



# Classic Psychedelics as a Psychotherapeutic Aid in the Treatment of Stimulant Use Disorder: a Case Report

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## Abstract

Despite nascent research supporting the efficacy of classic psychedelics as a psychotherapeutic aid for the treatment of substance abuse, to date, there is limited published research exploring their use in the treatment of stimulant use disorder and dual diagnosis. A 22-year-old male with a history of mood disorder and polysubstance use presented to a private Australian mental health clinic. While undergoing psychological treatment for mood and stimulant use disorder, this patient reported significant benefit from his use of classic psychedelics. Following consumption of 3.5 grams of psilocybin-containing mushrooms, he decided to seek out psychotherapy for the first time. Throughout treatment, subjective reports of his classic psychedelic use, which among others, included two occasions of having consumed 200 µg of lysergic acid diethylamide and 100 mg of dimethyltryptamine, were recorded and a psychometric tool used to capture mystical experiences was administered. As treatment progressed, the patient reported being better able to consolidate his therapeutic gains through the integration of insights obtained through his use of classic psychedelics, ultimately remaining abstinent from all stimulant drugs. The results of this case report suggest that classic psychedelics may be effective psychotherapeutic aids to be used in traditional substance abuse treatment programs. It is hoped that this case report will inform future research in this field.

**Keywords** Classic psychedelic · Mystical experience · Serotonin · Stimulant use disorder · Substance use

The use of classic psychedelics in assisting treatments for mental illness and substance abuse is predicated on an extensive body of literature, with western research predominating between

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the 1950s and 1970s (Hendricks et al. 2015). Due to the implementation of drug policies in the 1960s and 1970s, research remained stagnant for several decades (Hendricks et al. 2015). In Australia, psychedelics are currently classified as illegal substances with high abuse potential and no therapeutic value, making them difficult to access for research purposes (Inserra 2019). There has, however, been a resurgence of research on psychedelic substances since the 2000s, and over recent years, it has been gaining momentum. The “classic” psychedelics, which include psilocybin, lysergic acid diethylamide (LSD), dimethyltryptamine (DMT), and mescaline distinguished by unique neurophysiological and psychological effects that are derived primarily from complex mechanisms of interaction with serotonin 2A receptors (Barker 2016). New brain imaging research involving the administration of these substances has detected acute and post-acute changes in the default mode network, a system of brain regions involved in self-referential processing of information, wherein abnormalities are found to be present in several psychiatric illnesses (Carhart-Harris et al. 2012; Carhart-Harris et al. 2013; Carhart-Harris et al. 2016; Carhart-Harris et al. 2017; Palhano-Fontes et al. 2015). In their 2017 study, Carhart-Harris and colleagues found that alterations in the default mode network following the administration of psilocybin predicted lower levels of depression for several weeks following treatment. Furthermore, studies conducted across North America have found that a history of psychedelic use was linked to lower rates of suicidality and psychological distress (Argento et al. 2017; Hendricks et al. 2015).

Classic psychedelics have also shown promise for their use in assisting the treatment of substance use disorder. To date, two studies investigating the use of LSD have shown support for this substance as an effective therapeutic aid in the treatment of opioid abuse (Ludwig and Levine 1965; Savage and McCabe 1973). Additionally, a meta-analysis on LSD as a treatment for alcohol dependence found that compared with the placebo groups, the LSD groups showed significant reductions in psychopathology (Krebs and Johansen 2012). Additionally, there is preliminary evidence for the efficacy of psilocybin-assisted psychotherapy for alcohol and tobacco abuse (Bogenschutz et al. 2015; Bogenschutz et al. 2018; Garcia-Romeu et al. 2015; Johnson et al. 2014; Johnson et al. 2017; Nielson et al. 2018).

Significant adverse events associated with classic psychedelic use are low, with a recent systematic review finding no serious adverse events long-term (Wheeler and Dyer 2020). The authors found that while over 50% of studies reported mild adverse events, no medical intervention was required. Some of the most commonly reported adverse events included changes in blood pressure, body temperature, tension, fatigue, headache, confusion, panic, and restlessness.

Mystical experiences (experiences comprised of feelings of unity, transcendence of space and time, positive mood, and sacredness) while under the influence of classic psychedelics are thought to play an important role in negative symptom reduction (Carhart-Harris et al. 2017; Johnson et al. 2017). Research involving psilocybin has found smoking cessation and reduction in aversive patterns of alcohol use to be correlated with measures assessing mystical experiences (Bogenschutz et al. 2015; Garcia-Romeu et al. 2015). Moreover, a brain imaging study involving the use of psilocybin in the management of treatment-resistant depression found that mystical experiences mediated post-acute changes in the default mode network, which predicted the treatment response at five-week follow-up (Carhart-Harris et al. 2017).

There is one randomized control trial underway that is examining the use of psilocybin in the treatment of cocaine use disorder; preliminary results have shown that compared with the placebo group, the psilocybin group had more abstinent days, lower self-reported severity of dependence, improvements in mood, and higher life satisfaction ratings on post-treatment measures (Hendricks 2018).

These findings are consistent with an observational study conducted in an Indigenous community that investigated ayahuasca-assisted therapy for problematic substance use; self-report measures indicated significant reductions in the misuse of cocaine. (Thomas et al. 2013). Ayahuasca is a ceremonial drink consisting of the active ingredients DMT and harmala alkaloids (Thomas et al. 2013). These findings are also consistent with Garcia-Romeu et al. (2020), who found that of the 444 anonymous online survey respondents, 123 endorsed changes to their stimulant use post-psychedelic experience, with many reporting a reduction in cravings.

Although some studies have included participants with dual diagnoses, to date, no research has looked explicitly at the benefits of psychedelic-assisted psychotherapy in treating dual diagnosis. Furthermore, no peer-reviewed research has been published on the therapeutic benefits of classic psychedelic-assisted therapy for stimulant use disorder. The psychostimulant methamphetamine is a growing international problem, with some research reporting a worldwide epidemic (Chomchai and Chomchai 2015). Methamphetamine use has been linked to severe public health, psychiatric, social, financial, and legal problems (Chomchai and Chomchai 2015). Treatment is often challenging, as individuals can experience cognitive and emotional disturbances for several months following abstinence (Rawson et al. 2002). As a result, Rawson and colleagues state that the use of medication during this period would be helpful for recovery. However, reviews investigating clinical trials involving various medications in the treatment of methamphetamine dependence have concluded that these approaches remain limited (Karila et al. 2010). Consequently, given the growing body of evidence for psychedelic-assisted psychotherapy in the treatment of substance use disorders, it would be prudent to explore the use of classic psychedelics as therapeutic aids in populations with stimulant use disorder and/or stimulant use disorder with a co-occurring axis I disorder.

The primary purpose of this article, therefore, is to explore the therapeutic potential of classic psychedelics in assisting with the treatment of stimulant use disorder with co-occurring depression; this will be achieved by reflecting on the experience of an individual in recovery from stimulant use disorder and major depressive disorder who claims to have gained benefit from his use of classic psychedelics. It is hoped that this case will inspire future research on this topic.

## Case Report

To ensure confidentiality, the name of the individual who participated has been changed. Furthermore, informed consent was obtained before completing this report. All materials for this report were approved by an internal ethics board.

A 22-year-old Indian-Australian male, “John,” was referred to a private Australian mental health clinic on a background of depression and polysubstance use, which included a 6-year history of stimulant use. John enrolled in individual therapy in December of 2015 and was given formal diagnoses of major depressive disorder, stimulant use disorder, and cannabis use disorder using the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (APA 2013). Other relevant differential diagnoses were ruled out, and an individual program of focused-cognitive behavioral therapy was commenced. Throughout treatment, John had no significant physical health problems and was not taking any prescription medications.

Family, psychosocial, and medical history revealed that John’s mother struggled with lupus and an unknown bone disorder. John had a half-sister who died by suicide at age eighteen.

John reported having a half-brother who was 7 years his senior and who also battled with depression, stimulant, and cannabis use disorder. John's biological father abandoned him when he was 3 years of age, and they remained out of contact throughout his life. John reported to have completed year twelve, had started pre-vocational training as a technician, and had experience working in a winery. He further noted that due to his low socioeconomic status, he experienced significant bullying throughout primary school, which led to behavioral issues. Moreover, John reported that the symptoms of depression started around the age of thirteen and were worsened following a concussion at age fourteen.

Drug history revealed that John had used a variety of illicit substances including cannabis, methamphetamine, unprescribed dexamphetamine, 2,5-dimethoxy-4-bromophenethylamine, 2,5-dimethoxy-4-iodophenethylamine, 2,5-dimethoxy-4-iodoamphetamine, 3,4-methylenedioxyamphetamine (MDMA), DMT, 5-methoxy-N, N-dimethyltryptamine, ketamine, *Datura stramonium*, psilocybin, LSD, ayahuasca, and mescaline. John reported first having tried cannabis at the age of sixteen and psychedelics at the age of seventeen. Unfortunately, this developed into weekly use and dependency on the stimulant-psychedelic MDMA, which was taken orally and through intranasal inhalation. John further noted having used methamphetamine intranasally from age nineteen to twenty.

John reported benefiting from his use of classic psychedelics (i.e., psilocybin, LSD, mescaline, and DMT), which he used either alone in a safe place or with a small group of friends. Psilocybin, LSD, and mescaline were taken orally, while DMT was inhaled. John stated that before seeking out psychological treatment, he had used these substances several times throughout the year for approximately 1.5 years. He noted that standard doses throughout this period were 500 micrograms of LSD and, while uncertain of the exact dosages, 2.5 grams of psilocybin-containing mushrooms and 0.33 meters of cactus-containing mescaline.

John further noted that during this period of classic psychedelic use, his cravings for stimulant drugs reduced substantially. He further reported that following a difficult, yet insightful experience in which he consumed approximately 3.5 grams of psilocybin-containing mushrooms, he became aware of his substance abuse issues and decided to seek out psychotherapy for the first time. He noted that it was through his use of classic psychedelics that he found a “sparked interest in the pursuit of knowledge” and discovered spirituality “on his own terms.”

Throughout therapy, John reported weekly to monthly use of MDMA until September of 2016, at which point he achieved complete abstinence from all stimulants. Leading up to this point, John reported having used classic psychedelics approximately five times upon commencement of therapy (see Table 1 for more detail). In the month preceding his cessation of MDMA, John had consumed approximately 200 µg of LSD and 100 mg of DMT on two separate occasions, which he reported to have been instrumental in his recovery.

John experienced deep insights about the “emptiness of the stimulant high,” learning that it was not “what [he] was after”; compared with the spiritual and intellectual insights he believed to have achieved from his classic psychedelic experiences, stimulants simply “took everything and [left] nothing.” John further reported that his use of classic psychedelics enabled him to recognize a series of compulsive behavioral patterns that ultimately maintained his misuse of illicit substances. He stated that classic psychedelics assisted him to self-reflect from a neutral place of observation, fostering a deep sense of introspection that ultimately catalyzed behavioral change. Furthermore, largely due to his use of classic psychedelics, John concluded that he had gained what he could from these substances, and now had to apply this to himself and

**Table 1** Timeline outlining history of depression, stimulant use, cannabis use, classic psychedelic use, and psychotherapy

	2009–2014	Dec 2015 to Jun 2016	Jul–Dec 2016	Jan–Jun 2017	Jul–Nov 2017	Dec 2017 to May 2018	Jun–Nov 2018	Dec 2018 to May 2019	Jun 2019 to Sep 2019
Depression	<i>Onset: 2009</i>	Severe at initial assessment; stabilizing by May 2016	Symptoms stabilizing	Symptoms stabilizing	Elevated	Symptoms stabilizing	Symptoms stable	Not assessed	Not assessed
Stimulants	<i>First use: 2010</i>	Continued use	Last use Sep 2016	Abstinent	Abstinent	Abstinent	Abstinent	Abstinent	Abstinent
Cannabis	<i>First use: 2009</i>	Continued daily use	Continued daily use	Continued daily use	Continued daily use; reduced to nightly use Oct 2017	Continued nightly use; reduced to weekly use Jan 2018	Continued weekly use	Continued weekly use	Continued weekly use
Class. Psych.	<i>First use: 2010; continued use of psilocybin; mescaline; DMT; LSD</i>	500 mcg LSD, 500 mcg LSD, 200 mcg and 50 mg DMT	200 mcg LSD + 100 mg DMT; 200 mcg LSD + 100 mg DMT;	Nil	Nil	200 mcg LSD and 50 mg DMT	Nil	200mcg LSD	Nil
Psychotherapy {focused-CBT}	<i>Nil</i>	Start date (Dec 2015)	Ongoing	Ongoing; Matrix Jun 2017	Ongoing	Ongoing	Ongoing	Last session Jan 2019; MEQ-30 Mar 2019	Urine analysis Sep 2019

Area in italics indicates period prior to enrollment in psychotherapy

*Class. Psych.* classic psychedelics, *LSD* lysergic acid diethylamide, *DMT* dimethyltryptamine, *MEQ-30* 30 item revised Mystical Experience Questionnaire, *CBT* cognitive behavioral therapy

“look within for the answers.” He began to appreciate his newfound “ability to heal independently,” in the absence of substances.

John reported that concerning his depression, classic psychedelics provided insight into various mechanisms to aid in managing his symptoms. He noted that when taken with the right intention and in a safe setting, classic psychedelics catalyzed an inward, reflective meditative state, which, when integrated properly, provided him with the ability to achieve a sense of stillness and stability. This was particularly helpful for John, as his depressive symptomology was, in part, maintained by “exaggerated ideas and impossible expectations.” He further reported that his use of these substances aided in allowing him to observe himself from a lens of non-judgment. Thus, John reported that classic psychedelics provided the insights necessary to generate greater cognitive flexibility. Further, John noted that it was largely due to his use of classic psychedelics that he learned to apply a problem-solving approach toward his symptoms of mood disorder and no longer endorsed a “victim-mentality.” John reported transitioning to a period of integration in which he began daily meditation, positive self-affirmations, and engagement in creative pursuits, which ultimately helped to consolidate the skills learned in therapy.

While no longer dependent on stimulant drugs, in June of 2017, John enrolled in the Matrix program, which is an abstinence-based outpatient program for the treatment of stimulant dependence; John completed six of the 20-week program, which involved seven groups per week, including completion of the early recovery skills, after which he ceased attending, as he felt he did not require that intensive level of support going forward. By this period, not only had John ceased using all stimulant drugs but he had successfully reduced his intake of classic psychedelics to once per year.

Two months after his final therapy session, John completed a thirty-item revised Mystical Experience Questionnaire (MEQ-30; Maclean et al. 2012), wherein he was asked to reflect on his past experiences with classic psychedelic substances (see Table 2 for results). The MEQ-30 is a reliable and valid measure of the quantitative data gathered from subjects regarding their apparent mystical experiences and is comprised of the four primary factors of complete mystical experience: mystical, positive mood, transcendence of space and time, and ineffability (Barrett et al. 2015). The following two items were added to the original measure: (1) You specified in the Matrix initial assessment that you have tried a psychedelic in your lifetime. Please specify the type of psychedelic used. (2) Have you used this/these substance(s) within the past 3 months of your Matrix initial assessment? We also updated the instructions to read: Looking back on your experiences with classic psychedelics (e.g., magic mushrooms, LSD, mescaline {i.e., Peyote, San Pedro and/or Peruvian Torch cactus}, DMT, Ayahuasca), please rate the degree to which at any time during that (those) trips(s) you experienced the following phenomena. Answer each question according to your feelings, thoughts, and experiences at the time of the session.

**Table 2** Raw scores for the four factors that comprise the 30-item revised Mystical Experience Questionnaire (MEQ-30)

Scales	Raw score
Mystical <sup>a</sup>	65
Positive mood <sup>a</sup>	25
Transcendence of time and space <sup>a</sup>	22
Ineffability <sup>a</sup>	14
MEQ-30 total score	126

<sup>a</sup> MEQ-30 factors that were  $\geq 60\%$  of the maximum possible score

John completed this measure 3 months following his most recent use of LSD, scoring greater than or equal to 60% of the maximum score on each subscale, indicating a complete mystical experience (Barrett et al. 2015).

John reported that while the benefits far outweighed the risks, he noticed that after frequent use of classic psychedelics, it was difficult for him to relate to other people. He disclosed that classic psychedelics shifted his value system, such that he lost interest in the competitive nature of a capitalistic society; this ultimately led to a strong sense of disillusionment. John further noted that while this had not caused him significant distress nor impaired his function, his use of these substances altered his perception around bright lights, which he described as having more texture. This perceptual distortion continued even after ceasing his use of classic psychedelics for long periods.

A telephone call follow-up in September 2019 was made, and John reported being abstinent from all stimulant drugs for approximately 2.5 years. To confirm this, John returned to the clinic for a toxicological urine analysis, in which he tested negative for stimulants. John also reported having remained consistent in cutting back his use of classic psychedelics to once per year. While he expressed a willingness to reduce his intake, John did, however, continue to report weekly cannabis use, which was consistent with the toxicological findings. See Table 1 for more information about the timeline for depression, drug use, and psychotherapy.

## Discussion

Nascent findings supporting the use of classic psychedelics in the treatment of mental illness and substance use disorder have gained international attention over recent years. Despite the growing body of evidence supporting the efficacy of psychedelic-assisted psychotherapy for the treatment of substance use disorder, to date, no published research has explored their use in the treatment of stimulant use disorder with or without a dual diagnosis in a controlled, clinical setting. Preliminary evidence suggests that mystical experiences while under the influence of classic psychedelics predict treatment response. Thus, while neuroimaging is beginning to capture the neurobiological mechanism of action of these substances and so explain the neurophysiology of the psychedelic state, psycho-spiritual factors might play an important role in explaining the psychological factors behind the therapeutic outcome of that state.

This case report points to the benefit of investigating more rigorously the use of classic psychedelic-assisted psychotherapy in the management of stimulant use disorder with or without a dual diagnosis. This is the first case report involving the potential therapeutic benefits of classic psychedelics in assisting with the treatment of stimulant use disorder and depression. While it is difficult to disentangle the treatment effects from the effects of the classic psychedelics consumed, it is clear that from John's perspective his subjective experience with these substances had a significant positive impact on his mood, the cessation of stimulant drugs, and the application of a harm reduction approach toward his use of psychoactive substances generally.

Using the approach outlined by Barrett et al. (2015), the patient appeared to meet criteria for a full mystical experience, which might help to explain the perceived subjective benefits of his usage. It is important to highlight, however, that the MEQ-30 was originally designed to capture a specific psychedelic experience at a single point in time, therefore, we cannot conclude with certainty whether John had a full mystical experience. For the purpose of this research, the instructions were modified to capture John's experience with his use of psychedelics across time, which was retrospective and increased the risk of bias. Similar cases might



learn from this report to administer the MEQ-30 close to the most recent episode of psychedelic use, to minimize bias and more accurately capture a full mystical experience and its relevance to psychotherapeutic outcomes. Future research might also consider having participants fill out the MEQ-30 in reference to what they consider their single most personally meaningful or spiritually significant experience to be, as endorsement of these descriptors correlates with ratings of a complete mystical experience (Griffiths et al. 2008). Furthermore, to better capture the impact of psychedelic use on substance dependence and to track the severity of dependence across time, it would also be prudent to administer measures such as the Severity of Dependence Scale (Gossop et al. 1995) as close as possible following recent episodes of classic psychedelic use. Other limitations of this case report included limited generalizability and the inability to control for a placebo effect.

It is also important to note that while John credited his success to his use of classic psychedelics, his continued use of cannabis might have influenced his recovery. A study published in 1999 found stimulant-dependent individuals to report that their use of cannabis to mitigate withdrawal symptoms helped to regulate cravings and drug-dependent behaviors, with a 68% abstinence rate (Labigalini et al., 1999). These findings are supported by a 2013 review, which concluded that the endocannabinoid system plays a key role in modulating susceptibility to stimulant dependence and relapse (Olière et al., 2013).

Furthermore, it is important to highlight that there is increasing evidence that when used in conjunction with psychotherapy, the stimulant-psychedelic MDMA is efficacious in guiding the treatment for post-traumatic stress disorder (Amoroso and Workman 2016; Morgan 2020). Additionally, there is preliminary evidence for the use of MDMA-assisted psychotherapy in populations with autism spectrum disorder who experience social anxiety (Danforth et al. 2018).

It is also important to emphasize the risks of classic psychedelics when used recreationally and outside the context of therapist-supervised psychedelic therapy, which is a highly structured process involving ongoing follow-up and aftercare. In the recreational context, individuals are at higher risk of psychological distress and worsening of mental health issues (Hendricks et al. 2015). Consequently, it is possible that John's difficulty adjusting to mainstream culture could be due to having used these substances outside the context of therapy, which may have otherwise provided him with adequate support needed for integration back into society. Moreover, John also frequently used high doses over an extended period of time, which might have increased his risk of the minor, ongoing visual-perceptual disturbance he described.

In summary, the results of this case report and previous substance abuse research highlight the potential benefit of exploring the use of classic psychedelic-assisted psychotherapy in the treatment of stimulant use disorder with or without a co-occurring axis I disorder in a controlled, clinical environment. The psycho-spiritual and neurophysiological effects unique to classic psychedelics render them a useful therapeutic aid warranting further investigation.

**Author's Contribution** All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Dr. Shevaugn Johnson and Dr. Quentin Couper Black. The first draft of the manuscript was written by Shevaugn Johnson, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript. Data Availability Data supporting the findings of this case report are openly accessible in figshare at (doi:<https://doi.org/10.6084/m9.figshare.11345024>; dataset, Johnson and Black 2020).

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.



**Ethics Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by an internal ethics committee (Wellbeing and Recovery Research Institute LTD).

**Consent to Participate** Written, informed consent was obtained from the participant for being included in the study.

**Consent to Publish** The participant has consented to the submission of the case report to the journal.

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