PSYCHEDELICS: UNPACKED

THE ISSUES

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WHAT IS PSILOCYBIN'S PATH TO LEGALIZATION?

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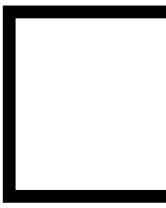
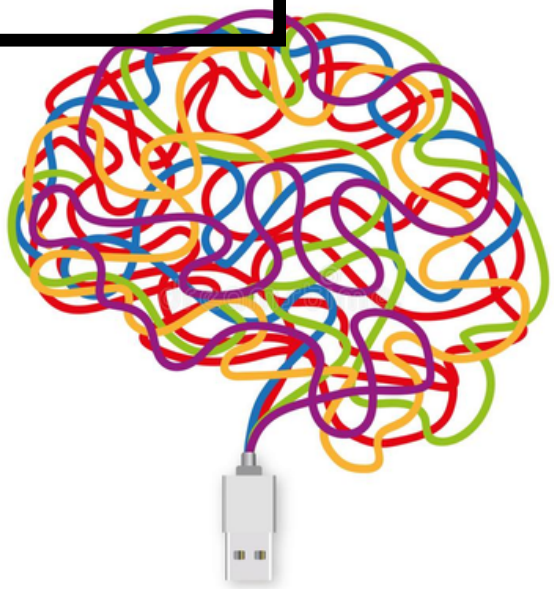
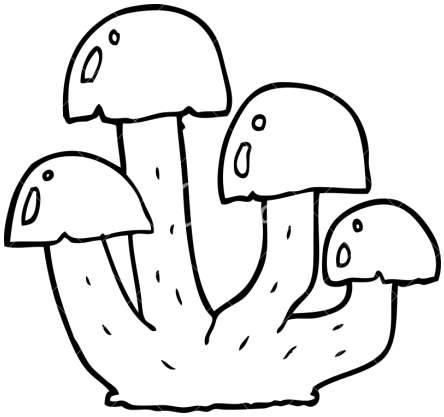


READY FOR YOUR TRIP?





LETTER FROM THE EDITORS

Dear Distinguished Reader,

When you hear the word psychedelics, it is likely that strong preconceptions will come to mind. Terms like “drug,” “addict,” and “illegal” may spring to the forefront. Or maybe “trip,” “hallucinations” and “adventure” do. But what about words like “medicine” or “treatment?” The idea of using psychedelics as potential treatment for mental illness was actually tested as early as the 1950s (Read more about this history on page 26), and promising results showed evidence of therapeutic potential to “markedly alleviate depression and suffering associated with terminal illness” and treat individuals suffering from addiction [4]. This research was headed by Dr. Timothy Leary and Richard Alpert of Harvard University, but both were eventually dismissed for unconventional and inappropriate methods and “often fell short of complying with scientific standards and federal requirements” [1]. Further research has been hindered until recently.

From our analysis of the intersections between the cultural, social, and political narratives surrounding psilocybin and LSD, it is clear that while the broader scientific understanding is that these psychedelics have extensive promise when it comes to therapeutic effects, their decriminalization and medicalization, requires trust from the public. Psychedelic substances were once strongly associated with hippies and the anti-war and counterculture movements, which were the younger generations’ attitudes against the status quo and social norms, and opposing the Vietnam War and government authority in the 1960s. In response, the government poured funds into years of misinformation and propaganda campaigns to promote misconceptions that professionally marginalized and criminalized psychedelic substances, forcing the psychedelic substance-using community underground. Anti-drug hysteria has blurred the scientific and pharmacological distinctions between psychedelics and other more dangerous and addictive drugs such as opioids and heroin.

By association with the countercultural communities that threatened the status quo, psychedelics came to represent a threat to the dominant narrative, and thus have been painted as dangerous. LSD was linked to addiction through mass manipulation by the government demanding colleges to report any activities and findings associated with the drug. The FDA held the belief that LSD was of the utmost danger to the population and use could result in psychosis–permanent physical and mental damage. This example, along with many others, is what drove the Nixon government to instate the Controlled Substances Act, making all psychedelics, including psilocybin, Schedule 1 drugs (the most restrictive category) and painting the portrait that psychedelics are inherently extremely dangerous. The stigmatization and criminalization eclipsed the reality that psilocybin and other hallucinogens have been safely used for thousands of years by indigenous tribes in religious and spiritual contexts, such as shamanism (see page 24).

LETTER FROM THE EDITORS

Over 40 years after it was halted, research on the therapeutic applications of psychedelic drugs for patients suffering from certain psychiatric disorders has been resurging today–though not without controversy. Psychedelic drugs are still illegal; the Policy & Advocacy Counsel for the Multidisciplinary Association for Psychedelic Studies (MAPS), stated that "the only way, besides Congressional intervention, to take them out of Schedule I—the most restrictive category—is to prove to the FDA that they are, in fact, safe for humans to take, have medical value, and are not as prone to abuse as originally asserted" [3]. Despite growing evidence of the potential benefits of psychedelics, strict governmental drug regulations inhibit clinical research trials and may prevent these drugs from ever being applied in a medical setting [2]. This notorious history has reinforced negative public perceptions of psychedelic drugs and restrictive

policies and regulations today. To overcome this negative past image, the psychedelic drug research community has been realigning itself with respectable scientists and adopting more measured, scientific approaches [2]. Thus, much of the research today is focused on the therapeutic potential of psychedelics in medicine, specifically in psychiatric disorders and severe anxiety and depression.

This magazine will serve as an interdisciplinary look into the controversies surrounding the therapeutic potential of psychedelics. For example, if psychedelics are approved for medical use, how will access be regulated? Will this treatment be restricted to those with no other options for psychiatric treatment or, conversely expanded to healthy people to improve their lives? Through comprehensive research into religious and spiritual uses, research of the field, perspectives of recreational and medical users, interviews with professional medical experts, and clinical trial results, this magazine will address the history, current status, and future directions of the field. Through this magazine, we hope you will open your mind to the fascinating world of medicalized psychedelics!

ENJOY YOUR TRIP!
PAULINE TZE, KATHERINE RECKAMP,
JESSICA RAUCH, MAX ESTABROOK

IS PSILOCYBIN A VIABLE MEDICAL TREATMENT?

Below
Researchers at Johns Hopkins are testing whether the potent psychedelic in psilocybin mushrooms can treat everything from smoking addiction to anorexia. Credit: Moha El-Jaw Getty Images [22]

Could psilocybin be a viable treatment? How does it work and what are the ethical questions and implications around medicalizing psilocybin? If this treatment is ever approved, what does that future look like? Who is allowed to take it? Will we eventually open it up to healthy people to just improve their life?

Right
The drug psilocybin in pill form. Two trials have shown a single dose reduced depression and anxiety caused by cancer and that the effect can last up to eight months. Photograph: NYU Langone Medical Center [23]

Image Source: agsandrew/Depositphotos

Mental health and mental health care, especially in the United States, are incredibly stigmatized issues, with a normative understanding that a daily pill or concoction of pills can treat or cure ailments. However, the obsession with pills and one-size-fits-all treatments devalues necessary dialogue around alternative modes of mental health treatment. One of the reasons behind this perspective is the rise of biological psychiatry beginning in 1980 with the revision and release of the Diagnosis and Statistical Manual of Mental Disorders III, which created more specific diagnostics for mental illness and focused more on the biological mechanisms behind mental illness rather than the psychology [1]. A new stage of psychiatry established agreed-upon definitions of the causes and behaviors associated with depression, anxiety, and other mental illnesses. Psychiatrists were able to diagnose and prescribe in a supposedly more precise way, but they seemed to ignore the fact that many of these symptoms tended to overlap. Moodiness, sleep problems, hyperactivity–all these symptoms may be influenced by a host of interacting internal and external factors that contribute to the mental illness diagnosis.

Around this time, better modeling and research techniques were becoming more mainstream, including magnetic resonance imaging (MRIs), animal modeling, genetic analysis, as well as enhanced neurochemical understanding for the effectiveness of antidepressant drugs and psychotherapies. New technology and innovation swept the field, while consequently ignoring the connections between consciousness, sense of self, genetics, psychological history, with biology -- not to mention a slew of social factors. As a result, mental illness became ambiguously understood as a “chemical imbalance” that was caused genetically [2]. Billions of dollars have been poured into the psychiatry research field since 1980, however, the biologization and

and medicalization of mental illness has often resulted in clinical approaches that fail to address it from a more holistic perspective. This has created an infrastructure within the clinical field that prioritizes information derived from reputable sources in the fields of genetics and biology, often overlooking potential social and environmental factors and solutions that do not originate from those fields– read about shamanic healing on page 24! The lack of serious interdisciplinary approaches hinders progress toward novel solutions that could improve access to resources to communities that need them.

The medical field acknowledges that depression varies among different individuals, so there are a few customized treatments with promising potential. However, even though these treatments exist, common medication and general therapy are typically prescribed for the average patient. Mental illness is challenging to treat because apparent biological differences do not necessarily predict the differences in the presentation of depressive or anxious symptoms [3]. Instead, as discussed on page X, depression and anxiety are the result of a combination of life experiences, biology, genetics, and stress response mechanisms. Furthermore, researchers are still trying to understand the biological processes of neurotransmitters such as serotonin, dopamine, and norepinephrine, since their role was hypothesized in mental illnesses such as Major Depressive Disorder over 40 years ago [21]. Because of this lag in research, the same drugs that were prescribed in the late 1980s are still being prescribed today. While antidepressants showed some promise when the first few were introduced to the market in the late 1950s, more recent studies show that they are effective only for a 34 to 46 percent of depression, while many drug-resistant forms of depression continue to be left unaddressed [21]. Several psychiatrists began turning towards prescribing medication more often than opting for traditional "talk therapy" popularized by Sigmund Freud [4]. This kind of generalized solution is unlikely to work for a mental illness that has so many environmental, genetic, and circumstantial causes. You can read more about antidepressants on page 18. Additionally, researchers still do not fully know how these drugs work or why certain individuals respond so differently to them. So how can the medical community challenge established paradigms to treat patients more holistically? How can the research community approach this problem from a more interdisciplinary perspective (aka "the HBS way")?

One area of particular interest has been the resurging research of psychedelics and their therapeutic applications in

Above
Current modes of treatment for psychiatric disorders focus on one-size-fit all pillss. Illustration from iStock.

how can the medical community challenge established paradigms to treat patients more holistically?

mental health treatment and psychiatric disorders. Psychedelics have the unique potential to create a personalized therapy experience that is patient-driven. Recent clinical trials have developed a protocol that has proven to be safe and effective [5]. Here is the process: Patients settle on a couch and are given a small dose of laboratory manufactured psilocybin, blindfolded, and given earphones to solidify their environment (a week later they are given a slightly stronger dosage). They are guided to direct their attention inward while the counselors lead them along their journey, helping them through moments of panic and anxiety. Because psychedelics create an altered state of consciousness in which the individual undergoing treatment garners the authority over their state of mind and mental health, whatever that individual "needs" they can obtain through the experience [6]. They are able to imagine their anxiety, depression, or other illness as a physical object, and they can handle it, destroy it, or torment that object in whatever way they need to in order to rid themselves of it. Psychedelics increase psychological flexibility that is thought to induce either spontaneous or intended changes in depression and anxiety [7]. When "tripping," the body is hypothesized to undergo changes that are individualized and self-guided, in which the brain takes over and leads the mind to the positive conclusion it "needs" to make in order to resolve whatever conflict through which the mind is going [6]. 80 percent of volunteers reported their experience was a top five meaningful experience in their life, and 90 percent reported an increase in life satisfaction, improved mood, and improved social relationships [8]. You can read more about the altered state of consciousness and the experience of psychedelics on page 35. These psychological experiences are not merely people's delusions; recent laboratory studies have confirmed that psychedelics do have real effects in changing the neural circuitry of peoples' brains [9]. You can read more about the neuroscience of psychedelics on page 14.

However, what does the future of medicalization mean for the field of psychedelics? How much more research is needed in order to fully understand the true benefits of these drugs? Who should have access and in what settings? And, how will the access to psychedelics change the landscape of modern Western medicine?

Above
The latest, most rigorous psychedelic studies tend to take place in settings like this living room, where researchers watch over subjects as they experience the effect of the drugs..Psychological Aspects of Cancer
Source: vox.com

Because psychedelics create an altered state of consciousness in which the individual undergoing treatment garners the authority over their state of mind and mental health, whatever that individual "needs," they can obtain through the experience.

While the true and full extent of potential is not fully known, many reputable doctors–including Dr. Charles Grob of UCLA as well as Dr. Roland Griffiths of Johns Hopkins University–have made psychedelics the subject of their life's work. Dr. Griffiths first ventured into the field when he realized that spiritual experiences and meditation were connected and had an important feature in many of the world's spiritual groups and religions. Dr. Griffiths has published 398 papers and has conducted research spanning addiction, anxiety, and depression. He has found that among both healthy volunteers and volunteers with depression and anxiety, clinical outcomes improved after a psychedelic experience [10]. Dr. Grob found that those who enjoyed a mystical experience or spiritual epiphany were more likely to experience a better long term therapeutic outcome.

Current, ongoing clinical research trials have been targeting patients with severe conditions, including anxiety about end-stage cancer and treatment resistant depressant. Dr. Grob's team led a 2011 pilot study of psilocybin treatment for anxiety in a trial of twelve patients with advanced-stage cancer. Their findings showed that some patients experienced positive trends in mood and anxiety [11]. Seven years later, a different team conducted psilocybin treatment for treatment-resistant depression in a trial of twenty patients [12]. Results revealed rapid and enduring improvements to depressive symptoms following treatment, which is consistent with other literature. However, there were increased amygdala responses to emotional stimuli, which is opposite to the actions of classic antidepressants (i.e. selective serotonin reuptake inhibitors (SSRIs), which tend to attenuate amygdala responses [13].

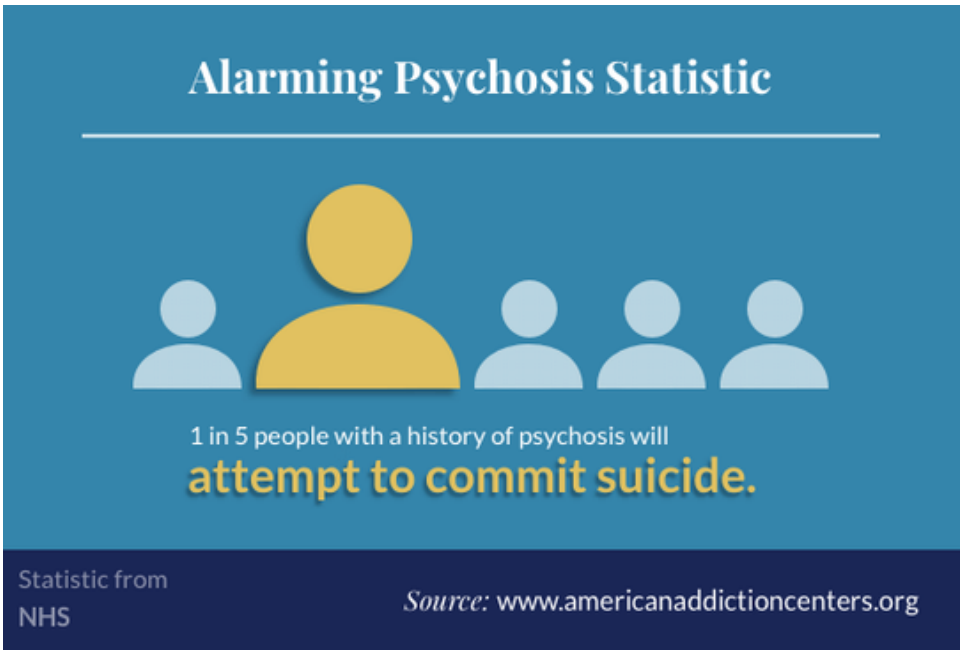
Most terminally-ill patients are extremely anxious about their upcoming death and do not know how to face this crisis. One volunteer named Annie Levy said that she was 'horribly anxious' about the pain and suffering associated with dying, and as a result she was extremely irritable with her husband (also her caretaker) leading to more stress for them both [14]. Matt Meza, an NYU volunteer, had been very healthy throughout life but was facing existential questions when learning he was dying from cancer. For both of them, their psychedelic experience was described as 'more helpful than any other treatment.' In the words of Meza, "when you realize there is not much time left you also realize that we are infinitely more than we think we are, and you develop a new understanding of yourself and your sacred value" [14]. In other words, the trip treatment left them unburdened.

With psychological support, the majority of patients had positive psychological experiences. All recent clinical studies involving psilocybin as a treatment share a structure of psychotherapy [15]. In the general structure of psilocybin-assisted psychotherapy, patients are first

Above
Artistic representation of mental illness vs brain on psychedelics. Image from *Sapien Soup Blog*

rigorously screened for risk factors such as family history of psychosis, schizophrenia, or bipolar disorder. Following this screening, participants will receive a full dose of psilocybin in combination with psychotherapy. This will be preceded by introductory/preparatory non-drug psychotherapy sessions prior to each experimental session, and non-drug integrative psychotherapy sessions the day after each psilocybin-assisted psychotherapy session [15]. This protocol promotes the safety of participants such that they are less at risk of the unpleasant effects of hallucinogen-induced intoxication, or more colloquially, a "bad trip," or even worse, psychosis. While these studies tend to have small sample sizes and are not representative of the entire population, all have found generally safe physiological and psychological responses and no clinically significant adverse events from psilocybin.

Importantly, both Dr. Grob and Dr. Griffiths each emphasize the bioethical implications of medicalization and legalization. Namely, they warn of the potential for psychosis and other mental health effects in patients with a personal or family history of bipolar, psychosis, and schizophrenia. Dr. Grob has emphasized that abuse of psychedelic drugs can lead



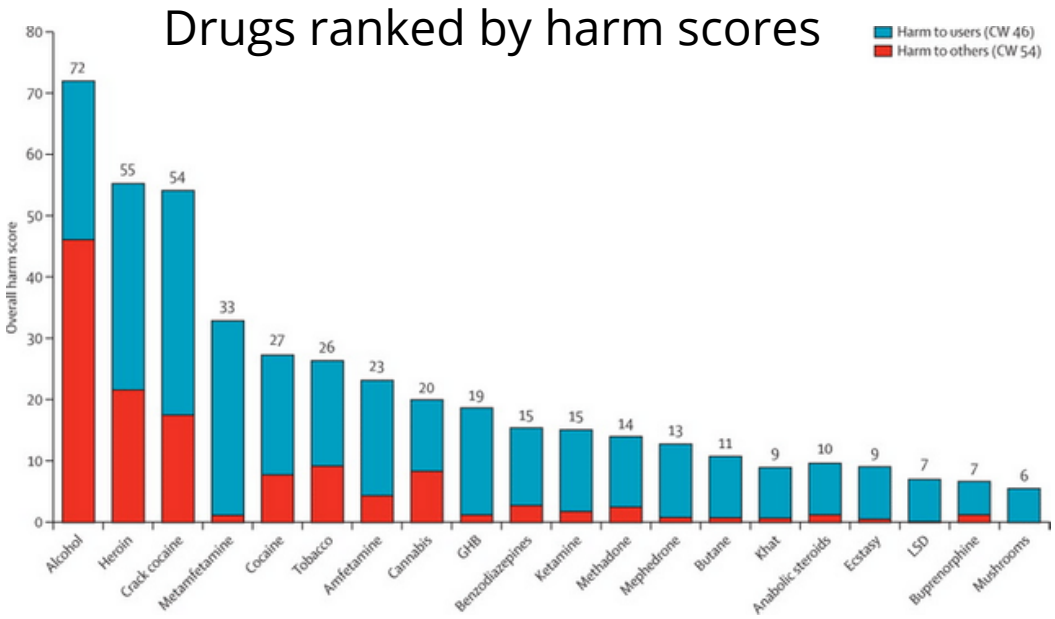
individuals to "go off the rails" and experience permanent mental psychoses. This poses the question of how psychedelics should be regulated as a medical tool or for recreational purposes. Additionally, mixing use with alcohol and drugs can lead individuals into high-risk situations. Nora Volkov, director of the National Institute of Drug Abuse, stated that experimenting outside of research can be dangerous if not accompanied by professionals [16]. Much of what we understand about the full extent of the adverse effects associated with use is taken from news stories or urban legends, so while not scientifically proven, we do know that certain populations may suffer permanent damage from psychedelic use. About three percent of the population will experience a psychotic disorder sometime in their life, and considering that those with relatives with psychosis-related disorders should also be wary of use, this increases the number of individuals who should avoid psychedelics. If one uses psychedelics while also having the tendency for psychosis, this can stimulate the individual to take part in high-risk situations that might be violent or self-harming. Individuals might be prone to psychosis without any knowledge of it, and so psychedelic use can induce psychosis by uncovering hidden traumas or impacting

Above
Why is having a history of psychosis so dangerous when taking psilocybin? Check out this statistic.
Statistic from NHS. Source: www.americanaddictioncenters.org

...experimenting [with psilocybin] outside of research can be dangerous....

psychological health in other detrimental ways [17]. It should also be noted that it is almost impossible to overdose on LSD and psilocybin and they are not addictive. A recent article reported fascinating stories about two women who took 100x and 550x the normal dosage, respectively, and did not suffer ill effects [18]. In fact, their health improved. The first girl had been suffering from bipolar disorder as a teenager when she accidentally OD'd and now twenty years later she still does not experience any manic episodes. The second woman had suffered severe pain from Lyme disease, treated it with morphine. After mistaking the LSD for cocaine and experiencing a 36 hour trip, for the next five days the woman felt no need for morphine. While these are only two stories, these remarkable outcomes carry significant weight as evidence that psychedelics are not lethal. All negative risks can be safeguarded for if doses are prescribed properly, administered in safe and highly monitored environments, and initial testing is done beforehand.

If medicalized outside of the hospital setting, the proper administration of LSD and psilocybin treatment would rely on doctors to communicate thoroughly with their patients before offering prescriptions. Dr. Grob



states that there would be a need for a healthy-use education program to give users the necessary knowledge that would reduce the likelihood of dangerous situations and maximize positive experiences. Individuals must be responsible with these very powerful drugs, but along with this, the system of use needs to provide a structure to help people stay safe [19]. If not treated carefully, history could repeat itself and the stigmas created in the 60s could be reintroduced and control the narrative of these drugs. However, Dr. Grob noted that back then mindfulness was not mainstream, while nowadays it is practiced throughout many cultures. We practice yoga while talking openly about cancer and death; we are in a much more progressive and open society, so the backlash against psychedelics would not be anywhere near as harsh as the 60s.

Consequently, there is much more to be understood about the research field before supporters can accurately advocate educationally about the full spectrum of benefits and potential side effects of use. Currently, researchers have access to lab-synthesized, pure psilocybin and LSD derivatives for research studies. With the onset of medicalization, doctors will need to be granted legal authority to write prescriptions

Above
Drugs ordered by their overall harm scores, showing the separate contributions to the overall scores of harms to users and harm to others. Mushrooms, or psilocybin, are ranked lowest. Source: David Nutt et al., 2010, "Drug harms in the UK" , *The Lancet*

it is almost impossible to overdose on LSD and psilocybin and they are not addictive.

for patients to access these compounds for medical treatment; this is complicated by questions about what mental illnesses or psychiatric disorders qualify as medically necessary. This is further complicated by the legal and medical responsibilities of pharmacists, who will be in charge of dispersing these compounds to patients and ensuring that the patient has a legitimate prescription.

Additionally, Dr. Grob asserts that when thinking about the medical future of psychedelics, it is imperative to recognize that capitalism and big business will want a piece of the fortune, and there are many consequences that will result from their involvement. For example, if pharmaceutical companies take charge of the manufacturing, then the FDA or other associated bodies would need to enforce purity and safe handling. Additionally, since the pharmaceutical industry prioritizes profits, oftentimes patient protection is not the main focus. For example, when drug companies seek to cut costs to enhance profit, potential risks are amplified [19]. Cutting corners in an attempt to please the company paying for research runs the risk of biasing the research process and publishing false results. Therefore, it might be hard to see an ideal future where patients have access to

Image Source: Commondreams.org

when thinking about the medical future of psychedelics, it is imperative to recognize that capitalism and big business want a piece of the fortune

treatments that are produced properly and equitably priced, as well as ethically distributed to only those who need them and not to those who would misuse them.

As careful as we can try to be in monitoring usage of psychedelics in research, illegal activity will certainly always continue to persist. While occasional recreational use has been widely known and criticized, a relatively new practice of microdosing has reached popularity in society. There is a popularized sense that microdosing can improve life by making one more creative, happier, and improve work ethic. Participants say a normal day is made much better by becoming more aware of nature, whether this is by taking a walk or just looking up at the sky. Ayelet Waldman, a microdoser and author of A Really Good Day, claims that it removes depressive and suicidal l thoughts the way doctors promised that antidepressants would, except those pills don't work and have more side-effects than benefits [20]. Exercising this practice every 6 months or so can improve sleeping and eating habits as well as discomfort in social situations. One microdoser stated that it has turned traumatic childhood and life experiences into manageable memories [20]. He is able to work through these memories and see them through a different lense than before. Occasional microdosing may cultivate wisdom by improving insight and understanding of others perspectives. The calming effect makes one feel better about themselves and others. We do not know all the risks, as it holds the same risks that can lead to psychosis in healthy people, but regular users will justify that it does not harm the user nor anyone else. In order to help understand this a bit more,

psychologist James Fadiman has been running a website that teaches people how to microdose safely and effectively. He asks people to report back on their experiences in order to collect data, which he is unable to do in a clinical setting. He has been asked if the results hold validity or if everyone is experiencing a mere delusion, and he is certain the effects are real [20]. Dr. Grob has also stated that these experiences are very real. In proving this, he gave an anecdote about his studies of ayahuasca in Brazil in the early 90s [19]. He gave the people there a questionnaire called the Hallucinogen Rating Scale, but to them the world hallucinogen meant false perception. They were offended because what they saw was very real, so he renamed it the Visionary Rating Scale. When people say they are seeing things, it is not a frank hallucination you get in a state of delirium or psychosis. He says it is more like a quasi dreamlike experience, with a vision that tells a story. Whether you agree with the practice of microdosing or not, the experiences of the users remain valid ones that should be treated with a level of respect.

The question remains, how will the medicalization of psychedelics change the landscape of modern medicine? It seems about time that the field of psychiatry breaks free from the rigid and uninventive structure it has been operating under for the past 50-plus years. This is imperative for those who cannot find the care they require via the treatment plans currently available in our modern day. Psychedelic use in a medical setting could dramatically change the way in which we conduct treatment and even what the word "treatment" really means. It opens the door for ameliorating some of the most difficult and seemingly impossible cases of mental illness. Those deemed "untreatable" or "treatment-resistant" have the potential to go in for a singular psychedelic "trip" that could better their lives in a way that years of talk-therapy or certain antidepressants couldn't. Of course, as promising as current research may be, it is imperative that the research field continues with this work, allowing for a repetition of results to bolster claims that it is a field worth investing in. Once the science is made more clear, psychiatrists can be properly trained on how to have these discussions with their patients and properly "guide" them through the treatment safely and effectively. It also opens the door for a restructuring of the educational framework from which we approach the discussion of psychedelics. With the backing of a strong scientific foundation paired with innovative and informed leaders in the field, the medicalization of psychedelics could help the field of mental health and mental illness extend its reach and care to even more people who need it.

Above
Psilocybin as the new mainstream
Image Source: Gillian Levine for *Leafly*)

Psychedelic use in a medical setting could dramatically change the way in which we conduct treatment and even what the word "treatment" really means.

THE SCIENCE

THE NEUROSCIENCE OF DEPRESSION AND ANXIETY

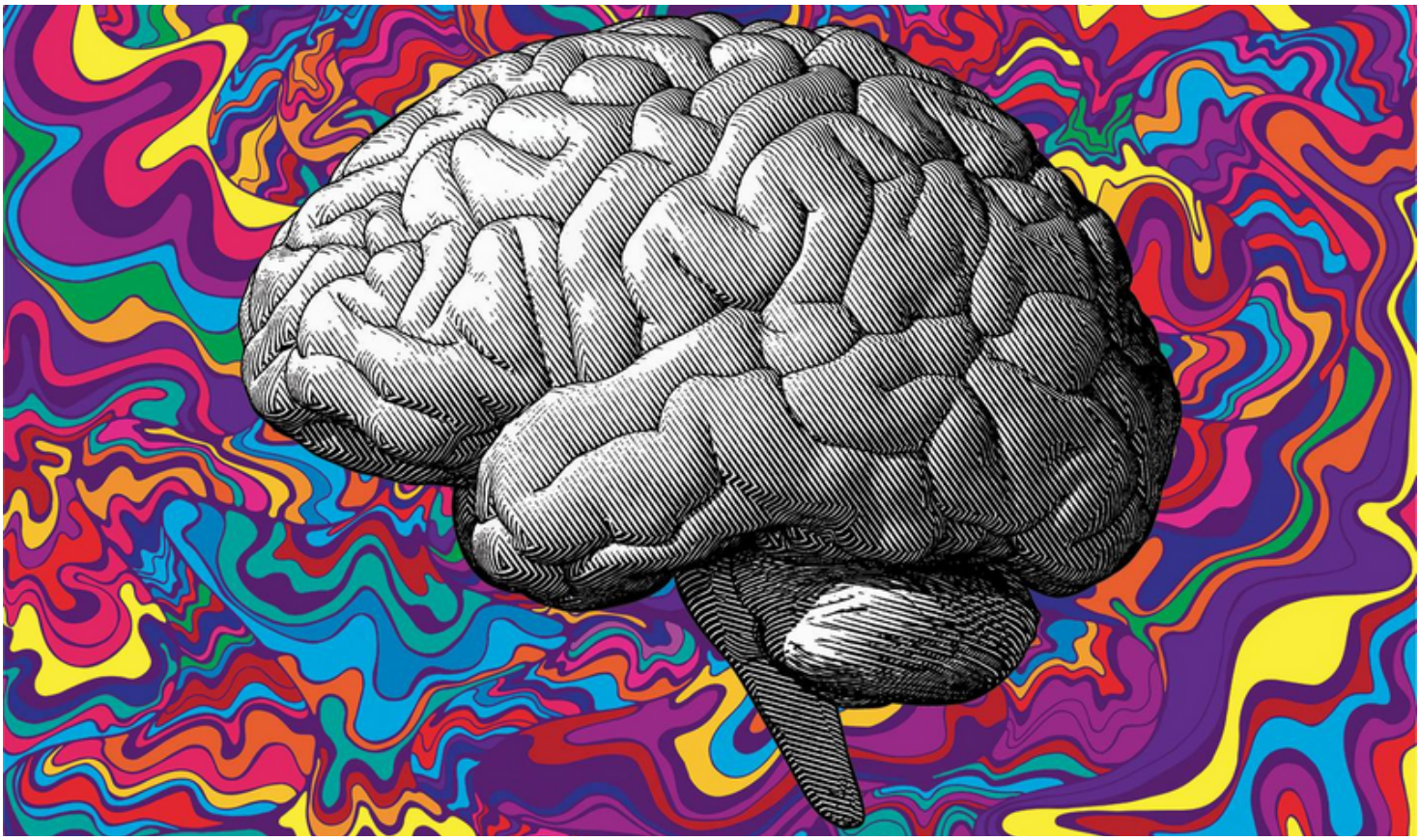


Image Source: Johns Hopkins University

Depression and anxiety are the result of the combination of many neurochemical, structural, genetic, and environmental effects. As a result, even if the presentation of symptoms is similar between different patients, the ideal treatments and causes may be extremely different.

What are the Structures Implicated in Depression and Anxiety?

Areas that play a significant role in depression and anxiety are the amygdala, thalamus, hippocampus, prefrontal cortex, and the default mode network.

Many studies show that the size of the hippocampus–implicated in long-term memory and recollection–decreases with depressive symptoms and continuous exposure to stressful events, often due to impaired neuron growth in the region [1],[2],[3],[4]. Individuals can be genetically predisposed to small hippocampal size, predisposing individuals to depressive symptoms. On the other hand, hippocampal size can become reduced as a result of depressive symptoms. In either situation, this small size inhibits recovery in individuals healing from depression and anxiety.

Improper hippocampal development can lead to negative emotions paired to certain memories, resulting in anxiety and depression when individuals recall these negative memories or experience similar events.

Additionally, the amygdala, which is associated with anger, pleasure, sorrow, fear, and sexual arousal, appears to be hyperactive when patients are sad, depressed, or reminded of a traumatic memory [5],[6]. Furthermore, in patients with mental illness, the thalamus is believed to incorrectly link certain sensory inputs to either happy or unhappy feelings [5]. Also, reduced resting state functional connectivity has been found in depressed patients in the regions near the amygdala and prefrontal cortex (PFC). The PFC supports the proper regulation of emotion–mostly negative and anxiety-like emotions.

Research shows that PFC activity increases following all pharmacological or psychological intervention for anxiety and depression [6]. Finally, the default mode network (DMN) includes the posterior and anterior cortical midline structures. It is responsible for "intrinsic awareness," which is defined as self-introspection and emotional regulation. The DMN is most active during resting state, in which an individual is more focused on themselves than on the world [7]. Many studies have found increased connectivity within the DMN in patients with depression whereas other studies with high sample sizes have found decreased connectivity [8]. On the other hand, Coutinho et al. found that at different regions of the DMN, activity was either increased or decreased [9]. Thus, changes in the DMN are mediated during the manifestation of depression, making it an interesting structural region that is thought to be targeted during the use of psychedelics. You can read more about the impact of the DMN from psychedelics on page 20.

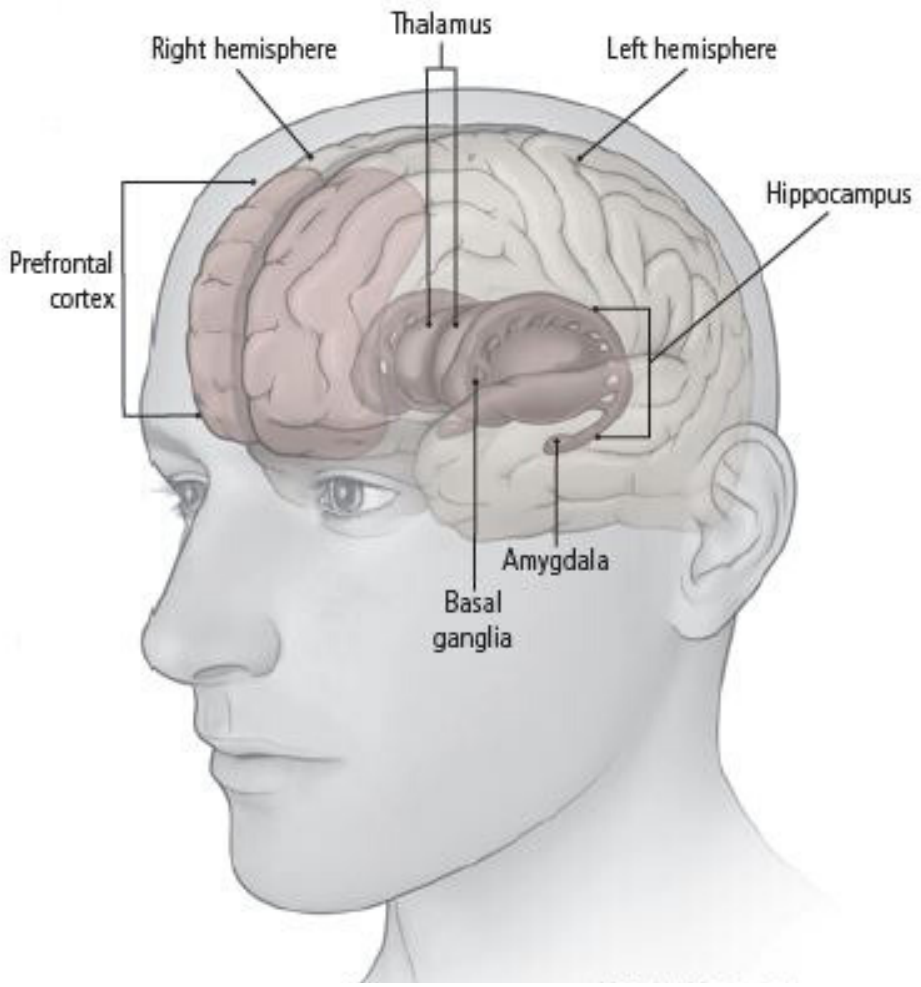


Image Source: Harvard University Medical School

How do Neurotransmitters affect Depression and Anxiety?

Neurotransmitters are chemicals designed to facilitate communication between neurons in the brain.

Antidepressant medications work by increasing the concentration of neurotransmitters in the synapses of neurons, allowing the brain to transmit signals more effectively and therefore regulate mood with more efficacy. See page 14 for more details about the effects of antidepressant and antianxiety medication. In severely depressed patients, receptors may be inactive to a specific neurotransmitter or the brain might not produce enough of that neurotransmitter, affecting behavior. The neurotransmitters at play in depression and anxiety include acetylcholine, serotonin, norepinephrine, and dopamine.

These neurotransmitters are important for regulating mood and behavioral response systems. Acetylcholine supports memory, learning, and information recall.Serotonin supports sleep, appetite, mood, and hinders pain. People with depression tend to have reduced serotonin levels. Norepinephrine is responsible for the constriction of blood vessels during fight or flight responses, and so improper levels or function of norepinephrine can potentially trigger anxiety. Dopamine impacts motivational systems and influences an individual's perception of reality. Issues in dopamine regulation and movement have been found to be associated with psychosis. Dopamine also helps support the brain's reward system, stimulating positive thoughts in the brain.

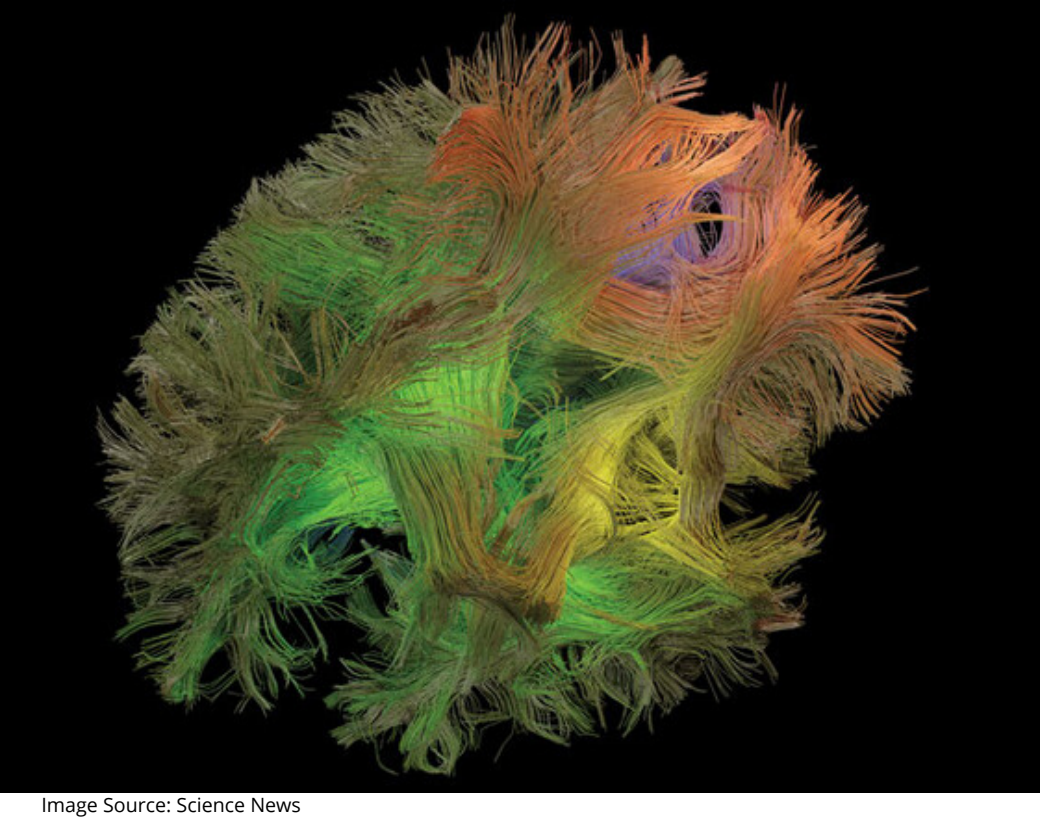


Image Source: Science News

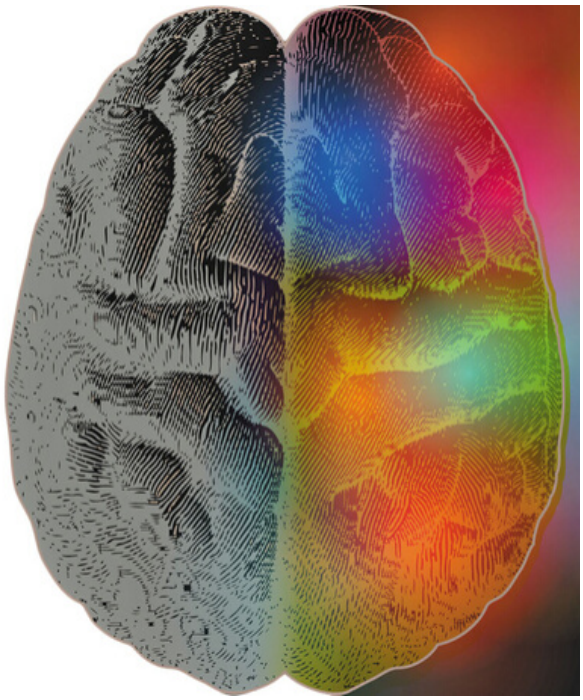
Why is Serotonin Important?

Understanding the neuroscience and therapeutic potential of psychedelics–which interacts heavily with serotonergic systems–requires a look at serotonin's role in depression and anxiety. Firstly, interference with serotonin receptor function during brain development can induce anxiety and depression later in life. Also, dysfunction of serotonin receptors can induce depressive and anxiety-like symptoms and can alter responses to antidepressant treatments. In anxiety, serotonin is important for the upkeep and regulation of anxiety-related neural networks [10]. Additionally, deficits in 5HT receptor transmission (serotonin receptors) support the development of depression, indicating that proper serotonergic systems are important in regulating mood and behavior [11].

Furthermore, serotonin receptors effect the release of many other neurotransmitters including glutamate, GABA, dopamine, epinephrine and norepinephrine, acetylcholine, and oxytocin [12].Many antidepressants also act as serotonin 5HT agonists, indicating the highly influential status of serotonin in the brain for downstream effects.

What is the Role of Environmental Effects and Stress?

Stress responses are controlled by the Hypothalamic-Pituitary Adrenal Axis which governs fight or flight responses by regulating both hormonal and neurotransmitter mechanisms. When undergoing or perceiving a stressful event, a cascade of events lead to the release of cortisol, signaling to the body to either fight or flee. The precursor to cortisol, called corticotropin releasing hormone (CRH), supports the relationship between thoughts and behaviors, emotional responses, and involuntary reactions. CRH can also influence the concentration of neurotransmitters in the brain. Individuals with depression often have increased levels of CRH and cortisol [13], and some antidepressants work by decreasing CRH.



Traumatic and stressful events in childhood can impact the functioning of CRH and the HPA axis later in life [3]. Also, prolonged stressful events can induce long-lasting effects in the brain by altering brain structure and chemical function [3]. During development, the HPA axis learns how to deal with stressful or adverse events by developing resilience mechanisms that are responsible for governing how the brain reacts to adverse events later in life. If improperly developed as a result of adverse childhood experiences, these mechanisms can become impaired and thus react overly sensitively to difficult experiences during adulthood, inciting bouts of depression and anxiety that can worsen over time without treatment [14].

How does the neuroscience of depression and anxiety help us understand the potential of psychedelics?

The neuroscience of depression and anxiety is a complex topic, manifesting through chemical, structural, and environmental stressors. New discoveries in the field are still being made, as it is not fully understood in its entirety. As you can read about more on page 20, psychedelics, while not fully understood yet, interact with many of the same structural regions and neurochemical networks affected in depression and anxiety.

While the serotonin systems in the brain malfunction in depression and anxiety, reducing the production of important neurotransmitters, psychedelics have the unique potential of resetting this system by essentially restarting the Default Mode Network.

While scientists are perplexed by how psychedelics do this, psychedelics provide a lot of hope for those with severe and untreatable mental illness, targeting the mind and brain as two interconnected and important factors in the multidimensional healing process

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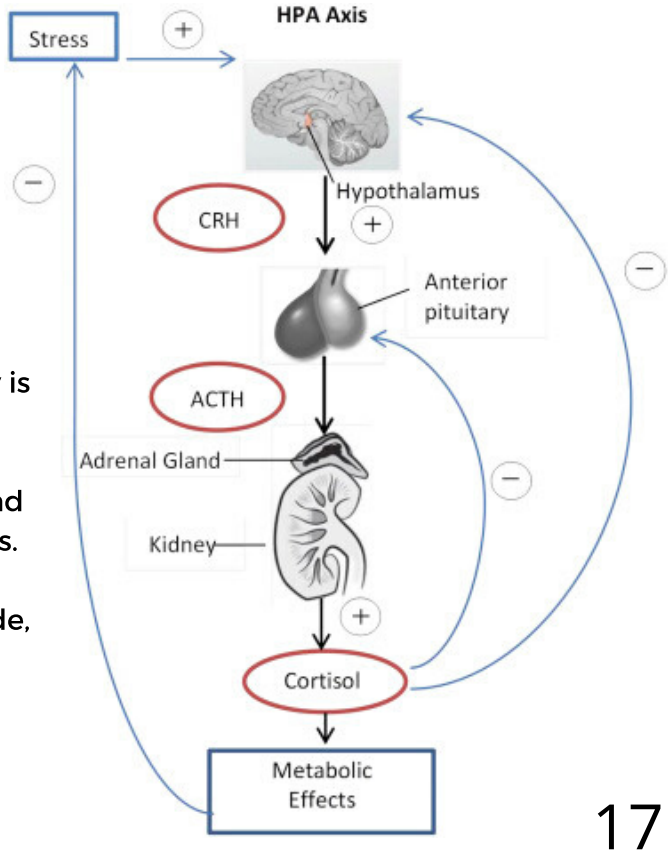
Image Source: Science Direct



ANTIDEPRESSANTS: FALLING SHORT

By Katherine Reckamp

Delving into today's modern media, it is not hard to come across articles claiming that psychiatrists are merely "drug pushers" who no longer incorporate talk-therapy into their practice. How, exactly, did we get to this point? With the medicalization of mental health and the creation of the DSM came a dramatic shift in psychiatry, making it almost unbelievable from how it looked in its establishment. Given the shift of approaches to treat mental illness, from Freud's couch to modern pills, this section focuses on the neuroscience of current antidepressants.

Antidepressants are used by 15.5 million people in the United States, a dramatic 60% more than just a decade ago [1]. But was this shift for the better? Several scientists would like to argue it is not. All antidepressants currently on the market work via the same few mechanisms in a few select neurochemical pathways in the brain. Because of this, the range of available antidepressants to the public has widened only marginally from their discovery. Alternate methods of treatment should be considered for those whose needs the current market is not meeting, such as patients with Drug-Resistant Depression.

The first-ever antidepressant by the name of iproniazid was approved for use in the 1950s [2]. Initially used for treating tuberculosis, the compound was soon afterwards discovered to be even more effective as an antidepressant. Further into the 50s came imipramine, a drug that was part of the tricyclic antidepressant family. Both drugs seemed to hold untapped potential. With very few side-effects, we were able to alter the brain chemistry of thousands, stabilizing mood and decreasing symptoms of both anxiety and depression. The "cure" for anxiety and depression seemed to be upon us.

The neurochemical mechanism varies only slightly between different drugs and most act to block the reuptake channels of certain neurotransmitters. The two most common antidepressant medications are selective serotonin reuptake inhibitors (SSRIs) and serotonin and norepinephrine reuptake inhibitors (SNRIs). Serotonin in the brain is associated with feelings of happiness and well-being. In order to help facilitate the amount of serotonin within the synapse, SSRIs have similar attachment sites to the receptors of serotonin. They are able to cross the blood-brain barrier where they then latch onto said receptor. This allows serotonin to remain in the brain for longer, leading to a "stabilized" mood and warding off feelings of anxiety and depression [3]. (Read more about other neurotransmitters on page X.) SNRIs block the reuptake of serotonin and work to stabilize the concentration of norepinephrine [4]. Due to the fact that norepinephrine is responsible in fight or flight mechanisms, by stabilizing norepinephrine in the brain, anxiety to non-life threatening events can be reduced [5]. It all seems quite straightforward and low-risk. Side-effects are minimal, mostly associated with constipation, insomnia, or fatigue, but never to any extent that could be considered threatening.

Looking beyond the rose-colored glasses of the 50s and 60s, it is becoming more and more clear that mental health issues cannot be treated as a "one size fits all" problem. Recent research by Dr. Kirsch has asserted that the efficacy of antidepressants was highly overstated in many of the beginning trials and even goes so far as to say that the placebo effect can explain much of the positive correlations found [6]. Anxiety and depression can result from a host of both environmental and genetic factors. So, unsurprisingly, the neurotransmitter reuptake inhibitors are not the most effective mode of treatment for every patient. Certain aspects of Major Depressive Disorder, such as memory impairment or compromised endurance when dealing with daily life stress, are not ameliorated by current drugs. Additionally, Treatment-Resistant Anxiety and Depression is prevalent in up to 40 percent of diagnosed persons [7]. There are few to no alternative medical routes for this population, as the FDA has continued to focus on research that has operated under the exact same chemical mechanisms for over 60 years.

As the field of mental health progresses, a similar progression should be expected of the range and types of treatments being offered. Moving forward, we must challenge ourselves to think outside the normalized structure surrounding antidepressants and seek out innovative and untapped ways to get people the treatment that they need. One such alternate route is the use of psychedelics as a method of treatment for depression and anxiety. The current research on psychedelics as an alternative to antidepressants has shown promising results, some of which you can read more about on the next page.

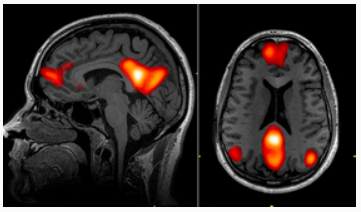
PSYCHEDELICS: NEUROSCIENCE OF THE BRAIN

When we are depressed our ego turns on itself and creates uncontrollable introspection. This hyperactive default mode network traps our minds in a repetitive and destructive loop of self-doubt. Using psychedelics disorganizes this brain activity and increases entropy in the default mode network, allowing our minds to reset to a more primitive mode of cognition.

THE SEROTONIN SYSTEM

has over fourteen receptors, over twice the number of any other major neuromodulator system. Neurotransmitters that normally bind to the serotonin receptors in the brain share a similar chemical structure to hallucinogens [1]. These hallucinogens include indoleamines (LSD and psilocybin) and phenethylamines (mescaline). These substances act as antagonists for the serotonin receptors, and their binding leads to an increased production of serotonin. These serotonin receptors are called the 5-HT2A receptors, subtypes of the larger 5-HT (5-hydroxytryptamine) in the central nervous system [1]. Indoleamines and phenethylamines share the same affinity for the 5-HT2A receptors, which is the only one they share. Unlike the 1A receptors, these 2A receptors are not located presynaptically on the 5-HT cell bodies. They are found on subpopulations of neurons in postsynaptic regions of the cerebral cortex [2]. Here, hallucinogens increase excitatory postsynaptic potentials activated in the layer V pyramidal cells [1]. This is most pronounced in the medial prefrontal cortex, where there is an increased density of 5-HT2A serotonin receptors. The effects include an increased amplitude and frequency of spontaneous EPSCs (excitatory postsynaptic currents), and greatly impact vision, hearing, thinking, emotion, and other perceptions [2].

These effects also include impacts on neural plasticity, neurogenesis, neurodevelopment, learning, cognitive flexibility, as well as enhanced environmental sensitivity. It is proposed that the 5-HT1A receptors provide basal control normally by promoting patience and moderating emotions. Separately, the 5-HT2A receptors are triggered during times of crisis, resulting in a relaxation of prior assumptions and beliefs about perception, emotions, cognition, and philosophy [2]. This means when serotonin levels in these structural areas are high, a wide range of perceptions are altered and the brain becomes more sensitive to change. Furthermore, research shows that psychedelics work differently than other serotonin drugs because they have the ability of resetting the serotonin pathways in the brain [2]. Those with severe depression have altered serotonin pathways, and psychedelic treatments can allow them to reestablish normal serotonin levels.



Shown: FMRI visual of the Default Mode Network in our brain. This region controls our ego, but psychedelics turns it off and lets it free.

Dr. Carhart-Harris et al. at Johns Hopkins used fMRI imaging to show that there is decreased cerebral blood flow (CBF) and connectivity in the default mode network (DMN) of the brain. This regulator area controls self-reflection, criticism, and worry, and is where our mind daydreams and forms mental constructions (self or ego) and moral reasoning [3]. It develops after childhood and is seen as an evolutionary advantage, because it controls all of the chaos inside of our brains and creates the image of who we think “we” are. When on psychedelics, mental activity dives into the subconscious as memories, emotions, and traumas come to the surface. As the brain undergoes this experience, the DMN mechanisms essentially shuts down and then reboots [4]. Our ego dissolves and our sense of self completely changes. This can help erase self-doubt, alter perceptions of traumatic memories, and bring suppressed thoughts to the surface. The neurological function of the DMN recalibrates and this allows for better release and uptake of serotonin within the brain such that users’ serotonergic pathways can reset to normal behavior.

What about hallucinations? Normally, various networks in the brain talk to themselves, however, a brain on psychedelics creates thousands of connections between networks. This “crosstalk” allows wishes, fears, and emotions to influence our visual perception, leading some to experience illusions or hallucinations [3]. These new connections increase the diversity and entropy of our mental activity and allows mental states to become bizarre and senseless, as well as imaginative and transformative.

LEft: normal crosstalk between neural network Right: crosstalk between neural networks on psychedelics

UCLA MEDICAL CENTER

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One day session with a trip guide and 30-minute follow-up one week later
You will be compensated $200 for your participation.

MUST BE AT LEAST 18 YEARS OLD
NO HISTORY OR FAMILY HISTORY OF PSYCHOSIS

To volunteer call 310-641-1254 or email
uclapsilocybinproject@ucla.edu

THE HISTORY

INTEGRATED TIMELINE: SHAMA

“mushroom stones” (psilocybin) dating back from this time provides evidence of Mesoamerican mushroom cults in southern Mexico and Guatemala (Wasson 1961, Nyberg, 1992).

1000-400 B.c (Middle Preclassic Mayan period) to the Classic Mayan period (500-1000 A.D.)

Photograph of Maya mushroom stones by Dr. Richard Rose reproduced from Stamets, 1996

Central American mushroom cults were discovered and the mushrooms themselves were renamed "Mexican magic mushrooms," in recognition of their psychotropic effects and to emphasize the significance of the mushrooms' early integration into the social fabric of the cultures that cherished them. (Gartz 1996)

1950s

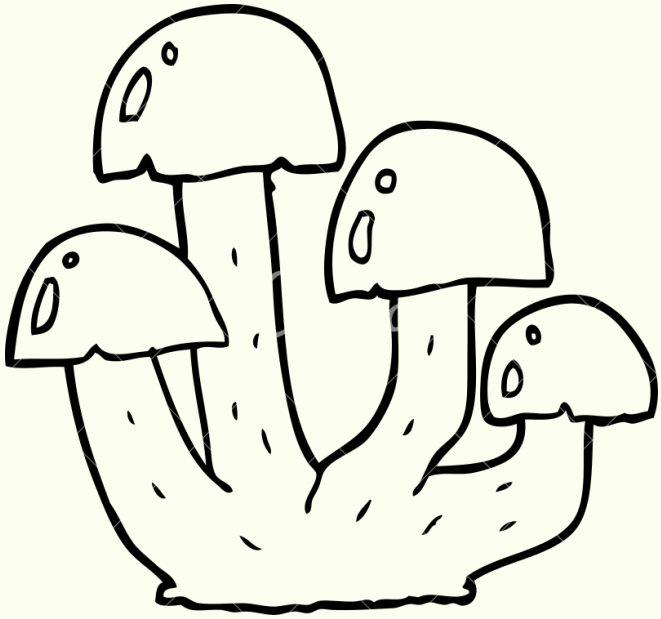
1000 B.C. TO 400 A.D.

16TH CENTURY

1950

Spaniards and accompanying Catholic friars discovered that the Aztecs conduct "religious rites of prehistoric provenance,” during which they ingest mushrooms they call teonanácatl "divine flesh." The friars condemned this practice as pagan and suppressed the ceremonies (Forte, 2012).

16th century



NIC, SCIENTIFIC, POLITICAL

Timothy Leary and
chard Alpert founded
e Harvard Psilocybin
Project

1960

US signed the Single Convention on Narcotic Drugs to prohibit use of cocaine, marijuana, and opium, but not classic psychedelics.

1961

Walter Pahnke's infamous 'Good Friday Experiment' revealed that psychedelics could not be researched with double-blind placebos.

1962

Leary and Alpert depart Harvard, after student-controversy, to start the IFIF and encourage counterculture sentiment of questioning authority.

1962-1963

FDA shuts down research projects related to LSD and mescaline.

1965

Colleges warned by FDA to find and stop use on campus

1966

Possession of LSD was officially criminalized

1968

Publication of Diagnosis and Statistical Manual of Mental Disorders III

1980

Oregon's secretary of state proposed to decriminalize psilocybin

2018

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Comprehensive Drug Abuse Prevention and Control Act listed psilocybin, LSD, and other psychedelics as strictly regulated Schedule 1 drugs.

1970

Birnbaum v United States, court dismissed Temple of The True Inner Light's request to use peyote for religious purposes.

1983

Gonzalez v. O Centro Expirita Beneficente Uniao de Vegetal Supreme Court allowed a Brazlian Church to use ayahuasca for religious ceremonies under the Free Exercise Clause and Religious Freedom Restoration Act of 1993

2006

Denver and Oakland decriminalized psilocybin

2019

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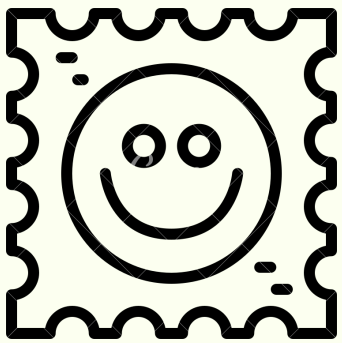


Part 1: The Shamanic

WHAT CAN WE LEARN FROM INDIGENOUS COMMUNITIES?

Painting by Pablo Amaringo

Mystical experiences do not seem to have a place in healing, especially in our medical world. Yet, in recent human clinical trials using psychedelics as treatments for psychiatric distress, the words mystical, magical, life-changing–originally hailing from what was deemed pseudoscience–are resurfacing.

How can these seemingly anecdotal descriptors represent legitimate healing? In an interview conducted by the Goop team (from the Netflix show The Goop Lab), Dr. Grob, one of the leading clinical researchers in the field of psychedelic-assisted therapy, urged that "in order to fully understand these compounds, we need to understand their anthropological contexts" [1].

What does the History Say?

Certain psychedelics–including psilocybin and ayahuasca–come from a long history of shamanic traditions; people have been consuming psilocybin–the psychoactive component of magic mushrooms–for more than 10,000 years [2].

Documentation of mushroom cults begins as early as B.C. 1500, a period during which Middle American cults worshipped psychedelic mushrooms as "God's flesh" [4]. Since these people have used psychedelics safely for so long, examining psychedelic rituals and rules of use within indigenous traditions is vital to optimizing drug use and understanding the drugs themselves.

What do Shamanic Communities Believe?

Psychedelic mushrooms, predominantly Amanita muscaria and Psilocybe species, have been used in shamanic contexts across a number of indigenous cultures, usually acting as "agents of the spirit world or inducers of trancelike states," meant to be ingested by "specialized members of society" [5]. For example, the psychedelic mushroom Amanita muscaria has been revered as a strength enhancer and shaman's tool among the indigenous peoples of Siberia [5]. In fact, they revere this mushroom to the extent where they habitually engage in "urine drinking to conserve the mushrooms' effects, [a practice that has been]

confirmed by ... numerous travelers over the years" [6]. In Wasson's article in the Life magazine, he states that when asked about the effect of mushrooms, "the first answer of the Spanish-speaking Indian ... was often this: Le llevan ahí donde Dios está, 'They carry [the psychedelic user] there where God is,' an answer that we have received on several occasions, from Indians in different cultural areas" [3].

Yet different groups of indigenous peoples also seem to carry different beliefs about each mushroom. For example, the "majority of Ukrainians, Russians, and Byelorussians....fearfully reject Amanita muscaria as a food, claiming that ingesting it internally can be deadly, although they do apply a fly agaric infusion externally as a remedy for ailing bone joints, skin, and eyes" [5]. In many of the indigenous healing practices that use psychedelic mushrooms, "it is usually not the patient but the healer who ingests the mushrooms, in order to draw knowledge of possible causes and cures from the experience spawned from the reaction" [5]. Additionally, using psychedelic mushrooms is not the only way shamans reach the "shamanic state of consciousness"; They also use combinations of "drumming, chanting, specific motion, or concentration" [5]. Nor is mushroom healing limited to humans, but also to "improve the health of whole ecosystems" [5]. For example, populating a habitat with fungi that can absorb environmental pollutants promotes the healthy soil restoration in contaminated forests [5].

What are Shamanic Rituals Like?

Velada was a mushroom ceremony dating back to the Aztecs in the 16th century who called these mushrooms teonanacatl or "God's flesh" [8]. Catholic friars tried to suppress them, but in the 1950s, researchers have found that traditional Mexican local tribes continue to practice these rituals "to commune with God to heal the sick" [2]. During the ritual, the shaman or curandero (medicine man) would ingest psilocybin mushrooms and contact the spirits, who would tell the shaman "the nature of the sickness and the way it could be healed" [2]. The participants seeking healing would

Below
"Anthropomorphic Beings Engaged in Mushroom Dance" 10,000-year-old rock drawing in Tassili, Sahara (Algeria)

ingest psilocybin while the shaman "chanted invocations to coax forth the divine," often vomiting to purge themselves of the illness [2]. It is important to notice that the mushrooms are not taken as a cure; rather, the shaman seeks answers from the spirits to guide the healing process.

To prepare for traditional psychedelic ceremonies, the shamanic communities discuss drug usage and lifestyle. For example, they insist that everyone participating in the ceremony should avoid "intoxicants like alcohol and other drugs in the days or weeks leading up to the event" [1]. They also mention eliminating "sugar, salt, and spices from one's diet and prohibiting sexual activity in the few days leading up to the experience [as all these behaviors] could make traversing the altered state induced by ayahuasca somewhat difficult and even perilous" [1]. This makes sense from our Western perspective because we would be concerned about drug interactions between psychedelics and other medicines and recreational drugs, as well as how our current health could affect the efficacy of a drug treatment. Yet even though we can learn a lot from the communities with shamanic traditions, it is important to consider how we might affect them by bringing their culture to the limelight.

Community of the Affected: Shamans

The wisdom and experiences shamans have about psychedelics are considered in many indigenous communities to be sacred local knowledge–not to be shared with foreigners [7]. Sharing these secrets has resulted in negative consequences to individuals, as well as significant changes to the cultural practices.

For example, María Sabina was a well-respected healer and shaman in Oaxacan village of Huautla de Jiménez who had performed mushroom ceremonies for many years [2]. She rose to fame as a shaman in the 20th century following Wasson's publication in Life [2]. However, the attention her fame brought to her Mazatec community brough undesirable foreigners from the Western countercultural movement seeking spiritual enlightenment [8]. Central American authorities kicked out the foreigners, and Sabina struggled in desolation and faced backlash from community members and fellow shamans who burned down her house, murdered her son, and shunned her for profaning the divine mushroom [8].

The waves of "drug tourists" that swept into indigenous lands seeking spiritual experiences led to growing commercialisation and commodification of psychedelic practices, which are perceived as "significant threats to the power and indigenous epistemologies of shamans" [9]. Shamans struggled to maintain the authenticity of their practice as "charlatans" posing as shamanic experts entered the psychedelic field [9]. This led to a "huge alteration of the spiritual side of the practice" [9].

Above
María Sabina preparing psychedelic mushrooms for velada. Image from Wasson's 1957 article in Life Magazine

...examining psychedelic rituals and rules of use within indigenous traditions is vital to optimizing drug use and understanding the drugs themselves.

Part 2: The Scientific & Political

1967 band poster by Wes Wilson

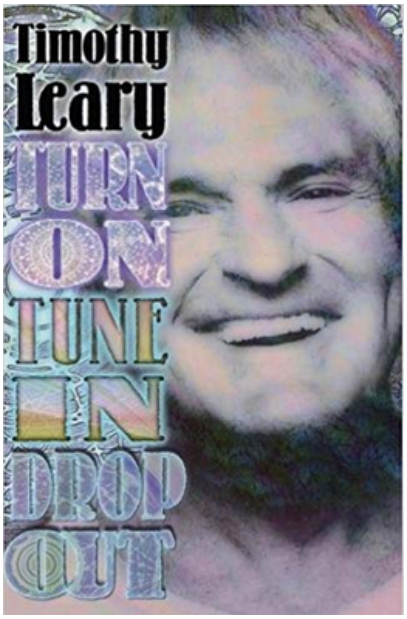
WHAT CAN WE LEARN FROM OUR SCIENTIFIC AND POLITICAL HISTORY?

The magic mushroom was unknown to science until the 1950s. This plant was "discovered" by R. Gordon Wasson, vice president of JP Morgan at the time, and he brought his finding to the United States in 1955 [1]. He then isolated and named the chemical molecules of psilocybin and psilocin, the active component of the prodrug psilocybin. Wasson developed a synthetic version of psilocybin that could be put into a pill, and in 1957 he published a Life Magazine article describing his experience. This was not the first scientific reference, as in 1952 journals had referenced the psychoactive mushroom used by 16th C Mesoamerican Indians, research conducted by Richard Evans Shultes in Central America. The discovery of the hallucinogenic effects of LSD occurred when Albert Hoffmann was researching lysergic acid derivative and accidentally absorbed LSD through his fingertips [8]. He felt dizzy and intoxicated, with feelings of extreme imagination, and perceptions of amazing shapes and pictures [3]. His LSD trip in 1943 led him to intentionally ingest the drug and further research ensued. Sandoz, the pharmaceutical company he worked for, offered free supply of Delysid (LSD-25) to researchers upon request if they would study it. It was first thought that it was a psychotomimetic, meaning it was a mind drug that mimicked psychoses [1]. Researchers Humphry Osmond and Abram Hoffer thought that symptoms of delirium and panic could keep alcoholics sober, which showed success in half of over 700 patients [1]. However, the board of Alcoholics Anonymous did not want the drug to be listed as

therapy, and a black box of knowledge persisted. Between 1953 and 1965 the National Institute of Mental Health and others funded trials with tens of thousands of patients, finding LSD to alleviate anxiety (70% success), depression (62%), and OCD (42%), as well as improve sleep and quality of life [1], [2]. This very early academic research on classical hallucinogens was designed without considering the powerful influences of set (psychological state) and setting (environment) [4]. Subsequent research, which included more preparation and interpersonal support during the period of drug action, found fewer adverse psychological reactions, such as panic reactions and paranoid episodes, and increased reports of positively valued experiences [4]. The press was remarkably promising, however, by 1959 it was being used by the general public beyond its therapeutic usage.

The popularity of psychedelics rose when Timothy Leary and Richard Alpert founded the Harvard Psilocybin Project in 1960. They started the advancement of serious academic research to develop a framework of how to make sense of these chemicals and devise therapies. The research by Leary became famous through the Crimson, the Harvard newspaper, and the national press. Their Concord Prison Experiment concluded that after inmates took the drug, only 25 percent went back to jail. However, when the same experiment was repeated decades later it was found that Leary had exaggerated the data [1]. By this time it was believed that Leary started to become obsessed. Both him and Alpert believed that scientific research was somewhat of a political game. They wanted to showcase the benefits of psychedelics for a cultural revolution and encouraged research outside of the laboratory [5]. They taught a course on psilocybin for graduate students and encouraged them to write about their own experiences, which raised concerns

Below
Cover of Timothy Leary's book written in 1966



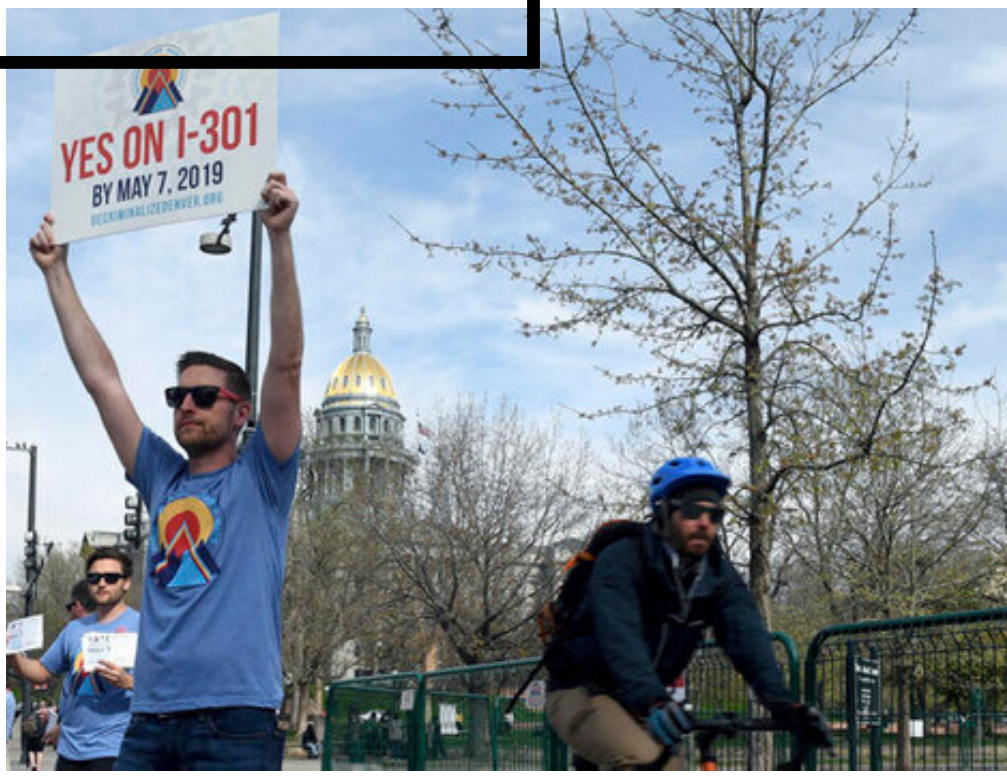
when some felt pressured to take the drug. What became was a cult following and an 'insider' effect. Additionally, some colleagues became uncomfortable with the practice of their behavioral experiments. Leary and Alpert had ignored random sampling when testing and even allowed researchers to take psychedelics along with the patients. It was also discovered that students were not analyzing data objectively or carefully [1]. An investigation by a Crimson reporter found that Alpert was giving mescaline to undergraduates, and both men were critically disciplined. After much backlash, Leary stated that the drug was too powerful to study at university, leaving to form the International Federation for Internal Freedom in 1962 [1]. His mental revolution promoted the younger generation to use these drugs and question authority, known as the counterculture. In 1967 at a hippie event in San Francisco, Leary promoted his stance against the war, encouraging students to "turn on, tune in, and drop out." Many kids dropped out of school at this time and refused to fight in Vietnam. He encouraged them to 'get out of the mind' and 'be-reborn.' [1]. Ironically, Leary helped establish the detrimental link between psychedelics and counterculture which led to its criminalization. He was very upfront about the risk, stating that these drugs "were more frightening than the bomb" due to the panic they may cause. Many historians and writings blame Leary for the downfall and subsequent criminalization of psychedelics.

In 1961 the US signed the Single Convention of Narcotic Drugs, which regulated marijuana, cocaine, and opium, but not psychedelics [6]. This showed a philosophical shift toward prohibiting the use of several chemicals. By 1963, bootleg LSD found on the streets had led to bad trips, emergency room visits, and psych-ward treatment. Subsequently, mainstream psychiatry abandoned the research, as LSD was thought to cause mental illness, not cure it [1]. Although not proven, it was claimed that psychedelics could cause permanent damage physically and mentally. In 1966 the FDA sent warnings to all universities, stating that concrete action must be taken against the use of these 'extremely hazardous' drugs on campus [7]. While no statistics showed any increased use or adverse effects, there was a push for harsh legal penalties. By 1965 the FDA began to shut down research projects related to LSD and mescaline, and in 1968 the possession of LSD was crminizaled [6]. Finally, in 1969 Nixon declared the war on drugs, including the Comprehensive Drug Abuse Prevention and Control Act of 1970. LSD, psilocybin, and other psychedelics were listed as Schedule 1 drugs, the most strictly regulated. These drugs were determined to possess a high potential for abuse, no medical use, and lack of safety. As a result, previous knowledge was erased and the field was abandoned and demonized for decades.

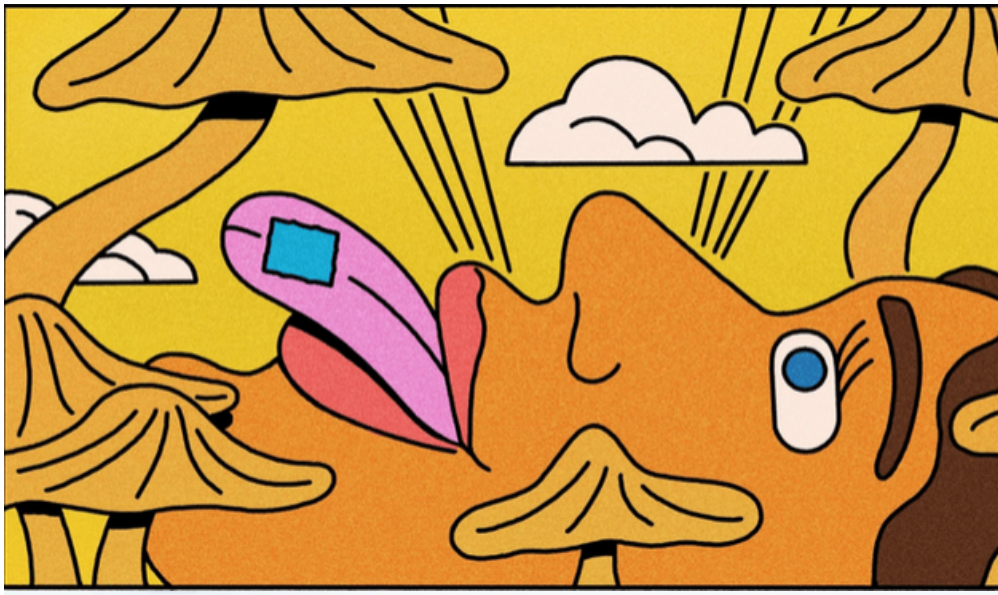
Timothy Leary and Richard Alpert... wanted to showcase the benefits of psychedelics for a cultural revolution.

WHAT IS PSILOCYBIN'S PATH TO LEGALIZATION?

Below
Residents of the city of Denver lobbying to be the first-ever U.S. city to legalize psychedelics. The succeeded, passing the law on May 7th, 2019.



What is the history that led to psilocybin's illegal status? What is the current legalization? Are our modern medical and legal systems equipped to effectively regulate psychedelics as a legalized substance? What can marijuana's path to legalization tell us about the future for psychedelics? Is it ethical to allow psychedelics to become legal despite their dangerous consequences?



Right:
An artistic representation of Timothy Leary's drug trials in the 1960s, where he used undergraduates as research subjects despite explicitly instructions not to, changing the field of psychedelic research indefinitely.

Given the science and recent clinical trials, it is clear that psychedelic mushrooms do not have the potential for abuse (in the context of dependence) and have clear medical and therapeutic benefits. In fact, they have fewer side effects than many of the current antidepressants on the market. This begs the question: why is it illegal?

The illegal status of psilocybin stems from a conservative political response to a growing counter-cultural movement that threatened current systems of power. Psychedelics in general were tied to the hippie culture and anti-war movement, so they were criminalized by association. In response, the Nixon government began a war on drug campaign to fix America's image; it instated the Controlled Substances Act of 1970, making psilocybin a Schedule 1 drug– defined by the United States Drug Enforcement Administration as "drugs with no currently accepted medical use and a high potential for abuse [1]. By painting psychedelics as the villain, the government condemned them to professional marginalization for the next few decades; all the public funding toward their research dried up, leaving small private sectors to fund it.

The road to legalization began in 1983 with the case of Birnbaum vs United States, held in a District Court in southern New York [2]. The plaintiffs included four members from the Temple of The True Inner Light, a Native American church. The group wanted their right to consume peyote, a psychedelic drug, without criminal punishment. They argued that the drug was the Flesh of God and that this practice was exercising their religious beliefs, a first amendment right. They argued that this practice was critical and fundamental to their beliefs, but in order to win the case they needed to prove that it was integral to their religious experience. The court viewed the case to be less about the religious experience and more about being free to consume the drug without penalty. The Temple members claimed that the drug experience made them better people. For example, Jeanne Gannon asserts she has gotten rid of her alcoholism, other drug abuse, and violent tendencies after taking psychedelics with

the group. Another member by the name of Theodore Fulton was a heroin user and had solicited prostitutes before joining the Temple. However, after joining and becoming a minister of the Temple, he continued to sell narcotics and was convicted of assault in 1979. While the plaintiffs attempted to dismiss his actions, the judge found that none of them demonstrated that psychedelics had been an integral part of their experience from the beginning. The judge believed that their beliefs only came after a period of illegal use and this case was an attempt to escape criminal penalty. More recently, in 1993 the Religious Freedom Restoration Act was passed in 1993, setting the state for the case of Gonzalez v. O Centro Expirita Beneficente Uniao de Vegetal in 2006. The Supreme Court allowed exemption under the Free Exercise Clause of the Act to a Brazlian Church, allowing them to use ayahuasca for religious ceremonies [3].

Currently, psychedelic mushrooms are still illegal despite the growing research and shifting public attitudes. The illegal status creates accessibility issues for recreational users. Some recreational users from our interviews stated that psychedelic mushrooms were comparably more difficult to source than LSD, which actually has a longer duration of effect. In recent years, many people have found psychedelic mushrooms helpful in normal everyday life, microdosing ever so often to increase production, creativity, and improve eating and sleeping habits. While still illegal, this and the use of psilocybin for medical treatment has been gaining support from the public via grassroots movements. Ultimately, grounding scientific claims by establishing clear medical uses are necessary steps in order for legalization measures to pass state-wide and federally.

Psilocybin has a growing legal acceptance in the United States, as displayed by the passing of the ballot measure in Denver, Colorado, where psilocybin use is now legalized and regulated. California has made a proposal to get psilocybin on the ballot; however, only Oakland and Santa Cruz have been successful at getting any legislation through. Looking at ways that psilocybin positively affects society helps the push for legalization. For example, the case states that the Journal of Psychopharmacology found that psilocybin use was actually correlated with a reduced likelihood of violent crime, as well as reduced opioid addiction [4]. Other projects, such as the End of Life Liberty Project, advocate for psychedelic use in terminally ill patients [5]. The goal of this project is to change the classification from a Schedule 1 drug.

Above:
Activists petitioning for the legalization of psychedelics in Denver CO.
Image from: ABC News

what lessons can be learned from the legalization of psychedelics in cities like Denver and Oakland?

They also claim the drug enhances the well-being of healthy volunteers. For now, patients must grow their own mushrooms or obtain them abroad or in clinical trials. By medicalizing the drugs we lessen the risk of bad experiences from using black market products. In a similar way that states have pushed to legalize marijuana, there is a need for cooperative federalism; federal and state laws must work together to address a shared issue.

In 1986, economist Edward Cowan coined the concept of "the Iron Law of Prohibition" [6]. This theory, he states, follows a basic economic framework: as barriers are placed on the illicit drug supply chain, this creates a pressure to minimize the volume of product while simultaneously maximizing the profit. In the prohibition era, this meant illegal vendors turned to more potent forms of alcohol, such as moonshine. More recently, as more and more restrictions are being put on opioids the black market has turned to heroin and fentanyl (an opioid that is 100 times stronger than oxycontin), two drugs that can be synthesized both in a cost-effective and efficient manner. Of course, having contraband that is larger and more detectable increases chances of being caught and is therefore another reason for the increased potency of illegal products to have the smallest physical amount possible. This economic theory argues that deciding on making an illicit substance "illegal" can do far more harm than good. After Nixon's war on drugs in the early 70's, and with it his attempt to completely eliminate psychoactive drugs, cocaine started rapidly increasing in popularity. Cocaine is a highly addictive drug, unlike magic mushrooms or LSD, and holds higher risks for the potential to overdose. What dangerous drug use patterns could then potentially be avoided with the legalization of psychedelics? It is hard to know.

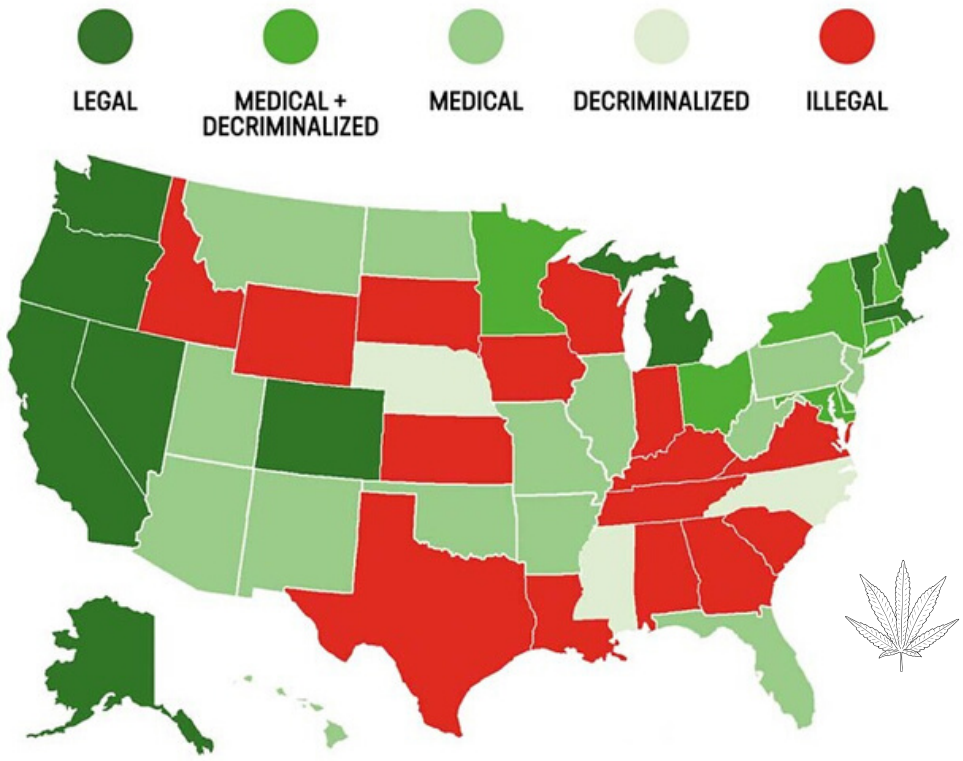
When seeking to understand the path to legalization for psychedelics, we can use marijuana, also previously deemed a Schedule 1 drug, as a case study. The process through medicalization and legalization was a rather lengthy one, beginning in the 1970s with the first host of decriminalization

However, what does the future of medicalization mean for the field of psychedelics? How much more research is needed in order to fully understand the true benefits of these drugs? Who should have access and in what settings? And, how will the access to psychedelics change the landscape of modern Western medicine?

Above
A look at what common home growing kits consist of. Legalization of mushrooms would prevent black market activity from occurring.
Image: Quartz Magazine

what dangerous patterns could potentially be avoided with the legalization of psychedleics?

policies. Following decriminalization, by 2016, 26 states had passed medical marijuana laws, and by 2019, 12 states had recreational marijuana laws [7]. Due to the increased costs of findings, arresting, and housing nonviolent drug offenders, the increased evidence regarding therapeutic potentials, and the financial strain on state budgets all led to the movement for legalization of cannabis [7]. Furthermore, it is understood that marijuana has fewer physical risks than other recreational drugs and is more socially accepted. The drug is not demanding on the body and the public is generally more educated on dosages in response to body type and experience level. The obvious parallel between marijuana and psychedelics is their psychoactive effect on the brain. Some who argued for marijuana legalization are using the right of 'Cognitive Liberty' to push for psychedelics [3]. They claim that the 'freedom of the mind' is being hindered by criminalizing these drugs. If individuals want to alter their consciousness and self-determine their brain chemistry what right do we have to prohibit that? We have the right to think for ourselves and use our body how we desire. It is an interesting argument and cannot be ignored, however it is important to remember that not altering one's state of mind can sometimes have negative or dangerous outcomes.



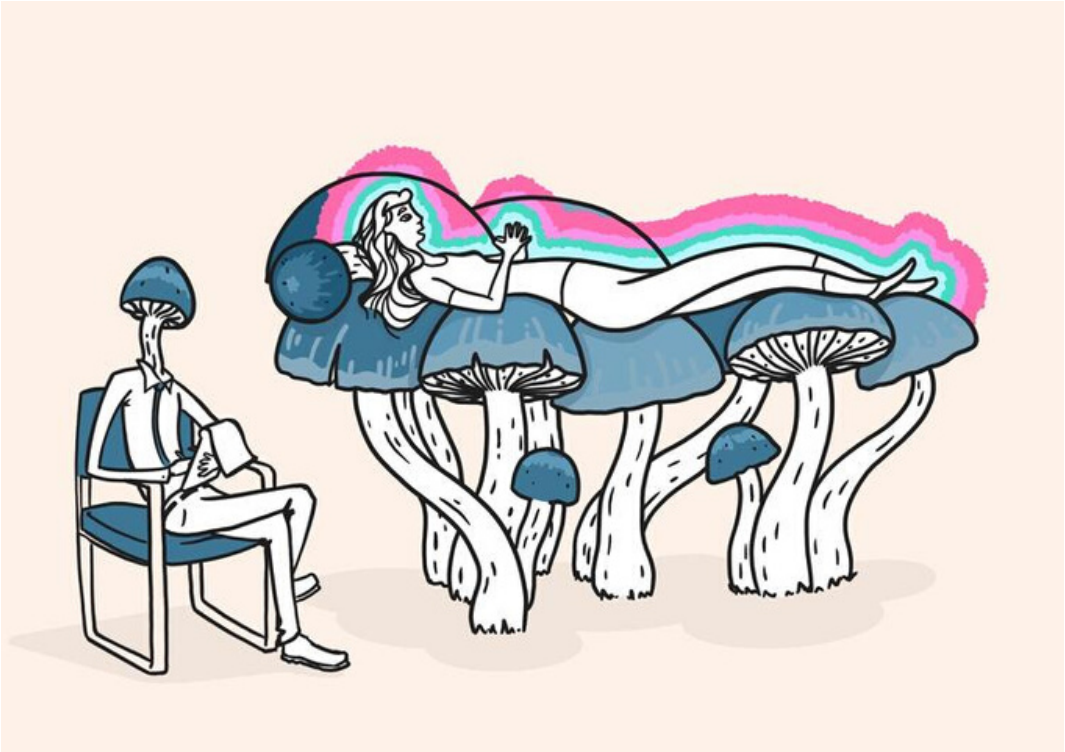
It must be kept in mind that both the cultural landscape and medical realities of marijuana and psychedelics are incredibly different. Marijuana does not have severe medical consequences such as psychosis or severe mental instability, whereas psychedelics have the potential to do so even after one use. It is important to keep in mind that altering our mind in this way can be dangerous to ourselves and others, even if by mistake, since these drugs do make us delusional and judgment may be impaired. (More information on the risks of psychedelics are outlined in the earlier piece on medicalization.) Furthermore, there is less social acceptance with psychedelics, especially given the political and cultural climate that began in the 1970s with the Nixon Administration.

Finally, because use is less common, there are fewer varieties and types of substances and potency levels, which makes the potential market much slimmer, and therefore limits potential buyers. Therefore, as Dr. Grob emphasized, in order to entrust the public to use these drugs properly we must properly and effectively organize and execute a comprehensive public education campaign. A set of safety and legal measures must be standardized and the public must understand the risks of taking psychedelics in order to keep them safe. However, what would this public education campaign look like? How effective would it be? Current educational curriculums will tell students that drugs are illegal and will provide a host of potential dangerous effects to back their claim. How would this narrative need to be reworded in

Above
Map of current legalization of marijuana in the United States.. Image from *Forbes*

a way that psychedelic drugs are not stigmatized but the risks are made clear? As we know from knowledge on anti-smoking campaigns, public education can only reach so far, so can we trust the public to use drugs properly? What experiences have we seen in the past that indicate otherwise? (Opioids, perhaps)?

Though much of the media surrounding marijuana's legalization remains positive, the fact of the matter is marijuana is only completely legal for recreational use in 11 states and in Washington D.C.. Several other states have medicalized its use but are still extremely reluctant to open the drug up to the public. As has been outlined, the potential risks associated with marijuana do not hold the same severity as those associated with psychedelics. Yet, a strong public perception of the illegality of the drug continues to persist. An extremely dramatic upheaval of current cultural norms and perceptions would be required for psychedelics to follow suit. Scientific research, positive results from medical usage, and continued support in the media are needed before psychedelics could take such a drastic step.



Lastly, unlike marijuana, the therapeutic benefits from psychedelics occur in an extremely structured and supportive environment. As Dr. Grob emphasizes, simply taking LSD or psilocybin on your own cannot induce the same psychological flexibility that the medical experience can, so it is rather unclear whether permitting access across the board can help the masses. The potential legalization of these drugs poses problems on how to regulate its accessibility and intake. For this reason, a road to legalization may potentially end up causing far more harm than good.

Above
Why is it important to be guided when undergoing psychedelic therapy?.Why is recreational use of psychedelics so different from marijuana? Images: MAPS.org

...therapeutic benefits occur in extremely structured and supportive environments...

THE SOCIAL/CULTURAL

THE COMMUNITY OF AFFECTED: RECREATIONAL PSYCHEDELIC CULTURE

WHAT DO RECREATIONAL USERS SAY ABOUT PSYCHEDELICS? INTERVIEWS WITH PSYCHEDELIC USERS

A: Two 22-year old females who experienced LSD on multiple recreational occasions, who have not suffered from major depression or anxiety
B: 21-year old female who experienced LSD and psilocybin on multiple recreational occasions, and who has suffered from major depression and anxiety.
C: 27-year old male who experienced LSD on one recreational occasion, who suffers from anxiety.
D: 20-year old male who experienced LSD and psilocybin on multiple recreational occasions, and who has suffered from anxiety

Q: "What were your experiences on the drug?"

A1: **Happiness and deep love** and admiration for the people around us. **Color** was coming out of everything, the walls, furniture, the people tripping with me.

A2: It was like every day experiences, but our **emotions and feelings of connection were heightened.** The trees and flowers, all living things, were almost breathing..

B: I felt very present and **in touch with the environment**. You kinda realize that nothing else matters except taking care of your **health**, **loving people**, creating **connections**, and **loving nature**.

C: I felt **invisible** almost. I was just in a state mentally and physically where **I didn't feel it**.

D: It was probably one of the **most intense experiences I felt**, in a good way. It was extremely **positively emotional**...I was really **happy**, super **comfortable**, super **satisfied**. I could see my thoughts, reaching new philosophical breakthroughs in my head. It was an **out-of-body experience.**

Neither C nor D had bad trips on either LSD or psilocybin.

Q: "Did you have any negative experiences on LSD?"

A1: I was so **overwhelmed**. I didn't experience the euphoria or life change that you always hear about, some friends did though. I felt so **dirty** after, I felt like I hadn't showered in days.

A2: My experience at Coachella was extremely **stressful**, I don't want to do that again. I was also super **exhausted**...I was bored after 7 or 8 hours and just **wanted it to end**.

B: The one time I did it in the wrong environment, the first time I did LSD, everything was **awful and terrible**. But I did realize I needed to talk to my mom about my eating disorder and I went to get treatment, so **there was some good**. I was just **overwhelmed**. I hadn't put myself in a safe environment.

Q: "How was your mental health in the days following?

A1: I was insanely **depressed and lonely** after the trip, but after a few days I felt normal.

A2: Me too, I was just **drained** and felt like I wanted to be in bed all day.

C: I'm not saying that psychedelics is a 100% the reason why I was probably cured, but I do have **anxiety**... and I think that ever since trying it I've just been **more laid back** and **chill**... but I think this is acid trip experience really **made things okay**, because I just realized there's so **many things that I've yet to experience.**

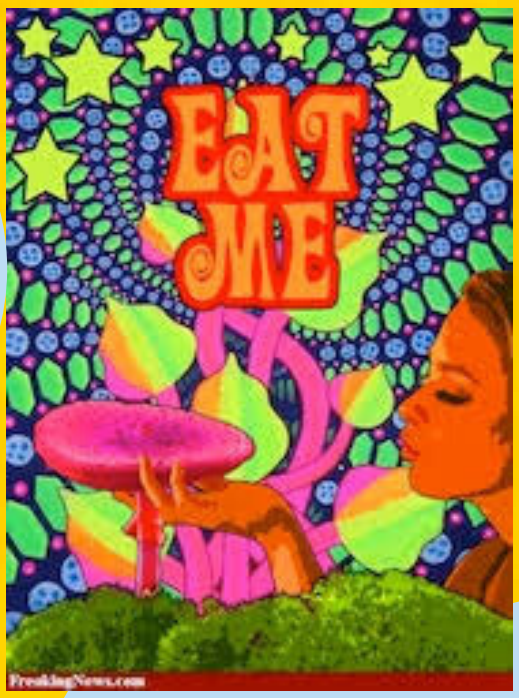
B: My friend was super honest with me and told me what was wrong with me in the most healthy productive way. I felt my **shell cracking away** and I felt my chest open and this **light came out of me** and I was **crying** so much, because all this shit was just **releasing**. I felt this **dark veil lift off of me**. The next morning I had no shoulder or back pain and my **soul felt so light.**

D: It has **helped my mental health** in that it has helped me be very **introspective**. If I look at how I've **grown**, how I've **changed**, I feel like that's been **beneficial** towards me. And just in general they've been **happy experiences** for me.

How Psychedelics Have Influenced the Mainstream

When people hear the word LSD, they often think of the psychedelic pink-and-orange swirls of 1960s art and naked people donning flowers in their hair. However, do they think of Alice in Wonderland? Mario Kart? Santa Claus? How about Steve Jobs?

Alice's "Trip" to Wonderland



In the beloved children's book "Alice's Adventures in Wonderland," kids are transported to an alternate world where cheshire cats disappear, tea parties are hosted by rabbits, and advice from a caterpillar is considered sound. Seven-year-old Alice falls down a rabbit hole and into a universe where logic and reality are bent. This playful existence makes the book as well as the subsequent Disney movie enjoyable for children and adults alike. But where did Carroll's inspiration for this ridiculous tale come from? Some would venture to say psychedelics. When Alice approaches a caterpillar smoking hookah, he is actually sitting on a mushroom. He tells her if she eats from one side of the mushroom it will make her shorter, while the other will make her taller. This instance where Alice ingests mushrooms to distort reality as well as her perception of self, sounds an awful lot like a magic mushroom to us. [1]

Santa Claus... is a shaman?

How could our pot-bellied, cookie-eating, present-giving childhood hero fly around the world in one night, fit in everyone's chimney and live comfortably in the north pole? The answer is psychedelics. A popular theory about the origins of Santa Claus claims that his appearance resembles the "uniform" of shamans in the Sami tribe in cold, snowy Finland. These shamans would ingest psychoactive mushrooms to perform healing rituals in their community. As all-knowing men that can defy both space and time, these shamans sound a lot like our good friend up north. [2]

Super Mario Bros. Magical Kingdom

Level Up! Classic video game Mario Bros. is set in a magical kingdom where spells are commonplace and characters like Mario get "power-ups" in order to win and advance. One such power-up is a magical red and white mushroom that the characters ingest, allowing them to get bigger and bulldoze their enemies. [3]

SOURCES

Preface From the Editors

[1] Bonson, K. R. (2018). Regulation of human research with LSD in the United States (1949-1987). Psychopharmacology, 235
(2), 591-604.Byock I. (2018). Taking Psychedelics Seriously. Journal of palliative medicine, 21(4), 417–421. doi:10.1089/jpm.2017.0684[2] De Gregorio, D., Enns, J. P., Nuñez, N. A., Posa, L., & Gobbi, G. (2018). d-Lysergic acid diethylamide, psilocybin, and other classic hallucinogens: mechanism of action and potential therapeutic applications in mood disorders. In Progress in brain research (Vol. 242, pp. 69-96). Elsevier.
[3] Ali, I. L. (2017, December 18). A New Era of Psychedelic Policy? Chacruna. https://chacruna.net/new-era-psychedelic-policy/
[4] Byock, I. (2018). Taking Psychedelics Seriously. Journal of Palliative Medicine, 21(4), 417–421. https://doi.org/10.1089/jpm.2017.0684

Neuroscience of Depression and Anxiety

American Journal of Psychiatry. 161:1957-1966.
[2] Duric, V. & McCarson, K.E. (2005) Hippocampal neurokinin-1 receptor and brain-derived neurotrophic factor gene expression is decreased in rat models of pain and stress. Neuroscience. 133(4):1199-1006. DOI: 10.1016/j.neuroscience.2005.04.002
[3] Bohrer, M., Colla, M., Deushle, M., Hagen, T., Heuser, I., Kronenberg, G. (2007). Hippocampal volume reduction and HPA-system activity in major depression. Journal of Psychiatric Research. 41(7):553-560. DOI: 10.1016/j.jpsychires.2006.06.011
[4] Gado, M.H., Kraemer, H.C., Sheline, Y.I. (2003). Untreated depression and hippocampal volume loss. American Journal of Psychiatry. 160(8):1516-8. DOI: 10.1176/appi.ajp.160.8.1516
[5] Harvard Medical School. (2009). What causes depression? Onset of depression more complex than a chemical imbalance. Harvard Health Publishing.
[6] Mathew, S.J., Patriquin, M.A. (2017). The neurobiological mechanisms of generalized anxiety disorder and chronic stress. Chronic Stress. doi: 10.1177/2470547017703993
[7] Ashwal, S. et al. (2018). Swaiman's Pediatric Neurology. 6th edition. https://doi.org/10.1016/C2013-1-00079-0
[8] Yan et al. (2019). Reduced default mode network functional connectivity in patients with recurrent depressive disorder. PNAS. 116(18):9078-9083. https://doi.org/10.1073/pnas.1900390116
[9] Coutiho, J.F., Fernandesl, S.V., Goncalves, O.F, Maia, L., Sampaio, A., Soares, J.M. (2016). Default mode network dissociation in depressive and anxiety states. Brain Imaging Behavior. 10(1):147-57. doi: 10.1007/s11682-015-9375-7.
[10] Codagnone, M.G., Cryan, J.F., O'Leary, O.F. (2020). Revisiting the behavioral genetics of serotonin: relevance to anxiety and depression. Handbook of Behavioral Neuroscience. 31:665-709. https://doi.org/10.1016/B978-0-444-64125-0.00038-4
[11] Hale, M.W. & Lowry, C.A. (2010). Handbook of Behavioral Neuroscience. Elsevier. Volume 21. https://doi.org/10.1016/S1569-7339(10)70091-6
[12] Frazer, A. & Hensler, J.G. (1999) Basic Neurochemistry: Molecular, Cellular, and Medical Aspects. Lippincott-Raven. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK28234/
[13] Herbert, J. (2013). Cortisol and depression: three questions for psychiatry. Psychological Medicine. 43(3):449-469. DOI: https://doi.org/10.1017/S0033291712000955l0.1016/j.jpsychires.2006.06.011
[14] Charney, D., Friedman, M.J., Litz, B.T., & Southwick, S.M. (2011). Resilience and Mental Health: Challenges Across the Lifespan. Cambridge University Press.

Current Antidepressants: Where are we now?

[1] Skolnick, P., Popik, P., & Trullas, R. (2009). Glutamate-based antidepressants: 20 years on. Trends in Pharmacological Sciences, 30(11), 563–569. doi: 10.1016/j.tips.2009.09.002
[2] Hale, M.W. & Lowry, C.A. (2010). Volume 21. Handbook of Behavioral Neuroscience. Elsevier. https://doi.org/10.1016/S1569-7339(10)70091-6
[3] Cryan, J. F., & Leonard, B. E. (2010). Depression: from psychopathology to pharmacotherapy. Basel: Karger.
[4] Binder, E., Martin, E.I., Nemeroff, C.B., Ressler, K.J. (2009). The neurobiology of anxiety disorders: brain imagine, genetics, and psychoneuroendocrinology. Psychiatriatric Clinics of North America. 32(3):549-575. doi: 10.1016/j.psc.2009.05.004
[5] Mayo Clinic Staff. Serotonin and norepinephrine reuptake inhibitors. Mayo Clinic. Retrieved from: https://www.mayoclinic.org/diseases-conditions/depression/in-depth/antidepressants/art-2004497
[6] Penn, E., & Tracy, D. K. (2012). The drugs don't work? antidepressants and the current and future pharmacological management of depression. Therapeutic Advances in Psychopharmacology, 2(5), 179–188. doi: 10.1177/2045125312445469
[7] Jakobsen, J. C., Gluud, C., & Kirsch, I. (2019). Should antidepressants be used for major depressive disorder? BMJ Evidence-Based Medicine. doi: 10.1136/bmjebm-2019-111238

Psychedelics: Neuroscience of the Brain

[1] Aghajanian, G. K., & Marek, G. J. (1999). Serotonin and Hallucinogens. Neuropsychopharmacology, 21(1), 16–23. https://doi.org/10.1016/S0893-133X(98)00135-3
[2] Carhart-Harris, R. L. (2018). Serotonin, psychedelics and psychiatry. World Psychiatry, 17(3), 358–359. https://doi.org/10.1002/wps.20555
[3] Pollan, M. (2018). How to Change Your Mind: What the New Science of Psychedelics Teaches Us About Consciousness, Dying, Addiction, Depression, and Transcendence. Penguin Books; nlebk.
[4] Grob, C. (2020, February 27). [Personal communication].
[5] Psychedelic Research Finds Ego Exists in This Part of the Brain. (n.d.). Gaia. Retrieved March 1, 2020, from https://www.gaia.com/article/psychedelic-research-finds-ego-exists-in-the-default-mode-network

Is Psilocybin A Viable Medical Treatment?

[1] The American Psychiatric Association, 2013. Available from: http://www.dsm5.org/.[2] Harvard Medical School. (2009). What causes depression? Onset of depression more complex than a chemical imbalance. Harvard Health Publishing.
[3] Ball, S.G., Iyengar, S., Maletic, V., Oakes, T., Robinson, M. & Russell, J. (2007). Neurobiology of Depression: an integrated view of key findings. International Journal of Clinical Practice. 61(12): 2030-2040. doi: 10.1111/j.1742-1241.2007.01602.x
[4] Harris, Gardiner. "Talk Doesn't Pay, So Psychiatry Turns Instead to Drug Therapy." The New York Times. The New York Times, March 5, 2011. https://www.nytimes.com/2011/03/06/health/policy/06doctors.html.
[5] CITE
[6] Pollan, Michael. (Interview). (2018, May 15). 'Reluctant Psychonaut': Michael Pollan Embraces The 'New Science' of Psychedelics. National Public Radio. [audio podcast]
[7] Barrett, F.S., Davis, A.K., Griffiths, R.R. (2019). Psychological flexibility mediates the relations between acute psychedelic effects and subjective decreases in depression and anxiety. Journal of Contextual Behavioral Science. 15, 39-45. https://doi.org/10.1016/j.jcbs.2019.11.004
[8] Griffiths, R. (n.d.). The science of psilocybin and its use to relieve suffering-TEDMED. Retrieved February 5, 2020, from https://www.youtube.com/watch?v=81-v8ePXPd4
[9] CITE
[10] Griffiths, R.R. & Johnson, M.W. (2017). Potential Therapeutic Effects of Psilocybin. Neurotherapeutics, 14(3), 734-740. doi: 10.1007/s13311-017-0542-y.
[11] Grob, C. S., Danforth, A. L., Chopra, G. S., Hagerty, M., McKay, C. R., Halberstadt, A. L., & Greer, G. R. (2011). Pilot Study of Psilocybin Treatment for Anxiety in Patients With Advanced-Stage Cancer. Archives of General Psychiatry, 68(1), 71–78. https://doi.org/10.1001/archgenpsychiatry.2010.116
[12] Roseman, L., Demetriou, L., Wall, M., Nutt, D., & Carhart-Harris, R. L. (2018). Increased amygdala responses to emotional faces after psilocybin for treatment-resistant depression. 269. https://dx.doi.org/10.1016/j.neuropharm.2017.12.041[13] Harmer, C. & Kaltenboeck, A. (2018). The Neuroscience of depressive disorders: A brief review of the past and some considerations about the future. Brain and Neuroscience Advances. 2:1-6. https://doi.org/10.1177/2398212818799269[14] A New Understanding: The Science of Psilocybin (2019) [Full Documentary]. (n.d.). Retrieved February 5, 2020, from https://www.youtube.com/watch?v=TIVIfQaqVG4
[15] Kumar, S. (2009). Psilocybin-assisted psychotherapy in the management of anxiety associated with stage IV Melanoma. Clinical Trials.gov). Retrieved from http://www.clinicaltrials.gov/ct2/show/study/NCT00979693.
[[16] Pollan, M. (2015, February 2). The Trip Treatment. https://www.newyorker.com/magazine/2015/02/09/trip-treatment
[17] Huber, Bridget. What do we know about the risks of psychede
lics? Michael Pollan. Retrieved from https://michaelpollan.com/psychedelics-risk-today/[18] Farah, T. (2020, February 21). This Is What Happens When You Take 550 Doses of LSD At Once. Vice. https://www.vice.com/en_us/article/pkeqd8/what-happens-lsd-overdose
[19] Grob, C. (2020, February 27). [Personal communication]
.[20] Microdosing: People who take LSD with breakfast - BBC News. (2017, April 10).

Psilocybin: A Story of the Shamanic, Scientific, Political

Part 1: The Shamanic
[1] Shamanism And Psychedelics—The Science Behind It. (2019, January 10). Goop. https://goop.com/wellness/health/the-science-and-shamanism-of-psychedelics/
[2] Kabil, A. (2017, January 6). This Mexican medicine woman hipped America to magic mushrooms, with the help of a bank executive. Medium. https://timeline.com/with-the-help-of-a-bank-executive-this-mexican-medicine-woman-hipped-america-to-magic-mushrooms-c41f866bbf37
[3] Wasson, R. G. (1957). Seeking the Magic Mushroom. Life, 42(19), 100–120 .http://www.imaginaria.org/wasson/life.htm
[4] Wasson, R. G. (1961). THE HALLUCINOGENIC FUNGI OF MEXICO: An Inquiry into the Origins of the Religious Idea among Primitive Peoples. Botanical Museum Leaflets, Harvard University, 19(7), 137–162. JSTOR
.[5] Yamin-Pasternak, S. (2011). Ethnomycology: Fungi and Mushrooms in Cultural Entanglements. In Ethnobiology (pp. 213–230). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118015872.ch13
[6] Miller, R. J. (2013). Drugged: The science and culture behind psychotropic drugs. Oxford University Press.
[7] Feinberg, B. (2018). Undiscovering the Pueblo Mágico: Lessons from Huautla for the Psychedelic Renaissance. In B. C. Labate & C. Cavnar (Eds.), Plant Medicines, Healing and Psychedelic Science: Cultural Perspectives (pp. 37–54). Springer International Publishing. https://doi.org/10.1007/978-3-319-76720-8_3
[8] Brown, J. B., & Brown, J. M. (2016). The Psychedelic Gospels: The Secret History of Hallucinogens in Christianity. Simon and Schuster

.Part 2: The Scientific/Political
[1] Pollan, M. (2018). How to Change Your Mind: What the New Science of Psychedelics Teaches Us About Consciousness, Dying, Addiction, Depression, and Transcendence. Penguin Books; nlebk.
[2] Agin-Liebes, G. I., Malone, T., Yalch, M. M., Mennenga, S. E., Ponté, K. L., Guss, J., Bossis, A. P., Grigsby, J., Fischer, S., & Ross, S. (2020). Long-term follow-up of psilocybin-assisted psychotherapy for psychiatric and existential distress in patients with life-threatening cancer. Journal of Psychopharmacology, 34(2), 155–166.
[3] Tucker, K. (n.d.). ARTICLE: PSYCHEDELIC MEDICINE: GALVANIZING CHANGES IN LAW AND POLICY TO ALLOW ACCESS FOR PATIENTS SUFFERING ANXIETY ASSOCIATED WITH TERMINAL ILLNESS, 21 Quinnipiac Health L.J. 239. Retrieved February 7, 2020, from
[4] Johnson, M., Richards, W., & Griffiths, R. (2008). Human hallucinogen research: Guidelines for safety. Journal of Psychopharmacology, 22(6), 603–620. https://doi.org/10.1177/0269881108093587
[5] Pollan, M. (2015, February 2). The Trip Treatment. https://www.newyorker.com/magazine/2015/02/09/trip-treatment
[6] Marlan, D. (2019). MARIJUANA SYMPPOSIUM: BEYOND CANNABIS: PSYCHEDELIC DECRIMINALIZATION AND SOCIAL JUSTICE. 23 Lewis & Clark L. Rev. 851.
[7] Times, R. B. S. J. S. to T. N. Y. (1966). COLLEGES WARNED TO CURB DRUG USE: U.S. Asserts Hallucinogens May Harm Students. New York Times, 1.[8] Lee, M. A., & Shlain, B. (1992). Acid dreams: The complete social history of LSD: The CIA, the sixties, and beyond. Grove Press.

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[1] The Controlled Substances Act. 1970. U.S. Drug Enforcement Administration. Retrieved February 5, 2020, from https://www.dea.gov/controlled-substances-act
[2] Birnbaum V. United States, 1983 U.S. Dist. Lexis 17841. (n.d.). Retrieved February 5, 2020, from https://advance.lexis.com/api/document?collection=cases&id=urn:contentItem:3S4N-TFR0-0054-51TG-00000-00&context=1516831.
[3] Marlan, D. (2019). MARIJUANA SYMPOSIUM: BEYOND CANNABIS: PSYCHEDELIC DECRIMINALIZATION AND SOCIAL JUSTICE. 23 Lewis & Clark L. Rev. 851
.[4] Denver, Colorado Government. (2018) Denver Psilocybin Mushroom Decriminalization Initiative. Retrived from https://www.denvergov.org/content/dam/denvergov/Portals/778/documents/PsilocybinFourthPetitionSample.pdf
[5] Tucker, K. (n.d.). ARTICLE: PSYCHEDELIC MEDICINE: GALVANIZING CHANGES IN LAW AND POLICY TO ALLOW ACCESS FOR PATIENTS SUFFERING ANXIETY ASSOCIATED WITH TERMINAL ILLNESS, 21 Quinnipiac Health L.J. 239.
[6] Beletsky, Leo. "Today's Fentanyl Crisis: Prohibition's Iron Law, Revisited." International Journal of Drug Policy, vol. 46, https://reader.elsevier.com/reader/sd/pii/S0955395917301548?token=E7660FE587B4CE702126C1E2E835D3FAE99379FE0027068668ED027E0A74E1DBFADC9B9F656ACFC7E80F48C38AD88F40.
[7] Pacula, R.L. & Smart, R. (2019). Medical Marijuana and Marijuana Legalization. Annual Reviews in Clinical Psychology. 13: 397-419. doi: 10.1146/annurev-clinpsy-032816-045128