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Psychedelic use and intimate partner violence: The role of emotion regulation

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Abstract

Background: Recent evidence suggests that psychedelic use predicts reduced perpetration of intimate partner violence among men involved in the criminal justice system. However, the extent to which this association generalizes to community samples has not been examined, and potential mechanisms underlying this association have not been directly explored.

Aims: The present study examined the association between lifetime psychedelic use and intimate partner violence among a community sample of men and women. The study also tested the extent to which the associations were mediated by improved emotion regulation.

Methods: We surveyed 1266 community members aged 16–70 (mean age=22.78, standard deviation=7.71) using an online questionnaire that queried substance use, emotional regulation, and intimate partner violence. Respondents were coded as psychedelic users if they reported one or more instance of using lysergic acid diethylamide and/or psilocybin mushrooms in their lifetime.

Results/outcomes: Males reporting any experience using lysergic acid diethylamide and/or psilocybin mushrooms had decreased odds of perpetrating physical violence against their current partner (odds ratio=0.42, $p<0.05$). Furthermore, our analyses revealed that male psychedelic users reported better emotion regulation when compared to males with no history of psychedelic use. Better emotion regulation mediated the relationship between psychedelic use and lower perpetration of intimate partner violence. This relationship did not extend to females within our sample.

Conclusions/interpretation: These findings extend prior research showing a negative relationship between psychedelic use and intimate partner violence, and highlight the potential role of emotion regulation in this association.

Keywords

Psychedelics, intimate partner violence, emotion regulation, substance use, violence

Introduction

The association between substance use and violence has been the subject of extensive investigation (Tomlinson et al., 2016). Reviews of the literature reveal a robust positive relationship between alcohol use and aggression (Foran and O’Leary, 2008; Stith et al., 2004; Tomlinson et al., 2016), and other evidence suggests similar associations between violence and methamphetamine use, cocaine use, and the use of the dissociative anesthetic phencyclidine (PCP) (Bey and Patel, 2007; Ernst et al., 2008). In contrast, the relationships between use of other psychoactive substances and aggression remain somewhat obscure; for example, studies of the association between cannabis use and aggression are inconclusive and vary according to type of violent behavior (Moore and Stuart, 2005; Smith et al., 2014; Walsh et al., 2017). With regard to hallucinogen use, findings are also equivocal with evidence of both risk and protective effects. Although positive associations between hallucinogen use and violence have been reported (Feingold et al., 2008), a recent review and two longitudinal studies suggest psychedelic use is associated with reduced aggressive behavior (Hendricks et al., 2017; Tomlinson et al., 2016; Walsh et al., 2016), and prior reviews reported insufficient evidence to confirm a link between psychedelic use and violence (Boles and Miotto, 2003; Hoaken and Stewart, 2003).

The category of psychedelics has fuzzy boundaries and overlaps considerably with the broader category of hallucinogens. However, some research has distinguished “classic psychedelics,”

which act primarily as serotonin 2A (5-HT_{2A}) agonists, from the dissociatives ketamine and PCP, and from empathogens such as 3,4-methylenedioxymethamphetamine (MDMA), which have different mechanisms of action (Nichols, 1986; Vollenweider et al., 1998). Classic psychedelics include lysergic acid diethylamide (LSD), psilocybin mushrooms (“magic mushrooms”), mescaline, and dimethyltryptamine (DMT). The effects of psychedelics are diverse and varied, but most characterizations include altered perception of time and space, visual distortions, a feeling of interconnectivity and oneness, and affective introspection. In some cases, psychedelic use may produce acute anxiety, particularly at higher doses and when set (i.e. expectations, intention, personality, and attitude) and setting (i.e. physical and social context) are not ideal (Adamson and Metzner, 1988; Hartogsohn, 2016). In rare cases, psychedelic use can precipitate adverse reactions such as hallucinogen-persisting perception disorder and transient psychotic symptoms (Nichols, 2004).

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Psychedelic plants have been used for therapeutic purposes for millennia (Carod-Artal, 2015; Schultes et al., 1992), and were introduced into Western medicine within the last few decades. Preliminary studies suggest that further research into the therapeutic use of psychedelics to treat mental health conditions is warranted (Tupper et al., 2015). Contemporary studies have reported promising findings for psychedelics as therapeutic adjuncts in the treatment of internalizing disorders (e.g. anxiety and mood problems) (Carhart-Harris et al., 2016; Gasser et al., 2014; Griffiths et al., 2016; Grob et al., 2011; Hendricks et al., 2015; Ross et al., 2016). Salutary effects have also been reported by recent studies that examined the association between psychedelic use and externalizing behaviors (e.g. problematic substance use, criminality, and violence) (Krueger et al., 2005). A meta-analysis of LSD in the treatment of problematic alcohol use found that a single dose of LSD was associated with a decrease in alcohol misuse at six-month follow-up (reviewed in Krebs and Johansen, 2012). A recent prospective study of individuals under community corrections' supervision reported that a hallucinogen use disorder was associated with a 40% reduction in recidivism after controlling for potentially confounding variables such as other drug use (Hendricks et al., 2014), and a study of a large US community sample found inverse relationships between psychedelic use and both violent crimes and property crimes (Hendricks et al., 2017). These findings are notable exceptions to the positive association between substance use disorders and criminality (Chandler et al., 2009).

Intimate partner violence (IPV), also described as "domestic violence," is defined as physical, sexual, or psychological abuse by an intimate partner (Coker et al., 2001). Substance use is an important predictor of IPV (Foran and O'Leary, 2008), and research has shown that treatment for a substance use disorder was associated with a decrease in IPV perpetration (Stuart et al., 2009). However, the association between substance use and violence varies across classes of drugs (Tomlinson et al., 2016), and a recent prospective study revealed that a lifetime history of hallucinogen use was associated with being less likely to be arrested for perpetrating IPV (Walsh et al., 2016).

Negative emotionality is a frequently cited precursor to perpetration of IPV in men and women (Brandt et al., 2012; Gratz et al., 2009). The inability to regulate intense emotions may lead partners to use violence in response to conflict (Gratz and Roemer, 2004; Jakupcak et al., 2005). Further, effective emotion regulation has been found to facilitate positive coping with conflict among partners (Maldonado et al., 2014). No literature to date has explicitly examined the association between psychedelic use and emotion regulation. However, psilocybin has been shown to enhance emotional empathy (Preller et al., 2015), attenuate reactivity in brain regions implicated in emotion processing (Kraehenmann et al., 2015), and decrease threat sensitivity (Kraehenmann et al., 2016). From a theoretical perspective, psychedelic use has been proposed to facilitate mindfulness, emotional integration and psychological flexibility (Watts, 1968; Fadiman, 2011; Gallimore and Strassman, 2016), all three of which are key features of therapies developed to address emotional dysregulation (Hayes, 2004; Hayes et al., 1999; Linehan, 1993). This pattern of association makes emotion regulation a plausible candidate mechanism underlying the potential protective effects of psychedelic use for violence.

However, despite renewed interest into the therapeutic potential of psychedelic use for externalizing behaviors (Hendricks et al., 2014; Hendricks et al., 2017; Walsh et al., 2016), the psychological mechanisms underlying the potential protective effects of psychedelic use for disordered behavior remain poorly understood. In the current investigation, we evaluated the relationship between use of LSD and/or psilocybin mushrooms (hereafter referred to as psychedelics) and perpetration of IPV. We further examined the association between psychedelic use and emotion regulation, and emotion regulation as a potential mechanism underlying the protective effects of psychedelic use for IPV. We hypothesized that prior psychedelic use would be associated with a reduced likelihood of intimate partner violence perpetration and better emotion regulation, and that the association between psychedelic use and decreased levels of violence would be mediated by emotion regulation.

Methods

Participants

Participants were 1266 adults recruited from The University of British Columbia ($n=742$), Laurentian University ($n=302$), Reddit (i.e. r/psychedelic studies, r/psychedelic medicine, r/drugs) ($n=122$), and Amazon's Mechanical Turk (AMT) ($n=100$) to complete an anonymous online survey. Participants in the two university samples were compensated with course credit, those from Reddit were offered entry into a draw for a gift card valued at \$50.00 (CAD), and participants recruited on AMT received \$3.00 (USD) compensation. This study was approved by the Research Ethics Boards of The University of British Columbia and Laurentian University and conducted in accordance with the ethical principles of the Declaration of Helsinki.

Psychedelic use

Respondents rated their lifetime use of LSD and psilocybin mushrooms on a five-point Likert-type scale, ranging from one (never) to five (more than 10 times). A dichotomous variable was computed whereby a participant was coded as someone who had used psychedelics if they reported one or more instance of using LSD and/or psilocybin mushrooms.

Emotion regulation

The Difficulties in Emotion Regulation Scale (DERS) is a 36-item self-report questionnaire designed to assess multiple aspects of emotion regulation, including: lack of awareness of one's emotions (Awareness), lack of clarity about the nature of one's emotions (Clarity), lack of acceptance of one's emotions (Non-acceptance), lack of access to effective emotion regulation strategies (Strategies), lack of ability to engage in goal-directed activities during negative emotions (Goals), and lack of ability to manage one's impulses during negative emotions (Impulse) (Gratz & Roemer, 2004). Items were rated on a five-point Likert-type scale and summed to a total score with higher numbers indicating greater difficulties with emotion regulation.

Table 1. Descriptive statistics for all samples.

	Full sample	Female	Male	University	Online
<i>n</i> (%)	1266	782 (61.77)	484 (37.90)	1044 (82.46)	222 (17.54)
Age	22.78 (7.71)	22.20 (7.51)	23.71 (7.96)	20.84 (4.52)	31.88 (11.93)
Psychedelic use (Yes %)	404 (31.90)	169 (21.60)	235 (48.60)	237 (22.70)	167 (75.20)
Intimate partner violence (Yes %)	141 (11.10)	104 (13.30)	37 (7.60)	121 (11.60)	20 (9.00)
Emotion regulation	83.09 (22.31)	85.67 (23.25)	78.91 (20.06)	84.12 (22.53)	78.21 (20.66)

Age: mean (standard deviation) age of participant; IPV: intimate partner violence; Emotion regulation: mean (standard deviation) score on Difficulty with Emotion Regulation Scale (DERS). Females and males differed in their rates of psychedelic use ($\chi^2=99.88$, $p<0.01$), alcohol use ($\chi^2=38.05$, $p<0.05$), and IPV ($\chi^2=9.61$, $p<0.01$).

IPV

IPV was measured using the revised short-form Conflicts Tactics Scale (CTS2S; Straus & Douglas, 2004), which is a 20-item measure designed to assess three categories of relationship conflict (i.e. psychological and physical aggression, and prosocial negotiation tactics) of dating, cohabiting, or marital couples. A dichotomous variable was created with the Physical Assault subscale (i.e. “I pushed, shoved, or slapped my partner” and “I punched or kicked or beat-up my partner”) whereby those that reported one or more instance in the past year were coded as perpetrators of IPV.

Alcohol use

Due to the robust association between alcohol use, violence (Foran and O’Leary, 2008), and concurrent substance use (Stinson et al., 2005), alcohol use was included as a covariate. The Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) is a 10-item measure designed to assess problematic alcohol use, and screen for alcohol misuse and dependence. Of the 10 items, eight are rated on a five-point scale that queries the frequency of alcohol use behaviors and feelings ranging from zero (never) to four (daily), and two items are rated on a similarly constituted three-point scale, with higher scores indicating more problematic alcohol use.

Analytic plan

Bivariate analyses examining differences between categorical outcomes were performed using chi-square. Pearson and point-biserial correlation analyses were conducted to examine the bivariate relationships between continuous study variables. Binary logistic regression was used to determine the relationship between violence and lifetime psychedelic use while controlling for alcohol use. Mediation analyses were conducted in SPSS with the PROCESS macro (Hayes, 2013) to model the mediating effect of emotion regulation between psychedelic use and partner violence. The mediation and logistic regression models used bootstrapped tests (5000 bootstrap samples) to provide more reliable estimates (Shrout, & Bolger, 2002). In light of robust gender differences in the correlates and prevalence of IPV (Johnson, 2006; Kurz, 1989; Walsh et al., 2010), parallel analyses were conducted on the sample as a whole and independently by gender.

Results

Chi-square tests revealed no differences in psychedelic use ($\chi^2=0.79$, $p=0.38$) and IPV ($\chi^2=0.19$, $p=0.67$) across the two

university samples. Among the two online forum samples, there were no statistical differences in the rates of IPV ($\chi^2=1.99$, $p=0.16$) while there were differences in the rates of psychedelic use ($\chi^2=48.23$, $p<0.05$). Based on similarity in sampling technique, the four samples were collapsed into two, a university sample (i.e. The University of British Columbia and Laurentian University) and an online sample (i.e. Reddit and AMT). The collapsed samples differed in rate of psychedelic use ($\chi^2=233.75$, $p<0.01$) such that the online sample had higher rates of past use of psychedelics; the samples did not differ in rates of IPV ($\chi^2=1.22$, $p=0.27$).

The total sample (Table 1) consisted of 1266 (61.77% female) participants who responded to questions about psychedelic use and IPV and who completed at least 80% of the DERS. Lifetime use of psychedelics was reported by 404 (31.9%) respondents. The participants were 16–70 years of age (mean (M)=22.78, standard deviation (SD)=7.71). The participants in the sample were predominantly Caucasian (72.84%), followed by Asian (15.54%), Black (2.40%), and Indigenous (2.04%) respondents. Total scores on the DERS were estimated for cases with missing values for less than 20% of items using a prorating method whereby an average item response was calculated based on the extant data and that value was multiplied by the number of items in the test (Orr, 1995; Strube, 1985). Less than 1% of the DERS data were estimated using this method.

Past year IPV perpetration was reported by 11.10% ($n=141$) of participants (Table 1). Bivariate correlation analyses (Table 2) identified positive associations between alcohol use and both IPV and psychedelic use among both males and females. Similarly, emotional dysregulation was associated with higher levels of IPV across gender. Emotional dysregulation was associated with more problematic alcohol use among females only. Psychedelic use was associated with less difficulty with emotion regulation in males only.

Logistic regressions examining the association between psychedelic use and IPV (Table 3) indicated that psychedelic use was inversely related to partner violence after controlling for alcohol use. These analyses also identified a gender by psychedelic use interaction such that a lifetime history of psychedelic use was inversely related to IPV perpetration in males, but not females. Logistic regression analyses revealed no interaction between psychedelic use and sample type (i.e. university vs online); therefore all analyses were conducted with samples combined.

The association between IPV and psychedelic use was identified in males only, and therefore our mediation analysis was limited to males ($n=484$). Scores on the AUDIT were included as a covariate to control for the effects of alcohol use on IPV, and

Table 2. Correlations.

Variables	Full sample				Female				Male			
	1	2	3	4	1	2	3	4	1	2	3	4
1. Psych. use	–				–				–			
2. IPV	–0.02	–			0.06	–			–0.09 ^a	–		
3. AUDIT	0.20 ^b	0.17 ^b	–		0.19 ^b	0.21 ^b	–		0.17 ^b	0.10 ^a	–	
4. DERS	–0.07 ^a	0.24 ^b	0.14 ^b	–	0.02	0.25 ^b	0.22 ^b	–	–0.11 ^a	0.20 ^b	0.07	–

AUDIT: Alcohol Use Disorder Identification Test; DERS: Difficulties in Emotion Regulation Scale; IPV: intimate partner violence measured with the revised short-form Conflicts Tactics Scale (CTS2S); Psych. use: history of psychedelic use; ^a $p < 0.05$, ^b $p < 0.01$;

Table 3. Regression analysis for intimate partner violence perpetration criterion.

	Full sample					Women					Men				
	B	SE	χ^2	OR	95% CI	B	SE	χ^2	OR	95% CI	B	SE	χ^2	OR	95% CI
<i>Step 1</i>															
Psychedelic use	–0.15	0.20	0.59	0.86	–0.59–1.26	0.40	0.24	2.76	1.49	0.93–2.37	–0.73	0.36	4.02	0.48	–1.51– –0.08
<i>Step 2</i>															
Psychedelic use	–0.39	0.21	3.71	0.67	0.45–1.01	0.11	0.25	0.18	1.11	0.68–1.83	–0.88 ^a	0.37	5.54	0.42	0.20–0.90
Alcohol use	0.10 ^b	0.02	34.57	1.10	1.07–1.14	0.11 ^b	0.02	29.86	1.11	1.07–1.16	0.07 ^a	0.03	6.13	1.08	1.02–1.14
<i>Step 3</i>															
Psychedelic use	–1.20 ^a	0.78	6.62	0.14	0.30–0.62										
Alcohol use	0.10 ^a	0.02	35.33	1.10	1.07–1.14										
Gender	0.31	0.25	1.56	1.36	0.84–2.22										
Psychedelic use X gender	1.07 ^a	0.44	5.84	2.91	1.22–6.91										

CI: confidence interval; OR: odds ratio; SE: standard error; ^a $p < 0.05$, ^b $p < 0.001$.

residualized variables were computed to index psychedelic use after controlling for alcohol use (Allen et al., 1997). The residualized variables were standardized to ease interpretation across all paths (Figure 1). Psychedelic users had fewer difficulties with emotion regulation ($b = -0.12$, standard error (SE) = 0.05, $p < 0.05$). Perpetrators of IPV demonstrated greater difficulties with emotion regulation ($b = 0.19$, SE = 0.05, $p < 0.01$). The negative association between psychedelic use and IPV ($b = -0.11$, SE = 0.04, $p < 0.05$) was reduced when emotion regulation was included in the model ($b = -0.09$, SE = 0.04, $p > 0.05$), suggesting mediation. The Sobel test indicated that emotion regulation mediated the association between IPV and psychedelic use ($Z = -2.17$, $p < 0.05$).

Discussion

We found that a history of psychedelic use among males was inversely associated with perpetration of physical violence against an intimate partner. The strength of the relationship was not trivial: men who endorsed a lifetime history of psychedelic use were roughly half as likely as those with no history of psychedelic use to report intimate partner violence perpetration (5.1% vs 10.0%). This finding is consistent in direction and magnitude to those of a recent longitudinal study of hallucinogen use among incarcerated men (Walsh et al., 2016), and thus provides preliminary evidence suggesting that the protective effects of

psychedelic use for partner violence may generalize across correctional and community samples of men.

The finding that the negative association between psychedelic use and IPV was identified in men but not in women is consistent with prior research that has identified gender differences in the correlates, severity, and function of partner violence (Johnson, 2006; Kurz, 1989). One potential explanation for the gender differences observed in the present study is that IPV perpetrated by females may be more likely to be primarily defensive (Graham-Kevan and Archer, 2003; Henning et al., 2006; Swan and Snow, 2002). Defending oneself may be an appropriate response to violence, and thus the effects of psychedelic use may not be engaged in modulating this defensive response. The rates of self-reported IPV among women noted in this study is also consistent with previous partner violence research (Walsh et al., 2010), and are consistent with the lower end of international norms (Chan et al., 2008).

Emotion regulation partially mediated the relationship between psychedelic use and intimate partner violence perpetration. The mediating role of emotion regulation highlights the value of this construct in elucidating psychological mechanisms that may underlie the salutary effects of psychedelic use. This finding also adds to experimental work that has demonstrated modulation of emotional processing via administration of psilocybin (Preller et al., 2015; Kraehenmann et al., 2015; Kraehenmann et al., 2016), and may be interpreted to suggest

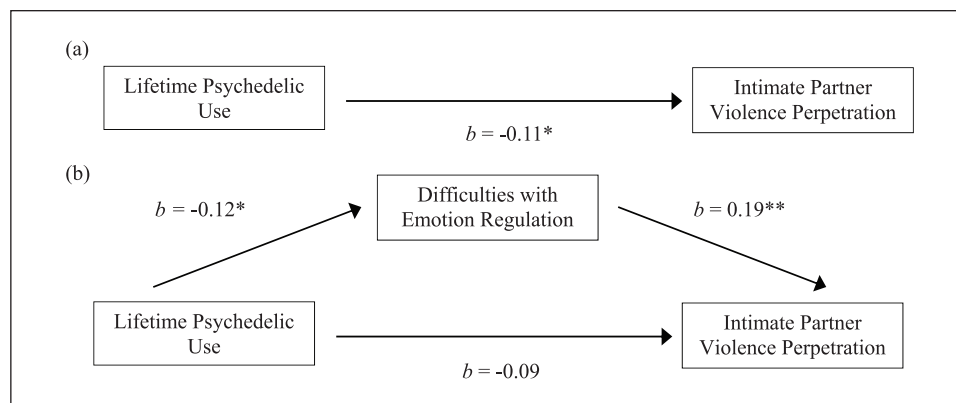


Figure 1. Emotion regulation mediates the association between psychedelic use and intimate partner violence (IPV). (a) Psychedelic use is associated with reduced IPV perpetration among men; (b) psychedelic use is hypothesized to exert an indirect effect on IPV through emotion regulation. * $p < 0.05$, ** $p < 0.01$.

that psychedelic-induced modulation of emotional responses persist well after administration. Moreover, given the putatively broad role of emotion regulation in diverse forms of psychopathology (Aldao et al., 2010; Nolen-Hoeksema, 2012), this finding suggests that enhanced emotion regulation may also underlie the diverse psycho-behavioral benefits associated with psychedelic use (e.g. Hendricks et al., 2015; Krebs and Johansen, 2012; Tupper et al., 2015).

The association between psychedelic use and better emotion regulation was not evident among female respondents. We also found that alcohol use was associated with worse emotion regulation in females but not in males. These findings add to the robust evidence of gender differences in the presentation and operation of emotion regulation (Gratz and Roemer, 2004), and such differences have been proposed to underlie broader gender differences in psychopathology (Hyde et al., 2008; Nolen-Hoeksema, 1991; Zahn-Waxler et al., 2008). Since these differences were not expected, we are reluctant to speculate further; nonetheless findings such as these suggest that future research on psychedelic use and emotions should incorporate gender in design and analysis.

The positive relationship between problematic alcohol use and IPV perpetration is consistent with prior research (Foran and O'Leary, 2008; Stith et al., 2004) and provides further evidence for alcohol use as a key risk factor for IPV perpetration among men and women. Controlling for this association in our data helped avoid misattributing an increase in violence to psychedelic use. In light of high rates of polysubstance use among users of hallucinogens (APA, 2013), future studies examining the relationship between psychedelic use and antisocial behavior should maintain the practice of controlling for use of alcohol and other substances (e.g. Hendricks et al., 2014; Walsh et al., 2016).

There are several limitations to our study. The cross-sectional design does not allow us to establish a causal relationship. Indeed, it may be that individuals who are disposed to psychedelic use differ with regard to personality or other individual differences that make them less likely to perpetrate IPV, and the observed relationships may therefore be better attributed to a third variable. Similarly, although male psychedelic users reported less difficulty with emotion regulation when compared to non-users, it may be that individuals with better emotion regulation are more

prone to use psychedelics. Finally, we relied on self-reports of substance use and violence, both of which are sensitive areas of research prone to social desirability, which may have reduced the accuracy of responses.

These limitations are balanced by several strengths, including a relatively large sample, detailed assessment of psychedelic use, and a theoretically driven design. The findings of this study provide further preliminary evidence of an inverse relationship between psychedelic use and violence among males. That our findings were consistent across four community samples increases our confidence in the validity of these findings. Given the insufficiency of extant treatments for disordered behavior, findings such as these suggest value for further study of the potential of psychedelic therapies to reduce interpersonal violence.

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