Psychedelic Research Reborn: Opening the Doors of Creativity and Social Connection

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Quick Take

- Ever since 2006, there has been a resurgence of research on psychedelics and how they affect human behavior and cognition.
- Recent reviews and neuroimaging studies suggest that psychedelics might actually impair creativity during the psychedelic experience but increase the generation of novel ideas over the long term.

- The psychological mechanisms stimulated by the psychedelic drug MDMA—reduced fear and negativity, increased sociability, and more communication—might foster perceived social connection, resulting in improved relationships.
- There is great hope that research into psychedelics, if conducted rigorously, might improve the scientific community's understanding of mental health as well as cognitive and social processes.

> "To live on a day-to-day basis is insufficient for human beings; we need to transcend, transport, escape; we need meaning, understanding, and explanation; we need to see over-all patterns in our lives. We need hope, the sense of a future."
>
> Oliver Sacks, Altered States, *The New Yorker* (2012)

The modern era of psychedelic research began in 2000, when researchers at Johns Hopkins University obtained regulatory approval to test psychedelics on healthy human subjects. Six years later brought an important breakthrough with reports on the safety and positive effects of psilocybin (Griffiths et al., 2006), sparking renewed interest in the study of therapeutic effects of psychedelics and pressure for more funding and approval of clinical trials. U.S. law also started changing and, in 2020, Oregon became the first state to decriminalize the possession of small portions of LSD.

In the years since the regulatory approval, Johns Hopkins' major center for psychedelic research, the Center for Psychedelic and Consciousness Research, has published more than 60 peer-reviewed articles indicating benefits of using psychedelics in patients with depression, addiction, and distress and advancing knowledge about the mechanisms through which psychedelics affect the brain, behavior, and cognition. As the Center pursues ongoing research, including testing the efficacy of psilocybin for treating a wide range of conditions, researchers elsewhere are busy as well, including psychological scientists exploring how psychedelics might inform social and cognitive psychology.

This resurgence of research into psychedelics has spawned concerns; some researchers caution against a "psychedelic hype bubble" that "can create impediments to rigorous science and reasonable clinical applications" (Yaden et al., 2022). But there is also great hope that research into psychedelics, if conducted rigorously, might improve the scientific community's understanding of mental health as well as cognitive and social processes such as creativity and social connectedness.

From shamanic rituals to illegality

Psychedelics are hallucinogenic drugs that can trigger altered states of consciousness and changes in perception, mood, and cognition. Many substances fall under the psychedelics umbrella, some occurring naturally and others synthesized in laboratories. The most studied include LSD, psilocybin, ayahuasca (whose major psychoactive component is *N*,*N*-dimethyltryptamine, or DMT), and mescaline, but other

substances appear to have similar effects, such as the dissociative anesthetic ketamine and the stimulant and psychoactive substance MDMA.

Humans have used psychedelics for at least 5,500 years, based on reports of Native Americans using peyote—a cactus with psychoactive alkaloids (El-Seedi et al., 2005)—for its medicinal and psychoactive properties. Archaeological findings and reports from Spanish colonizers (Miller et al., 2019) indicated that by the 16th century, indigenous South Americans living along the Amazon River were using ayahuasca—a psychoactive brewed drink—in ceremonial, shamanic, and social contexts.

Research on psychedelics eventually started, several centuries later. Mescaline, the main psychoactive component of peyote, was first identified in 1897 by the German chemist Arthur Heffter and first synthesized in 1919 by Ernst Späth. In 1938, Swiss chemist Albert Hoffman synthesized lysergic acid diethylamide (LSD) from an alkaloid found in ergot, a fungus that infects grain. Five years later he discovered the drug's effects, prompting the pharmaceutical company for which he worked to begin marketing LSD in 1947 as a cure for alcoholism, criminal behavior, and even schizophrenia. In 1959, Hoffman also isolated psilocybin from mushrooms. This compound, which is metabolized into a psychedelic drug after intake and can be found in different species of fungi, has effects comparable to those of mescaline. Although many researchers studied psilocybin in the 1960s, LSD received more attention.

LSD's use in psychotherapy continued to be studied throughout the 1950s and 1960s. Psychiatrists such as Humphry Osmond, who coined the term "psychedelic," used LSD to treat alcoholism, with promising results, and Harvard psychologists Timothy Leary and Richard Alpert tested the potential therapeutic effects of both LSD and psilocybin. Around the time, the Central Intelligence Agency (CIA) developed the research project MKUltra, which explored the use of psychoactive substances, including LSD, to aid interrogation.

Research began to ebb in 1968, however, when the U.S. government decided to reclassify LSD as a Schedule I substance (illegal for medical and recreational use). Factors in this decision included psychedelics' association with the counterculture of the 1960s, thanks in part to Leary and Alpert themselves, who had been fired from Harvard for questionable methods and lack of scientific rigor. Research slowed further in 1971, when the United Nations listed LSD along with other psychedelics as Schedule 1 substances (substances believed to create a serious risk to public health and not acknowledged as providing therapeutic value), and ended entirely in 1980.

Insights from neuroimaging and creativity research

Today, due in large part to the work that began at Johns Hopkins in 2000, research into psychedelics is well underway again. One of the questions that interests researchers is the possible effects of psychedelics on creativity.

In popular culture, perceived associations between the psychedelic experience and creativity rely on anecdotal reports—from the French author and painter Henri Michaux's reports on his experience with mescaline in the 1950s to the American poet Allen Ginsberg's experiments with LSD in the 1960s and the journalism work of Tom Wolfe in the 1968 book *The Electric Kool-Aid Acid Test*. There are also

anecdotal reports of the role psychedelic experiences have played in major scientific breakthroughs, such as Kary Mullis's Nobel prize-winning discovery of the polymerase chain reaction (PCR; Mullis, 2010).

One of the first studies on psychedelics and creativity dates from 1966 (Harman et al., 1966). In this study, the researchers gave participants LSD or mescaline and tested their ability to solve problems. The measures used were scores on tests of creative ability, content analysis of subjective reports and self-ratings, and evaluations of the scientific, industrial, and/or commercial endorsement of the solutions generated during the psychedelic experience. The results indicated that psychedelics appeared to facilitate creative problem solving. However, this experiment was conducted only with 27 participants, all males, and relied heavily on self-reports. Importantly, the researchers highlighted that the "problem-solving session was carefully structured with particular focus on establishing Ss' [participants'] expectancies and a psychosocial milieu conducive to creative activity," underscoring the importance of context in modulating the effects of psychedelics. In fact, most researchers have emphasized the influence of set (e.g., psychological expectations, cognitive and affective state of the individual) and setting (e.g., physical environment, social context) on the intensity and effects of the psychedelic experience (e.g., Nichols, 2004).

In a recent review (Fox et al., 2018), researchers pointed out that not much is known about whether psychedelics might interact with the creative process through cognitive mechanisms (e.g., by broadening attention), through affective–motivational aspects (e.g., perseveration), or through a combination of these and other aspects.

Researchers are currently using neuroimaging studies to test potential short- and long-term effects of the use of psychedelics on the creative process. Aided by neuroimaging studies that identified the brain correlates of the psychedelic experience, some studies have offered more clues about a possible relationship between psychedelics and creativity (for a review, see Fox et al., 2018). The psychedelic experience feels very creative by nature, in that it can provoke novel ideas and insights, intense emotional experiences, and hallucinations that can make the world feel brand new and full of possibilities. As Fox and colleagues explained, these experiences have been compared, on the negative end of the spectrum, with psychosis and, on the positive end, with transcendent mystical experiences.

Neuroimaging has highlighted how the various stages of the psychedelic experience differ from one another and relate to experiences such as daydreaming, dreaming, and creative thinking. Psychedelic experiences involving strong visual hallucinations appear to activate the same brain areas as "natural" altered states involving high rates of visual imagery, most notably daydreaming and nighttime dreaming. Psychedelic experiences involving ego depletion and a loss of the sense of self appear to involve deactivation of brain networks, including the default mode network (DMN)—interrelated brain circuits thought to be involved in introspection and self-reflection (Fox et al., 2018). By that thinking, in reducing activity in the DMN, psychedelics might reduce divergent thinking and actually impair creativity.

In a recent study (Mason et al., 2021), researchers administered psilocybin to participants and measured their divergent and convergent thinking, two aspects of creative thinking that help people come up with as many solutions as possible and decide the best solution, respectively. Results indicated that, relative to participants who received a placebo, those who received psilocybin reported feeling more creative but actually performed worse in tasks requiring divergent and convergent creativity. Reduced activity in the

DMN accompanied this worse performance. However, one week later, participants who had received psilocybin generated more novel ideas than those who had received the placebo. Thus, and in line with previous studies, it appears that although psychedelics reduce DMN activity acutely, they might increase DMN connectivity after the acute phase of the psychedelic experience, potentially via a neuroplastic effect on brain network function, and thus increase creativity later on.

Teaching about social connection

The newly revived psychedelic research can also be integrated with social psychology. In a 2022 *Perspectives on Psychological Science* article, Sonja Lyubomirsky proposed that social psychologists have much to gain by incorporating psychoactive substances into their research programs, noting that they may illuminate certain constructs and processes. Lyubomirsky focused on the construct of perceived social connection and on the use of MDMA [(±)-3,4-methylenedioxymethamphetamine], or ecstasy, a humanmade stimulant and psychedelic drug with low potential for abuse, as it is not typically used in a dependence-inducing pattern (Feilding, 2019). Developed in 1912 by a German pharmaceutical company and used in psychotherapy in the 1970s, MDMA became a street drug by the 1980s, associated with electronic dance music and raves, and was illegalized and classified as a Schedule 1 substance in 1985, despite the protests of several scientists.

In her 2022 article, Lyubomirsky proposed "using MDMA as both an innovative basic science tool and a biointervention that can assist in addressing the fundamental psychosocial need to connect with others." MDMA is known as the "love drug" because it promotes strong feelings of bonding, connectivity, and empathy. It was even used by psychotherapists in the 1970s for couples counseling because it facilitated communication. Research has indicated that MDMA influences social feelings (e.g., feeling more friendly and self-confident), social information processing (e.g., diminished fear), and social behavior (e.g., more prosociality) in humans. In the brain, it appears that MDMA increases levels of neurochemicals related to well-being and social bonding (serotonin and oxytocin) and decreases activity in the amygdala, a region of the brain involved in processing threat.

To support future research bridging basic and applied goals, Lyubomirsky presented a conceptual model that includes the psychological mechanisms that MDMA stimulates—reduced fear and negativity, increased sociability, and more communication. These mechanisms can foster perceived social connection, which can lead to potential long-term impacts—improved romantic relationships and social life, reduced loneliness and social deficits, and stronger therapeutic alliances.

This conceptualization helps explain how MDMA might be a promising tool to help social psychologists identify the most critical keys to improving relationships, whether those keys depend on the characteristics of the relationship and/or the partners. Partner responsiveness is a prime ingredient for relationship quality, and perceived partner responsiveness depends on each partner engaging in self-disclosure, being authentically interested in the other, and expressing care and appreciation for the other. For example, explained Lyubomirsky, if the partners of participants on MDMA report feeling authentically understood, investigators can assess the specific behaviors shown by the participants during the study session and try to isolate which behaviors are associated with this feeling.

Lyubomirsky also elaborated on the conditions that must be met for an individual's experience on

MDMA to be translatable from the lab to daily life. These conditions are authenticity—individuals should still feel like themselves while on MDMA; insight—MDMA should reveal insights into oneself, like a magnifying glass; and transformation—the experience should inspire people to change and connect to others in way similar to how they connected while on the drug.

Overall, MDMA may allow investigators to isolate the psychological mechanisms—and brain pathways—underlying felt social connection and thus reveal what should be targeted in future (nondrug) studies.

Nevertheless, Lyubomirsky cautioned about the delivery of MDMA interventions, which should be given to the right person, with the right support, and at the right time and place. She also mentioned the possibility of side effects and harms, including drug tolerance and increased connection to the wrong people, such as an abusive partner, members of an extremist group, or even the experimenter.

Finally, Lyubomirsky emphasized the importance of rigorous research on psychedelics and moving past the early psychedelic research-turned-pop-culture: “The time is ripe to harness the potential of psychedelic and related substances to elucidate unmapped terrain about constructs of interest to social psychologists and, at long last, to fully accept psychedelics into mainstream science and get past their association with ‘turning on, tuning in, and dropping out’ (Leary & Clark, 1967).”

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