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# **COGUMELOS MÁGICOS, AMIGOS OU INIMIGOS: DECIFRANDO A EXPERIÊNCIA SUBJETIVA MARCANTE COM PSILOCIBINA NA POPULAÇÃO PORTUGUESA**

[Magic Mushrooms, friend or foe: deciphering the Singular Subjective Experience with Psilocybin in Portuguese population]

Dissertação de Mestrado

Mestrado em Psicologia Clínica e de Saúde

Maryia Hurevich

Orientadora: Dr.<sup>a</sup> Sónia Pimentel Alves

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## ABSTRACT

This study aimed to explore the subjective psychological effects of psilocybin use in a Portuguese population, with a secondary focus on gender differences in these experiences. A retrospective mixed-method approach was used, drawing on data from the "Epidemiology of Psychedelic Drug Consumption in Portugal" project conducted at Fernando Pessoa University in Porto, Portugal. The sample is comprised of 120 participants (60 men, 60 women), aged 18-67, who reported using psilocybin in the past year. Data were collected through an online questionnaire from February 2022 to February 2023, which also assessed experience intensity, clarity, personal significance, and impact using a 5-point scale. Thematic analysis was performed on the responses for an open-ended question assessing the experience.

**Methods:** The study used a 32-item online questionnaire featuring multiple-choice and open-ended questions. Recruitment was done via social media and local organizations. Inclusion criteria required participants to be at least 18 years old, identify as male or female, have resided in Portugal for at least five years, and have consumed psilocybin. Thematic analysis of the responses identified five primary themes: emotional and psychological experiences, physical sensations, connection and unity, cognitive and perceptual changes, and personal transformation. Quantitative data were analyzed descriptively and inferentially.

**Results:** Thematic analysis revealed that Personal Transformation was the most prominent theme, characterized by healing, existential insights, and self-reflection. Emotional and Psychological Experiences included a range of feelings from joy and wonder to fear and anxiety, with positive emotions reported more frequently. Physical Sensations involved both discomfort (e.g., nausea, pain) and pleasurable experiences. Connection and Unity often entailed a sense of interconnectedness with nature, other people, or a mystical/spiritual connection. Cognitive and Perceptual Changes encompassed altered sensory perception, time, and space, with some participants struggling to articulate these experiences. Quantitatively, participants rated their experiences highly across all dimensions: intensity (mean = 4.33), clarity (mean = 4.32), personal significance (mean = 4.45), and impact (mean = 4.25), indicating that the experiences were deeply meaningful and transformative.

**Conclusion:** The findings provide insight into the profound and multifaceted effects of psilocybin, highlighting themes of personal growth, emotional richness, perceptual shifts, and a sense of connection. These results suggest that psilocybin may facilitate significant psychological and existential changes, reinforcing its therapeutic potential. Gender differences were explored as a secondary objective, revealing that women reported more positive emotional experiences and physical discomfort, while men noted more spiritual or mystical connections. This study underscores the value of considering individual variability in psilocybin experiences, which could inform personalized therapeutic approaches.

**Keywords:** "Psilocybin"; "Phenomenology"; "Subjective psychological experience"; "Gender differences"; "Personal transformation"; "Cognitive and perceptual changes"; "Thematic analysis".



## RESUMO

Este estudo teve como objetivo geral investigar os efeitos psicológicos subjetivos do uso de psilocibina numa população portuguesa, tendo como objetivo secundário explorar as diferenças de género nestas experiências. Foi utilizada uma abordagem retrospectiva de métodos mistos, com base nos dados do projeto "Epidemiologia do Consumo de Drogas Psicadélicas em Portugal", conduzido na Universidade Fernando Pessoa. A amostra foi composta por 120 participantes (60 homens, 60 mulheres), com idades compreendidas entre os 18 e os 67 anos, que reportaram o uso de psilocibina no último ano. Os dados foram recolhidos através de um questionário online, entre fevereiro de 2022 e fevereiro de 2023, o qual avaliou, através de uma escala de 5 pontos, a intensidade da experiência, a clareza, o significado pessoal e o impacto. As respostas dadas a uma questão de resposta aberta sobre a experiência foram analisadas através de uma análise temática.

**Métodos:** O estudo utilizou um questionário online composto por 32 itens, contendo questões de escolha múltipla e de resposta aberta. Foram incluídos participantes com 18 ou mais anos, que se identificassem como homens ou mulheres, que residissem em Portugal há, pelo menos, cinco anos e que tivessem consumido psilocibina. A análise temática das respostas identificou cinco temas principais: experiências emocionais e psicológicas, sensações físicas, conexão e unidade, alterações cognitivas e perceptivas e transformação pessoal. Os dados quantitativos foram analisados através de estatística descritiva e inferencial.

**Resultados:** a análise temática revelou que a Transformação Pessoal foi o tema mais proeminente, caracterizado pela cura, insights existenciais e autorreflexão. As experiências emocionais e psicológicas incluíram uma variedade de emoções, desde a alegria e admiração ao medo e à ansiedade, sendo as emoções positivas relatadas com maior frequência. As sensações físicas envolviam desconforto (por exemplo, náuseas, dor) e experiências prazerosas. A Conexão e a Unidade incluíram frequentemente uma sensação de interconexão com a natureza, com outras pessoas ou mística/espiritual. As alterações cognitivas e perceptivas incluíram a perceção sensorial, de tempo e espaço alterados, embora alguns participantes tenham demonstrado dificuldades para reportar estas sensações. Quantitativamente, os participantes avaliaram as suas experiências com uma pontuação elevada em todas as dimensões: intensidade (média = 4,33), clareza (média = 4,32), significância pessoal (média = 4,45) e impacto (média = 4,25), sugerindo que as experiências foram profundamente significativas e transformadoras.

**Conclusões:** Os resultados desvendam os efeitos profundos e multifacetados da psilocibina, destacando temas de crescimento pessoal, riqueza emocional, alterações perceptivas e um sentido de conexão. Estes resultados sugerem que a psilocibina pode facilitar mudanças psicológicas e existenciais significativas, reforçando o seu potencial terapêutico. As diferenças de género foram exploradas como objetivo secundário, revelando que as mulheres reportaram mais experiências emocionais positivas e desconforto físico, enquanto os homens reportaram mais conexões espirituais ou místicas. Este estudo sublinha a importância de considerar a variabilidade individual nas experiências com a psilocibina, o que poderá informar abordagens terapêuticas personalizadas.

**Palavras-chave:** “Psilocibina”; “Fenomenologia”; “Experiência psicológica subjetiva”; “Diferenças de género”; “Transformação pessoal”; “Alterações cognitivas e perceptivas”; “Análise temática”.



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## LIST OF ACRONYMS AND ABBREVIATIONS

®	Registered
<b>5D-ASC</b>	Five-Dimensional Altered States of Consciousness
<b>5-HT2A</b>	Serotonin 5-Hydroxytryptamine Type 2A
<b>5-HT2AR</b>	Serotonin 5-Hydroxytryptamine Type 2A Receptor
<b>EDI</b>	Ego-Dissolution Inventory
<b>EMCDDA</b>	European Monitoring Centre for Drugs and Drug Addiction
<b>i.e.</b>	<i>Id Est</i> (That Is)
<b>IBM</b>	International Business Machines
<b>LSD</b>	Lysergic Acid Diethylamide
<b>MDMA</b>	Ecstasy (3,4-Methylenedioxymethamphetamine)
<b>mg</b>	Milligram
<b>PiMS</b>	Pivotal Mental State
<b>PTSD</b>	Post-Traumatic Stress Disorder
<b>SAMHSA</b>	Abuse and Mental Health Services Administration
<b>SICAD</b>	Serviço de Intervenção nos Comportamentos Aditivos e nas Dependências
<b>SPACE Portugal</b>	Sociedade Portuguesa de Aplicação Clínica de Enteógenos
<b>SPSS</b>	Statistical Package for the Social Sciences
<b>SSRI</b>	Selective Serotonin Reuptake Inhibitors
<b>US</b>	United States



## 1. INTRODUCTION

The term "psychedelics," derived from the Greek words 'psyche' (meaning "mind" or "soul") and 'delos' ("to reveal"), was first introduced by psychiatrist Humphry Osmond in 1956 (Dyck, 2005). Alternative terms like 'entheogen' (signifying "the divine within"), 'psychotomimetic' ("imitator of psychotic states"), and 'hallucinogenic' ("producer of hallucinations") are also commonly applied to psychedelic substances (Nichols, 2016). For thousands of years the psychedelic plants and fungi have been used in various medicinal practices and known for their medicinal benefits (Doblin et al., 2019). For centuries, various indigenous cultures used different psychedelic substances based on their natural availability. A good example would be the historically widespread use of mescaline in Mexico as this psychedelic substance is found in peyote cactus, which is native to the region (Slothower & Wiegand, 2014). In modern literature, the term 'classic psychedelics' became an umbrella term that includes various psychedelic substances like lysergic acid diethylamide (LSD), mescaline, peyote, and psilocybin based on a common mechanism of action (Johnson et al., 2019; Kim et al., 2020). In some literature, this term is expanded to include other substances like MDMA (3,4-methylenedioxymethamphetamine; also known as "ecstasy") and ketamine. Whereas the focus of this project is primarily on psilocybin, for the purposes of fuller understanding, thorough examination, and occasional absence of specific evidence pertaining to psilocybin, there is analysis of some properties of all classic psychedelics.

### 1.1. Brief History of Psilocybin

Psilocybin is the primary psychoactive alkaloid that can be found in over 180 species of mushrooms that grow throughout different regions of the world (Passie et al., 2002). The officially recorded history of psilocybin can be traced back to 1529 when the Spanish Franciscan friar Bernardino de Sahagún traveled to Mexico to conduct ethnographic studies (Nichols, 2020). He spent over 50 years studying the Aztec culture and is likely most famous for writing the tremendous manuscript called "General History of the Things of New Spain" (Library of Congress, 2024). Sahagún was driven mostly by religious motives and thus was particularly interested in religious and spiritual practices of the population. In his manuscript he recurrently mentioned 'teonanacatl' or 'God's flesh', the

sacred mushrooms used in religious and spiritual practices in the region (Nichols, 2020). This type of mushrooms was also used widely by the Aztecs in spiritual rituals as an aid to induce a receptive and open mental state (Schultes, 1940).

According to Nichols (2020), the subsequent research of these mushrooms was somewhat hindered by the ongoing debates about their factual existence. Eventually, in early 20th century, various botanists and mycologists studied mushrooms containing psilocybin, which culminated in a revolutionary article in 'Life Magazine' that introduced 'magic mushrooms' to the Western world in 1957 (Nichols, 2020). Later in 1957, on another expedition in Mexico, French mycologist Roger Heim classified several mushrooms as mushrooms containing psilocybin. Roger Heim successfully cultivated these mushrooms in France and sent a sample containing psilocybin to Albert Hofmann, a chemist at Sandoz Pharmaceuticals, who discovered the psychedelic effects of LSD (lysergic acid diethylamide) in 1943 (Nichols, 2020). Albert Hoffman was able to identify and then synthesize the psychoactive compounds psilocybin and psilocin in 1959 (Geiger et al., 2018). The following year, the synthetic psilocybin was marketed by Sandoz Pharmaceuticals to be used as drug adjuvant to psychotherapy (Geiger et al., 2018).

One cannot thoroughly examine the history of the psychedelic substances without diving into the "hippie" movement that occurred in the United States in the 1960s. The recreational use of psychedelics became a core element of the "hippie" movement which led the American Drug Enforcement Agency to prohibit various psychotropic substances including psilocybin. The strong association with the highly sensationalized "hippie" movement led to significant stigmatization of psychedelic substances, which subsequently hindered scientific research and advancements in psychedelic therapy (Hendricks et al., 2015), until recently. However, the stigma surrounding psychedelic substances still lingers and seems to be present in different populations worldwide.

The renewed interest in psychedelic substances pushed the research in this arena forward and has led to significant findings that have shown the potential of psychedelics to be an efficient and promising treatment for various mental health disorders such as depression, anxiety, end-of-life-anxiety, eating disorders, PTSD, and others (Davis et al., 2021; Daniel & Haberman, 2017; Johnson & Griffiths, 2017; Muttoni et al., 2019; Lowe et al., 2021; Griffiths et al., 2016; Hendricks et al., 2015; Spiegel, 2016; Swift et al., 2017; Peck et al., 2023; Carhart-Harris & Goodwin, 2017; Reiff et al., 2020; Zaretsky et al., 2024). In modern culture, the stigma around hallucinogenic drugs seems to be diminishing and

more people show interest in these substances. According to the National Survey on Drug Use and Health (SAMHSA, 2021), 2.6% of the US population (7.4 million people) reported using hallucinogenic drugs during the year 2021, and 16.4% of the US population (45.8 million people) reported use of hallucinogenic drugs during their lifetime. Thanks to social media, it is also possible to easily assess the popularity of this subject online. One of the most prominent online psilocybin communities has grown to more than 260,000 users on the /r/microdosing subreddit (Reddit, 2013). There are currently multiple ongoing clinical trials around the world investigating the therapeutic potential of psilocybin for a number of physical and mental health ailments. It is important to note that compared to other psychedelic substances, psilocybin is the most studied psychedelic compound in the clinical setting.

## **1.2. Psychopharmacology of Psilocybin**

Psilocybin and psilocin, the metabolite of psilocybin, are known as psychedelic tryptamines and they have very similar molecular structures to a neurotransmitter serotonin which, in a way, might explain their psychological effects in humans (Madsen et al., 2019). Psilocin effects take place through serotonin 5-hydroxytryptamine type 2A (5-HT<sub>2A</sub>) receptor agonism, a pathway partially linked to depression (Carhart-Harris et al., 2021). There is also support for the theory that the pharmacological actions and subsequent effects of psilocybin involve not only 5-HT<sub>2A</sub> agonism, but also 5-HT<sub>2CR</sub> and 5-HT<sub>1AR</sub> receptors agonism (Erkizia-Santamaría et al., 2022). Beyond the critical role of serotonergic receptors, some researchers propose that interactions with other neurotransmitter systems, like dopamine and norepinephrine, could account for the distinct effects of various psychedelic substances (Halberstadt & Geyer, 2011; Nichols, 2004). Nonetheless, the general consensus is that psychedelic compounds alter consciousness through activation of serotonin 2A receptor (5-HT<sub>2AR</sub>). The prevailing view in developing psychedelic compounds for psychiatry is that the mind-altering subjective effects of these compounds contribute to, or are responsible for, the therapeutic benefits of psilocybin. It is important to note that most of the findings about the pharmacology of psilocybin come from animal experiments and these findings can provide insight into psilocybin's mechanisms of action that are challenging to obtain in humans, such as receptor pharmacology (Hesselgrave et al., 2021). There is some evidence that the consumption of psilocybin can elevate the blood pressure briefly,

without any changes in heart rate or body temperatures (Kopra et al., 2022). There is also some evidence that psilocybin might have a positive and long-lasting impact on sexual functioning, especially in comparison with a classical antidepressants like escitalopram (Barba et al., 2024).

Although pure synthetic psilocybin (Indocybin® Sandoz) was marketed and used in the 1960s for experimental and therapeutic applications, detailed pharmacological data remained sparse until recently. Psilocybin, administered in moderate doses (12–20 mg), was shown to induce a controllable altered state of consciousness (Garcia-Romeu et al., 2021). As noted by Passie et al. (2002), this altered state can enhance introspection and modify psychological functioning, resembling hypnagogic or hallucinatory experiences. Perceptual effects include illusions, synesthesia, emotional activation, and shifts in thought patterns and temporal perception, with effects lasting between 3 and 6 hours. Following comprehensive testing in both animals and humans, psilocybin was distributed globally under the brand Indocybin® (Sandoz) as a short-acting, well-tolerated alternative to substances like LSD in psychotherapeutic settings. Therapeutic and experimental usage was widespread and showed minimal complications. While significant tolerance to psilocybin can develop with repeated use, no physical dependence results from its use (Passie et al., 2002).

### **1.3. Psychological effects and subjective experience of Psilocybin**

The psychological effects of the psychedelics are probably why these substances are sought after, feared, stigmatized, and researched. Considering the history of these substances and its undeniable link with religious and mystical rituals and experiences, it can be assumed that humans started using it to expand their minds, or rather, gain a new perspective. In the early stage of psychedelic research, the use of psychedelics was intertwined with the notion of ego. Timothy Leary, a Harvard scholar famous for his research of LSD, proposed that psychedelics can help people in western society to let go of their ego and become more connected with each other (Leary et al., 2008). Among other things, Leary was inspired by the work of Carl Jung, and most specifically his interpretations and reflections on eastern spiritual manuscripts like Tibetan Book of the Dead. Leary proposed that psychedelics can reliably induce a state of ego-loss and profound internal reflection which would in turn lead to a more objective perspective and meaningful change (Leary et al., 2008). Leary himself described the psychological experience of psychedelics as elevating, freeing, and life-changing (Leary et al., 2008).

One of the most outstanding and unique properties of psychedelic drugs resides in their ability to create altered states of mind that resemble mystical experiences (Ko et al., 2022).

The use of psychedelics, and specifically psilocybin, is often correlated with hallucinations, derealization, distorted perception, euphoria, restlessness, sense of connectedness and oneness with nature, and other symptoms (Hallucinogenic Mushrooms Drug Profile | [www.emcdda.europa.eu](http://www.emcdda.europa.eu), 2024). Psilocybin, as one of the 5-HT<sub>2A</sub>R agonist psychedelics, has documented psychosis-mimicking effects like intense alterations in cognition, mood, and sensory perception (Quednow et al., 2020; González-Maeso & Sealson, 2009). Due to that, there has been concern that the use of psychedelics in populations with pre-existing mental health issues could worsen the underlying illness and trigger some negative reactions, although recent studies have found no statistically significant indication of that (Johansen & Krebs, 2015). The effects of psilocybin are not universally identical from individual to individual and are highly dependent on a variety of factors like dosage, context or setting, and expectations and openness to the experience (Carhart-Harris et al., 2018).

Classic psychedelics are frequently reported to produce a complex and versatile psychological experience. There are a few obstacles to gain a more profound understanding of the subjective experience of psychedelics. Firstly, psychedelic experiences are often considered ineffable: many individuals report that these states are unlike anything they have previously encountered and cannot be adequately described with words (Letheby, 2021; Smith & Sisti, 2020). Another reason is that current research strongly indicates the importance of the setting, intention setting, and other factors that can influence the experience significantly (Haijen et al., 2018; Zeiss et al., 2021). For instance, Kettner et al. (2021) found that in a ceremonial and communal setting of psilocybin administration, the subjective experiences amounted to intense visual, mystical, emotion, and existential journeys. They also found that this experience was correlated significantly with psychological well-being and social connectedness (Kettner et al., 2021).

Considering the challenges in assessing, evaluating and interpreting the subjective experience with psilocybin, to date, there are only a few questionnaires allowing an insight into it. One of them is the five-dimensional altered states of consciousness (5D-ASC) questionnaire that assesses the following dimensions: Oceanic Boundlessness

(feelings of unity and transcendence), Anxious Ego-Dissolution (loss of self-boundaries with anxiety), Visionary Restructuralization (altered visual perception), Auditory Alterations (changes in auditory perception), and Reduction of Vigilance (reduced alertness and drowsiness) (Studerus et al., 2010). The questionnaire was developed based on the most prominent reported changes and effects of psychedelics which naturally imply the main psychological domains of impact of these substances, including psilocybin. Another evaluation tool is called ego-dissolution inventory or EDI and it assesses the extent to which individuals experience a loss of their sense of self or ego boundaries during altered states of consciousness (Nour et al., 2016). This, in turn, suggests that these are the common psychological effects of psychedelic substances.

The phenomenological analysis of subjective experience with psilocybin conducted by Belser et al. (2017) revealed that nearly the entirety of their sample reported social connection, a range of emotions, special perception and newfound meaning of music, significant visual experiences and encounters, deep insight and wisdom lessons, reevaluated priorities in life, and a wish to repeat the experience. Common themes present in their sample included: profound feelings of well-being, love, and joy; a sense of embodiment; the inexplicable nature of the experience; changes in one's persona; feeling connected and belonging instead of loneliness; temporary psychological distress; visions of loved ones as entities offering guidance; and the desire to share the experience with others (Belser et al., 2017). Patchett-Marble et al. (2022) reported similar findings in their study. A minority of their participants reported lasting changes in their personalities, experiencing synesthesia, or a sensory crossover, release of intense emotions, like crying, dissolvment, and a struggle of comprehending the experience fully and integrating it (Belser et al., 2017). These findings were echoed by the later studies of McCulloch et al. (2022) and Singer et al. (2024), where they found that psilocybin can promote personal insightfulness and awareness and lingering positive emotional effects.

Most of the research done in this area combines certain subjective effects of classic psychedelics into general categories, simplifying the analysis of the subject. Van Elk & Yaden (2022) suggested the following domains: (1) altered and affective states, (2) changes in cognition, (3) behavior change, (4) social effects, and (5) belief change. Hendrick et al. (2018), reported that people commonly experienced the feeling of awe after ingesting psychedelics. Nour et al. (2016) reported significant changes in ego perception ultimately leading to ego-dissolution. Hartogssohn (2018) found that people

experience a heightened perception of emotions. Wackermann et al. (2008) reported that psilocybin can cause a distortion in time perception. In turn, in their recent study, Siegel et al. (2024) found that psilocybin significantly alters time and space perception and invokes ego-dissolution. Barrett et al. (2020) also found that psilocybin can affect attention span and memory in certain ways, either invoking or omitting certain memories. Khan et al. (2022) reported that psilocybin might be able to invoke particular memories, especially related to traumatic experiences in the past. Research also shows that psilocybin reduces amygdala reactivity, diminishing fear responses and enhancing positive emotional states such as calm, peace, and joy (Kraehenmann et al., 2015; Barrett et al., 2020; Bhatt & Weissman, 2024; Patchett-Marble et al., 2022). Kraehenmann et al. (2016) further demonstrated that psilocybin decreases threat-related connectivity between the amygdala and visual cortex, which likely contributes to reduced sensitivity to negative stimuli. This study revealed that nearly 19% of respondents reported emotionally charged experiences, both positive and negative, under the influence of psilocybin. David et al. (2020) suggested that psychedelics can improve psychological flexibility while Doss et al. (2021) reported improvement in cognitive flexibility. Mason et al. (2021) described significant improvement in creative thinking and problem solving. There are also noticeable positive changes in finding meaning (Hartogsohn, 2018; Patchett-Marble et al. 2022), suggestibility (Carhart-Harris et al., 2015), social connectedness (Carhart-Harris et al., 2018; Belser et al., 2017), empathy (Davis et al., 2020), and habit change (Teixeira et al., 2022). MacLean et al. (2011), also cited significant changes in people's openness to others, indicating a pro-social improvement.

Among other psychological effects of psilocybin consumption, there have been studies to confirm the following changes in personal values: increased connection with nature (Studerus, 2010; Lyons & Carhart-Harris, 2018; Kettner et al., 2019; Forstmann & Sagioglou, 2017), increased aesthetic appreciation (Studerus, 2011; Noorani et al., 2018), increased altruism and prosocial behavior (Griffiths et al., 2011; Griffiths et al., 2017; Noorani et al., 2018), decreased materialism (Lerner & Lyvers, 2006), more liberal political views (Nour et al., 2017), less authoritative political views (Lyons & Carhart-Harris, 2018); and increased connection with an appreciation of animals (Elin et al., 2022). Interestingly enough, most of the psychological effects triggered by psilocybin last for a long time, anywhere between 6 months and 3 years (Lyons & Carhart-Harris, 2018; Griffiths et al., 2018; Griffiths et al., 2006; Griffiths et al., 2008; Griffiths et al.,

2011; Kettner et al., 2019; Noorani et al., 2018; Schmid & Liechti, 2018). More than that, the versatility and uniqueness of subjective experience during the psychedelic trip play an important role in bringing about belief change, which, in turn, is linked with the therapeutic potential of these substances. Various studies of psilocybin showed that the participants consistently rate their psychedelic experience as the most meaningful experience of their lives (Griffiths et al., 2016; Ross et al., 2016; Johnson et al., 2014; Griffiths et al., 2006; Griffiths et al., 2008; Griffiths et al., 2011; Griffiths et al., 2018; as cited in Yaden & Griffiths, 2020). All things considered, most findings to date indicate a common theme: profound personal-growth or change; irrefutably linked to the consumption of psilocybin, which warrants a deeper analysis.

The exploration of the psychological effects of psychedelics in humans is reliant mostly on self-reporting. This fact by itself creates a plethora of limitations and challenges the accuracy and applicability of the findings. Whereas brain imaging and neuroscience offer a promising insight into the mechanism of action of psychedelic substances, they cannot offer a reliable insight into the psychological experience of psychedelics. It is also worth mentioning that classic psychedelics can induce altered states of consciousness with higher dosages, which are highly subjective and volatile (Quednow et al., 2020).

In addition to that, consumption of psychedelics still remains a social taboo and is illegal in most countries and therefore conducting thorough research with a large enough sample and accurate methodology can be challenging. Considering these limitations, there are a few studies available to date which evaluate and discuss subjective psychological effects of psilocybin, especially done in the Portuguese population. This project aims to offer some insight into the subjective narrative of people who've experienced the effects of psilocybin and hopefully contribute to the ongoing conversation about psychedelics and the human psyche.

#### **1.4. Pivotal Mental State, Peak Experience, and Psychological Transformation**

Brouwer and Carhart-Harris (2020) proposed a novel psychological concept called pivotal mental state (PiMS) which focuses on the process of psychological transformation, where 'psychological' refers to action or behavior, cognition, and perception. A more comprehensive definition of PiMS is an intense, temporary, hyper-plastic experience of the mind and brain that have extraordinary potential to mediate

psychological development or change (Brouwer & Carhart-Harris, 2020). PiMS is viewed as a process that could lead to various outcomes: negative, like a descent into a serious mental health crisis, or positive, life-changing breakthroughs. A multitude of conditions might trigger or lead to psychological transformation, including the consumption of psychedelics (Brouwer & Carhart-Harris, 2020). From a biological and pharmacological perspective, PiMS is linked to the serotonin system, specifically with its 2A receptor (5-HT<sub>2A</sub>R) (Chang et al., 2017; Parade et al., 2017; as cited in Brouwer & Carhart-Harris, 2020). Considering the pharmacological mechanism of action of psilocybin, it can reliably trigger or lead to psychological transformation, depending on the context of the consumption and dosage (Carhart-Harris & Goodwin, 2017).

In 1959, Abraham Maslow introduced the term "peak experience," describing it as a profoundly positive and transcendent event. This experience is characterized by a release from inner conflict, accompanied by feelings of awe, wonder, humility, and a deep sense of unity with the universe (Maslow, 1959). Maslow connected the notion of peak experience with the likelihood of personal growth and self-actualization, as well as with notions of one's identity and ego (Maslow, 1961). There are many 'triggers' that can induce or provoke a peak experience, including certain substances and drugs (Arkoff, 1975). According to the Klavetter and Mogar (1967) research, one of the pioneering studies of psychological effects of psychedelics and its therapeutic potential, those who had a peak experience while on psychedelics evaluated that experience as positive, and personally meaningful. What's more, people who've had peak experiences on psychedelics also reported significant therapeutic benefit and personal growth (Klavetter & Mogar, 1967). The peak experience induced by the consumption of psychedelics has been described as "unique, profound, overwhelming, otherworldly and impressive" (Sherwood et al., 1962; as cited in Majić et al., 2015). It is also described as liberating, promoting the feeling of unity with the universe and others, sensing awe, and being at peace (Richards et al., 1977; as cited in Haijen et al., 2018). The idea was that this kind of psychedelic peak experience could cause a profound personal transformation, a change of belief system, as well as a different outlook on themselves, others, and the environment (Majić et al., 2015).

### **1.5. Expectations, context of consumption and dosage**

There are multiple external factors that can shape and influence the psychological

experience of psilocybin. Various studies done on the subject point out the importance of the emotional state and expectations prior to ingestion, dosage, immediate environment and setting, and social support after the ingestion among other variables like age, drug interactions, etc. (Bouwer & Carhart-Harris, 2020; Carbonaro et al., 2016; Carhart-Harris et al., 2018; Haijen et al., 2018; Garcia-Romeu et al., 2021; Griffiths et al., 2017; Griffiths et al., 2011; Kettner et al., 2019; Lowe et al., 2021; Majić et al., 2015; Leary et al., 1963; Studerus et al., 2012). Interestingly enough, these factors seem to determine whether the experience will be negative or positive, as well as whether it will have lasting negative or positive psychological impact.

Probably the earliest insight into predicting a long-lasting psychological response to psychedelics was carried out by Leary et al. (1963). According to them, people who reported apprehension prior to ingestion of psilocybin had unpleasant subsequent experience and weren't willing to repeat it again. Along the same lines, some modern studies also support this notion. According to Haijen et al. (2018), the anticipatory anxiety and worry prior to ingestion of psilocybin is an accurate predictor of severe anxiety during a psychedelic experience. Neuroticism traits and excessive worrying prior to ingestion of psychedelics are also predictors of a negative experience (Barrett et al., 2017). On the other hand, positive expectations prior to ingestion, as well as less tension and anxiety, was linked to having a positive psychedelic experience (Metzner et al., 1965; as cited in Haijen et al., 2018). It also seems that those who are more interested in the therapeutic effects of psilocybin, and those who are more willing to confront their anxiety are more likely to have a pleasant psychedelic experience (Studerus et al., 2012). Taking the 'fork of the river' analogy of Bouwer & Carhart-Harris (2020), those who linger in a darker mental space, with anxiety or fear, are more likely to continue down the same path under the influence of psychedelics as opposed to those in a brighter mental space, who are likely to have a positive experience.

Besides that, context seems to play a crucial role in inducing particular psychological responses to psilocybin. In various studies in rats, the researchers detected numerous forms of neuronal plasticity which supported the idea that the response to psychedelics is dependent on contextual conditions (Carhart-Harris et al., 2018). In humans, consumption of psychedelics in negative context of the surrounding is generally linked to negative psychological experience (Haijen et al., 2018). This issue is extremely pertinent to the use of psychedelic drugs in an unsuitable or unsupported manner as well as to malpractice in

any form of shamanic rituals or therapeutic sessions. The same goes for people with mental health issues for whom the unsupervised or unsupported use of psychedelics might induce unpleasant or traumatic experience (Brouwer & Carhart-Harris, 2020). Most of the clinical trials involving psychedelics pay special attention to context and psychological preparation of the participants (Carhart-Harris et al., 2018). Such preparation normally includes setting up a pleasant space, dimming the lights, carefully selecting background music, etc. The participants normally have several psychological sessions prior to the administration of psychedelics, and are accompanied by one or two ‘sitters’, professionally trained mental health specialists, during the psychedelic session to ensure a positive psychological experience (Carhart-Harris et al., 2018).

Subjective difficulty of psychedelic experience is found to be positively associated with the dosage of the substance (Carbonaro et al., 2016). There is also plethora of data suggesting that psychedelics, at appropriate dosage levels, consistently create circumstances favorable to psychological transformation (Madsen et al., 2019; Haijen et al., 2018; Bouwer & Carhart-Harris, 2020; Carbonaro et al., 2016). A recent study of LSD also confirmed that the dosage is the most influential predictor of the psychedelic experience (Vizeli et al., 2024). The pooled analysis of Studerus et al. (2011) examined various studies and found a consistent relationship between psilocybin dosage and the intensity of the psychedelic experience. Another study by Johnson et al. (2012) also confirmed that higher doses of psilocybin correlate with more intense responses. In contrast, microdosing psilocybin, that became a modern fad, is typically defined as the practice of taking very small, sub-perceptual doses of psychedelic substances (Anderson et al., 2019). In other words, taking low dosages of psychedelic substances does not yield a prominent response.

## **1.6. Psychotherapeutic potential of psilocybin**

The history of medicinal and therapeutic, or rather, ritualistic use of psilocybin dates back centuries. However, even though psilocybin has been used for hundreds of years in indigenous religious and spiritual healing practices, the antiquated records of those times cannot be rightly compared with the therapeutic use of psilocybin in a modern setting due to the vast leaps and differences in understanding of the mind and of mental illness in modern science (Metzner, 1998). According to De Gregorio et al. (2020), the therapeutic potential of psychedelic experiences might be explained by the changed integration of

sensory perceptions which, in turn, facilitates a different or new experience of one's self and of the environment. Due to this change in sensory perception and the serotonergic activity of psilocybin, much of the research about this substance has been focused on mental health conditions with abnormalities or fluctuations in sensory perception, such as depressive disorders and anxiety or anxiety-related disorders (Daniel & Haberman, 2017). Considering that psilocybin has a high affinity for multiple serotonin receptors, it can affect the pathways implicated in depression (Carhart-Harris et al., 2021). Another theory is that classic psychedelics, including psilocybin, promote neuroplasticity which causes therapeutically significant changes (De Vos et al., 2021).

Psilocybin has been found to have significant therapeutic properties for various psychiatric conditions: suicidality and depressed mood or depression (Hendricks et al., 2015; Hesselgrave et al., 2021; Griffiths et al., 2016; Carhart-Harris et al., 2021; Davis et al., 2021; Gukasyan et al., 2022; Johnson et al., 2019); depression, anxiety, fear of death, and general distress in cancer patients (Griffiths et al., 2016; Spiegel, 2016; Swift et al., 2017; Ross et al., 2016; Grob et al., 2011); mood and anxiety disorders (Grob et al., 2011; Lowe et al., 2022); addictions (Bogenschutz et al., 2015; Johnson et al., 2014); post-traumatic stress disorder (Bird et al., 2021; Zaretsky et al., 2024); and obsessive-compulsive disorder (Wilcox, 2014; Moreno et al., 2006). It is particularly notable that a single dose of psilocybin was found to maintain a long-lasting improvement of psychological well-being (Griffiths et al., 2011) and psilocybin treatment maintained the therapeutic effects for the treatment of major depressive disorder for over a year (Gukasyan et al., 2022). Erritzoe et al. (2018) also found some long-term personality changes after consuming psilocybin like lowered nervousness and anxiety, elevated extraversion, openness, and conscientiousness.

### **1.7. Afterglow**

Some researchers have described a psychological state called 'afterglow' (Albaugh & Anderson, 1974; Krupitsky and Grinenko, 1997; Metzner, 1998; Pahnke, 1969; Pahnke et al., 1970; Sherwood et al., 1962; as cited in Majić et al., 2015). It refers to the mental state after the acute physiological effects of psychedelics have subsided and is generally described as "elevated and energetic mood with a relative freedom from concerns of the past and from guilt and anxiety" (Pahnke, 1969; as cited in Majić et al., 2015). Albaugh and Anderson (1974), reported enhanced effectiveness of psychotherapeutic interventions

during the period of afterglow, which normally subsides after a few weeks (as cited in Majić et al., 2015). This notion is particularly intriguing for mental health specialists and requires more research and insight into how it can be used therapeutically.

### **1.8. Gender differences**

At present, there is not much research available about the gender differences in psilocybin effects, either physiological or psychological. One experiment in rats (Tylš et al., 2016) showed that psilocin had a more pronounced effect in males; the locomotion and suppression of normal behavior was affected more in male rats than in females. A recent study showed that the changes in body temperature after ingesting LSD were smaller in female participants (Vizeli et al., 2024). The same study also found that female participants were more emotionally excited before ingesting LSD which had an impact on their experience (Vizeli et al., 2024). Shadani et al. (2024) suggested that the sex difference in psychedelic experience might be linked to menstrual cycle and estrogen levels.

Considering the mechanism of action of psilocybin, and the absence of specific research focusing on the gender differences in psilocybin experience and effects, another plausible way of understanding it better would be looking into the gender differences in serotonin functioning and possibly into 5-HT<sub>2A</sub> receptor binding. Bearing in mind the serotonin-based antidepressant properties of psilocybin reported by various aforementioned studies, it also warrants a look into gender differences in reactions to SSRI antidepressants to assess a possible direction of investigation into these variations. A study from 1996 found significant gender differences in serotonin processing, suggesting a gender based behavioral modulation by the serotonin system (Biver et al., 1996). According to Moses et al. (2000), some hormonal changes in women can influence the 5-HT<sub>2A</sub> receptors and therefore might affect the emotional response to serotonin altering substances. A later study however found no gender differences in 5-HT<sub>2A</sub> receptor binding in cortical regions (Adams et al., 2004).

As for the gender differences in response to SSRI antidepressants, the evidence is overwhelmingly clear – there are significant differences between how men and women react to various SSRIs. A study from 1974 cited that women have a much better response to SSRIs than men do (Raskin, 1974; as cited in Baca et al., 2004). It was also confirmed

by later studies, suggesting that women with depression generally have a significantly greater response to SSRIs than men do (Berlanga & Flores-Ramos, 2006; Baca et al., 2004; Martényi et al., 2001). Interestingly enough, in anxiety treatment, women showed a poorer response to SSRI treatment than men (Simon et al., 2006). There is also evidence that some side effects of SSRIs are manifesting differently in men and women (Keers & Aitchison, 2010). For instance, men are reporting more issues with sexual functioning than women while undergoing SSRI treatment (Espinola et al., 2022).

Presently, the nature of these differences remains unclear. The most widely accepted theory seems to be that women's hormonal changes affect their serotonin system and therefore can interfere with SSRI treatment or any other substance affecting serotonin processing (Espinola et al., 2022; Baca et al., 2004; Berlanga & Flores-Ramos, 2006; Biver et al., 1996; Adams et al., 2004; Martényi et al., 2001; Joyce et al., 2003). Others suggest that the key is in understanding the link between pharmacokinetics and pharmacodynamics of antidepressants (Kokras et al., 2010).

### **1.9. Narcofeminist approach and subjective experience of psychedelics in women**

Another way of looking at gender differences in psychedelics would be through a more philosophical, feminist lens. It warrants some attention as it might also offer insight at how men and women experience psychedelics subjectively. Without delving into the depths of women's rights history and the history of drug consumption in women, the feminist approach shows a glimpse of the complexity of subjectivity of drug consumption and gender-specific experience. Considering how certain expectations preceding drug consumption can influence and alter the experience itself (cf. Ch. Expectations, context of consumption and dosage), the prejudice and self-blame surrounding the drug consumption in women can suggest a powerful theory of how women's subjective experience is shaped. The shame and guilt narrative in women drug consumption is a well-known sociological phenomenon, as there are many expectations of women even in modern society (Dennis & Pienaar, 2023; Campbell, 2023; Dymock, 2023). Nancy Campbell (2023) suggested that there was a remarkable shift in how women experience and consume drugs in modern society. The idea is that lately, drug consumption and specifically the consumption of psychedelic drugs in women is done for self-exploration and liberation (Campbell, 2023).

Another interesting take suggests that the modern ‘renaissance’ of psychedelic research still fails to consider the relationship between psychedelics and gender, which seems to be true considering how few studies there are on gender differences in psychedelic consumption. Alex Dymock (2023) pointed out that the narrative of the first-person author of any psychedelic experience has been classically constructed as male. Whereas the accounts of psychedelics by women do exist, they have not been granted the significance they deserve (Dymock, 2023). Also, considering the history of psychedelics and its roots in indigenous communities, it is worthwhile to point out that most of the healers who worked with these substances were women (Nichols, 2016; Dymock, 2023). Ultimately, it is important to note that the aforementioned findings only indicate a possibility of gender difference in response and experience of psilocybin. However, taking into account all previous findings and sociological context and history of psychedelics, examining gender differences in the subjective experience of psychedelics seems paramount. One of the objectives of this project is to investigate the possible gender differences in the subjective psychological experience of psilocybin consumption and contribute to the general discussion about the effects of psilocybin.

### **1.10. Research in Portugal**

The psychedelic research in Portugal seems quite progressive and unbiased. There are a few organizations and academic institutions dedicated to investigating the effects and potential uses of various psychedelic substances, such as SPACE (Sociedade Portuguesa para a Aplicação Clínica de Enteógenos, 2024) and SafeJourney - Psicadélicos em Português (Safe Journey, 2024). There is a number of research projects launched in cooperation with foreign institutions by the Champalimaud Foundation in Lisbon (Fundação Champalimaud, 2024). At the same time, the National Ethics Council for Life Sciences (Conselho Nacional de Ética para as Ciências da Vida, CNECV, 2024) together with Portuguese academic societies and professional associations is developing recommendations for the use of psychedelic substances for mental health. As the therapeutic potential of the psychedelics is rapidly unveiled, there is a growing need for more localized investigations, recruiting local populations and taking into consideration a number of cultural, sociodemographic, and ethnical variables. In that light, there are still not many studies dedicated to examining the effects of psychedelics in Portuguese population and even fewer investigating the effects of psilocybin. To date, this project

seems to offer a unique insight into the subjective experience of psychological effects of psilocybin in Portuguese population.

It is important to note that, at present, the cultivation, production, possession, purchase and sale or transfer of psilocybin mushrooms in any capacity is considered drug trafficking and as such is punished by Portuguese criminal law, Decreto-Lei n.º 15/93 (Polícia Judiciária, 2024). This project did not in any way manipulate, encourage or promote drug use.

### **1.11. Research Objective**

The primary aim of this project is to understand what kind of psychological impact does psilocybin have in Portuguese population. It focuses on the subjective narrative of what the experience has been like and what it entailed. For these purposes, only filled-out responses were analyzed. Another goal of this project is to look into any possible gender differences in the subjective perception and evaluation of the psychological experience after consuming psilocybin. For these purposes, only responses that identified as ‘men’ or ‘women’ will be used. In addition to this, the intensity, clarity, personal assessment, and impact variables will be analyzed to check for any significant indications for the general population and between two genders.

## **2. METHODS**

### **2.1. Methodology**

This project employs a retrospective study design using opportunity sampling and web-based data collection.

Thanks to the ongoing investigation at the Pedagogical Psychology Clinic of the Fernando Pessoa University called “Epidemiology of Psychedelic Drug Consumption in Portugal: Motivation, Context and Subjective Effects”, the gathered data was used for multiple research projects including this one. The online questionnaire was created by a team of researchers in Fernando Pessoa University based on a comprehensive literature review on psychedelics and psychedelics consumption and is discussed in more detail in later section. The questionnaire consists of 32 questions, both open ended and multiple-choice format. Data collection began in February 2022 and ended in February 2023, taking 12 months in total. For the purposes of this study, sociodemographic data was used, as well as the data gathered from the questions about the experience (open-ended), and its intensity (scale from 1 to 5), clarity (scale from 1 to 5), impact (scale from 1 to 5), and personal evaluation (scale from 1 to 5). Only responses from participants who consumed psilocybin were used.

This project’s data was analyzed using a mixed methodology approach: quantitative variables were analyzed via IBM®SPSS® (Statistical Package for the Social Sciences, version 28) and a qualitative variable was analyzed via thematic analysis.

#### **2.1.1. Participants**

The project inclusion criteria for participation were: being at least 18 years old, identifying as either ‘man’ or ‘woman’, being a Portuguese national or residing in Portugal for at least 5 years, having consumed/ingested psilocybin at least once in the past 12 months (since 2022 when data collection began), and having good comprehension of the Portuguese language. The dosage of psilocybin consumed had to be sufficient to evoke a noticeable effect and so microdosing of the substance did not qualify for participation.

Considering all of the inclusion and exclusion criteria, the total amount of respondents amounted to 120. Out of 120 participants, 60 identified as men and 60 identified as women. The age of the participants varied from 18 to 67, with most participants aged between 28 and 47 years (n=77; 64.2%). More than half of the participants were single (n=65; 54.1%), around 29% (n=35) of the participants were in a relationship (married or civil partnership), and around 10% (n=19) were separated or divorced. Only 1 participant (1.2%) was widowed. 95% (n=114) of the participants were Portuguese, whereas 5% (n=6) identified as another nationality. Most of the participants were highly educated and held a bachelor degree (n=55, 45.8%). An important difference between men and women in this sample is that 90 percent of women participants (n=54) have a higher degree, while the same is true for 78 percent of men (n=47). Roughly 90% of the participants (n=109) did not report any pre-existing psychiatric diagnosis. For more details, please refer to the table below.

**Table 1**

*Sociodemographic characteristics of the participants*

			n	%
Participants	Gender	Women	60	50,0
		Men	60	50,0
Age	18 - 27 years	Women	13	54,2
		Men	11	45,8
	28 - 37 years	Women	14	43,8
		Men	18	56,3
	38 - 47 years	Women	24	53,3
		Men	21	46,7
	48 - 57 years	Women	6	46,2
		Men	7	53,8
	58 - 67 years	Women	3	50,0
		Men	3	50,0
Marital Status	Single	Women	35	53,8
		Men	30	46,2
	Married/In a relationship	Women	16	45,7
		Men	19	54,3
	Divorced/Separated	Women	8	42,1
		Men	11	57,9
	Widowed	Women	1	100,0
		Men	0	0,0
Nationality	Portuguese	Women	57	95,0
		Men	57	95,0
	Other	Women	3	5,0
		Men	3	5,0
Level of education	Secondary School	Women	0	0,0
		Men	2	100,0
	High School	Women	6	35,3
		Men	11	64,7
	Bachelor Degree	Women	32	58,2
		Men	23	41,8
	Master Degree	Women	17	50,0
		Men	17	50,0
	Doctorate Degree	Women	5	41,7
		Men	7	58,3
Psychiatric Diagnosis	Yes	Women	4	36,4
		Men	7	63,6
	No	Women	56	51,4
		Men	53	48,6

## 2.2. Procedures

The project was approved by the Fernando Pessoa University ethical committee on

January 22, 2022 (see Annex A). No identifying information was stored, including email addresses. The collected data will be stored for 5 years. At the end of that time period, all data will be deleted. The participants were given contact details of the research center in the university as well as some potentially helpful contacts of relevant psychological services.

For the purposes of this investigation a request to access the dataset was sent on June 21st, 2023 (see Annex B). A specific separate dataset was created for this particular research project to filter out the unnecessary variables. For the purposes of this project, only data referring to consumption of psilocybin was utilized and analyzed which amounted to 123 participants and their responses. To investigate both research questions only 120 responses were taken into consideration because there were 2 respondents who did not identify as man or woman, and one respondent who consumed a very small dose of psilocybin and therefore did not meet the participation criteria.

Participants were recruited online, through social media (Facebook) as well as through Portuguese organizations SPACE, SafeJourney - Psicadélicos em Português (website de divulgação informação sobre o tema dos psicadélicos), and SICAD (Serviço de Intervenção nos Comportamentos Aditivos e Dependências). The aforementioned organizations included the invitation to participate in the data collection in their newsletters and through their media channels.

The questionnaire was created in Portuguese, using Google Forms, to be completed online, and it became available in February 2022 until February 2023. The participation in the study was voluntary, anonymous and confidential. There was no monetary incentive or reimbursement for the participation in the study. Participants were provided with study information, after which they gave informed consent. The completion of the questionnaire took roughly 15 minutes on average. Incomplete questionnaires were discarded and not taken into consideration.

### **2.2.1. Data Analysis**

The primary research question, focusing on the subjective psychological experience of the participants, required qualitative analysis. In the questionnaire, the participants were asked to describe their experience with psilocybin. The question was open-ended, without a word limit. Thematic analysis was employed to identify, analyze, and report patterns or

themes within the dataset. This type of data analysis involves systematically examining textual or qualitative data to uncover recurring ideas, topics, or concepts, which are then organized into themes to provide insights into the underlying meanings and patterns in the dataset (Clarke, & Braun, 2013). The 120 responses were skimmed multiple times by the researcher to begin the coding process. To establish the codes, first some similar wording or occurrences were highlighted to establish a thematic direction. After that, some datasets were broken down into smaller parts and revised. After the initial codes were established, the common subthemes were identified, such as: pleasant and unpleasant emotional experiences; physical discomfort and pleasant corporeal sensations; feeling connected with the universe, nature, other people, oneself, or some sort of mystical connections and experiences; perceptual and sensorial changes, changes in perception of time and space, ineffability of the experience, revisiting memories; healing, self-growth, empowerment, existential changes, self-reflection and insight. Then, the main themes started shaping up based on the deductive theme networking method suggested by Attride-Stirling (2001). The analysis revealed 5 main themes: emotional experience, physical experience, experience of connection and unity, cognitive and perceptual alterations, personal transformation (see Diagram 1).

## Diagram 1

### *Themes and Sub-themes with Definitions*

Theme and Definition	Sub-themes
1. Emotional and Psychological Experience – this theme includes a wide range of emotional and psychological experiences, and states of mind, such as joy, sadness, anxiety, fear, varying in intensity.	1.1 Pleasant emotions such as joy, wonder, deep love, gratitude. 1.2 Difficult or unpleasant emotions such as fear, anxiety, sadness or anger.
2. Physical Sensations – physical sensations and bodily experiences including sensations of discomfort, relaxation, pain, and sexual tension, physical purging (vomiting; intense crying), sensations of death, localized or general.	2.1 Pain and physical discomfort (physical purging, crying attributed to sadness). 2.2 Pleasurable or Miscellaneous physical experiences (laughter, crying attributed to joy, weightlessness etc.).
3. Connection and Unity – this theme encompasses experiences of feeling connected to a higher power, nature, other individuals or encountering mystical entities. It includes feelings of unity, belongingness, and interconnectedness.	3.1 Connection with Whole/Unity: feelings of interconnection and belonging with nature and/or the universe. 3.2 Connection with Self and Others: feeling connected with one's self and/or others, people around, friends, or family, either alive or deceased. 3.3 Spiritual and mystical connections: experiences mystical or spiritual in nature, encounters with divine beings or entities.
4. Cognitive and Perceptual Changes – alterations in cognitive processing, expressing and recalling of information and perceptual changes.	4.1 Sensory and Perceptual Changes: Alterations in perception and sensory experiences. This includes vivid visualizations, synesthesia, changes in auditory perception, and heightened sensory sensitivity. Some reported experiencing intense visual distortions, enhanced sensory awareness and perception. 4.2 Time and Space Perception: alterations in perception of temporal and spatial dimensions. Multiple reports of witnessing other dimensions. 4.3 Ineffability: inability to explain the experience, the quality of certain experiences that makes them difficult or impossible to fully describe in words. This might occur because such experiences are often unique, intense, complex, and highly personal, making language inadequate to convey their full essence or meaning. 4.4 Memory: revising memories, trauma revisiting, or having difficulties recalling memories.
5. Personal Transformation – profound changes in one's personality, realizations about the meaning of life, reflections and integration of concepts about life, death, and the meaning of life, intentions and integration of the experience or some aspects of it.	5.1 Healing, Self-growth and Empowerment: healing from certain pains or experiences, and reporting personal growth attributed to it, integration of the psychedelic experience, gaining control over one's life, relationships, etc. 5.2 Existential Changes: awareness into the nature of existence, macro-level observations of life order and/or the meaning of life, reported changes on existential, near philosophical levels in life attitudes, experiencing re-birth, ego dissolution or a battle with ego. 5.3 Self-reflection and Insight: reflecting, intention setting, gaining clarity and/or a new understanding on behavior,

attitude, lifestyle or values.

After the themes were established, the derived coding network, as well as the identified themes and subthemes, were sent to two independent researchers to measure intercoder reliability.

The quantitative analysis of this study is composed of descriptive and inferential statistics. Descriptive statistics are used to better understand, summarize and describe the sample in question. The descriptive statistics methods used were the analysis of the frequency and of the distribution of variables, in a general manner but also considering possible differences between men and women to offer some insight for the research hypothesis. The inferential statistics go beyond the organization and description of the data and allow for the drawing of conclusions or identifying the patterns or associations. In the present work, since the variables analyzed were quantitative, t-tests were first considered in the attempt to verify if there is a difference in the experience between the two groups (men and women). However, none of the variables presented a normal distribution, so a non-parametric test had to be done instead of the parametric t-test. The next logical solution was the Mann-Whitney test which was performed for the four variables. All statistical analysis was performed in IBM®SPSS® (Statistical Package for the Social Sciences, version 28).

## **2.3. Results**

### **2.3.1. Intensity, clarity, personal assessment, and impact**

Based on the data from 120 participants, all of whom provided valid responses with no missing data, the average scores of the four variables – intensity, clarity, personal assessment, and impact, were quite similar. These variables were measured on a 5-point scale, where 1 stood for no noticeable effect, and 5 signified a significant effect.

Table 2 provides descriptive statistics for these four variables, with intensity having a mean of 4.33, clarity at 4.32, personal assessment slightly higher at 4.45, and impact at 4.25. The standard deviations, which range from 0.767 for clarity to 0.872 for impact, indicate a moderate level of variation in participants' responses across these dimensions. Overall, the data suggests that the experiences were evaluated consistently across the four measures.

**Table 2**

*Experience of participants: Intensity, clarity, personal assessment, impact*

	Intensity	Clarity	P. Assessment	Impact
Mean	4.33	4.32	4.45	4.25
Std. Deviation	.871	.767	.829	.872

Based on this analysis it is safe to say that across all 4 variables, the participants experienced a significant effect. Personal assessment of the experience scored slightly higher than the rest on average, suggesting that people generally attributed importance to their experience with psilocybin. The reported intensity, clarity, and impact of the experience also was scored above 4 ('A lot') on average, which means that on average the participants had intense, clear, and impactful experiences with psilocybin.

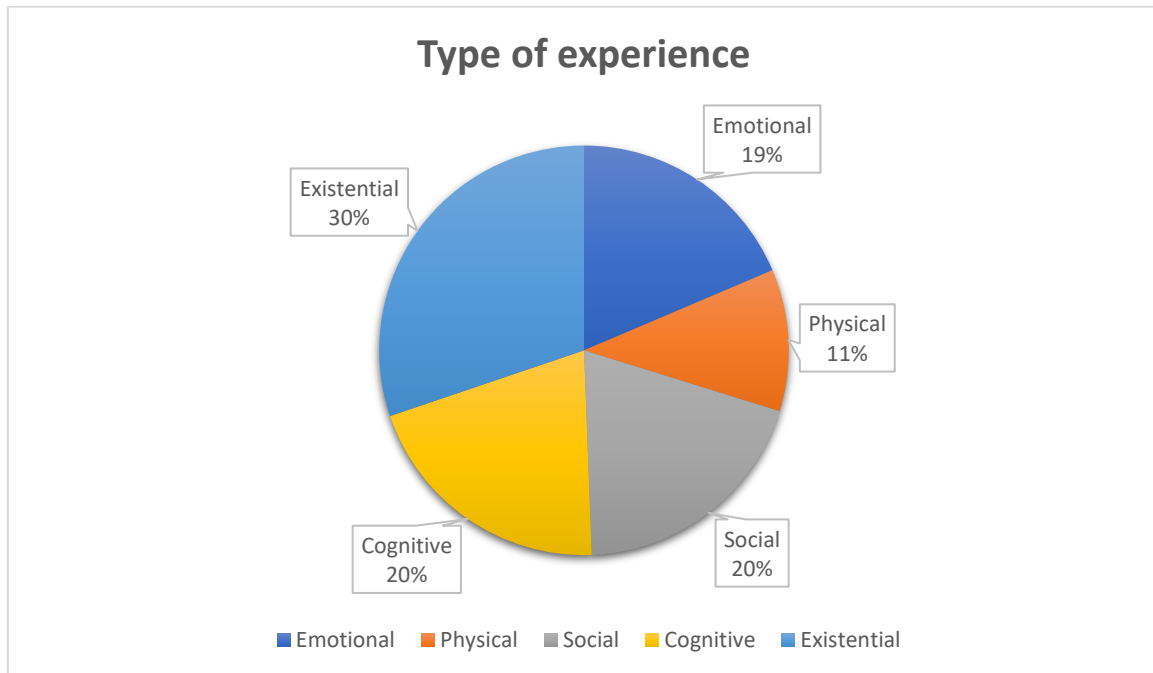
### **2.3.2. Thematic Analysis**

Thematic analysis generated five main themes (see Table 3). The themes were derived from the data, however, considering that the researcher has conducted literature review on the subject prior to conducting thematic analysis, it allows for some degree of bias which will be discussed more in the limitations section.

The total amount of occurrences within the responses amounted to 285. 7 participants haven't responded to the question, and so only 113 responses were analyzed. The following figure (see Graphic 1) represents a breakdown and the prevalence of the 5 themes in all of 285 occurrences.

## Graphic 1

### *Type of experience*



The 5 themes include 14 subthemes in total. The breakdown is shown in the table below including the number of occurrences per subtheme and the total number of occurrences per theme.

**Table 3**

*Themes*

Themes	Number of occurrences
1. Emotional and Psychological Experience	Total: 53
1.1. Pleasant emotions	38
1.2. Difficult or unpleasant emotions	15
2. Physical Sensations	Total: 32
2.1. Pain and physical discomfort	19
2.2. Pleasurable or Miscellaneous physical experiences	13
3. Connection and Unity	Total: 56
3.1. Connection with Whole/Unity	26
3.2. Connection with Self and Others	16
3.3. Spiritual and mystical connections	14
4. Cognitive and Perceptual Changes	Total: 58
4.1. Sensory and Perceptual Changes	34
4.2. Time and Space Perception	10
4.3. Ineffability	6
4.4. Memory	8
5. Personal Transformation	Total: 86
5.1. Healing, Self-growth and Empowerment	28
5.2. Existential Changes	23
5.3. Self-reflection and Insight	35

The Fleiss Kappa coefficient was calculated to measure the intercoder agreement on the codification analysis performed. The Fleiss Kappa coefficient amounted to 0.814 which signifies a very good level of agreement. In other words, this indicates a substantial level of agreement among the raters, suggesting that they are mostly consistent in their evaluations. According to commonly accepted benchmarks, this value falls within the significant agreement range (0.81 to 1.00), meaning that there is strong intercoder agreement (Laerd Statistics, 2024).

### **2.3.3. Emotional and Psychological Experience**

In the Emotional and Psychological Experience category, the majority of participants reported experiencing pleasant emotions, with 38 occurrences (13.3% of total), while only 15 occurrences (5.3%) experienced difficult or unpleasant emotions. This indicates that overall, positive emotional experiences were more prevalent than negative ones.

#### **2.3.3.1. Pleasant emotions**

Participants referred to experiencing a range of pleasant emotions, such as joy, wonder, deep love, and gratitude. Some also referred to experiencing peace and compassion:

*“Sentia uma felicidade, paz, compaixão e gratidão imensas e senti uma grande vontade de partilhar amor e amizade com o mundo.” (P2)*

#### **2.3.3.2. Difficult or unpleasant emotions**

Participants reported experiencing emotions like fear, anxiety, sadness or anger. Some answers included quotes like:

*“Medo de não voltar ao normal.” (P14)*

*“...Esta fase foi muito dolorosa. Zanguei-me, revoltei-me...” (P40)*

#### **2.3.4. Physical sensations**

The theme of Physical Sensations accounted for 32 occurrences (11.2% of total). The Pain and Physical Discomfort subtheme was more common (19 reports, 6.7%) compared to pleasurable or miscellaneous physical experiences, which were reported 13 times (4.6%). This suggests that while physical sensations were a significant aspect of the overall experience, discomfort was more frequently reported than pleasure.

The reported experiences were quite similar to the emotional domain, however in many instances the participants clearly described physical sensations. In some cases, it seemed to be a conductor to a psychological experience, a revelation, or a progression of an emotional journey.

### **2.3.4.1. Pain and physical discomfort**

Participants reported experiencing physical purging like vomiting, coughing, or crying, as well as pain, or sensations of dying:

*“...Vomitei bastante e tive dores físicas...” (P56)*

*“...Com as mãos na barriga, sentia a minha morte a acontecer, de forma lenta e dolorosa...” (P61)*

### **2.3.4.2. Pleasurable or miscellaneous physical experiences**

Participants reported some pleasant physical sensations, like laughter, or tears of joy, as well as some harder to categorize physical sensations like cleansing or weightlessness:

*“...durante quase todo do processo senti que estava a "limpar" o útero... chorei de tanta felicidade...” (P9)*

*“...Leveza.” (P104)*

### **2.3.5. Connection and unity**

Connection and Unity was an important theme, with 56 total occurrences (19.6%). The sense of connection with the whole or unity was most frequently reported (26 reports, 9.1%), followed by connection with self and others (16 reports, 5.6%) and spiritual and mystical connections (14 reports, 4.9%). These results highlight that many participants experienced a profound sense of interconnectedness, whether it was with the broader universe or within personal relationships.

#### **2.3.5.1. Connection with the whole or sensation of unity**

Participants reported feelings of interconnection and belonging with nature and/or the universe:

*“Sensação de conexão com o todo...” (P1)*

*“...conexão com a natureza...” (P14)*

### **2.3.5.2. Connection with Self and Others**

Participants reported feeling connected with one's self and/or others, people around, friends, or family, either alive or deceased:

*“...Depois recebi uma mensagem sobre o meu irmão...Entendi que há uma conexão com o meu irmão que vai muito além desta vida. Depois vi o Artur, meu amigo companheiro que suicidou...depois da experiência senti - um grande conforto de não ser tido abandonada pelo meu povo...” (P22)*

### **2.3.5.3. Spiritual and mystical connections**

Some participants reported experiences of mystical or spiritual nature, encounters with divine beings or entities:

*“...Durante a experiência acedi a uma espécie de dimensão mística...” (P2)*

*“...Neon gods/aliens...” (P4)*

### **2.3.6. Cognitive and Perceptual Changes**

In the Cognitive and Perceptual Changes category, there were 58 total encounters (20.4% of total), making it a significant aspect of the participants' experiences. Sensory and perceptual changes were reported by 34 participants (11.9%), making it the most frequently encountered subtheme in this category. Time and space perception changes were reported 10 times (3.5%), while ineffability and memory changes were less common, reported by 6 (2.1%) and 8 participants (2.8%), respectively. Overall, cognitive and perceptual alterations were a major part of the participants' experiences, especially changes in sensory perception.

#### **2.3.6.1. Sensory and Perceptual Changes**

Participants reported alterations in perception and sensory experiences. This includes vivid visualizations, synesthesia, changes in auditory perception, and heightened sensory sensitivity. Some reported experiencing intense visual distortions, enhanced sensory awareness and perception:

*“As cores tornaram-se mais vibrantes...” (P13)*

*“... capacidade de 'ver' a música em formas e cores.” (P20)*

### **2.3.6.2. Time and Space Perception**

Participants reported alterations in perception of temporal and spatial dimensions. There were multiple reports of witnessing other dimensions:

*“...Senti uma profundidade maior da dimensão espacial, relatividade do tempo e espaço...”(P62)*

*“...Perdi a noção do tempo, espaço, do meu corpo e de quem sou mas ao mesmo tempo nunca deixei de ser eu e nunca deixei de estar presente em presença total...”(P102)*

### **2.3.6.3. Ineffability**

Participants reported their inability to explain the experience, and related certain aspects of the experience as difficult or impossible to fully describe in words. This might occur because such experiences are often unique, intense, complex, and highly personal, making language inadequate to convey their full essence or meaning:

*“...Foi uma viagem indiscreível...” (P40)*

*“...É difícil por em palavras está transformação...” (P61)*

### **2.3.6.4. Memory**

Participants reported revising memories, trauma revisiting, or having difficulties recalling memories:

*“...regresso a momentos do passado marcantes...”(P103)*

### **2.3.7. Personal Transformation**

The Personal Transformation theme is the theme that was the most prominent in the data collected. It represents a significant portion of the overall experiences, accounting for 30.2% of all occurrences (86 out of 285). Within this theme, Healing, Self-growth, and Empowerment were experienced by 28 participants, making up 9.8% of the total encounters. This subtheme reflects individuals' feelings of personal development and

empowerment during their transformative journeys. Existential Changes, which involve shifts in one's perspective on life or purpose, were reported by 23 participants, or 8.1% of the total, highlighting the profound nature of these experiences. Finally, Self-reflection and Insight was the most frequently encountered subtheme, with 35 participants (12.3%) reporting deep introspective insights and reflections about themselves.

### **2.3.7.1. Healing, Self-growth and Empowerment**

Participants reported healing from certain pains or experiences, and reporting personal growth attributed to it, integration of the psychedelic experience, gaining control over one's life, relationships, etc.:

*"...Desde esse afastamento emocional pude observar as minhas circunstâncias e reposicionar-me..." (P13)*

### **2.3.7.2. Existential Changes**

Participants reported experiencing awareness into the nature of existence, macro-level observations of life order and/or the meaning of life, reported changes on existential, near philosophical levels in life attitudes, experiencing re-birth, ego dissolution or a battle with ego:

*"Tornou-me possível entender (...) o que será estar "morto", sem estar, dando origem a um entendimento totalmente diferente da experiência que é a vida." (P37)*

### **2.3.7.3. Self-reflection and Insight**

Participants mentioned reflecting, intention setting, gaining clarity and/or a new understanding on behavior, attitude, lifestyle or values:

*"Sensação de "closure" com algo que procurava, clareza para muitas respostas que procurava e que a pessoa com quem estava procurava." (P51)*

*"Profundo "olhar pra dentro"" (P84)*

In summary, Personal Transformation and Cognitive and Perceptual Changes were the most frequently encountered themes, highlighting the importance of introspection, self-growth, and changes in perception in the participants' experiences. Emotional experiences

were more likely to be positive than negative, while physical discomfort was more common than physical pleasure. Connection and unity, particularly with the larger whole, also played a significant role in shaping participants' overall experiences.

### **2.3.8. Gender differences**

The results of the thematic analysis were further examined to identify any gender differences. The occurrences were divided to compare the prevalence of themes and subthemes by gender. These differences were analyzed using a Chi-square test to ensure that the necessary conditions were met to assume a statistical significance.

The following table (see Table 4) illustrates the prevalence of themes and subthemes by gender as well as in relation to the total numbers.

**Table 4**

*Themes and subthemes by gender*

	Gender				$\chi^2$	p
	Women		Men			
	n	%	n	%		
1. Emotional and Psychological Experience						
1.1. Pleasant emotions	25	65,8	13	34,2	5.546	.019*
1.2. Difficult or unpleasant emotions	8	53,3	7	46,7	.076	.783
	<i>Total</i>	<i>33</i>	<i>19.3</i>	<i>20</i>	<i>17.5</i>	
2. Physical Sensations						
2.1. Pain and physical discomfort	14	73,7	5	26,3	5.065	.024*
2.2. Pleasurable or Miscellaneous physical experiences	7	53,8	6	46,2	.086	.769
	<i>Total</i>	<i>21</i>	<i>12.3</i>	<i>11</i>	<i>9.7</i>	
3. Connection and Unity						
3.1. Connection with Whole/Unity	17	65,4	9	34,6	3.142	.076
3.2. Connection with Self and Others	10	62,5	6	37,5	1.154	.283
3.3. Spiritual and mystical connections	6	42,9	8	57,1	.323	.570
	<i>Total</i>	<i>33</i>	<i>19.3</i>	<i>23</i>	<i>20.2</i>	
4. Cognitive and Perceptual Changes						
4.1. Sensory and Perceptual Changes	21	61,8	13	38,2	2.627	.105
4.2. Time and Space Perception	6	60,0	4	40,0	.436	.509
4.3. Ineffability	6	100,0	0	0,0	6.316	.012*
4.4. Memory	5	62,5	3	37,5	.536	.464
	<i>Total</i>	<i>38</i>	<i>22.2</i>	<i>20</i>	<i>17.5</i>	
5. Personal Transformation						
5.1. Healing, Self-growth and Empowerment	13	46,4	15	53,6	.045	.831
5.2. Existential Changes	14	60,9	9	39,1	1.345	.246
5.3. Self-reflection and Insight	19	54,3	16	45,7	.164	.685
	<i>Total</i>	<i>46</i>	<i>26.9</i>	<i>40</i>	<i>35.1</i>	
Total and percentage per gender in relation to total (285 = 100%)	171	60%	114	40%	285	100%

The table presents a detailed comparison of experiences reported by men and women across the established themes, such as emotional and psychological experience, physical sensations, connection and unity, cognitive and perceptual changes, and personal transformation. In general, women had a higher percentage of occurrences reported in most categories (60% of the total), with men representing 40%. In other words, women were more descriptive of their experience and their responses included more subthemes than those of men.

In the Emotional and Psychological Experience theme, women were far more likely to report pleasant emotions (65.8%) than men (34.2%). This indicates that women, more often than men, found their emotional experiences positive or enjoyable ( $p=.019$ ). However, when it came to difficult or unpleasant emotions, the difference between genders was much smaller, with 53.3% of women and 46.7% of men reporting such experiences.

In the theme of Physical Sensations, women again reported more experiences of pain and physical discomfort (73.7%) compared to men (26.3%). This significant difference shows that women were more prone to feeling discomfort ( $p=.024$ ). On the other hand, in terms of pleasurable or miscellaneous physical experiences, the distribution between genders was more balanced, with 53.8% of women and 46.2% of men reporting such sensations, but without any statistical significance.

In the theme of Connection and Unity, women were more likely to experience a sense of connection with the whole or a universal connection (65.4%) than men (34.6%). Similarly, women also reported a stronger connection with self and others (62.5%) compared to men (37.5%). However, the pattern is reversed in spiritual and mystical connections, where men were more likely to report such experiences (57.1%) than women (42.9%). There was no statistical significance found however.

In the Cognitive and Perceptual Changes theme, both genders experienced sensory and perceptual changes, though women were more represented (61.8% compared to 38.2% of men). The perception of time and space followed a similar trend, with women at 60% and men at 40%. A noteworthy observation in this category is the subtheme of ineffability—the inability to describe an experience—which was reported only by women (100%), while men did not report any ineffable experiences. Even though the  $p$  value for this parameter appeared statistically significant ( $p=.012$ ), the conditions for a valid

comparison were not met and so it cannot be considered statistically significant. In terms of memory, women again made up a larger portion (62.5%) compared to men (37.5%).

The theme of Personal Transformation shows both commonalities and variations between men and women in three subthemes: Healing, Self-growth and Empowerment, Existential Changes, and Self-reflection and Insight. In the subtheme of Healing, Self-growth and Empowerment, men slightly outnumbered women, with 53.6% of reports coming from men and 46.4% from women. Nonetheless, no statistical significance was found between genders.

For the Existential Changes subtheme, which involves reevaluating life's meaning and purpose, women made up 60.9% of the reports, while men represented 39.1%. In the subtheme of Self-reflection and Insight, women again outnumbered men, accounting for 54.3% of the reports, while men represented 45.7%. However, the differences were not statistically significant.

Women generally reported a higher frequency of emotional, physical, and unity experiences, while men had more experiences related to spiritual and mystical connections. There was more gender balance in personal transformation themes. Notably, only women's responses had a theme of ineffability, while 0% of men participants indicated inability to explain or describe their experience with psilocybin. This suggests that while men and women share many common experiences, women in this study reported more positive emotional experiences and negative or unpleasant physical experiences with psilocybin.

In addition to this, an analysis for gender differences in intensity, clarity, personal assessment, and impact of the experience was performed. Each of these domains were rated on a scale from 1 (not at all) to 5 (extremely). Below is a brief summary of the mean evaluation response sorted by gender.

**Table 5**

*Experience assessment by gender*

	Gender		Mann-Whitney U test	<i>p</i>
	Women	Men		
	Mean (SD)	Mean (SD)		
Intensity	4.30 (.944)	4.35 (.779)	1799	.995
Clarity	4.40 (.741)	4.23 (.789)	1581	.206
Personal Assessment	4.45 (.891)	4.45 (.769)	1719	.625
Impact	4.40 (.848)	4.10 (.877)	1428	.034

When analyzing the differences between men and women regarding the intensity of the experience, we verified that both groups do not present significantly different means (Mann-Whitney = 1799;  $p=.995$ ). While women's declared intensity of the experience is 4.3 on average, men's is 4.35 on average (see Table 5).

As seen in Table 5, regarding the difference between women and men when it comes to the clarity of the experience, women reported a value of 4.4 on average between 1 and 5, while men reported an average of 4.23. These values are not significantly different (Mann-Whitney = 1581;  $p= .206$ ), meaning there is no difference in the clarity of the experience between the two groups.

There is no difference between women and men when it comes to the personal assessment of the experience. They both report a value of 4.45 on average on a scale from 1 to 5 (Mann-Whitney = 1719;  $p=.625$ ).

Going against the previous findings, when it comes to the impact of the experience, there is a difference between the values reported by women and men. Women reported an average significantly higher than that of men (Mann-Whitney = 1428;  $p=.034$ ).

Based on the analysis performed, gender did not divide the experience in terms of intensity, clarity, personal assessment, and impact. On average, the respondents rated their experience in these domains as very prominent. In other words, on average, all respondents rated their experience with psilocybin as very intense, clear, personally significant, and impactful. There was a slight difference in how women rated the impact of their experience, that being slightly higher, or more impactful, than men.

## **2.5. Discussion**

The current psychedelic renaissance raises a lot of interesting and complicated questions. Even with modern understanding of human physiology and psyche there are many unknowns in how psychedelics affect people. New research is being published each month about the effects of psilocybin and its potential for therapeutic and healing process. Hopefully, this project can contribute to the discussion and shed some light on the subjective experience of psilocybin.

The results of the thematic analysis revealed that the respondents predominantly had an existential or transformational experience with psilocybin with a bit more than 30% of participants reporting some sort of an existential or transformational experience. Respondents reported self-growth and healing from certain past experiences, profound existential changes in life attitudes, and personal insights into their individual behaviors, patterns, etc.

While the general theme of transformation was quite common in this sample, the particular theme of ego-dissolution, that became almost synonymous with psychedelics in literature, was not prevalent. Only 2 respondents (or 1.67%) mentioned ego-dissolution or deconstruction. According to Nour et al. (2017), ego dissolution is a phenomenon that involves a decrease in self-referential awareness, which typically defines our normal waking consciousness (as cited in Mason et al., 2020). As a result, the boundaries between the self and the external world blur, fostering a heightened sense of unity with others and the environment. Considering how prominent this theme is in current research of psychedelics, perhaps it wasn't reported much by the respondents for a reason. Most importantly, the dosage of psilocybin was not monitored, and so it might explain the discrepancy between existing literature and present findings. Another possible explanation could be that the answers were in Portuguese and so the language and cultural

differences can account for this. Considering that most of the literature on this subject is coming from the United States, in Portuguese society this concept might be referred to differently or not as commonly used. As mentioned before, the transformational aspect of the experience was the most prevalent after all. Many participants mentioned getting personal insights under the influence of psilocybin. This type of experience is mentioned in current research as well, where psilocybin is considered conducive to personal insights (McCulloch et al., 2022) and its ability to enhance insightfulness overall (Singer et al., 2024).

Another prominent theme was cognitive experience which refers to perceptual, temporal, and spatial changes, ineffability of the experience, and memory revisiting with a bit over 20% of the respondents having an experience like that. In their in-depth study of the neurobiology of psychedelics, Vollenweider and Kometer (2010) found that psilocybin causes significant fluctuations across all 5 dimensions of the 5 Dimensions of Altered States of Consciousness (5D-ASC) including perceptual changes. There are also studies showcasing how psilocybin affects time perception or rather how it causes the distortions in temporal perception (Wackermann et al., 2008; Siegel et al., 2024). According to Barrett et al. (2020), psilocybin can also cause perceptual alterations and attention span fluctuations, as well as revoking certain memories. This was supported by the findings in this study. Psilocybin seems to be linked with revoking certain memories or past experiences. Apart from revisiting specific experiences in their past, there were a few respondents who reported that after taking psilocybin they've revisited their past traumatic experiences (death of a loved one, loss of a child, infertility, suicide of a friend, etc.). There is some evidence that psilocybin is conducive to facilitating confrontation of traumatic memories (Khan et al., 2022). The theme of memory revisiting might be tightly linked with context of the consumption as well as the intention setting. Some participants alluded to the fact that partially the reason for taking psilocybin was to resolve some trauma or past issues, which might explain the prominence of this theme. An interesting discrepancy can be observed in the subtheme of ineffability. Even though the theme of ineffability or inability to put the experience into words is quite prominent in research (Letheby, 2021; Siegel et al., 2024; Barrett et al., 2020; Smith & Sisti, 2020), the findings of the present study only showed a few instances and, interestingly enough, none of participants who identified as men reported an inability to describe their experience.

Almost 20% of the respondents reported experiences of connection and unity, both on

social and mystical levels. Mystical and spiritual experiences are among the oldest documented forms of psychedelic experiences in literature, with historical accounts tracing back to indigenous rituals and religious practices. Research suggests that psychedelics like psilocybin frequently induce these mystical experiences (Ko et al., 2022; Kettner et al., 2021), though the intensity and quality of the experience are often influenced by factors such as dosage and setting. Mystical experiences are not simply transient; they have been shown to facilitate deep personal transformation. For instance, MacLean et al. (2011) found that mystical-type experiences under the influence of psychedelics can result in long-lasting changes in personality, often marked by increased social openness, suggesting an interconnectedness between the various effects of psychedelics.

More recent studies support the idea that psilocybin specifically enhances feelings of social unity and connection with nature. According to Belser et al. (2017), the psilocybin consumption can often lead to the experience of social unity and positive emotions. Bird et al. (2021) found that participants who consumed psilocybin reported stronger bonds with others, as well as a heightened sense of unity with the natural world. This connection was also observed in this study, where individuals described a profound sense of oneness that transcended the self, fostering positive emotional response like empathy or compassion, and a holistic understanding of their place within the environment. This, again, might indicate that certain themes in psychedelic experiences are often intertwined or inseparable from one another. Furthermore, these findings align with Forstmann & Sagioglou's (2017) work, which demonstrated that psilocybin can reduce feelings of egocentrism, promoting prosocial behavior and enhancing environmental awareness and connection with nature. Taken together, these studies suggest that psilocybin not only triggers mystical experiences but also encourages a broader sense of social and ecological interconnectedness which have been confirmed by findings in this project.

Psilocybin has a profound impact on emotional processing, primarily by altering brain connectivity in regions linked to threat perception and emotional regulation. Psilocybin has been shown to reduce amygdala activity and weaken its connectivity with the visual cortex, resulting in decreased fear responses, heightened positive emotions such as peace and joy, and a diminished sensitivity to negative stimuli, while about 19% of users report experiencing emotionally intense reactions (Kraehenmann et al., 2016). This aligns with findings from Bird et al. (2021), who reported increased feelings of peace and emotional

connection, as well as occasional negative emotions, like fear or anxiety. Such negative emotions tend to be context-dependent, more likely to arise in stressful or unfamiliar settings, as noted by Carhart-Harris et al. (2016). However, in supportive environments, these negative feelings are typically short-lived, with positive emotions predominating (Bouwer & Carhart-Harris, 2020; Smith & Sisti, 2020).

In this study, the theme of physical or physiological experience is referring to any physical symptom that the participants referred to. A bit over 11% of all participants reported some sort of physical symptoms or experiences. It is important to note that these symptoms are likely related to the psychological experience, for example the feeling of fear or revisiting past traumas might trigger a physiological reaction of bodily purge, like vomiting. The sensation of lightness and weightlessness could also be psychological in nature, a byproduct of euphoric emotions perhaps. Psilocybin is generally considered a safe drug, with most of its impact being psychological. There is not much evidence to support prominent physiological response to the drug, however one study suggests that, depending on the dosage, psilocybin can cause brief elevation of blood pressure, but no changes in heart rate or body temperature (Kopra et al., 2022). Another specific reported physiological reaction was an arousal in libido. However, there are very few studies to date that suggest or confirm that psilocybin can cause a physiological change in libido, although a recent project suggests that psilocybin can have a positive effect on sexual functioning (Barba et al., 2024). There is a possibility that such experience is psychological in nature and is rather a by-product of the psychological response than a physiological reaction on its own, but more research is needed. Only 2 participants (1.67%) reported changes in libido, and incidentally both of them were men. Many respondents reported a pleasant feeling of weightlessness and levity and this type of experience is very common with psychedelics, including psilocybin, with reports of such responses dating back to Aztec ceremonies (Schultes, 1940).

Intention setting and expectations seem to indeed have a profound impact on the path the psychedelic journey takes. In the responses encountered in this project there was an indication that these can shape the experience. In the responses where the participants included descriptions of goal- and expectation setting, their experiences seemed to be linked with their intentions, goals, and expectations. For instance, some experiences described a premediated goals or issues that the respondents would like to gain clarity on or seek resolution. In those instances, the participants actually had an experience linked

to those goals or issues, which aligns with the existing literature citing the implications of the setting, as well as expectations or goal setting (Zeiss et al., 2021; Haijen et al., 2018). This could be a promising new direction to explore in future research. Since in this project the dosage was not a controlled variable, it is impossible to assume how it could predict an experience. However, the literature suggests that the dosage has a profound impact on the psychedelic experience. For instance, some research has cited the implications of the dosage, and the expectations, intentions, or goal setting (Zeiss et al., 2021; Carbonaro et al., 2016; Haijen et al., 2018; Griffiths et al., 2006; Griffiths et al., 2008). All these factors were shown to have a significant impact on the psychedelic experience. Vizeli et al., (2024) found that the dosage is the best predictor of the psychedelic experience with LSD. Some literature suggests that the dosage is linked specifically to the transformational experience (Madsen et al., 2019; Haijen et al., 2018; Bouwer & Carhart-Harris, 2020; Carbonaro et al., 2016). In addition to that, intention-setting and expectations seem to have a profound impact on the path the psychedelic journey takes.

The findings of this study revealed some gender differences in psilocybin experiences, which could contribute to the existing literature on psychedelic research and gender. Women were more likely to report positive emotional experiences and unpleasant physical reactions than men. This heightened emotional and somatic sensitivity among women may not only reflect gender differences in emotional expressiveness and somatic awareness but also suggest that biological factors such as hormonal fluctuations play a role in shaping these experiences. The gender disparity in reporting ineffability—where only women struggled to articulate their experiences—could be linked to societal norms around emotional expressiveness. Women might find it harder to convey their complex emotional and perceptual states induced by psilocybin while men might be less likely to share their emotions at all. The culture can play a significant role here, shaping the narrative of men and women. On another hand, a recent study by Shadani et al. (2024) suggested that the sex difference in psychedelic experience might be linked to the menstrual cycle phases and to the fluctuations in estrogen levels, further emphasizing the potential influence of biological factors. The results also showed that women rated their psychedelic experiences as more impactful than men on average, which could indicate that women tend to attribute more significance and personal meaning to such experiences. Overall, these results highlight that, while both men and women can experience profound

transformations under psilocybin, the nature and intensity of these experiences may be shaped by a complex interplay of gender-specific biological, psychological, and cultural factors.

### **2.5.1. Limitations**

The design of the study in itself posed some limitations. Ideally, the design wouldn't be retrospective, and the experiences or responses would be recorded presently. In addition, monitoring for the dosage and the homogeneity of the substance consumed would enhance the reliability and the generalizability of the results. It could also contribute to a more in-depth understanding of the gender differences in consumption of psilocybin.

Certain themes, prominent in the literature (like ego-dissolution) were not really observed in the present sample. It could also have an impact on the process of thematic networking and analysis by suggesting certain themes over others. Naturally, the size of the sample could be limiting, but also some cultural differences might suggest new dimensions in psychedelic experience. It also might be explained by the lack of control for homogeneity of the dosage of the substance, and the substance itself. Since there is research indicating that the dosage is a strong predictor of a psychedelic experience, dosage control could possibly allow for less variability in the data.

As pointed out in the descriptive statistics section, it is important to point out that any difference found between the groups of men and women might be due to the difference in level of education. Future research exploring how gender may influence the impact of experiences could consider looking into the differences in educational levels between men and women. Controlling for these educational disparities could ensure that any observed effects are genuinely attributable to gender, rather than confounded by variations in education. This framework could allow for more accurate conclusions regarding the role of gender in shaping experiences. In general, more research is needed to understand how gender affects psychedelic experiences. Future research could also include more gender identities and populations to diversify and enrich existing findings.

Lastly, this author is hoping that the current project can serve as a stepping stone for further research and analysis of the subjective experience of consuming psilocybin.

### 3. CONCLUSION

Psilocybin is a potent substance that has been used for centuries in many different parts of the world. Nowadays, having the tools and the freedom to discuss and research how this substance affects us psychologically presents a new direction, which could lead to a deeper understanding of the human psyche. A plethora of research suggests that psilocybin has great therapeutic potential for mental health, but, at this stage, more research is needed to gain a deeper insight into what kind of psychological impact psilocybin has.

In conclusion, the findings of this study reinforce the complex and multifaceted nature of psilocybin experiences. Participants commonly reported transformational and existential experiences, emphasizing personal growth, healing, and insights, though themes like ego-dissolution were notably rare, perhaps due to cultural or linguistic factors, or possibly the differences in the dosages consumed. The study also confirmed the well-documented cognitive effects of psilocybin, such as perceptual changes and memory-revisiting, particularly around traumatic experiences. Additionally, many respondents reported enhanced feelings of social connectedness and unity with nature, further supporting the notion that psilocybin facilitates prosocial behaviors and ecological awareness. Physical symptoms were minimal and seemed to be closely linked to psychological states. The role of intention-setting, dosage, and expectations was not controlled and might be significant, aligning with existing literature on the importance of these factors in shaping psychedelic experiences. There were some noticeable gender differences in the experiences, with women rating their experiences as more impactful than men and, on average, reporting more experiences of emotional, physical, and cognitive nature. These findings contribute to the growing body of research on psilocybin, highlighting its potential for personal transformation and emotional healing, while also opening up new avenues for future research, particularly around the role of gender in shaping psychedelic experiences.

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## ANNEXES

### Annex A. Ethical committee request



Universidade Fernando Pessoa

*Jan cumprimento às investifebrary*  
*21.01.2022*

Exmo. Senhor  
Prof. Doutor Pedro Reis  
Diretor da FCHS

Nº	Data
FCHS/PI – 229/21-2	19 de Janeiro de 2022

Exmo. Senhor Professor Doutor,

A Comissão de Ética apreciou a ressubmissão do projeto de investigação apresentado por Sónia Pimentel Alves e Ana Botelho Ribeiro, intitulado “Consumo de drogas psicadélicas: Motivação, contexto e experiência”.

Depois de apreciado o projeto, a Comissão de Ética verificou que todos os esclarecimentos/modificações solicitados em parecer anterior foram realizados.

Deste modo, a Comissão de Ética considera que não há nada a opor quanto à realização deste projeto.

Com os melhores cumprimentos,

A Presidente da  
Comissão de Ética da UFP

*Inês Lopes Cardoso*  
Inês Lopes Cardoso



Fundação Ensino e Cultura “Fernando Pessoa”

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UNIVERSIDADE FERNANDO PESSOA [REITORIA] - [FACULDADE DE CIÊNCIA E TECNOLOGIA] - [FACULDADE DE CIÊNCIAS HUMANAS E SOCIAIS]

Praça 9 de Abril, 349 - 4249-004 Porto - Portugal - T. +351 22 507 1300 - www.ufp.pt - geral@fundacaofernandopessoa.pt

[FACULDADE DE CIÊNCIAS DA SAÚDE] Rua Carlos da Maia, 296 - 4200-150 Porto - Portugal - T. +351 22 507 4630

ESCOLA SUPERIOR DE SAÚDE FERNANDO PESSOA

Rua Delfim Máia, 334 - 4200-253 Porto - Portugal

T. +351 22 509 6371 - geral@ess.fernandopessoa.pt



**Annex B.** Request to access research database



UNIVERSIDADE  
FERNANDO PESSOA  
www.ufp.pt

**Maryia Hurevich** <43336@ufp.edu.pt>

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**Request to access research database**

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**Maryia Hurevich** <43336@ufp.edu.pt>

21 de junho de 2023 às 13:57

Para: Sonia Alves <salves@ufp.edu.pt>, Ana Botelho Ribeiro <anabribeiro@ufp.edu.pt>

Good afternoon Prof Sonia and Prof Ana,

I hope all is well! My name is Hurevich Maryia, student ID 43336.

I'd like to present you with the topic of my research under supervision of Prof Sonia Alves (in the partial fulfillment requirement for the Master's degree in Clinical and Health Psychology):

Psychological Effects of Psilocybin - Thematic Analysis of the Experience (this title is a work in progress and might change later on)

The primary objective of this project would be to identify, describe, and comprehend/analyze the psychological experience after consumption of psilocybin.

The secondary objective of this project would be to explore any and all differences in the aforementioned experience between men and women (including those who identified as such).

I would greatly appreciate it if I could be granted access to the database of a bigger project conducted at UFP about the consumption of psychedelics and its effects.

Please let me know if you have any questions,

Best regards,

Maryia

**Ana B. Ribeiro** <anabribeiro@ufp.edu.pt>

21 de junho de 2023 às 15:56

Para: Maryia Hurevich <43336@ufp.edu.pt>

Cc: Sonia Alves <salves@ufp.edu.pt>

Hello, Maryia

Thank you for your kind e-mail and your interest on our research project.

We are pleased to inform you that you are granted access to all the relevant variables in our database necessary to your research.

We also request that if any work related to our project may occur in the future, we shall be informed and the names of the research team be included as well.

We wish you all the best with your research,

Best regards,

Ana Botelho Ribeiro

--

Ana Botelho Ribeiro

Psicóloga | OPP n° 16775

E-mail: [anabribeiro@ufp.edu.pt](mailto:anabribeiro@ufp.edu.pt)

Clínica Pedagógica de Psicologia

[Rua Carlos da Maia, 296](#)

[4200-150 Porto](#)

Tlf: 22 507 13 83

E-mail: [cppsic@ufp.edu.pt](mailto:cppsic@ufp.edu.pt)

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