


# Using Psychedelics With Therapeutic Intent Is Associated With Lower Shame and Complex Trauma Symptoms in Adults With Histories of Child Maltreatment

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## Abstract

**Background:** Child maltreatment negatively affects the formation of internal schemata of self and other during development, leading to negative adaptations in self-concept and social cognition. Clinical reports suggest the efficacy of psychedelics in treating the psychopathological sequelae of child maltreatment. Altering maladaptive schemata of self and other implicated in negative self-concept and impaired social cognition may be a central mechanism for reducing posttraumatic stress symptoms.

**Aims:** This study aims to assess whether psychedelic use moderates the relationships between child maltreatment and self-concept, social cognition, and posttraumatic stress symptoms.

**Method:** An online survey was completed by 166 participants and included measures of maltreatment exposure and severity, history of intentional therapeutic psychedelic use, posttraumatic stress symptoms, internalized shame, and facial emotion recognition.

**Results:** Child maltreatment significantly correlated with posttraumatic stress symptoms ( $r = .26$  and  $r = .20$ ,  $p < .01$ ) and internalized shame ( $r = .18$ ,  $p < .05$ ). Of all maltreatment subtypes, emotional abuse and neglect most strongly correlated with complex trauma symptoms ( $r = .32$ ,  $p < .001$ ) and internalized shame ( $r = .31$ ,  $p < .001$ ). Participants with a history of intentional therapeutic psychedelic use reported significantly lower complex trauma symptoms ( $d = 0.33$ ,  $p < .05$ ) and internalized shame ( $d = 0.35$ ,  $p < .05$ ) despite similar histories of maltreatment. Differences in complex trauma symptoms ( $d = 0.66$ ,  $p < .01$ ) and internalized shame ( $d = 0.80$ ,  $p < .001$ ) were largest for participants with a history of more than 5 occasions of intentional therapeutic psychedelic use. A history of more than 5 occasions of intentional therapeutic psychedelic use significantly moderated the relationship between emotional abuse and neglect and complex trauma symptoms ( $p < .01$ ). No associations were found between maltreatment or psychedelic use and facial emotion recognition.

**Conclusion:** These findings demonstrate that using psychedelic drugs with therapeutic intent is associated with lower levels of complex trauma symptoms and internalized shame in individuals with histories of child maltreatment. Psychedelic use may have therapeutic benefit in treating the posttraumatic sequelae of child maltreatment.

## Keywords

psychedelics, child maltreatment, complex trauma, developmental trauma, childhood trauma, psychedelic-assisted psychotherapy, shame, emotion recognition

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## Introduction

Child maltreatment (CM), including physical abuse and neglect, emotional abuse and neglect, and sexual abuse, is extremely common worldwide and is implicated in the etiology of myriad mental and physical disorders.<sup>1–5</sup> CM is often referred to as developmental trauma in order to

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signal the lasting and global effects of prolonged exposure to trauma on the child's cognitive, affective, social, and biological development.<sup>6-10</sup> Emerging clinical data are verifying longstanding anecdotal reports that psychedelic substances are singularly effective in treating the psychopathological sequelae of CM.<sup>11-14</sup> Psychological and neurobiological mechanisms of therapeutic action, however, have yet to be robustly elucidated.<sup>15-21</sup> A proposed mechanism of action is the capacity of psychedelic drugs to acutely disintegrate and post-acutely reshape maladaptive schemata of self and other formed in reaction to developmentally traumatic experiences.<sup>17,18</sup>

Schemata of self and other form in early relationships and play a central role in organizing social cognition, self-concept, affect regulation, and relational behavior throughout the lifespan.<sup>22-24</sup> When these schemata develop within and functionally adapt to an interpersonally traumatic environment in childhood, they are likely to prove maladaptive in adulthood and contribute to symptoms of psychopathology, such as negative or unstable self-concept, pervasive affect dysregulation, and social dysfunction.<sup>9,23,25,26</sup> Treatment may aim to adjust or "update" maladaptive schemata in order to more accurately and adaptively represent current reality.

CM has consistently been associated with negative self-concept. Multiple cross-sectional and longitudinal studies have found that child maltreatment predicts internalized shame and low self-esteem.<sup>27-35</sup> Multiple studies have also found distorted and impaired facial emotion recognition (FER) in children and adults with histories of CM, though the nature of these alterations remain inconclusive. A systematic review from 2014 found decreased global accuracy in FER, greater reactivity to negative emotions, and greater response bias toward negative emotions.<sup>36</sup> A number of other studies have reported increased amygdala reactivity to negative faces.<sup>37,38</sup>

As described above, theoretical models suggest that disturbances in self-concept are etiologically related to impairments in social cognition, each the result of maladaptive schemata of self and other that develop from disturbed interpersonal experiences in infancy and childhood.<sup>22,23,39</sup> In adulthood, low self-worth, high internalized shame, and impaired capacity to recognize and interpret others' emotions may produce pervasive difficulties in social interactions, leading to problematic and unstable relationships and a worsening of posttraumatic stress symptoms (PTSS) over time.<sup>40-43</sup> Adaptively altering the schemata that underlie these phenomena, then, may be an important target in the treatment of CM.<sup>39,44,45</sup>

Psychedelic drugs may prove valuable agents in catalyzing this kind of therapeutic transformation of maladaptive schemata. Models of the acute neurological activity of psychedelics suggest that they decrease

within-network functional connectivity and increase between-network, global connectivity, thereby disrupting reified neural patterns of cognition and behavior and facilitating new learning.<sup>17,46</sup> A recent theoretical model of the psychological action of psychedelics argues that they "relax" cognitive predictive models and representations, temporarily increasing their pliability, enhancing their sensitivity to current information, and allowing for their positive transformation and revision.<sup>17</sup>

Psychedelics have robustly been shown to profoundly compromise the normal subjective sense of self and, in high doses, occasion "mystical" states of selflessness, self-transcendence, or "ego dissolution," frequently leading to enduring positive changes in mood, personality, and self-concept.<sup>47-51</sup> Furthermore, in many studies of psychedelics with both psychiatric and healthy samples, the degree or strength of loss of self directly correlated with positive outcomes.<sup>52-56</sup> Psychological insight, an important mechanism of change in psychotherapy, has also been shown to mediate positive outcomes associated with psychedelic use in clinical and naturalistic settings.<sup>57-62</sup> Adaptive alterations and updates to dysfunctional self-schemata, therefore, may be a salient psychological mechanism underlying the curative effects of psychedelic use in people with histories of CM.

Psychedelics have also been shown to alter the recognition of negative faces and reduce amygdala reactivity to negative faces, with a number of studies finding associations between acute and post-acute attenuations of amygdala reactivity to negative faces and post-acute increases in positive mood and well-being.<sup>63-66</sup> Another study, however, found that increased amygdala responses compared to baseline for fearful and happy faces 1 day after psilocybin correlated with decreases in depressive symptoms.<sup>67</sup> In contrast to these prior results, a recent study found no acute or post-acute effects of ayahuasca on FER compared to placebo.<sup>68</sup> The nature of psychedelic-induced alterations to FER as well as their relationship to positive outcomes thus remains unclear.

Though most research on the use of psychedelics to treat mental disorders has been conducted in controlled, clinical settings, preliminary survey-based research suggests the therapeutic benefit of naturalistic psychedelic use as well.<sup>60,61,69</sup> Multiple studies have shown that the explicit intentions and expectations that the user assigns to the experience beforehand critically affect both the experience itself and its outcomes.<sup>70-73</sup> Using psychedelics with the deliberate intention of deriving therapeutic benefit and reduction of symptoms associated with psychopathology, therefore, may be as important as the formal setting in which the use occurs (i.e., naturalistic or clinical).<sup>74</sup>

The present study aims to examine the impact of intentional therapeutic psychedelic use (ITPU), in either naturalistic or clinical settings, on maladaptive schemata of self and other among adults with histories of CM. This study operationalizes schemata of the self in a measure of internalized shame and schemata of others in an FER task. Our main hypotheses are:

*H1 (replication). Child maltreatment exposure and severity will a) positively correlate with posttraumatic stress symptoms, b) positively correlate with internalized shame, and c) negatively correlate with global accuracy in identifying facial emotions.*

*H2 (primary hypothesis). Compared to individuals without a history of intentional therapeutic psychedelic use, individuals with a history of intentional therapeutic psychedelic use will a) report less posttraumatic stress symptoms, b) report less internalized shame, and c) show higher global accuracy in identifying facial emotions.*

## Method

### Participants

Volunteer participants were recruited online via the social networking websites Reddit and Facebook as well as by word of mouth. Inclusion criteria were that participants be 18 years or older, fluent in English, and endorse a history of CM. No compensation was provided to participants.

### Materials

**Demographics Questionnaire.** Items in this survey assessed age, gender, race, sexual orientation, marital status, socioeconomic status of childhood home, education, psychiatric diagnoses, and lifetime substance use history.

**History of ITPU.** History of ITPU was assessed with the following question: “Have you ever used a psychedelic/entheogenic/hallucinogenic substance (including, but not limited to: psilocybin “magic” mushrooms or truffles, LSD/“acid”, ayahuasca/yagé, mescaline/peyote/San Pedro, DMT, MDMA/ecstasy, ketamine, or 2C-B) with the intention of healing or processing childhood trauma?” For participants who endorsed a history of ITPU, follow-up questions assessed which substances had been used, number of occasions of use, timeframe of most recent occasion of use, settings of use, and impact of use, which included an optional open-ended text entry item.

**Childhood Trauma Questionnaire.** The Childhood Trauma Questionnaire (CTQ) is a 28-item retrospective self-report scale that assesses exposure to and severity of childhood maltreatment across five subscales.<sup>75</sup> Items are answered using a Likert scale of 1 (“Never true”) to 5 (“Very often true”); total scores for each subscale range from 5-25, and total overall score ranges from 25 (low) to 125 (severe). Internal consistency for the maltreatment type subscales in the present sample were as follows: physical abuse,  $\alpha = .83$ ; emotional abuse,  $\alpha = .80$ ; sexual abuse,  $\alpha = .95$ ; physical neglect,  $\alpha = .74$ ; emotional neglect,  $\alpha = .83$ .

**International Trauma Questionnaire.** The International Trauma Questionnaire (ITQ) is a 12-item measure designed to assess PTSD and complex PTSD (CPTSD) symptomatology as described in the 11th revision of the *International Classification of Diseases (ICD-11)*.<sup>76</sup> PTSD comprises three symptom clusters (reexperiencing in the here and now, avoidance of traumatic reminders, and a sense of threat), and CPTSD comprises these three core symptom clusters plus three additional symptom clusters that collectively represent “Disturbances in Self-Organization” (DSO; affective dysregulation, negative self-concept, and disturbances in relationships). A recent psychometric study of two trauma-exposed samples found two broad symptom clusters corresponding to PTSD and DSO, supporting the structural validity of the disorders.<sup>77</sup> The scale showed good internal consistency in the present sample ( $\alpha = .87$ ).

**Reading the Mind in the Eyes Test.** The reading the mind in the eyes test (RMET) is a widely used and reliable measure of FER.<sup>78</sup> The test comprises 36 grey-scale photographs of the eye region of actors and actresses accompanied by four complex emotional mental-state descriptions. Participants are instructed to select the word that best matches what emotion the person in the picture is expressing; only one of the four items is deemed correct. Stimuli were coded by emotional valence (positive, neutral, or negative) based on categorization previously established.<sup>79</sup>

**Internalized Shame Scale.** The Internalized Shame Scale (ISS) is a 30-item self-report measure comprising 24 negatively worded items to assess internalized (trait) shame and 6 positively worded items to counteract a negative response set.<sup>80</sup> Items are answered using a Likert scale of 1 (“Never”) to 5 (“Almost always”). The scale showed good internal consistency in the present sample ( $\alpha = .86$ ).

### Procedure

Participants completed the study online via Qualtrics. No portion of the study had time constraints.

After granting informed consent on the initial page of the survey, participants completed a demographics questionnaire and reported their history of ITPU. Participants then completed the CTQ to assess CM exposure and severity and the ITQ to assess current PTSS. The RMET followed, with a link to a glossary of terms provided on the first page and each photograph subsequently presented on its own webpage; after selecting a response, the survey automatically continued to the next photograph. Time spent on each page (i.e., before clicking a response) was recorded to collect reaction time data. Participants then completed the ISS. The final page of the survey thanked the participants for volunteering to participate and provided the contact information of the study principal investigator and their supervisor as well as information for referrals to mental health providers. The study was deemed exempt from review or oversight by the Institutional Review Board of The New School.

### Data Analysis

Descriptive statistics were calculated for all variables. Independent-samples t-tests, chi-square tests, and one-way analysis of variance (ANOVA) tests were used to assess associations between demographic variables and primary study variables. Data were manually inspected for outliers, and outliers representing invalid data points were removed as necessary and appropriate. Data were also inspected for duplicate responses and invalid responding and removed as necessary and appropriate. Only the data of those participants who completed the entire survey were included in analyses.

Bivariate correlation analyses were used to assess the relationship of CM exposure and severity (CTQ scores) to PTSS (ITQ PTSD and DSO scores; H1a), internalized shame (ISS scores; H1b), and FER accuracy (RMET scores; H1c). Bivariate correlation analyses were also used to assess the relationships of CM subtypes to outcome variables.

Independent-samples t-tests were used to assess differences between the ITPU and non-ITPU groups in ITQ PTSD and DSO scores and subscores (H2a), ISS scores (H2b), and RMET scores (H2c). One-way ANOVA tests were used to assess whether differential relationships with outcome variables were found among ITPU factors (number of occasions of ITPU, timeframe of most recent ITPU occasion, and impact of ITPU); Tukey post hoc tests and further independent-samples t-tests were used to assess these differential relationships.

Finally, linear regression analyses including manually coded interaction variables (i.e., CTQxITPU) were used to assess whether ITPU moderated any of the H1 relationships between CM and outcome variables in which

ITPU showed significant associations with the dependent variable in H2 analyses.

## Results

### Participant Characteristics

Recruitment of participants took place from October 15–24, 2019 during which time 283 people began the survey and 167 completed it entirely. One participant was excluded for entering a birth date indicating they were less than 18 years of age, and so the final sample comprised 166 participants. Median completion time for the survey was 20 min 32 s (interquartile range: 16 min 58 s to 29 min 34 s).

**Demographics.** The mean age of participants was 30.49 ( $SD = 9.52$ ) years, and the majority of participants identified as White (90.4%), cisgender (90.4%), woman (60.2%), and heterosexual (50.0%). A large proportion of the sample was LGBTQ, with 9.6% identifying as transgender and 49.7% identifying as non-heterosexual. The majority of participants endorsed at least one self-reported psychiatric condition, most commonly anxiety (84.9%) and/or depression (82.5%), and only 5.4% endorsed no psychiatric condition. All participants endorsed some lifetime history of substance use, most commonly caffeine (91.0%), alcohol (89.2%), and cannabis (75.3%). Full demographic information is reported in Table 1.

**History of ITPU.** Approximately one third of the sample (31.3%) endorsed a history of ITPU, among whom 40.4% had used psychedelics with therapeutic intent more than 5 times and 73.1% had used within the past 6 months; three quarters (75.0%) rated their experiences as exclusively healing/helpful/positive change, while only 1 participant (1.9%) rated them as exclusively harmful/damaging/negative change. The ITPU group did not significantly differ from the non-ITPU group in any demographic variable. Full information on ITPU is reported in Table 2.

**Trauma Exposure and Symptoms.** The sample reported high levels of CM and PTSS. Mean CTQ score was 69.58 ( $SD = 16.03$ ). In the entire sample, 92.8% of participants scored in the severe range on at least one of the maltreatment type subscales. Based on ITQ scores, 61.4% of the sample met diagnostic criteria for PTSD and 45.8% for CPTSD. Non-heterosexual participants had significantly higher CTQ scores ( $t(164) = 2.340$ ,  $M_{Diff} = 5.95$ , 95% CI [1.11, 10.79],  $p = .016$ ) and ITQ PTSD scores ( $t(164) = 2.427$ ,  $M_{Diff} = 1.89$ , 95% CI [0.30, 3.49],  $p = .020$ ) and were significantly more likely to meet diagnostic criteria for PTSD ( $X^2(1,166) = 4.984$ ,  $p = .026$ ) and CPTSD

**Table 1.** Demographic Characteristics (N = 166).

Demographics	n (%)
Age in years, mean (SD)	30.49 (9.52)
Identifies with sex assigned at birth	
Yes	150 (90.4%)
No	16 (9.6%)
Gender identity	
Woman	100 (61.0%)
Man	45 (27.1%)
Genderqueer/genderfluid	5 (3.0%)
Non-binary	9 (5.4%)
Other	5 (3.0%)
Racial, ethnic, or cultural background <sup>†</sup>	
American Indian	8 (4.8%)
White or Caucasian	150 (90.4%)
Asian	3 (1.8%)
Hispanic or Latino	18 (10.8%)
Pacific Islander	1 (0.6%)
African American	1 (0.6%)
Black, Non American	2 (1.2%)
Indian (from India)	2 (1.2%)
Arab American	4 (2.4%)
Mixed race	1 (1.2%)
Sexual orientation	
Heterosexual	83 (50.0%)
Gay	6 (3.6%)
Lesbian	2 (1.2%)
Bisexual	47 (28.3%)
Queer	9 (5.4%)
Questioning	5 (3.0%)
Pansexual	7 (4.2%)
Other	6 (3.6%)
Marital status	
Single, never married	73 (44.0%)
Married	42 (25.3%)
Committed partner	25 (15.1%)
Separated	3 (1.8%)
Divorced	8 (4.8%)
Widowed	2 (1.2%)
Living together	13 (7.8%)
Socioeconomic status of childhood home	
Lower (\$24,999 or less)	28 (16.9%)
Lower middle (\$25,000-\$49,999)	36 (21.7%)
Middle (\$50,000-\$74,999)	50 (31.1%)
Upper middle (\$75,000-\$1,49,999)	41 (24.7%)
Upper (\$1,50,000 or greater)	6 (3.6%)
Highest level of education completed	
Less than high school/GED	7 (4.2%)
High school/GED	18 (10.8%)
Some college	43 (25.9%)
Associate's degree	5 (5.4%)
Bachelor's degree	64 (38.6%)
Master's degree	18 (10.8%)
Doctorate degree	5 (3.0%)
Other	1 (0.6%)

(continued)

**Table 1.** Continued.

Demographics	n (%)
Student status	
Not currently a student	115 (69.3%)
Currently a student	51 (30.7%)
If currently a student, level of education currently pursuing	
Pursuing a GED	2 (1.2%)
Pursuing an associate's degree	3 (1.8%)
Pursuing a bachelor's degree	26 (15.7%)
Pursuing a master's degree	22 (13.3%)
Pursuing a doctoral degree	6 (3.6%)
Psychiatric diagnoses <sup>†</sup>	
Depression	137 (82.5%)
Bipolar/manic depressive illness	17 (10.2%)
Anxiety	141 (84.9%)
Schizophrenia	2 (1.2%)
Substance abuse	37 (22.3%)
Eating disorder	30 (18.1%)
Attention deficit disorder	40 (24.1%)
Anger problems	18 (10.8%)
Other mental illness	41 (24.7%)
None	9 (5.4%)
Lifetime substance use history <sup>†</sup>	
Alcohol	148 (89.2%)
Tobacco	90 (54.2%)
Caffeine	151 (91.0%)
Cannabis	125 (75.3%)
Hallucinogens	73 (44.0%)
Inhalants	31 (18.7%)
Opioids	44 (26.5%)
Sedatives, hypnotics, or anxiolytics	51 (30.7%)
None of the above	0 (0.0%)
History of intentional therapeutic psychedelic use (ITPU)	
Yes	52 (31.3%)
No	114 (68.7%)

GED: General Educational Development (equivalent to US high school diploma).

<sup>†</sup>Participants could select multiple responses for this question.

( $\chi^2(1,166) = 6.213, p = .013$ ). Mean CTQ scores were not significantly different between ITPU and non-ITPU groups ( $t(164) = 0.395, M_{Diff} = 1.06, 95\% \text{ CI}[-4.25, 6.37], p = .693$ ).

### Hypotheses

Our first hypothesis was partially confirmed. Parts (a) and (b) were confirmed: CTQ scores showed weak, positive correlations with ITQ PTSD scores ( $r(164) = .26, p = .001$ ), ITQ DSO scores ( $r(164) = .20, p = .009$ ), and ISS scores ( $r(164) = .18, p = .020$ ). Bivariate correlation analyses of CTQ subtype scores with PTSD, DSO, and ISS scores are presented in Table 3.

Part (c) was not confirmed: no significant relationship was found between CTQ scores and RMET scores ( $r(163) = .23, p = .093$ ), and no CTQ subtype scores

**Table 2.** Characteristics of ITPU Experiences (N = 52).

ITPU variables	n (%)
Substances used <sup>†</sup>	
Psilocybin / mushrooms	35 (67.3%)
LSD	29 (55.8%)
Ayahuasca / yagé	5 (9.6%)
Mescaline / peyote / San Pedro	4 (7.7%)
DMT (extracted)	11 (21.2%)
MDMA / ecstasy	22 (42.3%)
Ketamine	11 (21.2%)
2C-B	2 (3.8%)
Other	1 (1.9%)
Number of ITPU occasions	
1	8 (15.4%)
2–5	23 (44.2%)
5+	21 (40.4%)
Most recent ITPU occasion	
Within the past month	21 (40.4%)
1–6 months ago	17 (32.7%)
6 months–2 years ago	10 (19.2%)
2–5 years ago	2 (3.8%)
5+ years ago	2 (3.8%)
Settings of ITPU <sup>†‡</sup>	
At home	44 (84.6%)
At a party	4 (7.7%)
In a public space (e.g. mall, movie theatre)	4 (7.7%)
At a concert/festival/rave	8 (15.4%)
In nature	26 (50.0%)
In a religious/spiritual setting	5 (9.6%)
Other	3 (5.8%)
Impact of ITPU	
Healing / helpful / positive change	39 (75.0%)
Harmful / damaging / negative change	1 (1.9%)
Both healing and harmful	8 (15.4%)
No change	4 (7.7%)

LSD: lysergic acid diethylamide; DMT: N,N-dimethyltryptamine; MDMA: 3,4-methylenedioxy-methamphetamine; 2C-B: 2,5-dimethoxy-4-bromophenethylamine.

<sup>†</sup>Multiple responses could be selected for this question.

<sup>‡</sup>These response choices are drawn from Garcia-Romeu et al.<sup>61</sup>

**Table 3.** Matrix of Correlations Between CTQ Subscale Scores and ITQ PTSD Scores, ITQ DSO Scores, and ISS Scores.

CTQ subscale variable	PTSD	DSO	ISS
Emotional abuse	.18*	.28***	.26***
Emotional neglect	.05	.25***	.25***
Physical abuse	.17*	-.02	.01
Physical neglect	.16*	.19*	.18*
Sexual abuse	.23**	.03	-.03

\*Correlation is significant at the .05 level (2-tailed).

\*\*Correlation is significant at the .01 level (2-tailed).

\*\*\*Correlation is significant at the .001 level (2-tailed).

significantly correlated with RMET scores. Exploratory analyses found that CTQ scores also did not significantly correlate with RMET accuracy within any emotion valence (positive, neutral, or negative).

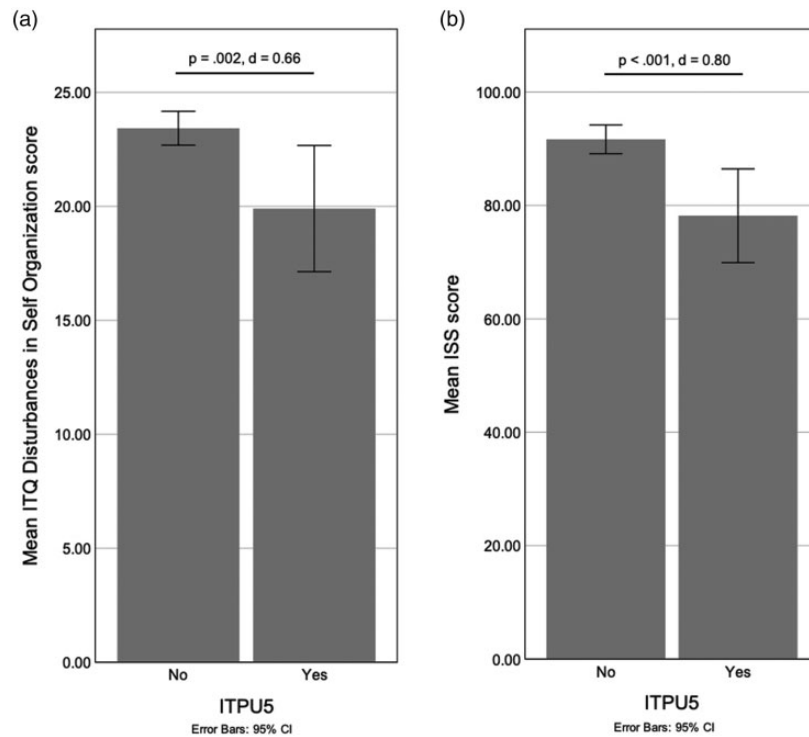
Our second hypothesis was also partially confirmed. Part (a) was partially confirmed: ITQ PTSD scores were not significantly different between ITPU and non-ITPU groups ( $t(164) = -0.430$ ,  $M_{Diff} = -0.38$ , 95% CI[-2.13, 1.37],  $p = .668$ ). ITQ DSO scores, however, were significantly lower in the ITPU group with a small effect size ( $t(164) = -2.010$ ,  $M_{Diff} = -1.63$ , 95% CI[-3.22, -0.03],  $p = .046$ ,  $d = 0.33$ ). A multiple regression analysis, however, found no significant effect of the interaction between CTQ and ITPU on DSO scores ( $\Delta R^2 = .010$ ,  $F(1,162) = 1.797$ ,  $p = .182$ ).

A one-way ANOVA of the effect of number of occasions of ITPU on DSO scores was trending toward significance ( $F(2,49) = 2.536$ ,  $p = .090$ ), and a Tukey post hoc test showed lower DSO scores in participants endorsing more than 5 occasions of ITPU (ITPU5) than in participants endorsing 2 to 5 occasions or in participants endorsing 1 occasion, though these differences were not significant. When comparing the ITPU5 group to the rest of the sample (i.e., not just to the participants who endorsed 1-5 occasions of ITPU), ITPU5 reported significantly lower significantly lower DSO scores with a medium to large effect size ( $t(164) = -3.178$ ,  $M_{Diff} = -3.52$ , 95% CI[-5.71, -1.33],  $p = .002$ ,  $d = 0.66$ ; Figure 1(a)). There was no significant effect of timeframe of most recent ITPU occasion or impact of ITPU on DSO scores.

ISS scores were also significantly lower in the ITPU group with a small effect size ( $t(164) = -2.104$ ,  $M_{Diff} = -5.72$ , 95% CI[-11.08, -0.35],  $p = .037$ ,  $d = 0.35$ ). A multiple regression analysis, however, found no significant effect of the interaction between CTQ and ITPU on ISS scores ( $\Delta R^2 = .001$ ,  $F(1,162) = 0.255$ ,  $p = .614$ ).

A one-way ANOVA showed a significant effect of number of occasions of ITPU on ISS scores ( $F(2,49) = 4.240$ ,  $p = .020$ ). A Tukey post hoc test revealed that ISS scores in the ITPU5 group were significantly lower than those of participants endorsing 2 to 5 occasions of ITPU ( $M_{Diff} = -12.64$ , 95% CI [-24.37, -0.90],  $p = .032$ ) and were also lower than participants endorsing 1 occasion at the trend level ( $M_{Diff} = -14.68$ , 95% CI [-30.84, 1.47],  $p = .082$ ). When comparing the ITPU5 group to the rest of the sample, ITPU5 reported significantly lower ISS scores with a large effect size ( $t(164) = -3.648$ ,  $M_{Diff} = -13.48$ , 95% CI [-20.77, -6.18],  $p < .001$ ,  $d = 0.80$ ; Figure 1(b)). There was no effect of timeframe of most recent ITPU occasion or impact of ITPU on ISS scores.

Part (c) was not confirmed: RMET scores were not significantly different between ITPU and non-ITPU



**Figure 1.** The differences in mean DSO scores (a) and mean ISS scores (b) between ITPU5 and non-ITPU5 groups.

groups ( $t(163) = 0.540$ ,  $M_{Diff} = 0.36$ , 95% CI  $[-0.95, 1.67]$ ,  $p = .590$ ).

### Post Hoc Analyses

**Moderation Analyses.** Due to the stronger relationships of emotional abuse and emotion neglect with primary outcome variables than other CTQ subscale scores (Table 3), a composite score of emotional abuse and neglect (EAN) was used in post hoc analyses. EAN scores showed stronger correlations than individual CTQ subscale scores or total CTQ scores with DSO scores ( $r(164) = .32$ ,  $p < .001$ ) and ISS scores ( $r(164) = .31$ ,  $p < .001$ ).

Based on these findings and the prior finding that ITPU5 was most strongly associated with outcome variables among ITPU factors, regression analyses were conducted to examine any moderating effects of ITPU5 on the relationship between EAN and outcome variables.

A multiple regression analysis including ITPU5 and EAN in the first step of the model and the interaction term between the two variables in the next step found no significant effect of the interaction on variance in ISS scores ( $\Delta R^2 = .011$ ,  $F(1,162) = 2.171$ ,  $p = .143$ ). When DSO was used as the dependent variable in the model, however, the interaction between EAN and ITPU5 accounted for a significant amount of variance in DSO scores ( $\Delta R^2 = .036$ ,  $F(1,162) = 7.323$ ,  $p = .008$ ),

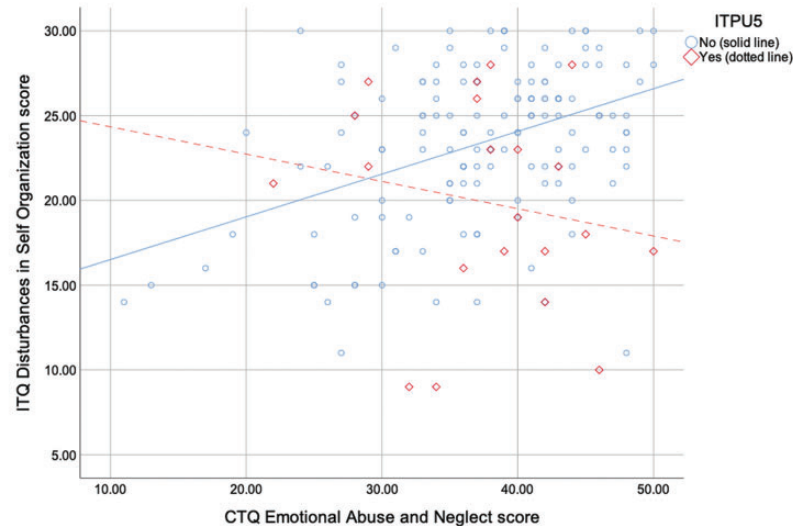
indicating that ITPU5 significantly moderates the relationship between EAN and DSO scores. Bivariate correlation analyses found that in the non-ITPU5 group, EAN scores showed a moderate, positive correlation with DSO scores ( $r(143) = .42$ ,  $p < .001$ ), while in the ITPU5 group, there was no significant relationship between the two scores ( $r(19) = -.18$ ,  $p = .434$ ; Figure 2).

**Additional Post-Hoc Analyses.** Additional post-hoc analyses regarding RMET reaction times, non-intentional psychedelic use, substance type in ITPU, and naturalistic ITPU are presented in the Supplemental Materials. Qualitative results regarding the impact of ITPU are also presented in full in the Supplemental Materials.

### Discussion

This study aimed to assess whether ITPU may have a moderating influence on the relationships between CM exposure and severity, posttraumatic symptomatology, and schemata of self and other. Our hypotheses were: 1) CM would be associated with higher PTSS, higher internalized shame, and impaired FER; and 2) ITPU would be associated with lower PTSS, lower internalized shame, and better FER compared to non-ITPU.

Our first hypothesis was partially confirmed: CM positively correlated with internalized shame and PTSS but showed no significant association with FER accuracy. Our second hypothesis was also partially confirmed:



**Figure 2.** The moderating effect of ITPU5 on the relationship between EAN scores and DSO scores.

complex (but not simple) PTSS and internalized shame were significantly lower in the ITPU group, but FER accuracy did not differ between the ITPU and non-ITPU groups.

Endorsing more than 5 instances of ITPU significantly moderated the relationship between levels of exposure to and severity of emotional abuse and neglect and CPTSD symptoms such that among participants who had not used psychedelics with therapeutic intentions more than 5 times, there was a positive, linear correlation between emotional abuse and neglect and CPTSD symptoms, while among participants who had, there was a non-significantly negative correlation.

The partial confirmation of H2a and confirmation of H2b lend themselves to multiple interpretations. Though ITPU was associated with lower internalized shame and complex trauma symptoms, these findings do not conclusively indicate causal or chronological relationships among the variables. The significant moderation analysis described above, however, may be suggestive of a beneficial influence of repeated occasions of ITPU on the relationship between CM and posttraumatic sequelae. Replications and clarifications of moderation findings as well as longitudinal studies of the effects of ITPU in people with histories of CM would provide further evidence of a causal relationship.

The failure to confirm H1c or H2c may be due to a number of factors at a number of levels of interpretation. A confounding factor may be alexithymia, a condition marked by difficulties with identifying and labeling emotional experiences, which has been shown consistently to be associated with childhood trauma.<sup>81–83</sup> A recent study found that RMET scores were significantly lower in alexithymic participants than non-alexithymic participants.<sup>84</sup> RMET scores in

the present study were comparable to those of the alexithymic group in Oakley et al. and lower than the norm among healthy participants reported by Baron-Cohen et al. in the development study of the test.<sup>78,84</sup> The high levels of CM exposure and severity across the entire sample may be associated with sample-wide impairments in performance that may or may not be related to alexithymia; a restricted range effect, therefore, may be impacting the capacity to detect an association between RMET scores and CTQ scores or ITPU.

### *Limitations, Implications, and Future Directions*

This study has some limitations, including its cross-sectional design, its reliance on retrospective reporting, its predominantly White sample, the potential for volunteer bias among participants, and the potential role of social desirability in participant responses, all of which may have affected the validity and generalizability of the findings. Another limitation is that past and/or current psychiatric treatment, such as psychotherapy or pharmacological treatment, was not assessed, and any confounding effects of such treatment, therefore, cannot be accounted for in the findings. An important future direction is the aforementioned longitudinal design to assess changes in internalized shame, social cognition, posttraumatic symptomatology, and other areas following ITPU in people with histories of CM. Such future studies ought to attempt to recruit a sample higher in racial diversity.

Despite these limitations, the present findings are significant in their implications for psychedelic-assisted treatments. Clinical trials of psychedelic-assisted psychotherapy for PTSD have thus far focused exclusively on MDMA, and none has yet used a “classic” psychedelic



(e.g., psilocybin, LSD, or ayahuasca/yagé).<sup>13,85</sup> In this study, however, psilocybin and LSD were the two most commonly used psychedelics in the ITPU group, suggesting, in line with findings from prior survey studies of naturalistic psychedelic use in traumatized populations, that classic psychedelics also have therapeutic utility in the treatment of PTSD, particularly complex PTSD associated with CM.<sup>19,86,87</sup> Furthermore, of all the substances endorsed as being utilized in ITPU, ayahuasca/yagé was the only unique predictor of reductions in complex PTSS (see Supplemental Materials). Some literature has discussed the potential of ayahuasca/yagé as a pharmacologic intervention for PTSD, though no clinical or observational studies have yet been conducted examining the question.<sup>88,89</sup> The present findings add to these prior discussions in situating ayahuasca/yagé as a viable candidate drug for use in psychedelic therapy for complex PTSD. Finally, despite the limited racial diversity of the present sample, nearly half of the participants were non-heterosexual, suggesting that psychedelics may have similar therapeutic potential for LGBT people as for heterosexual and cisgender people.

Our results also show that therapeutic benefit is derived from intentional psychedelic use in naturalistic settings (see Supplemental Materials), indicating that this benefit is not limited to formal, clinical settings where a psychiatric professional administers the drug and oversees the experience. These findings add to those of prior studies that reported therapeutic outcomes for alcohol use disorder, tobacco dependence, and cannabis, opioid, and stimulant misuse associated with naturalistic psychedelic use.<sup>60,61,69</sup> Future models of psychedelic treatment may incorporate more informal and independent use of psychedelics following adequate preparation in addition to structured psychedelic-assisted psychotherapy.

Finally, though ITPU, and especially ITPU5, was associated with decreased complex PTSS (i.e., disturbances in self organization; DSO), it was not associated with decreased “simple” PTSS, i.e., the symptoms of “simple” PTSD (versus complex PTSD). Emotional abuse and neglect showed the strongest associations with DSO, while physical and sexual abuse were not significantly associated with DSO. These results have significant implications both for the diagnosis and treatment of the variety of presentations of PTSD and for the development and conduct of psychedelic-assisted psychotherapy. Distinct patterns and types of CM result in differential profiles of posttraumatic symptomatology; the symptoms that comprise DSO – the profile of symptoms most strongly associated with emotional abuse and neglect and most effectively relieved by psychedelics in the present study – centrally relate to *the self*. The pervasive and disturbed patterns of interpersonal relating that define emotional abuse and neglect have a lasting,

negative impact on the developmental process of forming, or *becoming*, a self. Psychedelics, which catalyze a profound alteration in the subjective sense of self, often effecting a total loss of self and subsequent re-forming of the self, may then, as the present findings suggest, be particularly well-suited as therapeutic agents in psychiatric disorders involving disturbances of the self, most notably complex PTSD. Representative qualitative reports from participants in the present study regarding their experiences with ITPU (see Supplemental Materials) may illustrate this process of coming to embody a more adaptive self-schema that psychedelics can catalyze: “It showed me who I am and that I like myself”; “Made me feel real for the first time in probably a decade”; “I also realized that my true essential Self is that which is consistent between all states of being and consciousness, which has helped me leave the darkness of trauma induced dissociation”; “That trip was a gut wound to my ego and the best thing to move towards a healing and authentic life”; “I was exactly who I was supposed to be”; “It has freed me from the ego that I’ve spent my whole life creating.” These findings contribute to elucidating the mechanisms of therapeutic action of psychedelics with implications for the development and conduct of psychedelic-assisted psychotherapy.

## Conclusion

The findings of the present study demonstrate that using psychedelic drugs with therapeutic intent is associated with lower levels of complex posttraumatic stress symptoms and internalized shame in individuals with histories of child maltreatment. Psychedelics may prove valuable clinical agents in the treatment of a variety of mental disorders in which child maltreatment is etiologically implicated.

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## References

1. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The adverse

- childhood experiences (ACE) study. *Am J Prev Med.* 1998; 14(4): 245–258.
2. Jaffee SR. Child maltreatment and risk for psychopathology in childhood and adulthood. *Annu Rev Clin Psychol.* 2017; 13: 525–551.
  3. McCrory E, De Brito SA, Viding E. The link between child abuse and psychopathology: a review of neurobiological and genetic research. *J R Soc Med.* 2012; 105(4): 151–156.
  4. Springer KW, Sheridan J, Kuo D, et al. The long-term health outcomes of childhood abuse. *J Gen Intern Med.* 2003; 18(10): 864–870.
  5. Strathearn L, Giannotti M, Mills R, et al. Long-term cognitive, psychological, and health outcomes associated with child abuse and neglect. *Pediatrics.* 2020; 146(4):e20200438.
  6. D'Andrea W, Ford J, Stolbach B, et al. Understanding interpersonal trauma in children: why we need a developmentally appropriate trauma diagnosis. *Am J Orthopsychiatry.* 2012; 82(2): 187–200.
  7. De Bellis MD. Developmental traumatology: a contributory mechanism for alcohol and substance use disorders. *Psychoneuroendocrinology.* 2002; 27(1–2): 155–170.
  8. De Bellis MD, Zisk A. The biological effects of childhood trauma. *Child Adolesc Psychiatr Clin N Am.* 2014; 23(2): 185–222, vii.
  9. van der Kolk BA. *The body keeps the score: brain, mind, and body in the healing of trauma.* New York, NY: Penguin Books, 2015.
  10. Spinazzola J, van der Kolk B, Ford JD. When nowhere is safe: Interpersonal trauma and attachment adversity as antecedents of posttraumatic stress disorder and developmental trauma disorder. *J Trauma Stress.* 2018; 31(5): 631–642.
  11. Coleman R. *Psychedelic Psychotherapy: A User Friendly Guide to Psychedelic Drug-Assisted Psychotherapy.* Wellington, New Zealand: Transform Press, 2017.
  12. Feduccia AA, Jerome L, Yazar-Klosinski B, et al. Breakthrough for trauma treatment: safety and efficacy of MDMA-assisted psychotherapy compared to paroxetine and sertraline. *Front Psychiatry.* 2019; 10: 650.
  13. Krediet E, Bostoen T, Breksema J, et al. Reviewing the potential of psychedelics for the treatment of PTSD. *Int J Neuropsychopharmacol.* 2020; 23(6): 385–400.
  14. Mithoefer MC, Feduccia AA, Jerome L, et al. MDMA-assisted psychotherapy for treatment of PTSD: study design and rationale for phase 3 trials based on pooled analysis of six phase 2 randomized controlled trials. *Psychopharmacology.* 2019; 236(9): 2735–2745.
  15. Belser AB, Agin-Liebes G, Swift TC, et al. Patient experiences of psilocybin-assisted psychotherapy: an interpretative phenomenological analysis. *J Humanist Psychol.* 2017; 57(4): 354–388.
  16. Bogenschutz MP, Forcehimes AA. Development of a psychotherapeutic model for psilocybin-assisted treatment of alcoholism. *J Humanist Psychol.* 2017; 57(4): 389–414.
  17. Carhart-Harris RL, Friston KJ. REBUS and the anarchic brain: toward a unified model of the brain action of psychedelics. *Pharmacol Rev.* 2019; 71(3): 316–344.
  18. Feduccia AA, Mithoefer MC. MDMA-assisted psychotherapy for PTSD: are memory reconsolidation and fear extinction underlying mechanisms? *Prog Neuropsychopharmacol Biol Psychiatry.* 2018; 84(Pt A): 221–228.
  19. Healy CJ. The acute effects of classic psychedelics on memory in humans. *Psychopharmacology (Berl).* 2021; 238(3): 639–653.
  20. Hendricks PS. Awe: a putative mechanism underlying the effects of classic psychedelic-assisted psychotherapy. *Int Rev Psychiatry.* 2018; 30(4): 331–342.
  21. Krediet E, Bostoen T, Breksema J, et al. Reviewing the potential of psychedelics for the treatment of PTSD. *Int J Neuropsychopharmacol.* 2020; 23(6): 385–400.
  22. Andersen SM, Chen S. The relational self: an interpersonal social-cognitive theory. *Psychol Rev.* 2002; 109(4): 619–645.
  23. Bowlby J. *Attachment and Loss: Vol. 1: Attachment.* New York, NY: Basic Books, 1969.
  24. Main M, Kaplan N, Cassidy J. Security in infancy, childhood, and adulthood: a move to the level of representation. *Monogr Soc Res Child Dev.* 1985; 50(1/2): 66–104.
  25. Ainsworth MS, Bowlby J. An ethological approach to personality development. *Am Psychol.* 1991; 46(4): 333–341.
  26. Beebe B, Lachmann F, Markese S, et al. On the origins of disorganized attachment and internal working models: Paper II. An empirical microanalysis of 4-month mother-infant interaction. *Psychoanal Dialog.* 2012; 22(3): 352–374.
  27. Aakvaag HF, Thoresen S, Strøm IF, et al. Shame predicts revictimization in victims of childhood violence: a prospective study of a general Norwegian population sample. *Psychol Trauma.* 2019; 11(1): 43–50.
  28. Chiu C-D, Ho HL, Tollenaar MS, et al. Early relational trauma and self representations: misattributing externally derived representations as internally generated. *Psychol Trauma.* 2019; 11(1): 64–72.
  29. Dorahy MJ, Corry M, Shannon M, et al. Complex trauma and intimate relationships: the impact of shame, guilt and dissociation. *J Affect Disord.* 2013; 147(1–3): 72–79.
  30. Fowke A, Ross S, Ashcroft K. Childhood maltreatment and internalized shame in adults with a diagnosis of bipolar disorder. *Clin Psychol Psychother.* 2012; 19(5): 450–457.
  31. Kealy D, Rice SM, Ogrodniczuk JS, et al. Childhood trauma and somatic symptoms among psychiatric outpatients: investigating the role of shame and guilt. *Psychiatry Res.* 2018; 268: 169–174.
  32. Kim J, Cicchetti D. Longitudinal trajectories of self-system processes and depressive symptoms among maltreated and nonmaltreated children. *Child Dev.* 2006; 77(3): 624–639.
  33. Kim J, Talbot NL, Cicchetti D. Childhood abuse and current interpersonal conflict: the role of shame. *Child Abuse Negl.* 2009; 33(6): 362–371.
  34. MacGinley M, Breckenridge J, Mowl J. A scoping review of adult survivors' experiences of shame following sexual abuse in childhood. *Health Soc Care Community.* 2019; 27(5): 1135–1146.
  35. Thomson P, Jaque SV. Shame and anxiety: the mediating role of childhood adversity in dancers. *J Dance Med Sci.* 2018; 22(2): 100–108.

36. da Silva Ferreira GC, Crippa JAS, de Lima Osório F. Facial emotion processing and recognition among maltreated children: a systematic literature review. *Front Psychol*. 2014; 5: 1460.
37. Doretto V, Scivoletto S. Effects of early neglect experience on recognition and processing of facial expressions: a systematic review. *Brain Sci*. 2018; 8: 10.
38. McCrory EJ, Brito SAD, Sebastian CL, et al. Heightened neural reactivity to threat in child victims of family violence. *Curr Biol*. 2011; 21(23):R947–R948.
39. Seligman S. *Relationships in Development: infancy, Intersubjectivity, and Attachment*. New York, NY: Routledge, 2017.
40. Ehlers A, Clark DM. A cognitive model of posttraumatic stress disorder. *Behav Res Therapy*. 2000; 38(4): 319–345.
41. Feiring C, Taska LS. The persistence of shame following sexual abuse: a longitudinal look at risk and recovery. *Child Maltreat*. 2005; 10(4): 337–349.
42. La Bash H, Papa A. Shame and PTSD symptoms. *Psychol Trauma Theory Res Pract Policy*. 2014; 6(2): 159–166.
43. Saraiya T, Lopez-Castro T. Ashamed and afraid: a scoping review of the role of shame in post-traumatic stress disorder (PTSD). *JCM*. 2016; 5(11): 94.
44. Au TM, Sauer-Zavala S, King MW, et al. Compassion-based therapy for trauma-related shame and posttraumatic stress: initial evaluation using a multiple baseline design. *Behav Ther*. 2017; 48(2): 207–221.
45. Harman R, Lee D. The role of shame and self-critical thinking in the development and maintenance of current threat in post-traumatic stress disorder. *Clin Psychol Psychother*. 2010; 17(1): 13–24.
46. Carhart-Harris RL. The entropic brain—revisited. *Neuropharmacology*. 2018; 142: 167–178.
47. Griffiths RR, Johnson MW, Richards WA, et al. Psilocybin-occasioned mystical-type experience in combination with meditation and other spiritual practices produces enduring positive changes in psychological functioning and in trait measures of prosocial attitudes and behaviors. *J Psychopharmacol*. 2018; 32(1): 49–69.
48. Letheby C, Gerrans P. Self unbound: ego dissolution in psychedelic experience. *Neurosci Conscious*. 2017; 2017(1):nix016.
49. MacLean KA, Johnson MW, Griffiths RR. Mystical experiences occasioned by the hallucinogen psilocybin lead to increases in the personality domain of openness. *J Psychopharmacol*. 2011; 25(11): 1453–1461.
50. Millière R, Carhart-Harris RL, Roseman L, et al. Psychedelics, meditation, and self-consciousness. *Front Psychol*. 2018; 9: 1475.
51. Vollenweider FX, Kometer M. The neurobiology of psychedelic drugs: implications for the treatment of mood disorders. *Nat Rev Neurosci*. 2010; 11(9): 642–651.
52. Garcia-Romeu A, Griffiths RR, Johnson MW. Psilocybin-occasioned mystical experiences in the treatment of tobacco addiction. *Curr Drug Abuse Rev*. 2014; 7(3): 157–164.
53. Griffiths RR, Richards WA, Johnson MW, et al. Mystical-type experiences occasioned by psilocybin mediate the attribution of personal meaning and spiritual significance 14 months later. *J Psychopharmacol*. 2008; 22(6): 621–632.
54. Johnson MW, Garcia-Romeu A, Griffiths RR. Long-term follow-up of psilocybin-facilitated smoking cessation. *Am J Drug Alcohol Abuse*. 2017; 43(1): 55–60.
55. Lebedev AV, Kaelen M, Lövdén M, et al. LSD-induced entropic brain activity predicts subsequent personality change. *Hum Brain Mapp*. 2016; 37(9): 3203–3213.
56. Roseman L, Nutt DJ, Carhart-Harris RL. Quality of acute psychedelic experience predicts therapeutic efficacy of psilocybin for Treatment-Resistant depression. *Front Pharmacol*. 2018; 8: 17.
57. Connolly Gibbons MB, Crits-Christoph P, Barber JP, et al. Insight in psychotherapy: a review of empirical literature. In: Castonguay LG, Hill CE, eds. *Insight in psychotherapy*. Washington, DC: American Psychological Association, 2007: 143–165.
58. Davis AK, Barrett FS, Griffiths RR. Psychological flexibility mediates the relations between acute psychedelic effects and subjective decreases in depression and anxiety. *J Contextual Behav Sci*. 2020; 15: 39–45.
59. Davis AK, Barrett FS, May DG, et al. Effects of psilocybin-assisted therapy on major depressive disorder: a randomized clinical trial. *JAMA Psychiatry*. 2021; 78(5): 481–489.
60. Garcia-Romeu A, Davis AK, Erowid E, et al. Persisting reductions in cannabis, opioid, and stimulant misuse after naturalistic psychedelic use: an online survey. *Front Psychiatry*. 2020; 10: 955.
61. Garcia-Romeu A, Davis AK, Erowid F, et al. Cessation and reduction in alcohol consumption and misuse after psychedelic use. *J Psychopharmacol*. 2019; 33(9): 1088–1101.
62. Jennissen S, Huber J, Ehrental JC, et al. Association between insight and outcome of psychotherapy: systematic review and meta-analysis. *Am J Psychiatry*. 2018; 175(10): 961–969.
63. Barrett FS, Doss MK, Sepeda ND, et al. Emotions and brain function are altered up to one month after a single high dose of psilocybin. *Sci Rep*. 2020; 10(1): 2214.
64. Kometer M, Schmidt A, Bachmann R, et al. Psilocybin biases facial recognition, goal-directed behavior, and mood state toward positive relative to negative emotions through different serotonergic subreceptors. *Biol Psychiatry*. 2012; 72(11): 898–906.
65. Kraehenmann R, Preller KH, Scheidegger M, et al. Psilocybin-induced decrease in amygdala reactivity correlates with enhanced positive mood in healthy volunteers. *Biol Psychiatry*. 2015; 78(8): 572–581.
66. Rocha JM, Osório FL, Crippa JAS, et al. Serotonergic hallucinogens and recognition of facial emotion expressions: a systematic review of the literature. *Ther Adv Psychopharmacol*. 2019; 9: 2045125319845774.
67. Roseman L, Demetriou L, Wall MB, et al. Increased amygdala responses to emotional faces after psilocybin for treatment-resistant depression. *Neuropharmacology*. 2018; 142: 263–269.
68. Rocha JM, Rossi GN, de Lima Osório F, et al. Effects of ayahuasca on the recognition of facial expressions of emotions in naive healthy volunteers: a pilot, proof-of-concept,

- randomized controlled trial. *J Clin Psychopharmacol.* 2021; 41(3): 267–274.
69. Johnson MW, Garcia-Romeu A, Johnson PS, et al. An online survey of tobacco smoking cessation associated with naturalistic psychedelic use. *J Psychopharmacol.* 2017; 31(7): 841–850.
  70. Carhart-Harris RL, Roseman L, Haijen E, et al. Psychedelics and the essential importance of context. *J Psychopharmacol.* 2018; 32(7): 725–731.
  71. Haijen ECHM, Kaelen M, Roseman L, et al. Predicting responses to psychedelics: a prospective study. *Front Pharmacol.* 2018; 9(2): 897.
  72. Hartogsohn I. Set and setting, psychedelics and the placebo response: an extra-pharmacological perspective on psychopharmacology. *J Psychopharmacol.* 2016; 30(12): 1259–1267.
  73. Hartogsohn I. Constructing drug effects: a history of set and setting. *Drug Sci Policy Law.* 2017; 3: 205032451668332.
  74. Winstock AR, Timmerman C, Davies E, et al. *Global Drug Survey (GDS) 2020 Psychedelics Key Findings Report.* Report, London, England: Global Drug Survey. <https://www.globaldrugsurvey.com/>. Published March 2021. Accessed April 17, 2021.
  75. Bernstein DP, Stein JA, Newcomb MD, et al. Development and validation of a brief screening version of the childhood trauma questionnaire. *Child Abuse Negl.* 2003; 27(2): 169–190.
  76. Cloitre M, Shevlin M, Brewin CR, et al. The international trauma questionnaire: development of a self-report measure of ICD-11 PTSD and complex PTSD. *Acta Psychiatr Scand.* 2018; 138(6): 536–546.
  77. McElroy E, Shevlin M, Murphy S, et al. ICD-11 PTSD and complex PTSD: structural validation using network analysis. *World Psychiatry.* 2019; 18(2): 236–237.
  78. Baron-Cohen S, Wheelwright S, Hill J, et al. The ‘reading the mind in the eyes’ test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. *J Child Psychol Psychiatry.* 2001; 42(2): 241–251.
  79. Harkness K, Sabbagh M, Jacobson J, et al. Enhanced accuracy of mental state decoding in dysphoric college students. *Cognit Emot.* 2005; 19(7): 999–1025.
  80. Cook DR. *ISS: Internalized Shame Scale: Professional Manual.* Menomonie, WI: Channel Press; 1994.
  81. Aust S, Härtwig EA, Heuser I, et al. The role of early emotional neglect in alexithymia. *Psychol Trauma Theory Res Pract Policy.* 2013; 5(3): 225–232.
  82. Paivio SC, McCulloch CR. Alexithymia as a mediator between childhood trauma and self-injurious behaviors. *Child Abuse Negl.* 2004; 28(3): 339–354.
  83. Zlotnick C, Mattia JI, Zimmerman M. The relationship between posttraumatic stress disorder, childhood trauma and alexithymia in an outpatient sample. *J Traum Stress.* 2001; 14(1): 177–188.
  84. Oakley BFM, Brewer R, Bird G, et al. Theory of mind is not theory of emotion: a cautionary note on the reading the mind in the eyes test. *J Abnorm Psychol.* 2016; 125(6): 818–823.
  85. Varker T, Watson L, Gibson K, et al. Efficacy of psychoactive drugs for the treatment of posttraumatic stress disorder: a systematic review of MDMA, ketamine, LSD and psilocybin. *J Psychoact Drugs.* 2021; 53(1): 85–95.
  86. Davis AK, Averill LA, Sepeda ND, et al. Psychedelic treatment for trauma-related psychological and cognitive impairment among US special operations forces veterans. *Chronic Stress.* 2020; 4: 247054702093956.
  87. Williams MT, Davis AK, Xin Y, et al. People of color in North America report improvements in racial trauma and mental health symptoms following psychedelic experiences. *Drugs Educ Prevent Policy.* 2021; 28: 215–226.
  88. Inserra A. Hypothesis: the psychedelic ayahuasca heals traumatic memories via a sigma 1 receptor-mediated epigenetic-mnemonic process. *Front Pharmacol.* 2018; 9: 5.
  89. Nielson JL, Megler Jd Ayahuasca as a candidate therapy for PTSD. In: Labate BC, Cavnar C, eds. *The Therapeutic Use of Ayahuasca.* Berlin, Heidelberg: Springer, pp. 41–58.