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Honors Capstone

13 December 2022

Exploring the Role of Psychedelics in Past and Modern Society

Introduction

Many of us are presented with a list of drugs to steer clear of as we age and encounter more independence in our lives. This list typically includes compounds like cocaine, MDMA, opioids, and heroin; all substances that could seriously alter the trajectory of your life. In addition to these, classic hallucinogens may be mentioned, such as LSD, DMT, or psilocybin. These hallucinogenic compounds, commonly called psychedelics, hold a different place in our society compared to drugs like heroin and Vicodin. Although the general population today looks down on this class of drugs, that was not always the case. Over the course of time, human consumption and perception of psychedelic substances have waxed and waned. From the beginning of civilization to the current day, hallucinogenic substances may have altered our lives more than we realize. Their impact on culture, religion, and history deserves to be analyzed and considered in the current climate, where they are frowned upon. The influence they could have on us in the present and in the future, through biology, medicine, lawmaking, and economics, all open doors for us as humans in an ever-advancing society. Psychedelics were valued in previous centuries, they may be able to contribute to the present-day more than most think.

When discussing such an elusive topic as psychedelics, it is useful to first define the terms that will be present throughout the discussion. Psychedelics are "a class of psychoactive

substances that produce changes in perception, mood, and cognitive processes" as defined by the Alcohol and Drug Foundation. Other common names for psychedelics include hallucinogens and entheogens, drugs that can alter your perception of the world around you by influencing one's senses, sense of time, and emotions. For this discussion, I will mainly be referring to common psychedelics like psilocybin, LSD, peyote, ayahuasca, and DMT, along with other lesser-known substances that will be relevant to the discussion. These are some of the most common psychedelics in the world, but their popularity fluctuates based on time period, culture, and area of discussion. Through the presentation of these hallucinogenic substances, their history and use, the mechanisms they employ to achieve their effects, and their futures, I hope to paint a picture of the numerous uses of psychedelic drugs and the discoveries they can lead us to. I will not only detail their biological mechanisms, but will also dive into areas such as historical significance, cultural influence, religious influence, current and future medicinal uses, the legality of these substances and how it has changed over time, and the effect that these substances could have on the economics of our society.

Ancient Use

Psychedelics have a timeline that is currently thought to date back over 5,000 years. Many ancient civilizations, whether it be the Maya in ancient Mesoamerica or the Egyptians at the Northeast end of Africa, can be found to have used psychoactive substances, some even holding them to a level of sanctity. Hallucinogenic substances served as healing measures, both for the mind and the soul, in many of these civilizations, playing a critical role in their medicine and their culture. Within specifically the Mayan culture, the widespread trend of entheogen use can be observed in their spiritual ceremonies through the relics they left behind.

Entheogens, defined as “a chemical substance, typically of plant origin, that is ingested to produce a non-ordinary state of consciousness for religious or spiritual purposes” by the Oxford English Dictionary, have shown evidence of use in many areas of the ancient world. However, the Mayan civilization, located in present-day southern Mexico, stands out as a well-documented spotlight of psychedelic use among the other ancient civilizations that used entheogens to communicate with their gods. The Maya, which began as early as 1500 BCE and lasted approximately six centuries, had left behind evidence that points towards how they chose to utilize psychedelics. The main sources of evidence come in the form of artwork. Mayan “mushroom stones” have been found archeologically. These stones have been identified to depict the hallucinogenic fungi known as “k’aizalaj okox” to the Mayans, what we now know as mushrooms of the *Psilocybe* genus (Carod-Artal). This is a substance that the Mayans, and later the Aztecs, would have had access to in their Mesoamerican location and would make reasonable sense to have been the substance of choice for the shamans to communicate with the gods in religious ceremonies (Carod-Artal). In addition to the prevalence of the aforementioned mushroom stones, murals have been uncovered of Mayans consuming mushroom-looking plants while their gods stand by them. One such example of this is the Tepantitla mural, dated to 500 CE (Miller), showing religious figures bearing mushrooms to one of their gods, Tlaloc. The evidence of early psychedelic use in Mayan culture continues to mount as more and more artwork is uncovered. These depictions of hallucinogenic mushrooms used around their godly figures, along with the prevalence of capable mushrooms in the region where they built their civilization, show that the Mayans and the Aztecs most likely made spiritual use of psychedelics in their culture, which was later squashed by invaders to the New World.

"Where has this profound use of psychedelics gone?", you may ask. As the in the case of the Aztecs, their use of these spiritual substances was threatened once invaders began to lay their claim to the New World. The Aztecs occupied a very similar region as the Mayans but came about some time after the Mayans had disappeared. The Aztec culture utilized the psychedelic compounds of the area in much the same way that the Mayans did, using it for religious ceremonies and depicting it in ancient art alongside their gods. However, when the Spanish conquest of Mexico took place in the early 16th century, the native religious practices had to be done in the shadows. The Spanish, making their empire staunchly Roman Catholic, entered the territory of the Aztec civilization found in present-day Mexico and conquered them, persecuting any religious practice that was not their own. Since the psychedelic substances of the area were used for religious ceremonies, they had to be concealed or discontinued as the threat of danger loomed over those who wished to practice their rituals. According to the *Florentine Codex*, written by Spanish Friar Bernardino de Sahagun when he visited the Aztecs, there was observed usage of the previously mentioned mushrooms in the culture they found once they landed in South America. This event spelled disaster for not only the prevalence of psychedelics at that time but also for their entire future as the rest of the empires from Europe, with their religious practices that did not make use of hallucinogens, came and began to extinguish any spiritual rituals that did not support their own faiths. This set the foundation for the loss of psychedelics in modern European and American culture, as this deeply rooted fear of previous persecution led to large distrust in the substances that were being targeted.

Religious Influence

Religion, defined as a particular system of faith and worship by the Oxford Dictionary, touches many lives with its existence. There are boundless debates about whether certain

religious beliefs are correct or true compared to others, as the many belief systems around the world sprouted, grew, and developed. Many of the major religions could have had their seed first planted and watered by psychedelic compounds, as the many societies of history experimented with and experienced their effects. Psychedelics were viewed as a spiritual link in ancient centuries, so it becomes a reasonable hypothesis that the hallucinations they experienced then became part of their belief system. The visions and figures they experienced in religious ceremonies could have sent them on a path where they established and expanded their religions, which then grow to become much larger faiths over time. Through the previously established historical use of entheogens, along with evidence of psychedelic spiritual practice within areas of the world that harbored major religions, there is a mounting case for the use of psychedelics either creating the foundation for or amplifying the spread of spiritual systems.

When many people think of ancient religions, they think of the ancient Greek mythos containing figures like Zeus and Hades. The argument for psychedelic use being foundational for the early development of Hellenism, which is the ancient and modern religion practiced in Greece, provides an example of how psychedelics could have influenced modern religions. Whereas it was previously discussed in the context of ancient spiritual practices, Hellenism is a modern religion that developed from its ancient roots, which were in turn influenced by hallucinogenic compounds. According to the Hellenic Museum and their research, many religious ceremonies made use of a drink called “kykeon”, sometimes referred to as “The Drink of Champions”. Kykeon was a drink with an elusive recipe, but most discoveries state that a core piece of its concoction was barley. This may sound irrelevant at first, but after a discovery in a temple dedicated to the Hellenic goddesses Demeter and Persephone, it can be seen that there is a high likelihood that the barley used in many of these rituals was contaminated with ergot, a

fungus that grows on rye, barley, and related plants. This fungus contains LSD-like alkaloids, causing hallucinogenic effects when consumed according to Mayo Clinic. This temple, in an area known as Eleusis, served as an area of critical importance for worship in Hellenic culture, where yearly initiations named the Eleusinian Mysteries were held in the names of Demeter and Persephone. Notable participants in this deep ritual included monumental figures like Plato, Augustus Caesar, and Marcus Aurelius as mentioned in an article from the World History Encyclopedia written in 2012. This evidence of ancient Greeks brewing a drink with psychedelic properties demonstrates just one way that psychedelic compounds have influenced the foundation of some modern religions.

The Greek religion of Hellenism is not the only one that was able to grow and flourish into modern times, and other modern religions could have been heavily influenced by the practices that the Greeks performed for their spiritual processes. The largest religion in the world as of 2015 according to the Pew Research Center is Christianity, with 2.3 billion members. In a podcast episode with Vox and within the pages of his book “The Immortality Key: The Secret History of the Religion with No Name”, author Brian Muraresku connects the aforementioned Greek brew with a similar story of early Christianity. He details the discovery of an ancient pharmacy outside Pompeii, Italy, where there were traces of a wine that contained a psychoactive plant called henbane, among other compounds like cannabis and opium. He then connects that to the first generations of Christians that appeared in the area south of Rome, as both phenomena are dated to the same time. This evidence, along with the knowledge that the Greeks and Romans had a substantial cultural influence on each other, does not definitively show that psychedelics were the ignition to the beginning of the largest religion in the world. However, it does show

potential in more archeological research in that area of the world and in uncovering how these religions many people follow today could have truly begun.

Biological Mechanisms

The human body is a somewhat delicate machine, with countless processes being carried out by the second to keep it alive and functioning. This machine has such a large number of parts, that it becomes difficult to deduce what each part plays in the totality of its purpose. These mechanisms of the body can be influenced by various factors, such as the environment we are in or the substances we ingest. Psychedelics, while under the same umbrella term, do not all act on the same mechanisms present within us. Pharmacologically, many psychedelics act on 5-HT, better known as serotonin, and its receptors. These serotonin-based psychedelics include psilocybin and LSD. Other entheogens, like ayahuasca and DMT, affect different neurotransmitters to achieve their effects. These two groups have different ways of achieving similar results, making the understanding of their mechanisms important to fully understanding how they impact us when we ingest them and how they have impacted society with their use, as well as what potential their use could hold in the future.

Many of the psychedelic compounds focused on in this paper function in very similar ways. First, we will explore the mechanisms of psilocybin. Psilocybin, with the mouthful of an IUPAC name of 3-[2-(Dimethylamino)ethyl]-1H-indol-4-yl dihydrogen phosphate, is a compound that is heavily focused on in psychedelic research but is, in actuality, inactive itself. Psilocybin becomes quickly dephosphorylated by monoamine oxidase into psilocin as it reaches the liver, which then continues to cause the mind-altering effects that we associate with psilocybin. This compound looks similar to the neurotransmitter serotonin, formally called 5-hydroxytryptamine, structurally and interacts with serotonin receptors once ingested. To produce

its hallucinogenic effects, psilocin agonizes serotonin receptors, with high binding affinity to the 5-HT_{2A} receptors and low affinity for 5-HT_1 receptors (Passie). This interaction causes changes in the brain that can impact mood, cognition, and perception, leading to feelings of euphoria and peacefulness, as well as altering the way that the subject processes the stimuli in their environment. After ingestion, effects can typically be seen 30 minutes later and usually last 4-6 hours, though these numbers change depending on where the psilocybin is sourced from. From a neurological standpoint, important for understanding the hallucinogenic and psychotomimetic properties of the compound, psilocybin has been shown to mainly influence the activity in the frontal cortex, responsible for functions like decision-making and reasoning, and the visual cortex, which is responsible for processing incoming visual information. This can be seen in a study by Carhart-Harris et al., where two types of fMRI scans were done on 30 subjects who had ingested psilocybin. The study found decreased activity in the previously mentioned brain regions through arterial spin labeling perfusion and blood-oxygen level-dependent fMRI, hypothesizing that this decrease in activity could be what is leading to the unconstricted cognition that subjects experience when taking psilocybin.

The mechanism present for psilocybin is similar to the mechanisms for other common psychedelics, with few differences between the mechanism of action. LSD, which is an abbreviated name for d-lysergic acid diethylamide, also serves as a 5-HT_{2A} receptor agonist, but has more affinity for the 5-HT_{1A} receptor than psilocybin does, making it a more effective serotonin agonist. Additionally, LSD also serves as a dopamine agonist through its agonistic interactions with the D_2 receptor, a receptor that plays its own critical role in neurological processes and is a possible candidate for the hallucinogenic effects caused by the compound (Nichols). Another popular psychedelic, DMT, also targets the same serotonin receptors as LSD

and psilocybin but shows a higher affinity for various dopamine receptors (Rickli et al.). Despite slight differences in their mechanisms, most common psychedelics of the present have similar mechanisms of action once they enter your body, leading to their hallucinogenic effects and the possible mental impacts they could have on a subject.

Therapeutic Use

As we make strides in understanding how these compounds have an effect on our brains, we move closer to the use of them in our medical treatments. Psychedelics have been used as healing substances in the past and could see a revival as a tool in a doctor's kit. While their ancient purpose was mainly that of healing the spirit, science has made progress in the use of hallucinogens in treating the mind, mainly in the areas of depression and PTSD. As psychedelics enter a revolution in medicine, their therapeutic uses become more and more studied. Research in this field could lead to an entirely new world of mental health drugs, while also reducing the stigma that psychedelic substances have been imprisoned in.

One of the most researched areas of treatment for psychedelics is one that impacts nearly 10% of Americans, according to USNews. Major depressive disorder, colloquially known as just depression, is given criteria for diagnosis by the DSM-5, a diagnostic manual by the American Psychiatric Association. This criterion includes conditions like depressed mood, loss of interest or pleasure, and a slowing down of thought and reduction of physical movement. Classical psychedelics have been tested in combatting the onslaught of depression cases present in the public, showing promise through the various studies done. Such studies were investigated in the systematic review by Muttoni et al. The findings of this scoping review did not focus on a specific psychedelic but included seven studies that tested ayahuasca, psilocybin, and LSD across 130 patients. The researchers found that the use of these classical psychedelics provided

immediate anti-depressive effects that lasted for several months, making the use of psychedelics a very promising avenue for treatment in cases of severe or treatment-resistant depression. Although the review states that further evidence is required, I believe this to be a strong starting point for the future of psychedelics and their use in the toolkit of medical professionals. Through controlled dosage and within a tightly-controlled environment, the treatment of depression could become much more commonplace in medical practice, with increasingly promising evidence entering the medical sphere each day.

Depression is not the only area where psychedelics have begun to shine. An area of mental health that has not had the same popularity boost as conditions like depression, but one that still impacts around 6% of American adults as found by the Center for the Advancement of Health. This overshadowed ailment is known as a post-traumatic stress disorder, or PTSD for short, and consists of exposure to actual or threatened death, serious injury, or sexual violence in one or more specified ways, one of the documented intrusion symptoms, avoidance behavior, two or more negative alterations in cognitions, for a length of longer than one month and that impacts the regular function of the afflicted as according to the DSM-5. Psychedelics have shown potential in the treatment of this complicated and severe mental illness, providing those impacted by it with a hope to have more of a normal life back. The review by Krediet et al. investigates four different types of compounds and their effectiveness in the treatment of PTSD. Within that review, the main case of classical psychedelics being used for the treatment of PTSD was back in 1980, when it was utilized to treat victims of "concentration camp syndrome" in the Netherlands and focused around using these substances to allow patients to reexperience the traumatic event that had afflicted them in the first place, this time in a more controlled environment. Although this research is severely limited by there not being any formal diagnosis

of "PTSD" at that time, documentation shows that hundreds of patients were treated this way by Dutch psychiatrist Jan Bastiaans, but only 12 were found and followed up with recently, where all but 1 of them reported moderate to strong improvements in their condition after treatment. This research is nowhere near a concrete case for the use of psychedelics in PTSD therapy, but it is yet again another promising starting step for the deployment of hallucinogenic substances in the ever-evolving world of medicine.

Laws and Government

The formation of government permanently altered what makes a civilization legitimate, and governments around the globe adopt different systems of representing and protecting their people. One of the areas that lawmakers focus on heavily is the presence of drugs throughout the nation. This fascination with the legality and safety of drugs can be seen in multiple cases, such as the War on Drugs in the United States. Different countries adopt different laws that bind the substances citizens use to legality or illegality. While the substances remain the same, the laws across the globe differ heavily. Psychedelics have been through the ebb and flow of lawmaking, rising and falling in popularity based on the policies that governments push onto their citizens. The restriction of these compounds has had its benefits but has been largely detrimental to society as it has stunted research on the potential of psychedelics.

One of the biggest bullies to the potential of psychedelics is the United States. Psychedelics were given the Schedule I classification in the United States in 1971 under President Richard Nixon through the Controlled Substances Act, defining them as drugs with no accepted medical use and with a high potential for abuse, greatly damaging the public opinion of psychedelics and completely halting government-subsidized research utilizing psychedelic compounds. This caused a very sudden decline in the research that could have gone into the

investigation of how these compounds function, how they influence us, and what they could be used therapeutically. This was the limbo that all major psychedelics were entrapped in, where they could not be legally researched and could not be legally consumed recreationally. Hallucinogens began to break free of this classification in 2017 when the FDA granted MDMA Breakthrough Therapy Status, followed shortly by a psilocybin synthetic derivative receiving the same treatment in 2018. This action positively influenced the research that was allowed on psychedelics, despite their Schedule I classification still being active. Not only did this prove that there was potential for hallucinogens in the treatment of severe mental illnesses, but it also began a cascade of other liberating cases for psychedelics. In June 2019, Denver, Colorado, and Oakland, California became the first United States cities to decriminalize psilocybin mushrooms. Other areas, such as the state of Oregon and Washington, DC have also decriminalized psychedelic drugs, as well as the first publicly traded psychedelics company, MindMed, entered the stage. These actions signal that the oppression of psychedelics could be coming to an end for the people of the United States, which could do wonders for the medical research done on the substances which can then affect the wellness of the general public.

On the other side of the Atlantic Ocean, Europe has followed a similar path in the area of legislation when compared to the West. The United Kingdom began its assault on psychedelics in 1971 with the Misuse of Drugs Act under Prime Minister Sir Edward Richard George Heath, where psychedelic drugs like LSD, DMT mescaline extract, and psilocybin were placed in Class A based on how dangerous they were perceived to be to society and carried the heaviest penalties, extending to seven years in prison for possession. In addition to this hefty hook to psychedelics, during the same year, the United Nations introduced their Convention on Psychotropic Substances to control LSD, DMT, and MDMA throughout the nations that placed

these drugs into Schedule I status for a large majority of member states. The only current step towards decriminalization in those countries that are members of the United Nations was taken by New Zealand when the first micro-dosing study using LSD was approved in Auckland. Otherwise, the United Kingdom and other European countries are still placing heavy control on psychedelic substances, stunting their potential and preventing a large-scale medical breakthrough.

Conclusion

Psychedelics have been shown to play an influential role in human history, have continued to impact our lives in the present day, and have demonstrated a high potential to become a larger part of our lives in the future. From ancient civilizations to the present day, these substances have been used for spiritual, medicinal, and cultural purposes. Despite the current cautious perception of psychedelics, they have the potential to have a positive impact on our society through their use in medicine and have begun to turn the corner from their prohibition, turning into a more useful substance for human use. As our understanding of these substances continues to evolve, it is important to consider their past and potential future use in a broader context. With further research and an open mind, psychedelics may hold the key to unlocking new avenues of knowledge and understanding. The continual research of psychedelic substances in all areas can provide impactful strides in discovering their full potential, and I believe they will continue to show serious promise for many different afflictions as more research is done.

Acknowledgments

I would like to give many thanks to those that proofread and influenced this final paper, mostly my peers and family. I would also like to extend special thanks to my Honors Capstone

professors, as their guidance provided me with the avenue to freely discover and discuss this topic.

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