The Psychedelic Renaissance and Its Forensic Implications

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Recent years have seen a renaissance of research into the use of psychedelic compounds to address various psychiatric conditions. The study of these substances went dormant in 1970 when the United States government passed the Controlled Substances Act, which categorized lysergic acid diethylamide, commonly known as LSD or acid, as a Schedule I drug. The rise of psychedelics in research settings raises questions regarding their risks outside of clinical trials. The available data on the impact of psychedelic use on interpersonal violence and other criminal behavior remain scant. Although Timothy Leary's work of the 1960s failed to clearly demonstrate a reduction in criminal recidivism with psychedelic-assisted psychotherapy, recent studies suggest that the use of psychedelics may reduce individuals' risk of interpersonal violence. Forensic psychiatrists should be aware of this research, as well as the role that psychedelics may play in various forensic assessments. This article summarizes basic information that the forensic practitioner should know about psychedelic substances, including their various effects and proposed mechanism of action; describes historical and recent research into psychedelics and criminal behavior; and offers evaluators a practical means by which to assess individuals' psychedelic use in forensic contexts.

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Psychiatrist Humphry Osmond first introduced the term "psychedelic" to the scientific community when he spoke of his research on the compound lysergic acid diethylamide (LSD) at a 1957 meeting of the New York Academy of Sciences.[1] Osmond had been studying the effects of LSD on patients with various psychiatric maladies since 1952 as the deputy director of psychiatry at the Saskatchewan Mental Hospital. He found that LSD fundamentally altered patients' cognition: it could disrupt logical thought, distort perception of reality, and alter consciousness. He purposefully selected the term psychedelic, derived from the Greek *psyche* (i.e., the mind or soul) and *delos* (i.e., to show). Psychedelic referred to the "mind-manifesting" capabilities of LSD and similar compounds. Osmond famously stated, regarding his newly defined substance category, "To fathom Hell or soar angelic/Just take a pinch of psychedelic" (Ref. 2, p 713).

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Various investigators studied the therapeutic potential of LSD and other psychedelic compounds until the 1960s. At that time, individual states began to ban the production and distribution of LSD. The federal government's categorization of LSD as a Schedule I substance under the Controlled Substances Act of 1970 caused clinical research on psychedelics to come to a standstill.[3] Like cannabinoids, methylenedioxymethamphetamine (MDMA), ketamine, and other psychoactive substances, however, psychedelics are once again seeing their day in clinical research trials for conditions ranging from addiction to anxiety related to terminal illness.[4] Mainstream journalist Michael Pollan's latest book, *How to Change Your Mind*, has shined a public spotlight on this class of chemicals' effects and therapeutic potential.[5] In May 2019 Denver become the first jurisdiction of the United States to decriminalize mushrooms containing psilocybin.[6] There has been a comparative silence regarding the forensic implications of the psychedelic renaissance. Questions regarding psychedelic use and interpersonal violence and other forms of criminal behavior remain largely unanswered, though new research is beginning to provide some evidence to better elucidate the rela-

Table 1 Names and Sources of Common Classic Psychedelics

Chemical Name	Common or Slang Name	Natural Sources
5-Methoxy-*N,N*-dimethyltryptamine	5-MeO-DMT, the toad	Yopo tree (*Anadenanthera peregrina*) seeds, skin exudate from the Sonoran desert toad (*Bufo alvarius*)
Lysergic acid diethylamide	LSD, acid	Synthetically derived from ergot fungus (*Claviceps purpurea*)
N,N-dimethyltryptamine	DMT, the spirit molecule	Chacruna shrub (*Psychotria viridis*) and other plant species
Mescaline	Peyote	Peyote cactus (*Lophophora williamsii*), San Pedro cactus (*Echinopsis pachanoii*), Peruvian torch cactus (*Echinopsis peruviana*)
Psilocybin	Mushrooms, magic mushrooms, shrooms	*Psilocybe* mushroom species

From Reference 7.

tionship. With increasing public interest in psychedelics, forensic psychiatrists may be increasingly likely to encounter subjects with a history of use and will require a framework to assess the use of this unique category of compounds. This article summarizes basic information regarding psychedelics that forensic psychiatrists should know; describes and assesses available research regarding the relationship between psychedelics, criminal behavior, and interpersonal violence; and delineates practical recommendations for forensic evaluators examining individuals with a history of psychedelic use.

A Psychedelic Primer

Psychedelics are a unique category of psychoactive substances. Though some psychedelics like LSD are synthesized exclusively in the laboratory, others can be derived from natural sources, including plants, fungi, and the secretions of animals. Table 1 summarizes the chemical name, common names, and natural sources of some of the most well-characterized psychedelic substances. Classic psychedelic compounds exert their effects through agonism of the 5-HT2A receptor in pyramidal neurons.[7] Neurophysiologic effects include alteration of cerebral blood flow and metabolism, increased connectivity between brain regions that typically do not communicate, and decreased activation of and communication between nodes of the default mode network, a neural system thought to play a role in introspection.[8] Psychedelic effects are varied and include altered somatosensory, visual, auditory, and proprioceptive perception; synesthesia; derealization; and depersonalization.[9] The effects of psychedelics are not clearly dose-dependent, but higher doses may be associated with qualitatively different phenomena resulting from completely altered consciousness. Users may lose awareness of their environment and their perception of time and space. Some users report mystical or transcendent experiences, such as being one with the universe, reliving memories, encountering otherworldly or god-like beings, or facing one's own death.[9]

Other types of psychoactive substances may be grouped with the classic psychedelics depending on the context or due to overlapping effects. For example, empathogens or entactogens are chemicals that produce euphoria and a sense of emotional connectedness and openness to others. Examples include MDMA (also known as ecstasy) and 4-methyl methcathinone (also known as mephedrone or "bath salts"). These compounds primarily work via monoamine reuptake inhibition and release.[10] Another notable difference between the classic psychedelics and empathogens is that psychedelic substances do not generate symptoms commonly associated with drug dependence, such as withdrawal or craving, whereas empathogens may.[11,12] Ketamine and phencyclidine (PCP) are also compounds with which psychedelics may be grouped, though they exert their dissociative effects via inhibition of the *N*-methyl-D-aspartate glutamate receptor. Effects of ketamine and PCP may include feelings of euphoria, sedation, hallucinations, and distortion of time and space.[13] Similar to psychedelics, researchers are identifying an increasing number of psychotherapeutic uses of both MDMA and ketamine.

DSM-5 and Psychedelics

The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5),[14] does not utilize

the term "psychedelic," instead putting psychedelics and MDMA in the category of other hallucinogens. Use of the term "hallucinogen" has largely fallen out of favor among modern researchers when describing psychedelics because the compounds typically do not cause users to experience frank hallucinations, and the characterization fails to capture the range of other effects that psychedelics can have on an individual's consciousness.[15] The DSM-5 also provides for diagnoses of other hallucinogen intoxication, other hallucinogen intoxication delirium, hallucinogen persisting perception disorder (HPPD), as well as other hallucinogen-induced psychotic disorder, bipolar disorder, depressive disorder, and anxiety disorder. The criteria for other hallucinogen disorder lack a withdrawal criterion. The text notes that a "withdrawal syndrome . . . has not been consistently documented in humans" (Ref. 14, p 525). Forensic evaluators should note that the literature has not described psychedelic-related cravings or compulsive psychedelic use, either. In fact, classic psychedelic compounds have shown promise in the treatment of substance use disorders of physiologically addictive drugs like nicotine, alcohol, and opiates.[16,17] When making a diagnosis of psychedelic use disorder, then, one will likely have to rely more on behavior-based criteria, such as failure to fulfill major role obligations because of use or social or interpersonal problems related to use.

The DSM-5 diagnosis of HPPD, colloquially referred to as flashbacks, describes the reexperiencing of perceptual symptoms like "geometric hallucinations, false perceptions of movement in the peripheral visual fields, flashes of color, intensified colors, trails of images of moving objects, positive afterimages, halos around objects, macropsia and micropsia" (Ref. 14, p 531) after cessation of use of the substance. DSM-5 notes a 4.2 percent prevalence estimate of this disorder in individuals who use hallucinogens, but epidemiologic data are scarce. HPPD is thought to occur less frequently when LSD is administered in a therapeutic or research setting, as opposed to recreational settings. Regardless, HPPD is rare considering the frequency of recreational psychedelic use.[8,18]

Criminal Behavior and Violence

With the revival of interest in the therapeutic potential of LSD, psilocybin, and other compounds, it is increasingly important to understand the forensic implications of their use. Of concern is the relationship between psychedelic use and violence and other criminal behavior. The literature examining the relationship between psychedelics and violence largely consists of case reports, though there are an increasing number of epidemiological survey studies examining this relationship. I conducted a search of PubMed and PsychINFO databases to identify published articles on psychedelic use and violence. A PubMed search of [psychedelics, hallucinogens, lysergic acid diethylamide, or psilocybin] and [violence, homicide, or murder] yielded 136 results. A PsychINFO search of similar terms yielded 20 results. I reviewed the abstracts, selected articles that addressed the relationship between psychedelic use and violence, and identified additional references in the articles' bibliographies. Articles pertaining to empathogens like MDMA and dissociative anesthetics like ketamine and PCP were excluded.

Case Reports

Of the articles obtained from the PubMed and PsychINFO searches and a review of their references, there were 11 case reports that described a link between psychedelic use and violence. Table 2 summarizes them. In eight of the cases, the subject who used psychedelic substances committed homicide. The other three were a man threatening his wife with a gun, a man breaking into a home and attempting rape, and a man who was thought to be involved in an attempted homicide. Ten of the 11 cases involved LSD, and the remaining case involved the synthetic tryptamine compounds 5-MeO-DIPT and 5-MeO-MIPT. Other substances, including alcohol and cannabis, were implicated in three of the cases, though it is possible that the subjects used other substances in six of the other cases. All subjects except one were male.

Nine of the 11 case reports of psychedelic-related violence were published in the 1960s and 1970s. At the time, there were frequent stories in the media about "good kids turned bad" (Ref. 1, p 386) by LSD, fueling a moral panic surrounding the substance and its role in the counterculture movement. It may be possible that the medical establishment responded similarly, publishing case reports dramatizing concerns related to LSD and its purported role in various violent happenings. Otherwise, one would expect the continued publication of media and medical reports linking psychedelics to violent behavior.

Table 2 Case Reports of Psychedelic Use and Violence

Year of Case[a]	Psychedelic Substance Involved	Other Substances Involved	Subject	Description of Case
1962[19]	LSD	Unknown	A 25-year-old woman with a history of multiple prior inpatient psychiatric hospitalizations for emotional problems and prior diagnoses of psychopathic personality and alcohol addiction	A woman with prior homicidal thoughts toward her victim was admitted to an inpatient psychiatric hospital for four months and received four treatments of 50 μg LSD. She stabbed a young man to death 90 minutes after release from the hospital on the third day following her last LSD treatment.
1963[20]	LSD	Unknown	A male psychologist	A man took three doses of LSD and, at an unknown time thereafter, developed grandiose beliefs and threatened his wife with a gun.
1966[21]	LSD	Unknown	A 32-year-old former medical student with a history of prior LSD and other hallucinogenic substance use	A man with marital difficulties consumed a sugar cube containing LSD, went to his mother-in-law's house, and stabbed her to death. He reported amnesia for the event. He received a diagnosis of paranoid schizophrenia and was found not guilty by reason of insanity.
1969[21]	LSD	Alcohol	A 24-year-old man with a history of aggravated assault and alcohol abuse	A man consumed alcohol and LSD. Approximately six hours after consuming LSD, he had an argument with someone and shot him. He was found guilty of first-degree murder.
1969[22]	LSD	Unknown	A 37-year-old English man	A man murdered an 18-year-old woman by blunt force trauma to the head and asphyxiation with a bed sheet in the context of an LSD trip when he thought he was descending to the center of the planet and being attacked by snakes. He was found guilty of manslaughter.
1970[23]	LSD	Possibly alcohol	A 19-year-old man	A man was acquitted of breaking and entering and attempted rape due to temporary insanity induced by consuming a drink containing LSD. No further details relating the timing of the LSD consumption and the alleged events were available.
1972[24]	LSD	Unknown	A 22-year-old man with a history of cannabis, amphetamine, and LSD use and depression	A man took LSD from a hitchhiker and developed fears that she intended to destroy his mind. He traveled from California to Massachusetts, then over the course of eight days to London, Paris, Athens, and Tel Aviv, where he stabbed a man with a knife because he feared the man was a Nazi bragging about killing Jews. He was found unfit to stand trial and deported back to the United States.
1973[25]	LSD	Cannabis, alcohol	A 22-year-old man with a history of chronic cannabis, LSD, and methamphetamine use, who reported previously taking LSD more than 100 times without a negative experience	A man met with his ex-girlfriend at her dormitory and stabbed her with a knife after smoking a marijuana cigarette, taking two LSD tablets of unknown doses, and drinking a glass of beer earlier in the day. He was briefly admitted to an inpatient psychiatric unit and discharged with diagnoses of "drug dependence" and "unspecified personality disorder." Three days after discharge, he shot and killed another girlfriend, reporting that he had smoked marijuana and taken an unknown amount of LSD two days before the murder. He was found "unfit to stand trial for reasons of insanity" and sent to a state hospital.
1973[26]	LSD	Alcohol	A man with a history of LSD use	A man stabbed a coworker to death after drinking alcohol and becoming "psychotic," which the author inferred was due to an LSD-related flashback.
2005[27]	LSD	None	A 26-year-old man	A man suspected of involvement in an attempted homicide tested positive for LSD. No details regarding the subject or related events were provided.
2006[28]	5-MeO-DIPT, 5-MeO-MIPT	None	A 22-year-old man with a history of mushroom and cannabis use and no prior negative experiences	A man purchased three designer drugs from the internet. He took "Wild Game" and "Mipty" and developed persecutory fears. He killed his girlfriend with a kitchen knife. Police found him in a suburban neighborhood naked and confused. He subsequently reported amnesia for the event.

[a] If the year of the case is unknown, then the year of publication is provided.
LSD, lysergic acid diethylamide.

The available case reports remind the forensic evaluator involved in such cases to identify concomitant additional substance use, symptoms of mental illness, and rational alternative motives that may contribute to or better account for violent behavior.

Empirical Studies

To date there has been limited empirical research on the effect of psychedelic use on criminal and violent behavior. In the early 1960s, Timothy Leary and his team of researchers with the Harvard Psilocybin Project conducted the Concord Prison Experiment to assess the effect of psilocybin-assisted psychotherapy on criminal recidivism.[29] Thirty-two subjects incarcerated at the Massachusetts Correctional Institute at Concord participated in group therapy sessions occurring twice weekly over a span of six weeks in addition to two administrations of psilocybin. Notably, the researchers took part in the psilocybin experience with subjects. In different publications, Leary reported 27 percent[29] and 32 percent[30,31] rates of 10-month postrelease recidivism for 28 of his experimental subjects and compared them to the expected 56 percent recidivism base rate for prisoners at the facility.[32] He also found that 7 percent of experimental subjects were reincarcerated for a new crime (as opposed to a parole violation), which was compared with an expected 30 percent.[33]

Rick Doblin published a 34-year follow-up study reanalyzing recidivism data for 21 of Leary's experimental subjects.[34] He found that Leary's use of recidivism base rates was flawed and that the actual expected recidivism rate for prisoners at 10 months postrelease was 34 percent, notably closer to the experimental group's recidivism rate. In addition, he noted that Leary counted all subjects re-entering the prison for any parole violation (even if they were subsequently convicted of a new crime) as parole violators, which meant that the percentage of subjects returning to prison for parole violations as opposed to new crimes was not significant. Leary's colleague Ralph Metzner, who was a graduate student at the time, acknowledged the errors and attributed them to a halo effect surrounding the research team's optimistic views of the potential impact of psilocybin on society.[35]

Around the same time as the Concord Prison Experiment, Dutch psychiatrist Arendsen Hein began to use LSD to aid criminal recidivists thought to be psychopaths to reduce their risk of further criminal behavior. He reported that, two years following treatment, 12 of his subjects were clinically improved and two were much improved.[36,37] Data on the criminal recidivism of his subjects treated with LSD are unavailable. A third attempt to research the effects of psychedelics on forensic subjects occurred at Atascadero State Hospital in California, where 10 treatment-resistant sexual offenders underwent LSD-assisted group psychotherapy sessions. Nine subjects were noted to develop improvements in empathy, insight, communication, and treatment engagement.[38] Recidivism data on these subjects are not available.

These early studies failed to demonstrate a clear effect of psychedelic use on criminal recidivism or violent behavior. Many of these studies were limited by small sample sizes and researchers' expectation bias regarding the effect of psilocybin and LSD on subjects. Recent studies utilizing larger sample sizes and epidemiologic data may prove to be more fruitful in clarifying the relationship between psychedelic use, violence, and other criminal behavior. A recent survey of 684 adolescents aged 18 to 22 in southeast Texas found that self-reported past-year hallucinogen use was associated with an increased likelihood of carrying a firearm with an odds ratio of 2.81 (95% CI 1.00–7.81).[39] Notably, the survey given to participants listed both LSD and PCP as examples of hallucinogens, so it is unclear if past-year psychedelic use is specifically associated with adolescent firearm carrying. In 2008, Feingold and colleagues[40] evaluated 150 men from a longitudinally studied population of youth at risk for delinquency to assess the relationship between substance use problems and intimate partner violence. They found that a history of a "drug problem" with hallucinogens, defined as meeting one of the seven DSM-IV-TR[41] substance dependence criteria, was significantly associated with intimate partner violence. The authors did not define what substances were considered hallucinogens, however, so it is unclear if the findings relate specifically to psychedelic substances or other categories of drugs like dissociative anesthetics and empathogens.

Other research has supported the notion that psychedelics may reduce individuals' risk of criminal recidivism and violent behavior. In 2014, Hendricks and colleagues[42] assessed the relationship between hallucinogen use and recidivism in more than 25,000 individuals on community supervision in the

southeastern United States. The authors utilized a DSM-IV[43] diagnosis of hallucinogen abuse or dependence as a marker of naturalistic hallucinogen use and defined supervision failure as noncompliance with a case management intervention program, noncompliance with the legal system, failure to appear in court, incarceration, or death. The authors reported that a diagnosis of a hallucinogen use disorder reduced the probability of supervision failure with an odds ratio of 0.60 (95% CI 0.45–0.79), in stark contrast to diagnoses of any cannabis use disorder, cocaine use disorder, alcohol use disorder, opiate use disorder, or amphetamine use disorder, which all significantly increased the likelihood of supervision failure. This study, similar to those mentioned previously, failed to separate psychedelics from other compounds in the hallucinogen category, which makes it unclear what substances may have an impact on supervision failure and a potential therapeutic application.

In 2016 Walsh and colleagues[44] prospectively evaluated the effect of hallucinogen use on intimate partner violence in 302 inmates in an Illinois county jail. Subjects were assessed for a history of lifetime hallucinogen use, lifetime DSM-IV hallucinogen use disorder (abuse or dependence), and arrest for an offense related to intimate partner violence. More than half of the subjects (55.6%, $n = 168$) had lifetime hallucinogen use, of whom 86.9 percent ($n = 146$) indicated they had used classic psychedelics and 44.5 percent ($n = 65$) other hallucinogens like MDMA, PCP, and ketamine. Only 22 subjects met criteria for a lifetime hallucinogen use disorder. One third of subjects ($n = 101$) were arrested for intimate partner violence. Utilizing Cox regression analysis, the authors found that lifetime hallucinogen use significantly reduced the risk of arrest for intimate partner violence ($\beta = -.48$, $P = .04$). A lifetime hallucinogen disorder diagnosis demonstrated weaker predictive value but trended in the same direction. In an effort to identify a potential mechanism to explain these results, Thiessen and colleagues[45] surveyed 1,266 community members about substance use, emotion regulation, and intimate partner violence. In a logistic regression analysis, the authors found that lifetime psychedelic use was inversely related to past-year intimate partner violence ($\beta = -1.20$, odds ratio = 0.14, 95% CI 0.30–0.62). In addition, subjects reporting a history of psychedelic use had fewer difficulties with emotion regulation, and emotion regulation mediated the relationship between intimate partner violence and psychedelic use. Taken together, these studies' results indicate that psychedelic use may be related to a reduced likelihood of intimate partner violence. It remains unclear, however, if the emotion regulation identified by Thiessen and colleagues was present in psychedelic users before they ever used psychedelics or in some way resulted from the substance use.

In more recent work, Hendricks and colleagues[46] published the most extensive study on the relationship between psychedelic use and criminal behavior to date. Utilizing data collected from the National Survey on Drug Use and Health from 2002 to 2014, the authors assessed self-reported lifetime psychedelic use and past-year criminal behavior. Lifetime psychedelic use included any prior use of ayahuasca, DMT, LSD, mescaline, peyote or San Pedro cactus, or psilocybin mushrooms. They compared psychedelic users and nonusers on the basis of six different criminal outcomes: past-year drug distribution; past-year larceny/theft; past-year assault; past-year arrest for a drug-related crime; past-year arrest for a property crime; and past-year arrest for a violent crime.

Of approximately 225 million subjects, 13.6 percent ($n = 30{,}711{,}342$) reported a lifetime history of psychedelic use. After adjusting for potentially confounding variables, the authors found that lifetime psychedelic use was associated with a 47 to 68 percent increased odds of past-year drug distribution, a 27 percent decreased odds of past-year larceny/theft, and a 12 percent decreased odds of past-year assault. Notably, other lifetime illicit substance use was associated with an increased odds of past-year larceny/theft (except for PCP and sedative use, which were unrelated) and past-year assault (except for cocaine, other stimulant, and heroin use, which were unrelated). Lifetime psychedelic use was associated with a 22 percent decreased odds of past-year arrest for a property crime and an 18 percent decreased odds of past-year arrest for a violent crime; it was not associated with past-year arrest for a drug-related crime. Lifetime use of other illicit substances was either associated with an increased risk of these three types of arrest or not associated with the type of arrest. The authors posited that psychedelics may have a role in preventing criminal behavior. Regarding the increased odds of past-year drug distribution for lifetime psychedelic users, the authors noted that they did not have data on which substances were distrib-

uted and suggested that psychedelic users may be distributing psychedelics to others with prosocial intentions. That lifetime psychedelic use was associated with reduced odds of all other criminal outcomes suggests that the criminalization of psychedelics might do more harm than good by generating increased black-market distribution without a reduction in violent or otherwise antisocial crime.

Though Timothy Leary's research failed to identify a link between psychedelic use and a reduction in criminal recidivism, more recent studies support his hypothesis that psychedelic use may reduce an individual's risk for engaging in violence and other antisocial behavior. More research is needed to elucidate the direction and temporal relationship between psychedelic use and violence and other criminal behavior. Perhaps individuals who use psychedelics tend to be less violent or antisocial prior to their initiation of psychedelics, confounding the relationship between psychedelic use and criminal outcomes. Randomized controlled trials of defined doses of psychedelic substances in forensic and nonforensic samples could serve to clarify the impact of psychedelic compounds on criminal behavior. Given ethics-related restrictions on experimentation in correctional and other forensic populations, however, there is unlikely to be a revival of research involving psychedelic use in incarcerated individuals at this time.

Another limitation of this body of research is the failure of some researchers to separate psychedelic compounds from other substances frequently grouped together under the category of hallucinogens, including dissociative anesthetics (e.g., PCP and ketamine) and empathogens (e.g., MDMA).[39,40,42,44] The failure to distinguish between these compounds clouds the authors' findings. PCP, for example, has been more clearly linked to violent behavior.[47] Future research should focus on specific compounds to clarify their relationship to criminal outcomes given these substances' disparate pharmacodynamic activity and behavioral effects.

If psychedelic use indeed reduces an individual's risk for violent and other criminal behavior, it remains unclear by what mechanism this occurs. There is some preliminary evidence indicating that psychedelic use conducted in controlled settings may induce changes in personality traits of openness and self-transcendence. Self-transcendence relates to the expansion of one's personal boundaries, such as considering oneself part of a greater whole.[48] Carhart-Harris and colleagues[49] recently highlighted this phenomenon, defined as "connectedness," and emphasized its role in the therapeutic benefits occasioned by psychedelic use. They hypothesize that psychedelics improve one's sense of connectedness to self, to others, and to nature or the universe, though it remains unclear which specific element of the psychedelic state (ego dissolution, mystical experience, awe, or something else) stimulates a user's sense of connectedness. Perhaps connectedness to others induced by psychedelics reduces users' risk for engaging in violent or otherwise antisocial behavior, though further research is needed to test this hypothesis.

Forensic Evaluation of Psychedelic Users

An individual's history of psychedelic use may arise in any number of forensic assessments. Forensic psychiatrists may be more likely to encounter individuals with a history of psychedelic use soon if more jurisdictions decriminalize psychedelic substances or if psychedelics become available as prescription medications. It is therefore critical for the forensic psychiatrist to understand basic evaluative principles pertaining to psychedelic use and their application in different forensic contexts.

Evaluating Psychedelic Use

The forensic evaluation of psychedelic use should account for the unique characteristics of this category of substances. Table 3 summarizes relevant elements of the psychedelic interview that an examiner should assess. A practical and relevant concept to consider, first defined by Timothy Leary in the 1960s,[48] is "set and setting." Set refers to an individual's mindset and includes his or her history of psychedelic use and any prior negative experiences, the expectations that the individual has about the substance and its effects, and the meaning he or she ascribes to using psychedelics. Setting defines the environmental factors pertaining to psychedelic use and includes the physical location, presence of sensory stimuli, and the availability of others to assist with the experience. Though difficult to study empirically because it would be unethical to purposefully induce a negative psychedelic experience in a research subject, set and setting are thought to play a tremendous role in shaping a person's response to psychedelic substances.[51,52]

Set and setting can help a forensic psychiatrist understand the role that psychedelic use plays in an individual's life, identify potential risks that may arise from psychedelic use, and clarify the relation-

Table 3 Essential Elements of the Psychedelic History Interview

Name of Element	Ask About
Psychedelic substance use patterns	First use of psychedelic substance(s) Different psychedelic substances used (e.g., LSD, psilocybin, ayahuasca, mescaline, DMT, etc.) Frequency of psychedelic use Dose(s) of psychedelic substances used Experiences during psychedelic intoxication
"Set" elements	Intentions or goals of psychedelic use Meaning ascribed to psychedelic use Relevant personality traits (e.g., openness, self-transcendence, impulsivity, irresponsibility) Knowledge of psychedelics, including therapeutic uses History of hallucinogen persisting perceptual disorder
"Setting" elements	Location(s) of psychedelic experiences (e.g., private versus public) Use of perceptual cues during psychedelic experiences (e.g., music, visual imagery, tactile stimuli) Concomitant substance use Presence of other individuals for guidance or emotional support during psychedelic experience History of using psychedelics in the setting of concomitant obligations
Problematic use	Using psychedelics more than intended or over a longer period than intended Excessive time spent obtaining or using psychedelics or recovering from use Using psychedelics despite failure to fulfill major role obligations Using psychedelics despite persistent or recurrent social or interpersonal problems related to use Giving up social, occupational, or recreational activities to use psychedelics Recurrent psychedelic use in hazardous situations
Other elements to consider	Problematic use of other substances History of legal problems related to psychedelic use or distribution History of antisocial or criminal behavior

DMT, 5-methoxy-*N,N*-dimethyltryptamine; LSD, lysergic acid diethylamide.

ship between an individual's psychedelic use and the relevant legal matter. In their discussion of the forensic evaluation of LSD users accused of crime, Barter and Reite[21] identified five criteria that they found useful when reviewing an individual's psychedelic history, two of which specifically relate to an individual's set. First, they noted that an individual's prior drug experiences can have an impact on the effect of the drug. Inexperienced users may develop fear and anxiety during intoxication and engage in purposeful behavior that is atypical for them, increasing the risk of violent or otherwise criminal behavior. Second, they reported that an individual's prior emotional stability can affect one's psychedelic experience, suggesting that individuals with preexisting emotional disturbance may be at higher risk for an adverse outcome. In addition to these elements, one should assess an individual's intentions pertaining to psychedelic use. Individuals may use psychedelics with or without a therapeutic intention or consideration of the potential negative consequences of intoxication. Ignoring the risks that the substances pose suggests impulsive use and may increase the possibility of a negative outcome.

In addition to factors relating to an individual's set, there are some setting variables that may be relevant when assessing a psychedelic user accused of a crime. Barter and Reite[21] identified two relevant setting variables, including the dosage of the substance and the concomitant use of other drugs. Though the effects of psychedelics are less clearly dose-dependent, higher doses can result in qualitatively different experiences associated with greater distortion of logic and altered consciousness.[9] The simultaneous intoxication with other substances may have unpredictable effects on the psychedelic experience. Additional setting variables to explore include the location of use and the availability of others to assist if the individual has a negative reaction to the psychedelic. An individual's failure to attend to the setting of psychedelic use (e.g., using in public or highly stimulating environments) may suggest impulsive use and increase an individual's risk for engaging in dangerous behavior.

Competency to Stand Trial Evaluations

Psychedelic use is unlikely to have an impact on an individual's competency to stand trial unless the per-

son is acutely intoxicated. Psychedelics typically do not have persistent effects apart from rare cases of HPPD. HPPD is unlikely to affect an individual's ability to understand the legal process or to work with an attorney because its symptoms are limited to the perceptual abnormalities associated with psychedelic use, as opposed to the disruption of logic and consciousness that may result from acute intoxication. The potential impact of psychedelic use on preexisting psychotic and bipolar disorders is unclear. If symptoms of psychosis or mania are present and interfering with an individual's competency, then the condition may most appropriately be diagnosed as a primary psychotic or mood disorder.

Criminal Responsibility Evaluations

Psychedelic consumption could play a role in the assessment of criminal responsibility. As noted in Table 2, cases have been reported in the medical literature of individuals who have committed crimes and attempted to plead not guilty by reason of insanity based on LSD intoxication. In one case, a man was acquitted of breaking and entering and attempted rape based on temporary insanity induced by consuming a drink laced with LSD.[23] In another case, a man with a history of polysubstance use was found not guilty by reason of insanity for killing an ex-girlfriend two days after consuming LSD and marijuana.[24] One highly publicized case involved a former medical student who consumed LSD and stabbed his mother-in-law to death. The man ultimately received a diagnosis of schizophrenia and was found not guilty by reason of insanity.[21] The medical literature has not reported further cases of psychedelic-related findings of insanity since the 1960s.

When evaluating an individual accused of committing a crime under the influence of a psychedelic, a critical variable to assess is the time course from ingestion to the alleged incident. Barter and Reite[21] identified this relationship as the final useful criteria in the forensic assessment of LSD users accused of committing a crime. They noted that the acute effects of LSD intoxication rarely persist beyond eight hours, so individuals are likely to be responsible for their behavior outside of that window. It is therefore necessary for the forensic examiner to understand the duration of the acute effects of different psychedelic compounds to better understand an individual's purported behavior after consumption. Regardless, a defendant who voluntarily consumes psychedelics and engages in criminal behavior is unlikely to be found not guilty by reason of insanity or otherwise absolved of criminal responsibility.[53] Despite this, some have argued that the unpredictable effects of LSD intoxication may be more similar to psychosis or delirium than drug intoxication "as usually considered in legal precedent" (Ref. 21, p 537).

Given the substantial alteration of perception, thought process, and consciousness that psychedelics may induce, it is possible that an individual who was intoxicated at the time of the crime may be able to assert a *mens rea* defense for a specific-intent crime. One defendant appealed his conviction for manslaughter on the grounds that LSD intoxication prohibited him from developing the *mens rea* for the crime. The court noted that manslaughter does not require specific intent and therefore upheld the conviction.[22]

Violence Risk Assessment

Though substance use is traditionally considered a risk factor for violence, there is conflicting evidence regarding the effect of psychedelic use on criminal behavior.[34,39,40,42,44-46] The most recent data indicate that, among the general population, a history of psychedelic use is related to a reduced risk of various types of criminal behavior and arrest for certain offenses.[46] Without further evidence, however, it is premature to state that psychedelic use is a protective factor for violence and antisocial behavior. Furthermore, psychedelics may have different effects in different populations. In the absence of a clear relationship between psychedelic use and violence, forensic psychiatrists should conduct a thorough psychedelic history in a user accused of a crime to characterize the drug use and to determine if it is impulsive, dangerous, risky, or otherwise problematic. In such cases, psychedelic use may indeed represent a violence risk factor.

Conclusion

With growing research interest in the therapeutic benefits of psychedelics and the potential for their decriminalization in U.S. jurisdictions, forensic psychiatrists are likely to evaluate an increasing number of individuals with a history of psychedelic use. There is a small but growing body of literature examining the relationship between psychedelic consumption and interpersonal violence and other criminal behavior. Though large-scale epidemiologic surveys suggest that psychedelic use is related to a reduced risk of various types of

antisocial behavior, causality and explanatory mechanisms remain unclear. Future research should clarify these relationships in different populations and may identify a therapeutic role for psychedelic compounds in reducing the risk of criminal behavior. In the absence of clarity, however, forensic psychiatrists should conduct thorough psychedelic histories on any evaluee who uses psychedelics, including elements of set and setting, to identify the relationship between the individual's psychedelic use and the relevant forensic question.

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