JOURNAL OF PSYCHOACTIVE DRUGS
2019, VOL. 51, NO. 4, 343–350

Passion for Marijuana Use Mediates the Relations between Refusal Self-Efficacy and Marijuana Use and Associated Consequences

Alan K. Davis, Ph.D. [a] and Brooke J. Arterberry, Ph.D.[b]

[a]Behavioral Pharmacology Research Unit, Department of Psychiatry, Johns Hopkins School of Medicine, Baltimore, MD, USA; [b]Department of Psychology, Iowa State University, Ames, IA, USA

ABSTRACT

Marijuana (MJ) refusal self-efficacy and obsessive/harmonious passion for MJ use are associated with use and related consequences but have not been examined simultaneously. We examined the relation among obsessive/harmonious passion for MJ use, refusal self-efficacy, frequency of use, and related consequences in an online community sample (n = 524; mean age = 23.78; 87.5% male). A path analysis revealed that, while controlling for the relationship between MJ use and consequences, lower refusal self-efficacy was related to greater obsessive passion and to greater harmonious passion, and was associated with more consequences but not with MJ use. Greater obsessive passion was associated with greater MJ use frequency and consequences, and greater harmonious passion was related to greater MJ use frequency and fewer consequences. Obsessive passion mediated the relation between lower refusal self-efficacy and greater MJ use and more consequences, and harmonious passion mediated the relation between lower refusal self-efficacy and consequences. Passion mediates the relationships between refusal self-efficacy and MJ use and consequences, with obsessive passion being the stronger mediator. Passion could be a relevant target in interventions aimed at changing a person's MJ use.

ARTICLE HISTORY
Received 8 July 2018
Accepted 1 February 2019

KEYWORDS
Passion; marijuana; obsessive; harmonious; self-efficacy

Introduction

Marijuana (MJ) is the most used illicit drug in the United States and other countries (Johnston et al. 2014; National Institute on Drug Abuse (NIDA) 2018; United Nations Office on Drugs and Crime 2014). The subjective effects of MJ include both positive and negative experiences, such as relaxation, euphoria, disinhibition, paranoia, anxiety, and depression (Green, Kavanagh, and Young 2003). Despite being perceived as the least risky drug (NIDA 2018), some people report experiencing negative consequences that include challenging somatic, social, or psychological effects (Simons et al. 2012). Even though frequent MJ users have a higher likelihood of meeting criteria for MJ use disorder, not all go on to develop this condition (Farmer et al. 2015; Hall and Pacula 2003). Nonetheless, MJ users who experience problems associated with use may benefit from behavioral interventions to reduce the number of or frequency with which they experience these consequences.

Few behavioral treatments for reducing MJ use and related consequences have been developed and efficacy is inconsistent across studies (e.g., Blow et al. 2017; Hingson and Compton 2014; Saitz 2014; Walton et al. 2013). Specifically, several studies show modest effects for reducing MJ use but not use-related consequences (Blow et al. 2017; Hingson and Compton 2014; Saitz 2014; Walton et al. 2013). Additionally, a recent meta-analysis concluded that behavioral treatments were effective in reducing MJ use when compared to waitlist control conditions but not treatment as usual conditions (Davis et al. 2015). Although treatments can include a variety of malleable behavioral or psychological targets (e.g., motivation to change, attitudes/beliefs about consumption), MJ refusal self-efficacy is one area that has received attention in regard to understanding persistent MJ use (Gullo et al. 2017; Kadden and Litt 2011). As it relates to Bandura's Social Cognitive Theory (Bandura1986, 1997, 1999), MJ refusal self-efficacy is the level of confidence a person has in their ability to refuse offers of or abstain from using MJ in a variety of social, environmental, and emotional contexts (Young et al. 2012). Among treatment populations, MJ refusal self-efficacy is associated with future MJ consumption, where greater refusal self-efficacy is related to lower consumption, abstinence, and better treatment outcomes (Gullo et al. 2017; Kadden and Litt 2011; Litt et al. 2008; Litt, Kadden, and Petry 2013; Stephens, Wertz, and Roffman 1995, 1993),

CONTACT Alan K. Davis alan.kooi.davis@gmail.com School of Medicine, Johns Hopkins University, 5510 Nathan Shock Drive, Baltimore, MD 21224
Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/ujpd.

thus highlighting the importance of addressing refusal self-efficacy in behavioral interventions.

Another recent development in the MJ use literature has been the examination of an individual-level psychological factor that may explain persistent MJ use: the dualistic model of passion (DMP). According to the DMP (Vallerand 2015; Vallerand et al. 2003), passion is defined as a person's proclivity toward certain activities that are well-liked, important, and worthy of substantial expenditures in time and energy. Within the DMP model, there are two types of passion: obsessive and harmonious. Obsessive passion develops when an activity (e.g., MJ use) results in uncontrollable behavioral engagement that causes conflict in the person's life due to dissonance between the activity and the person's values. In contrast, harmonious passion develops when an activity results in manageable behavioral engagement that enhances a person's life and is consistent with their values.

There is growing evidence supporting the application of the DMP among people who engage in addictive behaviors such as alcohol use, gambling, and online video gaming (see Vallerand 2015). For example, obsessive passion is consistently associated with frequency of engaging in an addictive behavior, negative consequences, and negative affect, while harmonious passion is associated with life satisfaction and positive affect and inconsistently associated with frequency of engaging in the behavior (Davis and Rosernberg, 2015; Lafrenière et al. 2009; Ratelle et al. 2004; Rosenberg and Kraus 2014; Rousseau et al. 2002; Steers et al. 2015; Stoeber et al. 2011; Wang and Chu 2007).

Among MJ-using young adults and community populations (Davis 2017; Davis et al. 2018; Steers et al. 2015), development of obsessive or harmonious passion for MJ depends on the importance and amount of control a person has retained over their MJ use. Together, the factors of perceived importance and control may differentiate those who experience MJ-related consequences and those who do not. Indeed, obsessive passion has been shown to be associated with greater frequency of MJ use, craving, number of sessions per day, and MJ-related consequences (Davis 2017; Davis et al. 2018; Steers et al. 2015), while harmonious passion was associated with frequency of MJ use among infrequent users (Steers et al. 2015), but not regular users (Davis 2017). In a community sample, harmonious passion has been inconsistently related to marijuana-related consequences, where one study found an association with fewer MJ-related consequences (Davis 2017), and another study found no association with consequences (Davis et al. 2018).

Refusal self-efficacy has been associated with a person's ability to limit or abstain from MJ use in a variety of contexts, and the degree to which MJ use is an obsessive or harmonious passion has been associated with ability to control MJ use. Therefore, it is important for clinicians and researchers to gain understanding of the relation between these constructs, as they could be a proxy for the ability to employ MJ use-reduction strategies (Davis et al. 2014a, 2014b). In short, passion may help explain the psychological context of refusal self-efficacy and elucidate a factor that influences the capacity for managing MJ use through engagement in MJ reduction behaviors.

A path model was used to determine whether passion for MJ use mediated the relationships between refusal self-efficacy and MJ use and negative outcomes. The consistent findings regarding the relations between refusal self-efficacy and MJ use (Gullo et al. 2017; Kadden and Litt 2011; Litt et al. 2008; Litt, Kadden, and Petry 2013; Stephens, Wertz, and Roffman 1995, 1993) and the relations between obsessive passion and MJ use and consequences (Davis 2017; Davis et al. 2018), support this study's hypotheses: (H1) refusal self-efficacy will be positively associated with harmonious passion; (H2) refusal self-efficacy will be negatively associated with MJ use and consequences; (H3) refusal self-efficacy will be negatively associated with obsessive passion; (H4) obsessive passion will be positively associated with MJ use and consequences; and (H5) obsessive passion will mediate the relation between refusal self-efficacy and MJ use and consequences. Because harmonious passion is inconsistently related to MJ use and consequences (Davis 2017; Davis et al. 2018; Steers et al. 2015), we hypothesized that (H6) harmonious passion would be positively related to MJ use and negatively associated with consequences; and (H7) harmonious passion would mediate the relation between refusal self-efficacy and use/consequences.

Method

Procedure

The current study data were collected as part of a large web-based study of young adults who use MJ (Davis 2017; Davis et al. 2018). Respondents were recruited by using message postings and electronic advertisements delivered on Facebook. Each advertisement directed potential respondents to a web-based, secure survey hosted by surveygizmo (www.surveygizmo.com), and those who clicked an advertisement were presented with a consent document detailing the inclusion criteria: between the ages of 18 and 65 years, able to read and understand English, and have used MJ at least once per month during the past six months. Following

consent, respondents completed each study questionnaire (described in the following) and all items within each questionnaire were presented in a random order. Lastly, each respondent was notified that a single donation of $150.00 was given to Bluelight.org as way of "paying it forward" for their time completing the study (which took approximately 20 minutes). The study was deemed exempt by the Bowling Green State University's Human Subjects Review Board and the full survey is available from the first author.

Measures

Passion for marijuana use

The Marijuana-Harmonious and Obsessive Passion Scale (M-HOPS; Davis 2017; Davis et al. 2018) is a 13-item modified version of Vallerand et al.'s (2003) Passion Scale. The MHOPS is comprised of six harmonious passion items (Using marijuana…. "allows me to live a variety of experiences," "…allows me to live memorable experiences," "…reflects the qualities I like about myself," "…is in harmony with the other activities in my life," "The new things that I discover while using marijuana allow me to appreciate it even more," and "For me, using marijuana is a passion that I still manage to control") and seven obsessive passion items ("I cannot live without using marijuana," "The urge is so strong I can't help myself from using marijuana," "I have difficulty imagining my life without using marijuana," "I am emotionally dependent on using marijuana," "I have a tough time controlling my need to use marijuana," "I have almost an obsessive feeling for using marijuana," and "My mood depends on me being able to use marijuana"). Respondents rated each item on a 7-point scale ranging from 1 = "do not agree at all" to 7 = "completely agree." Internal consistency in the present sample was .82 for the obsessive passion subscale and .73 for the harmonious passion subscale.

Marijuana refusal self-efficacy

The Marijuana Refusal Self-Efficacy Questionnaire (also known as the Cannabis Refusal Self-Efficacy Questionnaire; Young et al. 2012) is a 14-item measure that assesses a person's level of confidence that they could refuse MJ in a variety of social (e.g., when my friends are smoking, when my spouse or partner is smoking), emotional (e.g., when I feel upset, when I am worried), and environmental (e.g., when I am at a party) contexts. We modified the Cannabis Refusal Self-Efficacy Questionnaire by replacing the word "cannabis" with the word "marijuana" in order to be consistent in our use of terminology in this study. Respondents were asked to rate how confident they were that they could refuse MJ in each of the listed situations on a 6-point scale from 1 = "I am very sure I could NOT resist smoking marijuana" to 6 = "I am very sure I could resist smoking marijuana." For this study, an overall mean rating of self-efficacy was used. The internal consistency of the entire scale was .91.

Marijuana consequences

The Rutgers Marijuana Problem Index (White, Labouvie, and Papadaratsakis 2005) was used to examine the frequency with which respondents experienced each of 18 MJ-related consequences (e.g., neglected responsibilities, felt that you needed more than you used to use in order to get the same effect, kept using marijuana when you promised yourself not to). Respondents were asked to report consequences experienced within the past 12 months on a 5-point scale ranging from 0 = "never" to 4 = "10 or more times." For the purpose of this study, and similar to Hendershot, Magnan, and Bryan (2010), individual items were dichotomized (yes/no) and then summed to create a score of the total number of consequences experienced by each respondent (range 0–18). Internal consistency was .84.

Marijuana and other substance use history

One item assessed recent frequency of MJ use (0–30 days in the past month). A series of items also assessed consumption (yes/no) of licit and illicit substances (e.g., alcohol, tobacco, psychedelics/hallucinogens) during the six months prior to the study.

Demographics

Basic demographic characteristics were obtained, including gender, age, ethnicity, and sexual orientation.

Data analyses

Data quality

Study completion time was examined in order to identify careless responding. Overall, respondents completed the survey in approximately 20 minutes. Only 10 respondents took less than 10 minutes (and no one completed in less than seven minutes), which suggests that careless responding was not a concern in the sample.

Analytic plan

First, descriptive analyses of demographic and background characteristics for all study variables were calculated. Pearson correlation coefficients were calculated to examine the relationships among all primary study variables (obsessive passion,

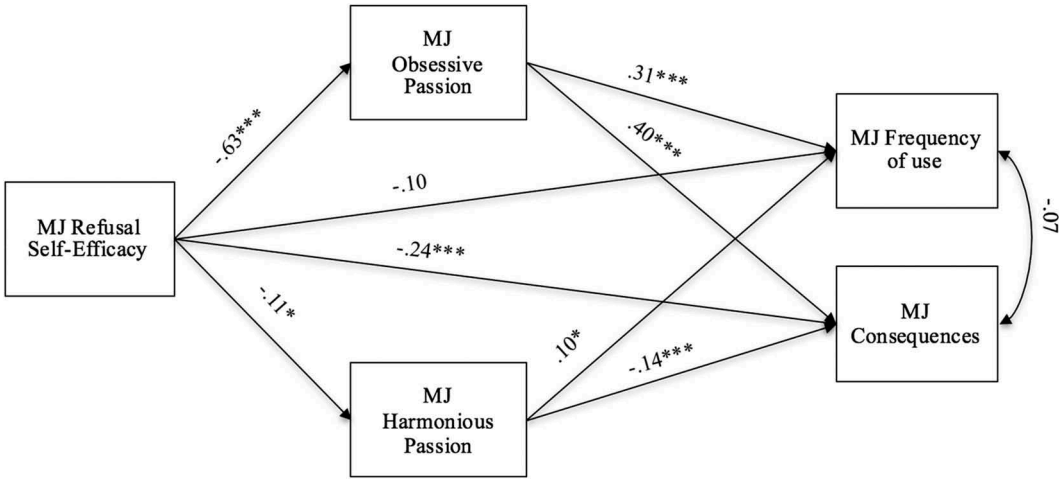

Figure 1. Path analysis examining obsessive and harmonious passion, and marijuana refusal self-efficacy, as predictors of marijuana use and use-related consequences. *p<.05; **p<.01; ***p<.001.

harmonious passion, refusal self-efficacy, frequency of MJ use, MJ-related consequences). A path analysis was then used to test hypothesized direct (H1-H4, H6) and mediation effects (H5, H7) (see Figure 1). Although sex, ethnicity, and age were considered as covariates, these variables were excluded because they were not associated with any other variable in the model. Analyses were conducted using maximum likelihood with robust standard errors in MPlus version 7.0 (Muthén and Muthén 1998–2017).

Results

Respondent characteristics

Detailed descriptions of recruitment and participant characteristics are published elsewhere (Davis 2017; Davis et al. 2018). Respondents were recruited in the spring (March and April) of 2015. Of all individuals who clicked the advertisement link (n = 3,232), 746 consented to fill out the survey. However, 221 of these respondents were excluded because they did not meet the inclusion criteria or had missing data on the primary measures (i.e., M-HOPS and MJ frequency). The final sample (n = 524) was comprised of primarily young adults (M = 23.8, SD = 9.0), most of whom reported that they were White (86%), male (88%), single (55%), and employed part- or full-time (59%). In general, respondents used MJ frequently (M = 21.4 days in month prior to assessment, SD = 10.6; Mode = 31; 50% used 25–31 days; 98% typically smoked MJ leaves/buds/stems) and experienced an average of 6.0 (SD = 3.8) consequences associated with MJ use. Additionally, most respondents had consumed alcohol (85%) and nicotine (71%) during the six months prior to the survey.

Table 1. Means, standard deviations, and correlations among obsessive and harmonious passion, refusal self-efficacy, past 30-day frequency of marijuana use, and marijuana use-related consequences (n= 524).

	M (*SD*)	1	2	3	4	5
1. Harmonious passion	5.19 (1.09)	.	.04	−.11*	.12**	−.10*
2. Obsessive passion	2.46 (1.26)		.	−.63***	.38***	.54***
3. Refusal self-efficacy	4.19 (1.19)			.	−.30***	−.47***
4. Past 30-day marijuana use	21.42 (10.63)				.	.15**
5. Marijuana consequences[a]	6.00 (3.81)					.

*p < .05; **p < .01; ***p < .001.
[a] Total score on the Rutgers Marijuana Problems Index.

Associations of M-HOPS scores and correlations with refusal self-efficacy, and frequency of marijuana use and related consequences

There was no association between harmonious and obsessive passion subscale scores (Table 1). Additionally, harmonious passion was weakly correlated with refusal self-efficacy, frequency of MJ use, and consequences, whereas obsessive passion was moderately to strongly associated with refusal self-efficacy, frequency of MJ use, and consequences. Refusal self-efficacy was also moderately associated with frequency of use and consequences.

Path analysis

As shown in Figure 1, while controlling for the relationship between frequency of MJ use and use-related consequences, we found partial support for our hypotheses

that (H1) lower refusal self-efficacy was directly associated with greater harmonious passion; (H2) lower refusal self-efficacy was associated with greater MJ consequences; (H3) lower refusal self-efficacy was associated with greater obsessive passion; (H4) greater obsessive passion was associated with greater MJ use and more consequences; and (H6) greater harmonious passion was associated with greater MJ use and fewer consequences. Additionally, our mediation hypotheses were also supported: (H5) obsessive passion was a mediator of the relation between refusal self-efficacy and MJ use and consequences (via greater obsessive passion; β = −.20, SE = .03, p< .001, 95% CI [−.26, −.13]); and (H7) harmonious passion was a mediator of the relation between refusal self-efficacy and use/consequences (via lower harmonious passion; β = .01, SE = .01, p< .05, 95% CI [.00, .03]). Model fit was excellent, X^2 (1, N = 524) = .758, p = .384, standardized root-mean-square residual = .01.

Discussion

The present study examined the relations among the variables proposed by the DMP for MJ use, MJ refusal self-efficacy, past 30-day consumption, and use-related consequences in a sample of young people who used MJ frequently. All of our main hypotheses were partially (H1 and H2) or fully (H3-H7) supported. The main finding from this study was that, when including obsessive and harmonious passion in a path model, the association of MJ refusal self-efficacy with recent frequency of use and use-related consequences was mediated by obsessive passion (H5). This finding is consistent with and extends prior MJ passion research which indicated that obsessive passion is associated with greater frequency of use, number of consequences, number of use sessions per day, and craving (Davis 2017; Steers et al. 2015).

Furthermore, when controlling for the interrelation among other motives for MJ use (e.g., euphoria, coping, social motives), obsessive passion stands out as more strongly associated with recent use and consequences (Davis et al. 2018). Taken together, and given prior findings regarding the relation between refusal self-efficacy and treatment outcomes (Gullo et al. 2017; Kadden and Litt 2011; Litt et al. 2008; Litt, Kadden, and Petry 2013; Stephens, Wertz, and Roffman 1995, 1993), this study suggests that obsessive passion could be a relevant intervention target in this high-risk population. Although more research is needed to ascertain the malleability of passion within the context of MJ interventions, it could be that by addressing obsessive passion in treatment, a client might experience an increase in their confidence to abstain from MJ use and achieve their reduction or abstinence goal. However, this hypothesis assumes that passion for MJ is an antecedent of use, and the cross-sectional nature of these data precludes such definitive claims. Therefore, further longitudinal studies are needed to examine this hypothesis.

Another finding from this study showed a negative, albeit weak, association between MJ refusal self-efficacy and harmonious passion. Although inconsistent with our hypothesis (H1) regarding passion for MJ use, this finding is consistent with the broader DMP literature (Vallerand 2015). Harmonious passion has been related to frequency of behavioral engagement and would likely limit a person's confidence to abstain entirely from a valued activity, especially when that activity is compatible with other activities in life and in harmony with personal values. Furthermore, we found that MJ refusal self-efficacy was associated with use-related consequences via less harmonious passion (H7). This suggests that among those less confident in their ability to control their MJ use, higher levels of harmonious passion could be a protective factor against the experience of MJ use-related consequences. If this finding is replicated in future longitudinal studies, this could provide compelling evidence for prevention of MJ-related consequences by helping individuals better align the frequency or quantity of their MJ use with other activities and personal values. Such an approach would be consistent with motivational interviewing and could easily be included in a personalized feedback intervention.

Simultaneous inclusion of all study variables in the path analysis showed that there was no relationship between MJ refusal self-efficacy and frequency of MJ use, which was inconsistent with our hypothesis (H2). This finding may be understood within the context of alcohol use and the inconsistencies between self-efficacy of refusal and alcohol quantity/frequency, where some studies have found an association and others have not (see Kadden and Litt 2011 for a review). This finding nonetheless highlights the strong mediating effect of obsessive passion between these variables and suggests that it could be more relevant to address obsessive passion as part of prevention/intervention efforts.

There are several limitations to the methodology that have been documented elsewhere, including using a web-based cross-sectional survey that relied on retrospective recall and self-report, a sample comprised primarily of young White men from unknown geographical locations, and used incentives which could have created unique volunteer biases (see Davis 2017; Davis et al. 2018). Additionally, the use of different advertising locations or methods may have attracted a more diverse demographic, those wanting greater anonymity, or individuals who do not use Facebook. Our measure of refusal self-efficacy included

only 14 items reflecting social, environmental, and emotional MJ use contexts and it is possible that self-efficacy to abstain from MJ use could vary in situations not examined by this measure. For example, all of the emotional contexts included in this measure had a negative valence (e.g., when I feel upset, when I feel sad, when I am worried). Emotional contexts that have a positive valence (e.g., when I am happy, when I am excited) or neutral valence (e.g., when I am bored) are equally worthy of examination and could be differentially associated with refusal self-efficacy and passion for MJ use. We recommend that future studies include a broader range of items on this measure in order to advance understanding of the relation between refusal self-efficacy and obsessive and harmonious passion.

Conclusion

Prior findings show that obsessive passion is associated with recent MJ use and related consequences (Davis 2017; Davis et al. 2018; Steers et al. 2015). In the current study, obsessive passion emerged as a strong mediator of MJ refusal self-efficacy and frequency of use and consequences. This finding suggests that the degree to which MJ use is an obsessive passion may distinguish the ability or inability to reduce use and decrease the number of problems a person experiences related to MJ consumption. However, no studies to date have examined passion for MJ use among a treatment-seeking sample, which is needed to determine whether obsessive passion is an important predictor of intervention outcome. Clinicians and researchers interested in decreasing MJ use among those at risk for MJ-related problems should consider using the M-HOPS to better understand whether MJ use is an obsessive or harmonious passion, which could highlight a relevant intervention target. For example, the M-HOPS could be used as a way to measure and discuss MJ use in early interventions, in terms of whether one's use is consistent with values and other life activities, regardless of whether they meet criteria for an MJ use disorder. Such an approach is consistent with motivational interviewing and acceptance and commitment-based approaches, which may be especially helpful for people who use MJ because of ambivalence about changing their use, and thus may be less likely to identify with having any related problems. It is also possible that reducing obsessive passion for MJ use could lead to an increase in a person's confidence in their ability to reduce or abstain from MJ use, thus contributing to better outcomes. Considering that motivation to change is a strong predictor of a person's ability to reduce substance use (Stein et al. 2011; Barnett et al. 2012), concomitantly addressing the likely dynamic relation among refusal self-efficacy, obsessive passion, motivation to change, and the negative reinforcing effects of substance use could positively impact overall treatment outcomes. Future research should begin to test this using rigorous controlled trial designs.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

Dr. Arterberry was supported by a National Institute on Alcohol Abuse and Alcoholism T32 postdoctoral training grant (#AA007477) and Dr. Davis was supported by a National Institute on Drug Abuse postdoctoral training grant (#DA007209). The funding sources had no role in the design/execution of this study or the interpretation or communication of findings.

ORCID

Alan K. Davis http://orcid.org/0000-0003-4770-8893

References

Bandura, A. 1986. The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology* 4:359–73. doi:10.1521/jscp.1986.4.3.359.

Bandura, A. 1997. *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bandura, A. 1999. A sociocognitive analysis of substance abuse: An agentic perspective. *Psychological Science* 10:214–17. doi:10.1111/1467-9280.00138.

Barnett, E., S. Sussman, C. Smith, L. A. Rohrbach, and D. Spruijt-Metz. 2012. Motivational interviewing for adolescent substance use: A review of the literature. *Addictive Behaviors* 37 (12):1325–1334. doi: 10.1016/j.addbeh.2012.07.001.

Blow, F. C., M. A. Walton, A. S. Bohnert, R. V. Ignzcio, S. Chermack, R. M. Cunningham, B. M. Booth, M. Ilgen, and K. L. Barry. 2017. A randomized controlled trial of brief interventions to reduce drug use among adults in a low-income urban emergency department: The HealthiER You study. *Addiction* 112:1395–405. Epub ahead of print. doi: 10.1111/add.v112.8.

Davis, A. K. 2017. The dualistic model of passion applied to recreational marijuana consumption. *Addiction Research and Theory* 25:188–94. doi:10.1080/16066359.2016.1242722.

Davis, A. K., B. J. Arterberry, E. E. Bonar, K. Bohnert, and M. A. Walton. 2018. Why do young people consume marijuana? Extending motivational theory via the dualistic model of passion. *Translational Issues in Psychological Science* 4:54–64. doi:10.1037/tps0000141.

Davis, A. K., and H. Rosenberg. 2015. Application of the passionate attachment model to recreational use of MDMA/ecstasy. *Journal of Psychoactive Drugs* 47:24–29. doi:10.1080/02791072.2014.973125.

Davis, A. K., J. Leith, L. A. Osborn, H. Rosenberg, L. Ashrafioun, A. Hawley, E. E. Bannon, S. Jesse, S. Kraus, E. Kryszak, et al. 2014a. Development and evaluation of the Marijuana

reduction strategy self-efficacy scale. *Psychology of Addictive Behaviors* 28:575–79. doi:10.1037/a0036665.

Davis, A. K., L. A. Osborn, H. Rosenberg, N. Cross, K. Lauritsen, L. Ashrafioun, S. Bradbury, M. Feuille, J. H. Lackey, A. Hawley, et al. 2014b. Psychometric evaluation of the Marijuana reduction strategy self-efficacy scale with a sample of young recreational marijuana users. *Addictive Behaviors* 39:1750–54. doi:10.1016/j.addbeh.2014.07.005.

Davis, M. L., M. B. Powers, P. Handelsman, J. L. Medina, M. Zvolensky, and J. A. J. Smits. 2015. Behavioral therapies for treatment-seeking cannabis users: A meta-analysis of randomized controlled trials. *Evaluation and the Health Professions* 38:94–114. doi:10.1177/0163278714529970.

Farmer, R. F., J. R. Seeley, D. B. Kosty, J. M. Gau, S. C. Duncan, M. T. Lynskey, and P. M. Lewinsohn. 2015. Internalizing and externalizing psychopathology as predictors of cannabis use disorder onset during adolescence and early adulthood. *Psychology of Addictive Behaviors* 29:541–51. doi:10.1037/adb0000059.

Green, B., D. Kavanagh, and R. Young. 2003. Being stoned: A review of self-reported cannabis effects. *Drug and Alcohol Review* 22:453–60. doi:10.1080/09595230310001613976.

Gullo, M. J., M. Matveeva, G. F. X. Feeney, R. M. Young, and J. P. Connor. 2017. Social cognitive predictors of treatment outcomes in cannabis dependence. *Drug and Alcohol Dependence* 170:74–81. doi:10.1016/j.drugalcdep.2016.10.030.

Hall, W., and R. L. Pacula. 2003. *Cannabis use and dependence: Public health and public policy*. Cambridge: Cambridge university press.

Hendershot, C. S., R. E. Magnan, and A. D. Bryan. 2010. Associations of marijuana use and sex-related marijuana expectancies with HIV/STD risk behavior in high-risk adolescents. *Psychology of Addictive Behaviors* 24:404–14. doi:10.1037/a0019844.

Hingson, R., and W. M. Compton. 2014. Screening and brief intervention and referral to treatment for drug use in primary care: Back to the drawing board. *JAMA* 312:488–89. doi:10.1001/jama.2014.7863.

Johnston, L. D., P. M. O'Malley, R. A. Miech, J. G. Bachman, and J. E. Schulenberg. 2014. *Monitoring the future national survey results on drug use: 2014 overview, key findings on adolescent drug use*. Ann Arbor: Institute for Social Research, The University of Michigan.

Kadden, R. M., and M. D. Litt. 2011. The role of self-efficacy in the treatment of substance use disorders. *Addictive Behaviors* 36:1120–26. doi:10.1016/j.addbeh.2011.07.032.

Lafrenière, M.-A. K., R. J. Vallerand, E. G. Donahue, and G. L. Lavigne. 2009. On the costs and benefits of gaming: The role of passion. *Cyber Psychology and Behavior* 12:285–90. doi:10.1089/cpb.2008.0234.

Litt, M. D., R. M. Kadden, E. Kabela-Cormier, and N. M. Petry. 2008. Coping skills training and contingency management treatments for marijuana dependence: Exploring mechanisms of behavior change. *Addiction* 103:638–48. doi:10.1111/j.1360-0443.2008.02137.x.

Litt, M. D., R. M. Kadden, and N. M. Petry. 2013. Behavioral treatment for marijuana dependence: Randomized trial of contingency management and self-efficacy enhancement. *Addictive Behaviors* 38:1764–75. doi:10.1016/j.addbeh.2012.08.011.

Muthén, L. K., and B. O. Muthén. 1998–2017. *Mplus user's guide*. 8th ed. Los Angeles, CA: Muthén and Muthén.

National Institutes on Drug Abuse. 2018, May 2. Marijuana. Accessed May 10, 2018. https://www.drugabuse.gov/publications/research-reports/marijuana.

Ratelle, C. F., R. J. Vallerand, G. A. Mageau, F. L. Rousseau, and P. J. Provencher. 2004. When passion leads to pathology: A look at gambling. *Journal of Gambling Studies* 20:105–19. doi:10.1023/B:JOGS.0000022304.96042.e6.

Rosenberg, H., and S. Kraus. 2014. The relationship of 'passionate attachment' for pornography with sexual compulsivity, frequency of use, and craving for pornography. *Addictive Behaviors* 39:1012–17. doi:10.1016/j.addbeh.2014.02.010.

Rousseau, F. L., R. J. Vallerand, C. F. Ratelle, G. A. Mageau, and P. J. Provencher. 2002. Passion and gambling: On the validation of the gambling passion scale GPS. *Journal of Gambling Studies* 18:45–66.

Saitz, R. 2014. Screening and brief intervention for unhealthy drug use: Little or no efficacy. *Frontiers in Psychiatry* 5:121. doi:10.3389/fpsyt.2014.00121.

Simons, J. S., R.D. Dvorak, and J.E. Merrill., &Read, J.P. (2012). Dimensions and severity of marijuana consequences: Development and validation of the Marijuana Consequences Questionnaire (MACQ). *Addictive Behaviors* 37: 613–621. doi:10.1016/j.addbeh.2012.01.008

Steers, M.-L. N., C. Neighbors, M. Christina Hove, N. Olson, and C. M. Lee. 2015. How harmonious and obsessive passion for alcohol and marijuana relate to consumption and negative consequences. *Journal of Studies on Alcohol and Drugs* 76:749–57. doi:10.15288/jsad.2015.76.749.

Stein, L.A.R., M Clair, R. Lebeau, S. Colby, N.P. Barnett, C. Golembeske, and P. Monti. 2011. Motivational interviewing to reduce substance-related consequences: effects for incarcerated adolescents with depressed mood. *Drug and Alcohol Dependence* 118:475–478.

Stephens, R. S., J. S. Wertz, and R. A. Roffman. 1993. Predictors of marijuana treatment outcomes: The role of self-efficacy. *Journal of Substance Abuse* 5:341–54. doi:10.1016/0899-3289(93)90003-T.

Stephens, R. S., J. S. Wertz, and R. A. Roffman. 1995. Self-efficacy and marijuana cessation: A construct validity analysis. *Journal of Consulting and Clinical Psychology* 63:1022. doi:10.1037/0022-006X.63.6.1022.

Stoeber, J., M. Harvey, J. A. Ward, and J. H. Childs. 2011. Passion, craving, and affect in online gaming: Predicting how gamers feel when playing and when prevented from playing. *Personality and Individual Differences* 51:991–95. doi:10.1016/j.paid.2011.08.006.

United Nations, Office on Drugs and Crime. 2014. World drug report 2014, Vienna, United Nations. http://www.unodc.org/wdr2014.

Vallerand, R. J. 2015. *The psychology of passion*. New York, NY: Oxford University Press.

Vallerand, R. J., C. Blanchard, G. A. Maggeau, R. Koestner, C. Ratelle, M. Leonard, M. Gagne, and J. Marsolais. 2003. Les passions de l'ame: On obsessive and harmonious passion. *Journal of Personality and Social Psychology* 85:756–67. doi:10.1037/0022-3514.85.4.756.

Walton, M. A., K. Bohnert, S. Resko, K. L. Barry, S. T. Chermack, R. A. Zucker, M. A. Zimmerman, B. M. Booth, and F. C. Blow. 2013. Computer and therapist based brief interventions among cannabis-using

adolescents presenting to primary care: One year outcomes. *Drug and Alcohol Dependence* 132:646–53. doi:10.1016/j.drugalcdep.2013.04.020.

Wang, C., and Y. Chu. 2007. Harmonious and obsessive passion in playing online games. *Social Behavior and Personality* 35:997–1006. doi:10.2224/sbp.2007.35.7.997.

White, H. R., E. W. Labouvie, and V. Papadaratsakis. 2005. Changes in substance use during the transition to adulthood: A comparison of college students and their noncollege age peers. *Journal of Drug Issues* 35 (2):281–306. doi:10.1177/002204260503500204.

Young, R. M., M. J. Gullo, G.F. X. Feeney, and J. P. Connor. 2012. Development and validation of the Cannabis refusal self-efficacy questionnaire CRSEQ in adult cannabis users in treatment. *Drug and Alcohol Dependence* 125:244–51. doi:10.1016/j.drugalcdep.2012.02.018.