Introduction

Present society is a constantly evolving system where every individual with a mind is at risk of facing lack of equal rights and equitable opportunity and an individual will always be classified into groups by present society whether it be due to sex, race, neurodevelopment, mental health disorder, aesthetic, or opinion - classification has resulted in various forms of marginalization and minority throughout collective societal history. So, no matter which way you're seen as right & wrong by the collective of your era, the fact is that coping with a constantly evolving system is difficult on the mind without a strategic intervention. Strategic intervention is an umbrella phrase, here, I am assessing strategic intervention via substance. To state the thesis bluntly, psilocybin is an accessible alternative to popular strategic interventions such as SSRIs for those who can't or don't want to rely on the pharmaceutical industry but still desire strategic intervention via substance due its influence on aspects of neurobiology and cognitive function. How does the psilocybin prodrug compound influence aspects of neurobiology and cognitive function?

Result

Psilocybin is a naturally occurring prodrug compound located in select species of psychoactive mushrooms. Taxonomically speaking, psilocybin is most commonly associated within the genus psilocybe + the species cubensis - there are others such as genus panaeolus + species cyanescens. I must mention psilocybin is converted into the active metabolite known as psilocin. The active metabolite known as psilocin is responsible for all mind & body interactions due to psilocybin ingestion - the psilocybin/psilocin is a conversion intricacy of one system.

Background on serotonin: “The serotonin (i.e., 5-hydroxytryptamine, hence "5-HT") receptors are activated by the neurotransmitter serotonin, which acts as their natural ligand. The serotonin receptors modulate the release of many neurotransmitters, including glutamate, GABA, dopamine, epinephrine /norepinephrine, and acetylcholine, as well as many hormones, including oxytocin, prolactin, vasopressin, cortisol, corticotropin, and substance P, among others. Serotonin receptors influence various biological and neurological processes such as aggression, anxiety, appetite, cognition, learning, memory, mood, nausea, sleep, and thermoregulation.” (Wikipedia 1). “They can be divided into 7 families of G protein-coupled receptors which activate an intracellular second messenger cascade to produce an excitatory or inhibitory response. The exception to this is the 5-HT3 receptor which is a ligand-gated ion channel.” (Wikipedia 1). “The 7 general serotonin receptor classes include a total of 14 known serotonin receptors.” (Wikipedia 1).

The interaction between psilocybin and serotonin: in regards to neurobiology, I will mention first that psilocybin is known to influence serotonin receptors; there are multiple subtypes of serotonin receptors that are classified under the 5-HT range, with different receptors producing different responses. Psilocybin is an agonist to serotonin receptors, meaning the compound stimulates the receptor and produces a biological response. Psilocybin can…“-increase dopamine levels indirectly through the 5-HT receptors.” (Tyls et al 788). Additionally, “-5-HT hallucinogens increase activity in the pardoner-limbe circuiting.” (Tyls et al 788). According to Tyls, psilocybin acts on the 5-HT1A receptor instead of the transporter which is special because this has been meant to, “-show anxiolytic/antidepressant effects.” (Tyls et al 787). There is a great impact by psilocybin shown in 5-HT2A receptors as well, causing the

receptor to…"-rapidly downgrade after a single dose." (Tyls at al 787). This is notable because, "-the down regulation of 5-HT2A can also result in the prevention of relapse of abuse…since high 5-HT2A density in the human brain correlates with an increase in anxiety and stress response activation." (Tyls et al 788). This isn't to say that the 5-HT2A receptor is irrelevant though, because psilocybin is thought to disrupt the…"-cortico-striato-thalamo-cortical (CSTC) circuits most likely via 5-HT2A agonism." (Tyls et al 788). The perspective around 5-HT in this piece summarized that, "-psilocybin induces altered state of consciousness by agonist action at 5-HT1A, 5-HT2A, and 5-HT2C receptors. Precipitating complex changes in the cortico-striato-thalamic-cortical (CSTC) circuiting and in the activation of neural networks." (Tyls 791).

Background on neurogenesis: "Neurogenesis is the process by which new neurons are formed in the brain. Neurogenesis is crucial when an embryo is developing, but also continues in certain brain regions after birth and throughout our lifespan." (University of Queensland 1).

The interaction between psilocybin and neurogenesis: "-at a low dose (0.1mg) it tends to increase neurogenesis whereas at a high dose (1mg) it tends to be suppressed." (Tyls et al 787). Information like this is relevant to individuals who microdose…taking amounts such as 100 micrograms of psilocybin - which is 1/10th of the standard 1000 milligram `~ 1 gram dose.

Background on entropy: A high entropy state is known as primary consciousness and is unstable as well as characterised by creative thinking whereas a low entropy state is known as secondary consciousness and is hyperstable as well as characterized by rigid thinking and low levels of creativity.

Background on the default mode network (DMN): “The default mode network includes the medial prefrontal cortex, the cingulate cortex, regions of the medial and lateral temporal cortex anterior and posterior, the precuneus and posterior cingulate cortex, and angular gyrus, and is considered to be involved in self-referential mental activity that includes autobiographical processing and introspective thought.” (ScienceDirect 1).

Background on the task positive network (TPN): “-the task positive network shows consistent activations across different tasks, while the default mode network (DMN) shows consistent deactivations. These two systems reveal moment to moment anticorrelation even when the subject isn’t performing explicit tasks” (Di and Biswal 2).

The interaction between psilocybin and entropy: “-two important networks, the default mode network (DMN) and task positive network (TPN) are both activated simultaneously under psilocybin intoxication although under normal conditions they are always activated in mutual exclusion.” (Tyls et al 790). An additional larger research piece states, “The observed co-activation of brain networks under psilocybin consumption can be seen as a collapse of qualities, which is characteristic for primary consciousness.” (Tyls et al 790).

The interaction between psilocybin and cognitive executive function: within this review…one research piece found negative interactions, “-both study drugs (psilocybin and DXM) caused impairment in DSST while acutely under the influence of [the] drug.” (Meshkat 47). Whereas a second research piece found that, “-higher doses of psilocybin (25 and 10 mg) are associated with greater improvements in DSST scores-” (Meshkat 48).