response bias affected findings. Finally, although CUD symptoms were assessed and the number of symptoms are associated with a diagnosis, we did not conduct formal diagnostic evaluations.

This body of research suggests that the DMP should be considered important in understanding why and to what extent young people consume cannabis or experience use-related consequences. One area of future research would be to examine the bidirectional relationships between passion constructs and cannabis-related outcomes, as passion constructs may be more stable or be better understood as trait-like instead of individual states. Future research should also explore whether addressing constructs of the DMP in existing evidenced-based interventions for cannabis misuse and CUD is feasible, acceptable, and effective. One promising area of inquiry could involve adapting a brief motivational interviewing intervention (e.g., Miller and Rollnick, 1991) to include discussion of HP and OP and to assess whether this improves cannabis use-related outcomes among college students. Furthermore, research could explore whether one's level of HP and OP differentially predicts response to evidence-based treatments, perhaps highlighting for whom an emphasis on passion could be beneficial in psychotherapy. Studies could also assess whether levels of HP and OP could be used as a screener to identify those more likely to need brief intervention and/or referral to treatment.

In the meantime, clinicians working with college students or other young people with cannabis use, misuse, and/or use-related problems might consider whether integrating a discussion and measurement of passion into counseling activities could be beneficial in helping to ascertain the ways in which cannabis use is experienced by college students. Indeed, the language of passion may be more acceptable to

college students by reducing stigma associated with identifying as having cannabis use-related problems. For example, college students may be less likely to identify as having a problem with cannabis but may instead be more likely to think about their cannabis use in relational terms. If cannabis misuse is conceptualized as a relational problem consistent with the DMP, individuals may be more open to exploring and changing their cannabis use (consistent with HPs), as opposed to current treatment approaches that frame cannabis as primarily a behavioral problem. This new way of thinking could also move the field in the direction of more acceptability for a Recovery Oriented Systems of Care (ROSC) model (Sheedy & Whitter, 2009), which supports that recovery from any kind of substance use disorder should include improvement in functioning, whether or not that improvement in functioning includes reduction or cessation of substance use. Regardless, decreasing the stigma associated with acknowledging problems associated with cannabis use among college students, even if limited to changes in the language we use to describe functional and dysfunctional use, may help to engage college students in important conversations about the role cannabis use plays in their day-to-day lives. This alone might facilitate more connection to care with these high-risk individuals and help decrease the likelihood of negative long-term cannabis misuse and CUD trajectories.

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