

# A Need for Legal Reclassification: Therapeutic and Medical Benefits Using Lysergic Acid Diethylamide

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Depression, addiction, and other mental health disorders present a serious challenge socially, personally, and economically, creating an urgent need for novel treatments. In the present research, the therapeutic potential of lysergic acid diethylamide (LSD) is examined in the context of alcohol and smoking addictions, Autism Spectrum Disorder, and other mental health conditions such as depression and anxiety. This includes an examination of the psychedelic substance as a way to explore mental states and reorient emotion-based cognitions. Using the psychedelic experience as medicine, LSD can be used to treat a specific psychiatric illness, targeting the source of the issue and allowing patients to gain insight into their own disorders and behaviour, all with relative safety. It is concluded that LSD should be legally reclassified in such a way that allows further exploration of its utility as a treatment for clinical disorders, as well as its potential to provide insight into the psychology of these conditions.

Keywords: lysergic acid diethylamide, mental health, therapy, treatment, legal

Lysergic acid diethylamide (LSD) is a potent hallucinogenic drug that evokes profound psychological and somatic effects (Frankel & Cunningham, 2002). It was first synthesized in 1943 by Swiss scientist Albert Hofmann, who soon after discovered the drug's psychedelic properties (Gasser, Kirchner & Passie, 2015). In 1949, it was brought to the attention of multiple medical centers in the United States when it was discovered that LSD could be used as a means of temporarily mimicking mental illness and thus producing a model for psychosis (Osmond & Smythies, 1952). Research into its treatment applications goes back as far as the late 1950s, when Dr. Humphry Osmond and Abram Hoffer gave doses of LSD to severe alcoholics and found that the substance produced a vivid aware-

ness of personality problems (Mangini, 1998). The researchers speculated that it was able to induce experiences inspiring an alcoholic to dismantle habitual patterns through self-reflection and create a change in self-concept. Similar studies were also conducted, most notably by Ditman and Whittlesley (1959) and O'Reilly and Reich (1962), further inspiring extensive research on LSD and resulting in the publication of thousands of scientific papers and a proliferation of prescriptions to patients for its use in treating psychiatric disorders and promoting personality improvement.

The healing qualities of LSD were believed to be a medical breakthrough, and researchers began exploring the use of psychedelics for a variety of other purposes such as facilitating psychother-

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apy, enhancing creativity, and studying schizophrenia. It was seen as a promising and idealistic therapeutic method until the research came to a halt in 1967 due to inconsistent empirical data, government interventions, and societal disapproval. Increasing concerns resulted in psychedelics being legally classified as Schedule One controlled substances in the United States, which suggests that LSD has a high potential for abuse and has no accepted medical use. This shut down avenues of research on unanswered questions and hindered future attempts to explore the benefits of the substance (Mangini, 1998). However the medical use of LSD must not be viewed as a treatment for psychiatric disorders generally, but rather as a way to target specific disorders. The goal is not to find a miracle drug that will universally aid all medical issues as was postulated 40 years ago; this only leads to a surge in inconsistent research and contradictory results, all of which will spark controversy and create doubt concerning its healing properties. Expecting unrealistic results acts to discredit moderate or short-term effects, and poorly described trials result in the impression that studies were not well designed thus leading to the dismissal of valid results (Krebs & Johansen, 2012). The medical field needs something above and beyond a quick fix daily medication that temporarily alters neurochemical relations. Psychiatry must start addressing the source of mental illnesses and LSD may have the potential to do that. In light of its therapeutic benefits and low potential for abuse, LSD should be legally reclassified to a Schedule Four substance which suggests a low potential for dependence and accepted medical use in treatment. This would allow researchers to investigate its possible treatment applications and re-open avenues for research concerning its effects on addictions and mental health disorders such as Autism Spectrum Disorder

(ASD), anxiety, and depression.

LSD has promising implications in the mental health field and may be able to treat a multitude of disorders. LSD is a serotonergic agonist that down regulates 5-HT<sub>2A</sub>, a system which has many implications regarding depressive and anxiety disorders (Buchborn, Schröder, Höllt, & Grecksch, 2014). Similar to antidepressants, LSD drug treatment has the potential to reverse depressive responses and feelings by rebalancing the hippocampal 5-HT<sub>2</sub> and 5-HT<sub>1A</sub> signaling; in fact, rebalancing serotonin postsynaptic receptor signaling is a common property that many antidepressants share (Buchborn et al., 2014). Furthermore, serotonin released from the median dorsal raphe forebrain primarily binds to postsynaptic 5-HT<sub>1A</sub> receptors in the hippocampus and limbic system (Baumeister, Barnes, & Giaroli, 2014). This pathway is involved in tolerance and resilience to chronic stressors, allowing one to adapt to and cope with stressful situations. Targeting and stimulating this pathway using LSD has the potential to diminish the severity of, and treat, pervasive disorders such as generalized anxiety disorder, as well as prevent them from occurring in high-risk subjects. A recent study showed psychological improvements over a twelve-month period in anxiety patients given three months of LSD-assisted psychotherapy (Gasser et al., 2015). Other than an initial sense of loss of control, none of the patients reported lasting adverse effects. Furthermore, patient reactions to the LSD treatment involved a positive facilitation of emotions, confrontation with previously unknown anxieties, as well as a restructuring of emotions, situational understandings, and world views (Gasser et al., 2015). This restructuring of emotions and recognition of mood states is key in helping patients suffering from severe depression and anxiety, but may also extend further and have beneficial implications for other mental health

disorders such as Post Traumatic Stress Disorder (PTSD). LSD can alleviate emotional distress, facilitate cognitions such as memory, and reorient the negative biases that prime an individual's mindset (Buchborn et al., 2014). Examining the precise nature of LSD binding effects and the rebalancing of serotonin in specific neural pathways may have drastic therapeutic benefits for mental health disorders and further research is needed.

Another application for which LSD has potential is the psychotherapeutic treatment of alcoholism. LSD is well-known for providing insight into one's own behaviour by allowing the subject to explore new sensory experiences and by giving the individual a deeper meaning and motivation in their lives (Gasser et al., 2015). Such introspection requires patients to observe insights into their problems and the hardships that have led them to rely on alcohol. LSD's profound effects on the mind allows the patient to address deep underlying problems, confront their memories, and meaningfully re-label their past experiences (Sessa, 2014). In randomized controlled trials conducted by Krebs and Johansen (2012), results showed that patients in alcoholic treatment programs given a single dose of LSD displayed a decrease in alcohol misuse. LSD treatment approximately doubled the success rates during the first follow-up. There was a beneficial effect in short-term and medium-term patients after follow-ups, however there was not a statistically significant effect for long-term follow-ups (Krebs & Johansen, 2012). However, this is expected, as it is uncommon for any drug to continue its treatment effects months after a single dose; follow-up admissions of the drug may be necessary to prevent longer-term relapse prevention. This, in combination with other therapies such as cognitive-behavioural therapy and psychosocial interventions, can further decrease a patient's risk of relapse. Krebs and Johansen

(2012) also found that it was not uncommon for patients to become much more self-accepting, optimistic, and feel as if they were given a new positive energy after a period of illness or sadness. Thus there is reason to believe that the legal reclassification of LSD to a Schedule Four controlled substance can serve as an adequate solution to alcohol dependence, allowing patients treated with LSD to obtain the confidence and courage to conquer current addictions and face future problems.

There is also evidence to indicate that LSD could be helpful in the treatment of tobacco addiction. Advancing the scientific study of LSD for this purpose may hold the same promise found in its application to alcoholism. Five million mortalities world-wide are smoking related, which highlights an urgent need for effective treatments (Johnson, Garcia-Romeu, & Cosimano, 2014). Using psilocybin, a naturally occurring psychedelic produced from mushrooms, Johnson et al. (2014) observed smoking cessation rates of 80% throughout the following 10 weeks after psilocybin treatment. The majority of participants also associated their cessation experience with drastic behavioural changes. Participants labeled three key mechanisms by which psilocybin aided them in quitting smoking, including their changing orientation toward the future with long-term benefits outweighing immediate desire, changing priorities and values, and a strengthening of their own belief in their ability to quit (Johnson et al., 2014). As noted previously, these are the same goals of LSD treatment, so it is entirely possible that treatment with LSD, a substance functionally similar to psilocybin, may also result in the cessation of smoking. Other drug addictions of this nature may also benefit from LSD administration. For example, after only a single dose of LSD in trials for heroin addiction, results showed a significantly lower rate

of relapse in the LSD group compared to the control group at three, six, nine, and twelve months post treatment (Savage & McCabe, 1973, as cited in Krebs & Johansen, 2012). A possible concern that may be raised in the context of using LSD to treat addictions is the use of one psychoactive drug to replace the dependence of another drug, therefore creating an entirely new addiction. However, LSD is a 5-HT<sub>2A</sub> agonist which is associated with fast elimination and prompt tolerance as a result of receptor downregulation, thus it is not found to produce compulsive drug-seeking and addiction (Nichols, 2014; Johnson et al., 2014). Due to this tolerance, it has been argued that dependence and frequent use are much less likely compared to other drugs (Fantegrossi, Woods, & Winger, 2004). Replacing a harmful and dangerous drug with a different controlled, non-addictive substance can serve as a way to prevent or alleviate serious drug problems and in turn save lives. The evidence regarding LSD is compelling enough to pursue this method of treatment and dated societal biases and misguided beliefs should not impede potential breakthroughs in the treatment of addiction.

In addition to its therapeutic benefits, LSD is known to heighten creativity which has many potential applications, especially to the clinical field (Sessa, 2008). Creative enhancement involves an increase in consciousness, altering perceptions, changing an individual's emotions or self-concept, and the elimination of self-imposed restrictions, all of which are involved in the psychological experience induced by LSD in humans (Baumeister et al., 2014). The medical field is poised to benefit greatly from these enhancements in creativity, specifically in the case of Autism Spectrum Disorder (ASD; Sessa, 2008). Creative innovation is largely dependent on greater cooperation and communication between brain regions that may not be usually strongly

connected (Heilman, Nadeau, & Beversdorf, 2003; Beaty et al., 2014). As patients with autism usually have deficits in the social domain, such as difficulty seeing the connectivity between people and objects (Lai, Lombardo, & Baron-Cohen, 2014), it is postulated that LSD will allow patients to find new meaning and associations between objects and people. Allowing this enhanced communication between brain areas in such patients may allow for a better understanding of ASD and the brain in general. Furthermore, Klintwall et al. (2011) postulated that altered sensory modalities contribute to autistic symptoms, and a mechanism that targets specific sensory input has potential to change the patient's behaviour. Thus, creative enhancement by the psychedelic experience is one area that may have potential to advance not only the study of ASD, but also the study of neuroscience more generally by furthering the research on both the brain and the mind. Despite this, the credibility and medical benefit of LSD's potential for creative enhancement is often dismissed due to social stigma and perceived negative image of psychedelics. Therefore, in order to preserve the credibility of research on LSD as a legitimate treatment for clinical problems, legalization should allow research to be carried out in a controlled manner while maintaining restrictions on its public access.

Although many would argue that LSD is a harmful and dangerous drug, it is not nearly as harmful as many other freely available substances (Nutt et al., 2007). Alcohol, by comparison, is said to cause more harm than any other drug and results in 5% of global disability rates and 4% of total global mortality rates (Rehm, Mathers, & Popova, 2009). Following this, some may then argue that alcohol is more dangerous simply because it is more prevalent, and the increased use and availability of LSD would cause similar harmful results. However un-

like alcohol, a widely accepted yet fatal substance, it is believed that LSD has no critical dose acting directly on the body that would cause fatality. It is also important to note that LSD would not become widely available, and instead be limited to the scientific and medical community. In addition, benzodiazepines, which are currently used to treat anxiety, are commonly prescribed yet can result in severe sedation, impaired cognitive and psychomotor skills, as well as severe withdrawal leading to insomnia, muscle spasms, tension, and even death (Lader, 2014; Neale & Smith, 2007). While no drug or medical intervention is completely without risk, LSD is, statistically, very safe (Sessa, 2014), and perhaps even safer than some psychoactive substances currently used to treat mental illness. In light of this, it is clear that the current legal classifications of LSD are not based on scientific evidence and are in need of re-evaluation.

Additional concerns regarding the usage of LSD center around possible side effects such as hallucinogen persisting perception disorder (HPPD). HPPD is a condition characterized by re-experiencing one or more of the perceptual symptoms causing distress and impairment in significant areas of functioning (Lerner et al., 2003). Other studies have also suggested that the prolonged use of LSD induces anxious mood, tension, paranoia, and suicide attempts (Cohen, 1960). However, concerns of this nature are based on misleading studies conducted from the 1960s to the 1980s intended to deter use of the substance. Most claims positing the harms of psychedelics should be evaluated with caution, as they are based on case reports or theoretical assumptions (Johansen & Krebs, 2015). In a recent population study of 130,000 adults in the United States, Johansen and Krebs (2015) failed to find a link between psychedelic drugs (such as LSD, psilocybin, and mescaline) and mental health problems. Specifically,

there were no significant associations between lifetime use of psychedelics and mental health issues, psychological distress, anxiety, depression, or suicidal thoughts. Psychedelics are not known to harm the brain or other body organs, result in addiction and compulsion, disrupt psychosocial functioning, or cause severe adverse effects (Halberstadt, 2011). It can then be hypothesized that in a controlled, monitored environment, the possible negative outcomes of repeated LSD usage can be avoided. However, due to legal restraints, the research community is limited in its ability to investigate and dispute concerns regarding the postulated side effects. Such restrictions on this research reflect misguided and outdated beliefs about the dangers of LSD.

Depression, addiction, and other clinical disorders present a serious challenge to society and the misinformation on both illegal drugs, and mental illness, is overwhelming. LSD offers a novel alternative that can generate lasting benefits while avoiding harsh side effects, such as sedation and dysphoria, that accompany many medications used today. Physical and mental health barriers can potentially be overcome with the legalized medical and therapeutic use of LSD, allowing patients to improve their emotional state, confidence and trust in given situations, and the ability to cope by enabling access to the thoughts and feelings that are usually excluded from consciousness. However, due to the historical methodological problems and the illegality of hallucinogens, evidence for LSD's therapeutic benefits are still largely unevaluated and its known potential is highly limited. The rationale behind the Schedule One classification of LSD appears to be misguided and illogical in light of the evidence for its potential benefits and relative safety (Baumeister et al., 2014). From a medical and public health perspective, it is difficult to understand the justification for the dismissal of

the medical use of LSD. A major impact on the quality of life for those living with mental health issues and addictions is likely within reach.

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