The Anatomy Of A Trip: A Mixed Methods Content Analysis On The Psilocybin Experiences Of People With PTSD

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Statement of Originality

This report contains no material offered for the award of any other degree or diploma, or material previously published, except where due reference is made in the text.

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Abstract

In recent years, psychedelic research has undergone a quiet renaissance, with a number of studies investigating the potential benefits of psychedelic- assisted treatment for various mental health conditions. Among the most helpful of these substances is psilocybin or 'magic mushrooms'. Considering the promising results psylocibin therapy has produced for anxiety, depression, OCD and substance use disorder, it stands to reason that valuable information would be gained by studying how psylocibin interacts with the neurobiological differences in people with PTSD. In addition, traditional treatments for PTSD often achieve underwhelming results, calling innovative approaches to be considered. The current study aimed to identify and understand common themes experienced during psilocybin usage expressed online by individuals with PTSD/CPTSD. This study used a mixed methods content analysis research design, utilising 825 posts detailing the psilocybin experiences of people with PTSD from the online forum website 'Reddit'. The data were analysed and coded in Nvivo. The results showed that the majority of participants reported general reductions in PTSD symptoms after psilocybin use. Specific symptom reductions included decreased depression, anxiety, nervous system arousal, and flashbacks among others. Additionally, the presence of challenging or unpleasant experiences during a trip were generally considered as 'part of the healing process' and considered to be ultimately productive by most posts. Effects varied with dose and experiences became more intense and unpredictable as dosage increased, resulting in distressing experience for some. Motivation for psilocybin skewed heavily toward treatment for PTSD. These findings indicate that psilocybin may yet play a role in the treatment of PTSD and highlights an urgent need for the exploration and investment in innovative approaches to PTSD treatment.

Keywords: PTSD, psilocybin, magic mushrooms, trip, confrontation, processing

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Chapter 1: Introduction

Prevalence and Impact of PTSD in Australia

Post -traumatic stress disorder (PTSD) is a complex mental health condition that can significantly impair an individual's quality of life (American Psychiatric Association, 2013). While it is estimated that up to 75% of Australian adults have experienced a traumatic event in their lifetime, most of these people do not develop PTSD (AIHW, 2024). When the development of the disorder does occur, the effects are deeply detrimental to the person's health (Kessler et al., 2017) and can be difficult to treat due to the neuro-biological changes that occur when a person develops PTSD (Yehuda & LeDoux, 2007; Ehlers & Clark, 2000). Over a million Australians are struggling with the disorder in any given year, making it the second most occurring mental health disorder in Australia (Pheonix Australia, 2022). A major contributor to this statistic is Australia's high rates of family, domestic, and sexual violence (FDSV), which account for approximately 47% of PTSD cases (Kessler et al., 2017; Australian Bureau of Statistics, 2023). The impact of PTSD on a person's wellbeing is multifaceted, affecting an individual's mental and physical health, relationships and behaviour. Individuals with PTSD are more likely to engage in harmful behaviours and face an elevated risk of chronic diseases and premature mortality (Kessler et al., 2017). The psychological burden, marked by a constant undercurrent of stress, impaired functioning and feelings of depression and shame, exacerbate and perpetuate the disorder's insidious impacts a person's life (Breslau, 2009).

Symptoms and Neurobiology of PTSD

PTSD is a mental health condition that can develop after exposure to a traumatic event, such as a serious accident, terror attack, natural disaster, military combat, the death of a loved one, or sexual, physical, or emotional abuse (American psychological Association, 2013). PTSD is characterised by symptoms that can significantly affect cognition, emotion

(Yehuda, R., & LeDoux, 2007) and behaviour (Bremner, 2006). The symptoms of PTSD are grouped into four categories: Intrusion symptoms, avoidance symptoms, negative changes in cognition or mood, and arousal symptoms (Mann et al., 2024). Intrusion symptoms can include unprompted distressing thoughts or memories of the event, flashbacks, or intense physical or emotional reactions to trauma reminders. Avoidance is characterised by an intense urge to avoid thoughts, conversations, people, or places that remind them of the traumatic event. Negative changes in cognition and mood involve self-critical thoughts and beliefs, distrust of others, social isolation, memory difficulties (such as forgetfulness or misremembering), feelings of hopelessness, and strained relationships. Finally, arousal symptoms may manifest as self-destructive or risk-taking behaviour, hypervigilance, irritability, sleep disturbances, and exaggerated startle responses.

The development of PTSD is thought to involve multiple brain regions, including the hippocampus, amygdala, and prefrontal cortex (Shin et al., 2006). During a traumatic event, the hippocampus, which is responsible for storing and processing past experiences as a memory, may fail to properly integrate the experience into long-term memory, resulting in the event being repeatedly re-experienced in the form of flashbacks (Bremner, 2006). This can result in fragmented unprocessed memories being stored in the amygdala, often referred to as the brain's 'fear centre' (Shin et al., 2006). Consequently, when individuals with PTSD encounter reminders of the traumatic event - such as a touch, a smell or a sight - the unprocessed memory stored in the amygdala can be triggered, leading to flashbacks. These flashbacks are often experienced as if the traumatic event is recurring, with intense emotions, and a disturbing sense of realism (Bourne et al., 2013). However, flashbacks can also manifest solely as overwhelming emotions without explicit sensory details, leaving individuals confused, fearful and even ashamed of their seemingly inexplicable reaction (Brewin, 2014). This lack of a clear memory associated with the emotional response

contributes to a persistent state of heightened fear and anxiety, driven by long-term dysregulation of norepinephrine and cortisol systems (Yehuda, 2002).

The Consequences of Untreated PTSD

If left untreated, PTSD symptoms can worsen over time and affect numerous areas of a person's life (Solomon & Mikulincer, 2006). Intrusive thoughts and feelings about the traumatic event, combined with the neurobiological changes associated with PTSD (Yehuda, R., & LeDoux, 2007), can persist and worsen without intervention. Untreated PTSD is likely to have detrimental effects on relationships, physical health, mental health, and productivity, with chronicity and severity increasing over time (Solomon & Mikulincer, 2006). Research indicates a higher risk of cardiovascular disease among individuals with untreated PTSD, alongside other conditions like chronic pain, fatigue, and sleep disorders (Boscarino, 2004). Untreated PTSD also significantly increases the likelihood of developing comorbid conditions, such as anxiety, depression, or substance use disorder (Kessler et al., 1995). Many individuals with PTSD turn to cigarettes, drugs or alcohol to cope with their symptoms. Additionally, the emotional toll of untreated PTSD, characterised by feelings of hopelessness, emotional numbness and difficulty connecting with others, can increase the risk of suicidal thoughts and behaviours (Boden et al., 2013).

The high comorbidity rates between PTSD and other mental illnesses, often exacerbated by prolonged lack of treatment, complicate recovery (Kessler et al., 2005). Unfortunately, many individuals with PTSD only seek treatment after their symptoms have become chronic. This allows negative thought patterns, distressing emotions, and unhealthy coping mechanisms to become entrenched (Ehlers & Clarke, 2000). Repeated and prolonged exposure to trauma, from childhood through adulthood can perpetuate chronic symptoms by making deeply ingrained patterns and beliefs harder to change (Allan, 2003). In situations where socio-environmental factors have normalised traumatic experiences, many individuals

do not grasp the severity of their situations until years later, often after leaving the environment where the trauma occurred (Allan, 2003). These ingrained patterns, coupled with the underlying neurobiological changes associated with PTSD, make it increasingly difficult to reverse the course of the disorder (Yehuda & LeDoux, 2007). This difficulty is multiplied by the fact that a significant proportion of people with PTSD never seek treatment, with estimates suggesting that up to 50% may remain untreated (Kessler et al., 2000).

Efficacy of current PTSD treatment

PTSD presents unique treatment challenges. Successful management of trauma-related symptoms often requires multifaceted, complex, and prolonged interventions (Institute of Medicine, 2014). These can be financially burdensome and thus, inaccessible for many individuals. Unfortunately, a large portion of those who do receive treatment still cannot find relief, with estimates suggesting that up to 33% of people with PTSD experience treatment-resistance (Institute of Medicine, 2014). Therapies such as Cognitive Processing Therapy (CPT), Prolonged Exposure (PE), and Trauma-Focused Cognitive Behavioural Therapy (TF-CBT) are strongly recommended by the American Psychological Association for the treatment of PTSD for their efficacy and extensive evidence base. However, there are significant drop out rates (Gutner et al., 2016). The intense shame and avoidance associated with traumatic memories often hinders full engagement in PTSD treatment, even when the therapy is not trauma focused (Gutner et al., 2016). This can lead individuals with PTSD to drop out of treatment prematurely, particularly in modalities that require trauma recall, disclosure, and emotional confrontation and processing (Foa et al., 2002).

Complementary and Alternative Treatments

While traditional treatments for PTSD, such as psychotherapy and pharmacotherapy, can be helpful for some individuals (Watts et al., 2013), others may experience unwanted side effects, treatment-resistant symptoms, or simply prefer alternative approaches (Astin, 1998).

Complementary and alternative medicine (CAM) refers to interventions used alongside or instead of conventional treatments (NCCIH, 2021). CAM encompasses diverse practices like yoga, acupuncture, spiritual interventions, hypnosis, and newly approved psychotropic drugs like MDMA, marijuana and psilocybin (Mitchell et al., 2021). As research and technology advances our understanding of trauma and its complexities, mental health professionals are increasingly incorporating CAM into clinical interventions for various disorders, including PTSD (Kessler et al., 2001). Anecdotal evidence suggests that integrating or replacing traditional therapies with alternative treatments may contribute to a more holistic approach to PTSD recovery and may also improve treatment adherence and engagement (Krupnick et al., 2008). Growing research efforts are dedicated to investigating these alternative methods with recent attention focused on the therapeutic potential of psilocybin, a psychedelic compound derived from 'magic mushrooms' for treating PTSD and other mental health conditions (Carhart-Harris & Goodwin, 2017).

Psilocybin: Therapeutic Potential and Legal Considerations

Psychedelics are psychoactive substances known for producing profound altered states of consciousness, often referred to as a 'trip'. These experiences typically involve sensory and perceptual distortions, altered time and space perception, and shifts in worldview and self-concept (National Institute of Drug Addiction, 2024). Psychedelics are distinct from other psychotropic drugs due to their significant perceptual distortion, often resulting in visual and auditory hallucinations, along with profound changes in mood, thought, and cognition (Nichols, 2016). Common experiences include time dilation, heightened emotions, intensified sensory experiences, and feelings of interconnectedness, spiritual transcendence, and mystical or metaphysical insights (Ko et al., 2022). Psilocybin is a naturally occurring psychedelic found in varying species of mushrooms all over the world (Baugh, 2024). After psilocybin is ingested, it is metabolised in the body and turned into psilocin - the 'trip'

inducing component of psilocybin. Since psilocin is chemically similar to serotonin, psilocyn is able to act on the serotonin receptors to produce it's effects on the user (Baugh, 2024). Psilocybin can be consumed 'wet' (straight from the ground), dried, powdered or brewed into a tea. The average duration of a psilocybin 'trip' varies from 4-6 hours depending on dosage (Baugh, 2024). The intensity of the effects produced by a psilocybin dose are dependent on factors such as weather the mushrooms are wet or dried, the mushroom strain, the weight of the person and their tolerance (Perez, n.d). In terms of dried mushrooms, which is how they are usually consumed, 1g is considered a low dose, 1.75g is considered a medium dose, 3 g is considered a large dose, and 5g or above is considered a very large or 'heroic' dose (Remeday, 2022). The psychedelic experience is highly subjective and influenced by factors like setting (the physical and social environment), mindset (expectations and intentions) - colloquially referred to as set and setting (Baugh, 2024). Notably, individuals under the influence of psilocybin are often hypersensitive to environmental and social cues. For example, shifts in lighting or emotional tone can significantly alter the experience (Carhart-Harris et al., 2016). Psilocybin has a long history of use in various cultural and religious contexts for their ability to induce perceived spiritual experiences or a sense of connectedness connection to a higher power (Schultes & Hofmann, 1979). Despite this, most psilocybin has been illegal in most countries since the early 1970s/ late 1980s. However, in recent years the potential psychological and pharmacological benefits psilocybin have been re-examined. As of 2023, Australia is the first country in the world to legalise psilocybin for mental health purposes (Haridy, 2023). Despite Australia's recent legalisation of psilocybin for mental health treatment, it is a misconception that the drug will be easily accessible or widely available for sufferers of treatment resistant depression (Therapeutic Goods Administration, 2023).

Microdosing psilocybin

Microdosing psilocybin involves self-administering very small doses of psilocybin 1 to 7 days a week. This practice does not produce the effects of a full dose psilocybin experience, such as significantly altered mental states or visual distortions (Rootman et al., 2021). These doses are typically below 1g (Remeday, 2022). This practice has gained traction over the years with people engaging in this practice for various reasons related to improving spiritual, mental and physical health as well as curiosity and creativity (Rootman et al., 2021). Microdosing psilocybin may appeal to people seeking out CAM for PTSD, as self-preparation of psilocybin microdoses is relatively easy and inexpensive for people who harvest from a location that is known to produce psilocybin mushrooms or for those who cultivate their own. From the point the mushrooms are picked, they can be dried using various home methods, ground into a powder, and weighed into the desired microdose (Perez, n.a). The costs associated with this are negligible compared to paying for a course of PTSD therapy sessions (Australian Psychological Society, 2024; American Psychological Society, 2017). As well as this economical advantage, microdosing psilocybin may appeal to people seeking CAM for PTSD because it is predominantly a self-administered in a person's home, which may allow practitioners of microdosing feel an agency and comfort that can at times be missing in traditional therapy (American psychological association, 2019). This is important for people with PTSD, as the disorder is resultant of a traumatic experience/s over which the individual had no control, resulting in detrimental changes to perceptions of autonomy and capability (Lanius et al., 2020). People seeking mental health support rarely are able to choose their provider and the type of therapy they receive which can result in not being compatible with the practitioner they are assigned and or disagreement with the therapy they are receiving (Najavits, 2015). Microdosing psilocybin mitigates this as it is chosen and guided by the person with PTSD. The incline in the popularity of microdosing and or self-

administering psilocybin for therapeutic purposes is likely due to media coverage of the benefits detailed in recent studies, fuelled additionally by Australia's landmark decision to legalise psilocybin for treatment resistant depression in 2023. Additionally, taking lager doses of psilocybin (1g and over) to confront mental address mental health issues is gaining traction, this emerging trend can be observed in online forums such as (Reddit r/Macrodosing, 2024). This uptake in psilocybin use for the purpose of mental health treatment or improvement points to larger issues in the healthcare system such as affordability, availability and lack of emphasis on prevention of mental health disorders (Wainberg et al., 2017).

Psilocybin Research

In the past 20 years, psychedelic research has undergone a kind of renaissance, with the therapeutic benefits of psilocybin being of particular interest. However, there has been no research to date regarding the effects of psilocybin on people with PTSD, therapeutic or otherwise (Kahn et al., 2022). There has been inquiry into the effects of psilocybin on other mental health concerns, the results of which could be applicable to PTSD and highlight the need for the topic of the current study. A double-blind, placebo-controlled pilot trial conducted by Grob et al. (2011) investigated the effects of psilocybin on anxiety in terminal cancer patients. The study was comprised of 12 participants who were each administered a moderate dose of psilocybin in a clinical setting. Depression and anxiety were measured using the State-Trait Anxiety Inventory (STAI) and the Beck Depression Inventory (BDI). The results of the study showed that compared to baseline, participants had significantly lower depression and anxiety scores after the psilocybin session. These effects were observed up to the final check in point at six months with persistent improvement in mood. Participants also completed the 5-Dimension Altered States of Consciousness Profile after each drug experience, which revealed that psilocybin produced effects such as positive derealization

and depersonalization, visual hallucinations, synaesthesia, altered sense of time, enhanced mood, changed perceptions, and facilitated creativity and recollection. While this study contributed valuable insights into psilocybin's therapeutic potential, it's generalisability is limited by a small number of participants, who were predominantly women. The current study aims to expand on these findings and address these issues by analysing 825 psilocybin experiences from a public forum ('Reddit'), which has a diverse user base in terms of age, ethnicity, gender, and socioeconomic status (Sattelberg, 2021), offering a broader scope of psilocybin's effects. The researchers from this study acknowledged the extensive attention paid to subjects throughout the experience may have influenced therapeutic outcomes. This is a limitation as it cannot be determined to what extent psilocybin is responsible for the observed therapeutic benefits. Due to the design of the current study, researcher influence on the psilocybin experiences included in analysis is not present, as the psilocybin experiences analysed in the current study were collected from Reddit post publish, with no indication they would be involved in a study. In addition to this, a potential key difference in the administration of psilocybin to people with PTSD compared with other mental health concerns is the component of flashbacks and resurfacing of repressed traumatic memories. As such, the current study is instrumental in taking the findings of Grob et al (2011) in terms of psilocybin facilitated recollection and observing weather or not this effect results in flashbacks and resurfacing of trauma memories for people with PTSD.

Similarly to the above-mentioned study, Ross et al (2016) examined the effect of psilocybin on cancer related depression and anxiety wherein the results of the Grob et al (2011) study were replicated. Both studies observed significant and sustained reduction of anxiety and or depression after psilocybin administration, diagnosis that were a direct result of terminal or life-threatening cancer diagnosis. Alike to Grob et al. (2011), Ross et al. (2016), had a relatively small sample size of 29 participants, which limits the generalisability

of results to a broader population. Both studies involved single dose administrations of psilocybin, as such, it remains unclear whether the effects observed in these studies are sustainable over longer periods of time or if these therapeutic effects require maintenance doses for lasting benefits. The settings of both studies were clinical in nature, as they performed in controlled, therapeutic environments for the safety of participants. While this was essential to participant safety, the therapeutic setting could have influenced outcomes. Additionally, there is more investigation needed on the outcomes of psilocybin use with therapeutic intention in a naturalistic setting. The limitations listed for each study point to a need for further research on the therapeutic potential of psilocybin, with research design considerations that include larger, more diverse samples, repeated dosing, and varying settings.

The results of these studies on cancer diagnosis related instances of anxiety and depression may also extend to other cases wherein anxiety or depression is a secondary symptom of a primary cause, alike to how anxiety and depression in people with PTSD are usually symptoms of the trauma they have experienced (Wang et al., 2023). Given the promising therapeutic potential of psilocybin demonstrated in prior research for conditions like anxiety and depression, it is crucial to further investigate its efficacy in addressing complex psychopathologies such as PTSD. The current study contributes to this expanding field of inquiry by categorising and quantifying the subjective psilocybin experiences of people with people with PTSD and relaying their motivations for using the substance. The studies by Grob et al. (2011) and Ross et al (2016) were quantitative experimental studies that revealed valuable information on psilocybin's interactions with people experiencing distressing circumstances, the current study aims to add to this body of knowledge by providing information on the candid, naturalistic accounts of people who have taken psilocybin and have PTSD through mixed content analysis. Given the increasing number of

studies supporting psilocybin's therapeutic potential, it is imperative to explore the neurobiological mechanisms that may explain the effects observed. Recognising how psilocybin interacts with PTSD specific neurobiology can offer insight into psilocybin's capacity to assist in emotional processing and recovery.

Why use content analysis to investigate this topic?

Content analysis is a well-established method for analysing qualitative data from social media platforms, allowing researchers to explore lived experiences and understand online communities (Lai & To, 2015). A mixed methods content analysis of reddit posts is the ideal method of study to examine the interactions that occur between psychedelic drug use and PTSD. The firsthand accounts on Reddit detailing psychedelic encounters of those with PTSD are abundant and rich, offering unique insight into the patterns, narratives, motives and assumptions that arise at the intersection of these to subjects (Chi & Chen, 2023; r/ptsd, June 2024). Performing a content analysis on the pseudonymous posts of reddit facilitates the examination of authentic and unfiltered narratives that concern sensitive topics like PTSD, trauma and drug use, which promotes a more thorough and precise identification of patterns, themes, motives and attitudes present at the juncture of these topics (Pestana et al. 2021; Medvedev et al., 2020). The focused communities of reddit, the subreddits, dedicated to PTSD and psychedelic drug use, provide detailed discussions and exchanges that are specific and highly relevant to the study, content analysis of these discussions and exchanges will reveal information directly related to the endeavour of this research (Chi & Chen, 2023). The contextually informative nature of content analysis combined with Reddit's ability to provide real time data allows us to identify the trends, attitudes and practices that are current in the zeitgeist of psychedelic users with PTSD (Chi & Chen, 2023; Lai & To, 2015; Medvedev et al., 2019). Reddit is a platform that has a vast and diverse user base across continents, with the website being free and accessible to anyone with an internet connection

(Medvedev et al., 2019). Because of this, conducting content analysis on reddit ensures that the results produced will incorporate the voices, narratives and perspectives of a broad spectrum of people which will the depth and generalizability of the findings (Lai & To, 2015; Medvedev et al., 2019). Studying and analysing the interactions that occur in the dedicated subreddits using content analysis can reveal how individuals with PTSD seek advice, support, and information about psychedelics, providing insight into the community's dynamics, semantics and support seeking behaviour (Lai & To, 2015; Pestana et al. 2021). Applying content analysis to the constantly updating landscape of reddit facilitates identification of emerging trends and novel uses of psychedelics in the context of PTSD treatment, providing valuable insights for future research and clinical practice (Chi & Chen, 2023; Proferes et al., 2021). The qualitative nature of the content analysis and its use on reddit has the potential to reveal nuanced details about the subjective experiences of individuals using psychedelics for PTSD that cannot be extrapolated from quantitative data (Michael et al.2021). Additionally, these qualitative insights have the potential to add dimension to clinical research by contributing the element of real-world context, individual lived experience with psychedelic interactions PTSD and the outcomes of said interactions (Lai & To, 2015).

Previous studies seeking information on psychedelic experiences have also used content analysis gather information on experience, attitudes, practices and motives with valuable results. For example, many people who take Dimethyltryptamine (DMT) report having contact with higher powers or entities, a study by Michael et al. (2021) investigated this phenomenon. Using thematic and content analysis, this study was able shed light on the nature of these seemingly otherworldly experiences, by finding common throughlines with which these 'encounters' seem to occur, deepening our understanding of how DMT interacts with the human psyche. Regarding reddit specifically, two existing studies of note merge Reddit and the method of content analysis. In 2021, Lea et al. aimed to investigate the

perceived benefits of limitations of microdosing psychedelics, common dosing practices and motivations for microdosing by examining 174 microdosing-related discussion threads. The results achieved by this study were enlightening, as expository powers of content analysis applied to candid quantitative data allowed the researchers to make inductive and deductive observations that provided context and clarity about the practice of microdosing. Pestana et al. (2021) replicated the depth and value of these results using the same methodology in their study examining the motives and modalities of psychedelics, utilising 350 posts from the 'psychonaut' subreddit. Each of these studies have obtained rich results using content analysis to analyse qualitative psychedelic experiences and mirror the aims and intentions of the current research.

Neurobiological Mechanisms of Psilocybin in PTSD Treatment

Trauma exposure that leads to the development of PTSD is followed by chronic stress (Averill, 2017). The chronic stress associated with PTSD has been linked to overactivity in the glutamate system which causes dysregulation of fear and emotional circuitry (Averill, 2017). Chronic stress often inhibits the emotional processing that is necessary for people with PTSD (Maeng & Milad, 2017). Therefore, it may be possible that when a person with PTSD takes psychedelics, it ceases this overactivity in the glutamate systems allows the individual a break from constant fear and nervous system arousal to be present enough within themselves for emotional processing (Mason et al., 2020).

Psychedelic drugs such as LSD and psylocibin interact with serotonin neurotransmitters in a manner that stimulates serotonin production (Madsen et al, 2019). Serotonin plays a vital role in regulating mood, capacity for learning and memory creation. There is evidence to suggest that this interaction with serotonin may increase the brain's ability to form new neural pathways (neuroplasticity) (Smausz et al., 2022). Neuroplasticity allows one to think in ways they may not have before, and in relation to PTSD, psychedelic

use is theorised to create neural pathways that promote understanding, acceptance and new perspectives of traumatic events as well as ideas about new ways of coping (Mastinu et al, 2023).

Similarly, The Default Mode Network (DMN) is a network in the brain that connects various areas of the brain and becomes active when a person is 'in their own head' and not focusing on the world around them (Smausz et al., 2022). The DMN has been shown to be active during rumination, a symptom that is central PTSD (Moulds et al., 2020; Zhou et al., 2019). People with PTSD often ruminate on others' perceptions of them, negative perceptions of themselves and events of the past (Moulds et al., 2020). Taking psychedelic drugs has been shown to dampen activity in the DMN for the duration of the high, for people with PTSD, this break in internally focused negative thinking could allow for positive changes in perspective/ narratives and productive processing of traumatic memories and emotions (Smausz et al., 2022). While there are some compelling theories on the neurobiological mechanisms of the benefit of psilocybin on PTSD, there is a possibility that these mechanisms could be cognitive in nature.

Cognitive Behavioural Theories

Psychedelic experiences can be emotionally intense, often encouraging individuals to confront and process traumatic memories. The open mindedness and break from regular though patterns that result from taking psychedelics could lead to the weakening of conditioned fear responses associated with the trauma.

The cognitive flexibility that is shown to be present during psychedelics use may encourage deviation from usual maladaptive thought patterns and beliefs (Doss et al., 2021). This flexibility could promote the adoption of more healthy coping mechanisms, as well as encourage individuals to open to thoughts of a positive and productive nature. Because of the high degree openness to experience that seems to occur when one is on psychedelics,

considering and internalising these new, productive thoughts and beliefs about themselves and the trauma appears to be made less difficult (Erritzoe et al., 2018).

People with PTSD can sometimes have trouble identifying emotions related to their trauma due to dissociation or memory problems. Psychedelic experiences create strong feelings of being present and self-aware (Yaden et al., 2021). This heightened self-awareness is helpful in identifying and processing emotions related to the trauma and promoting self-compassion. In addition to this self-compassion, psychedelics increase feelings of connectedness and trust in our environment and people around us (Bhatt & Weissman, 2024). Isolation and shame are common side effects of the trauma that comes with PTSD, which often becomes a hurdle in the healing journey for this population (Palmer et al., 2022). Taking psychedelics may facilitate one's ability to identify and process painful memories by creating an atmosphere of self-compassion, trust in general surroundings and connectedness with self, others and environment.

It is important to note however, that these are only theories, and that much more research is required to fully understand the mechanisms responsible for the effects observed when PTSD and psychedelics interact. The nature of PTSD and its symptoms is often an alienating experience. To combat this, many people with this condition gather in dedicated online forums to seek support and community in online spaces such as Reddit.

Reddit

Gathering information about people's psychedelic experiences from social media forums like reddit produces benefits that strengthen the quality and generalisability of conclusions (Medvedev et al., 2019). Reddit specifically was chosen for this as it is a popular and accessible social media platform among varied demographics (Proferes et al., 2021). This popularity and accessibility provide broader range of data than traditional methods, such as user-provided firsthand accounts, personal experiences, and diverse perspectives regarding

the use of psychedelic drugs (Pestana et al., 2021). Additionally, because Reddit is a pseudonymous online platform, users often disclose information that they may not feel comfortable sharing in other contexts where they are directly or indirectly observed by another person, such as a face-to-face interview or a survey (Medvedev et al., 2019). Reddit is discussion, community and support oriented platform that uses specialised discussions boards (subreddits) to host discussions about specific topics (Medvedev et al., 2019). In subreddits relating to psychedelics, users actively engage in conversations, share information, ask advice and provide peer support regarding psychedelic usage (Chi & Chen, 2023). Analysing the interactions that occur between users in these subreddits can reveal valuable information about how these communities support each other, share harm reduction strategies, and distribute knowledge about safe practices – all of which central are to understanding community dynamics (Chi & Chen, 2023; Medvedev et al., 2019). Evaluating the content of Reddit posts can produce high quality and useful qualitative data, as we are able to recognise the contexts, attitudes, motivations and outcomes associated with both recreational and medicinal psychedelic drug use in a way that is difficult with quantitative studies (Pestana et al., 2021). Due to the regularity and frequency with which users engage with reddit, the platform allows relevant and timely observations about trends, attitudes and perceptions pertaining to psychedelic drug use to be made (Medvedev et al., 2019). In the same vein, Reddit plays a valuable role in detecting emerging trends about psychedelic use based on user reports - this may provide future starting points for research investigating additional applications of psychedelics and could potentially inform policy regarding the legality of psychedelic use in different contexts (Pestana et al., 2021; Proferes et al., 2021). Utilising data from reddit posts minimises the ethical issues that may arise regarding informed consent and privacy when data is collected from participants directly, as the posts are published pseudonymously, of the participants own volition and under the assumption

that they will be seen and replied to by other people (Proferes et al., 2021). Using this method, we are also granted access to the unfiltered narratives of people with PTSD who have used psilocybin, maximising the quality of information's and minimising risk of harm to this population.

The Current Study

Despite mounting evidence of psilocybin's therapeutic potential, there is a lack of research on its effects among individuals with PTSD. The current study seeks to explore personal experiences and motivations related to psilocybin use in this population. In addition to this, the data collected for this study will be sourced from 'Reddit' and analysed using content analysis. The data from this study will be used to gain insight into how psylocibin interacts with PTSD symptomology and the possible therapeutic benefits that may come from this interaction.

RQ: What are the perceived effects, benefits, and challenges of psilocybin use among individuals with PTSD, as described in online forums?

Sub RQ: What are the motivations of people with PTSD for using psilocybin

Chapter 2: Method

Design type

To address the research questions, we conducted a mixed methods content analysis of Reddit posts related to PTSD and psilocybin use. Content analysis is a well-established method for analysing qualitative data from social media platforms, allowing researchers to explore lived experiences and understand online communities (Lai & To, 2015). The process began by the researchers choosing the data of interest (in this case it was Reddit content) and narrowing down topics of interest within the data available. After consideration of the available reddit data, the topic for this study was chosen. A sample of the data of interest was taken that best reflected the population of interest and fit within the time constraints of the

research. The data for this study were collected in June 2024 and included English speaking posts on Reddit which indicated the user had PTSD (either explicitly or contextually) and had used or intended to use psilocybin (either explicitly or contextually). Analysis of the content in these posts allows researchers to uncover details about the meaning, intention and tone of the text, as well as thoughts, beliefs and assumed knowledge within the community. To discern this information reliably, a codebook was created to systematically specify the criteria for code classification. Each classification was crosschecked by other researchers to ensure consistency. By checking the criteria in the codebook against the data, we made reliable observations about themes and patterns present in the data. As per the research design, we employed object level and attribute level categories to classify the variables of interest, and the responses produced by those variables of interest (Krippendorf, 2004). For example, an object-level category in this study was “challenges and adverse effects” and an attribute-level category for this was ‘re-traumatisation’. Because of the lack of literature on this specific research topic, an inductive approach to coding was used. Inductive coding was employed as it allows for ideas and patterns to be recognised in textual data without the rigidity of deductive coding, allowing for novel insights on a new subject such as this one to be made (Thomas, 2006). When an inductive approach is used, attribute-level categories are determined based trends observed in the data and are determined by the researchers. To do this, researchers read the units of data repeatedly to gain a comprehensive understanding of the data during the initial coding stage. This facilitated the identification of significant words, throughlines and themes directly from the data.

Ethical considerations.

The data used in this study was posted on Reddit, a public platform. While this is true, many users of social media report an expectation of some level of privacy even when it comes to things they have posted publicly on social media (Hemphill et al., 2022). According

to Sugiura et al (2017), any information used for research that could be considered private interaction must be contributed with informed consent. As such, informed consent and individual privacy concerns privacy of the ethical issues in this study. Social media data collection involves two contexts: open interactions (publicly available) and closed interactions (restricted access, like private chats). Closed interactions require informed consent, but this study utilised open interactions from Reddit where users post with the expectation of public engagement (Chi & Chen, 2023). This reasonably implies user knowledge of content visibility and interactivity. Furthermore, the pseudonymous nature of Reddit posts makes obtaining informed consent impossible. Attempts to obtain informed consent would violate individual privacy rights rather than protect them (The Association of Internet Researchers, 2019). Regarding privacy, steps to further de-identify individual posters were taken. The usernames of users which can sometimes contain identifying information were deleted from the data file, and the quotes used to exemplify research outcomes were modified, and personal information removed, to avoid the original quote being used to discover the posters username or identity. Data scraping form reddit presents no additional ethical concerns as the same results could have been retrieved manually. Dealing with pre-existing data contributed on a public platform negates the risk of working with the vulnerable population of interest. Researchers were aware that that they were dealing with sensitive information about trauma and drug use and approached the data with non-judgement and neutrality. This research was conducted with the upmost respect for the individuals who chose to disclose their psychedelic drug experiences in the context of their PTSD diagnosis. The procedures of this study were reviewed by USQ's ethical review board and received approval (ETH2024-0151).

Reddit Search Strategy

For this study, all of Reddit was searched to extract data using a method called data scraping. Data scraping – also referred to as data mining or web scraping- works by applying an algorithm written by a computer coding specialist to a website of interest (Landers et al., 2016). When the algorithm is applied to the website, large amounts of relevant textual data tailored by key words and parameters are produced and organised into a data file. For this study, a software programmer was hired to extract the data from Reddit using a scraping code he had written in Python to interact with Reddit's application programming interface (API). Use of the Reddit API function allows access to large amounts of reddit posts which can be then organised into a data file (Medvedev et al, 2020). The terms/ key words used to produce the data were; "(ptsd OR cptsd OR "post traumatic stress disorder" OR "complex post-traumatic stress disorder" OR trauma OR traumatic OR abuse OR abuser OR "sexually assaulted" OR raped OR assaulted) AND (psilocybin OR "magic mushrooms" OR shrooms OR microdosing OR mushies OR "golden tops" OR "psychedelic mushrooms" OR "hallucinogenic mushrooms").

Data Extraction

A total of 204,000 data points were yielded from the Reddit data scrape, which were then organised into an excel file for data analysis. Due to the volume of posts to sort through manually, it was decided that only original posts (also referred to as parent posts) would be screened manually for relevance. Five thousand and thirty-three parent posts were screened for relevancy, of which 504 were deemed relevant. The comments on the extracted parent posts were then screened manually for relevant data. In total, there were 825 parent posts and comments included in the final data set for analysis. Relevance was decided based on four factors: subreddit, self-identification of PTSD, context (the space or manner in which posters responded to original posts or other comments) and mention of isolated psilocybin use. Due to time constraints, a limit of 1000 posts and comments was employed.

Coding development

The coding method used in this study employed a mix of deductive and inductive approaches. The researchers read over the experiences reported in the data file to manually identify significant words and themes that shaped the creation of codes. Additionally, researchers screened the existing literature on the effects of psilocybin and commonly experienced PTSD symptoms and applied the findings to code formulation. A preliminary codebook was created based on an initial review of 5% of the data, which was coded by two researchers independently. The code book was then refined through discussions among the research team. Due to time constraints, we did not any statistical measures to evaluate interrater reliability. New codes were created as they were observed in the data to ensure a comprehensive record of experiences. The codes produced were focused predominantly on the effects, benefits and challenges people with PTSD experienced when taking psilocybin and a code to record people's motivations for using psilocybin. The software used for data analysis was Nvivo.

Chapter 3: Results

The frequency or 'prevalence' of each code/ experience is collated in table 1 . It is important to acknowledge that the variability in post detail may have resulted in underrepresentation of certain experiences. Some of the posts only offered brief descriptions of user experiences and may not fully capture the range or intensity of effects, potentially underestimating the true prevalence of specific challenges or benefits associated with psilocybin use. The results are presented below, organised by each research question.

Table 1.

Frequency of codes reported and the percentage of reports out of all data.

Codes	Frequency	%
Challenges and Adverse effects		

Anxiety or fear during trip	59	7.15
Disconnection form reality	9	9.09
Difficult experience during trip	64	7.75
Depressed after trip	6	.72
Persistent negative effects	20	2.42
Overwhelming	29	3.51
Flashbacks	44	5.33
Cognitive effects		
Open mindedness	45	5.45
Increased Self-awareness and insight	91	11.01
New perspectives on trauma, self and experiences	114	13.81
Reduction in rumination	50	6.06
Dosage experience		
Negative Macrodose	26	3.15
Negative Microdose	15	1.81
Positive Macrodose	116	14.06
Positive Microdose	129	15.63
Emotional processing		
Confrontation and processing of trauma-related emotions	111	13.45
Feelings of Wholeness	4	.48
Increased self compassion	38	4.60
Reduction in emotional avoidance	53	6.42
Release of repressed emotions	66	8
Amplified emotions	15	1.81
Motivation for psilocybin use		
Recreation or experimentation	15	1.81

Spiritual or personal growth	3	.36
Treatment of PTSD	304	36.84
Neurobiological effects		
Feelings of Connectedness and unity	26	3.15
Heightened sensory experiences	20	2.42
Improved learning ability	4	.48
Improvement in mental clarity	21	2.54
Mystical or spiritual experiences	39	4.72
Sense of freedom	8	.86
Sense of peace and calm	40	4.84
Uncovering repressed memories	12	1.45
Psychological wellbeing		
Improved mood and emotional regulation	111	13.45
Increased self-worth	33	4
PSTD symptom reduction		
Addiction cessation	14	1.69
Decreased anxiety and or depression	84	10.18
Decreased flashbacks and nightmares	23	2.78
Improved Sleep	14	1.69
Reduced dissociation	21	2.52
Reduced nervous system hyperarousal	37	4.48
Reduced suicidal thoughts	14	1.69
Valence of experience		
Mixed	36	4.36
Neutral or no effects	8	.96
Negative	15	1.81
Positive	306	37.09

Supressed effects due to anti-depressants	8	.96
Overall helpful or meaningful experience	165	20

Research question 1: How do individuals with PTSD describe their personal experiences with psylocibin use, including the effects benefits and challenges in online discussion forums?

Dosage-Related Experiences and Outcomes

Participants' experiences varied depending on the dosage of psilocybin. Positive experiences were reported more frequently with both microdosing (e.g., "Micro-dosing has been a life saver for me") and macrodosing (e.g., "Macrodosing was profound") among those that disclosed dosage. Users who reported positive experiences with macrodosing and microdosing often reported relief from PTSD symptoms, sustained positive changes in psychological wellbeing and testified that the substance had the desired effect. Some users had negative experiences with microdosing, either not achieving the desired effect or experiencing negative side effects such as heightened anxiety, headaches and insomnia. Many people who described having positive experiences with microdosing reported going through a 'trial and error' period which often included unwanted side effects before finding a suitable dose. The negative experiences had with macrodosing seemed to be far more distressing and destabilising than negative experiences with microdosing. Negative macrodosing experience was the most reported negative dose-related experience. While reported far less than positive macrodosing experiences, instances that described negative experiences with macrodosing were extremely detrimental to users and worsened as dosage increased.

Valence of experience

The valence of experience referred to how users felt about their psilocybin experience/s overall. Positive experience indicated that a user had positive feelings about

their psilocybin experience/s: "It has been nothing short of a miracle". The overwhelming majority of posters perceived the psilocybin experiences in a positive light and indicated that psilocybin had a positive effect on their wellbeing and or PTSD symptoms. A much smaller potion of users reported having negative feelings about their psilocybin experience/s: "Mushrooms make me panic". Users who reported having negative feelings about their experiences cited reasons such as PTSD flashbacks, anxiety, overwhelm, fear and negative depersonalisation and derealisation. Some users indicated mixed results or feelings about their psilocybin experience/s: "My first three trips were pleasant, the fourth was intense and scary" or "shrooms have the ability to be immensely helpful & just as destructive". For those that reported having received mixed results from taking psilocybin on more than one occasion, mindset and environment were factors that were often perceived as the reason for a positive or negative change between experiences. Negative and mixed result experiences typically involved doses over 1 gram. Users stressed the importance of a positive mindset and a relaxing, consistent environment. There were reports that detailed shifts in the environment that changed the course or mood of the experience, for example “My friend’s family member came home unexpectedly and it made me feel unsafe”. Many people reported overall helpful or meaningful experiences, which referred to positive feelings about psilocybin experience/s that contained challenging or upsetting aspects. Instances of this code mostly consisted of poster’s who felt they confronted and processed traumatic memories during their trip and felt better for it despite it being a difficult experience: “I took 3g and it felt like getting years of therapy done. Trips can be intense and confronting though”. These experiences usually occurred in doses of 1 gram or above. Few people reported having a neutral experience, which referred to users did not feel strongly either way about their experience: “It did not really change much for me”. A small portion of users reported suppressed effects due to anti-depressants. Users that reported this indicated that they either had no effects or an extremely

supressed effect relative to the dosage they had taken taken. Those that indicated supressed effects due to ani-depressants often reported needing much higher doses than the average person to ‘trip’: “I am on antidepressants, so I need to take 8-9G to have a therapeutic trip”.

Effects of Psilocybin use

Some effects recorded appeared to be predominantly dose dependant. As the dose increased further past 1gram, the more profound, intense and obscure the experiences became. While some effects appeared to be exclusive to macrodosing, no effects could be conclusively categorised as micro dosing only effects, and were shared by both dose ranges.

Macrodosing effects

Participants frequently reported mystical or spiritual experiences, which often included encounters with entities or God, otherworldly realms, and the reception of profound messages: 'These shapes and colours were used to talk to me”. The messages perceived by users were usually positive in nature and had themes of guidance and assurance. These types of experiences appeared to become increasingly immersive and abstract as the dosage increased. Interestingly, a large portion of users spoke about psilocybin as if it were a kind of entity itself, for example, “I surrendered myself to the mushroom I've been letting IT tell me where to go”. Many users reported feelings a sense of freedom from the mental turmoil of PTSD during and after their psilocybin experience/s: “It felt like the mental shackles that I had in my brain were finally released”. Macrodoses of psilocybin sometimes led to users uncovering repressed memories. These memories usually pertained to traumatic memories events from their past, such as childhood abuse that they blocked out: “I finally remembered being molested”. Some people felt grateful to be able to identify these experiences and work through them, others found it destabilising. Confrontation and processing traumatic memories and emotions was a frequently reported aspect of a macrodose experience. This process aided in therapeutic processing and integration of the trauma and was often credited as a major

component of observed improvements in wellbeing: “It power washed the grief to the surface and helped me process and move on”. Confrontation and processing of trauma related memories was usually accompanied by significant release of repressed emotions, in forms such as crying, which facilitated profound emotional catharsis. Releasing these repressed emotions was acknowledged frequently by users as deeply therapeutic: “I cried for a while. It felt very healing”. In many cases, users described amplification of existing emotions, which forced individuals to confront feelings they had been avoiding: “It magnified, in UNIMAGINABLE WAYS, the inherent madness of grief”. These experiences suggest that psilocybin may play a role in facilitating emotional processing and acceptance, which could be crucial for PTSD recovery Confrontation and processing of trauma-related emotions referred to how psilocybin created a mental space bought forward traumatic memories in a way that allowed individuals to process difficult emotions associated with these events. This process aided in therapeutic processing and integration of the trauma, for example “It power washed the grief to the surface and helped me process”. Some users reported feelings of emotional wholeness, describing how psilocybin made them feel they had rediscovered and reintegrated parts of themselves they felt they had ‘lost’ due to their trauma: “I feel like I have gotten a lost part of me back”. Many users reported increased self-awareness and personal insight on psilocybin, which improved user’s understanding of their own emotions thoughts, relationships and behaviours, for example “I have better understanding of myself and my emotions”. A significant portion of users indicated that altered perceptions of trauma, self and experiences were profound aspects of their trip that facilitated therapeutic outcomes: “The shrooms showed me the beauty in the memories of the places of my childhood, which I previously wanted to escape”.

Cognitive and Emotional Effects of Psilocybin Across Dosages

Some users reported improvement in mental clarity during and after psilocybin use, specifically referring to how psilocybin cut through brain fog or internal white noise that often comes with having PTSD/depression/anxiety and allowed users to think more clearly: “It also quieted all the chatter and noise in my head”. Many users recounted a sense of peace and calm as a significant part of their therapeutic experience, feeling relief from mental tension, anxiety and hypervigilance “Taking psilocybin is the only time I can really find peace in my mind”. Improved leaning ability was experienced by a small portion of users who were able to process and apply new or old information that they hadn’t been able to before: “In just the last 2 weeks I have been spontaneously using words that were basically lost to me”. Increased self-compassion was often reported as a profound component of psilocybin experiences: “During the experience I even felt loveable”. This was often described as significant because users had previously struggled to feel positively towards themselves due to the negative effects of trauma on self esteem. Users commonly perceived a reduction in emotional avoidance, and attributed this to psilocybin weakening processes that uphold emotional avoidance: “Shrooms helped reconnect me with my emotions, and fixed my emotional numbness”. Cognitive flexibility was a frequently reported effect during and after user’s psilocybin experiences, with users reporting they noticed consideration of new, more productive perspectives and had a more optimistic outlook on life: “Something deep inside told me to just let go. I laid down and just let everything happen”. Many users reported a decrease in rumination during and after their psilocybin experience, which allowed them to break from repetitive negative thought patterns and create room for more productive thoughts and behaviours: “I found myself automatically and effortlessly [correcting] negative thought/behaviour patterns until they just stopped happening”.

Benefits

Many of the above listed effects were reported to have contributed to benefits experienced by users. The benefits investigated in this study focused on reduction in PTSD symptoms and improvement in wellbeing. A large portion of users described an unspecific, general decrease in PTSD symptoms: “My PTSD is so much better now”. For those who were specific about PTSD symptom reduction, decreased anxiety and or depression was the most commonly reported (e.g. “My baseline anxiety is lower”), followed by decreased hypervigilance (e.g. “I don’t startle as easily now”), reduced flashbacks and nightmares (e.g “It stopped the flashbacks completely”), reduced dissociation (e.g. “I feel more present these days”, improved sleep (e.g. “I sleep better than I have in years”), reduced suicidal thoughts (e.g. “I don’t think about killing myself as often”) and addiction cessation (e.g. “Shrooms helped me quit smoking”). Reduced flashbacks and nightmares, addiction cessation and reduced nervous-system hyperarousal were benefits predominantly reported with macrodosing. Other reductions in PTSD symptoms were reported within both dose ranges. Addictions that were reportedly lessened or extinguished after psilocybin use included cigarettes, prescription opioids, heroin, alcohol, marijuana, and food and shopping addictions. Some users even detailed an extinguished desire to use their dug of choice despite withdrawal symptoms: “I can’t lie, the withdrawals were hell, but I didn’t feel the drive to smoke weed like the other times I have tried to quit”. Large portions of users described sustained improvements in mood and emotional regulation: “Everything puts a smile on my face”. Some reported that psilocybin allowed them to view themselves in a different, more positive light than before, improving their self-esteem “I actually like myself now”. Implementing positive changes and decreasing maladaptive behaviour were also commonly reported benefit among users, and was attributed to positive and productive shifts perspective/ thinking: “It changed the way I saw everything for the better. I look after myself more now”. A significant portion of of users described the psychological benefits and impacts on their life to be so

profound that they were lifesaving: “Mushrooms without a doubt saved my life”. In some cases, these benefits extended so far that individuals were taken off their mental health medication by their health providers: “Psilocybin worked so well that my doctor took me off Wellbutrin”.

Challenges

Difficult or challenging experiences during the trip was the most commonly experienced negative effect of psilocybin, and included miscellaneous aspects of the trip that the considered to be unpleasant or emotionally/psychologically challenging: “I was pushed to the limits of what I could experience, and then a little further showing me that my capacity was greater than I thought”. This effect was mainly observed with macrodosing. Anxiety or fear was the second most reported negative effect of psilocybin, and was observed with microdosing and microdosing and intensified as dosage increased, for example “I tried microdosing for a month, made me really anxious” vs “I thought I would die from the terror and absolute anguish I experienced for 7 hours”. Disconnection from reality was a negative side effect reported by a small number of users, which referred to experiences wherein individuals felt a negative sense of depersonalisation or derealisation during or after the psilocybin experience: “I questioned if I was real for while after that”. The severity of this of this effect became more apparent as dosage increased and was mainly observed with macrodosing. A very small portion of users described feeling depressed after using psilocybin. This effect varied in duration and was not exclusive to dosage. Flashbacks were a commonly reported adverse or challenging aspect of the psilocybin experience: “During the trip I relived every second over and over again”. This effect was related exclusively to macrodosing and the intensity of the flashbacks increased with dosage. Persistent negative effects were reported by some users, which included adverse lasting effects such as re-

traumatisation, psychosis and HPPD: “It retraumatised me and I was unstable for a long time afterwards”. This experience was exclusively reported in relation to macrodosing.

Sub RQ: What are the motivations of individuals with PTSD for taking psilocybin?

The overwhelming majority of users indicated that their motivations for using or intending to use psilocybin were PTSD treatment related: “I am desperate. I am thinking of trying psilocybin to treat my PTSD”. Few posts within the sample reported using psilocybin for spiritual growth or recreational purposes.

Chapter 4: Discussion/Conclusions

This study aimed to understand the experiences of individuals with PTSD who have used psilocybin, and to examine their motivations for using the drug. As predicted, the personal accounts from reddit produced a wealth of information on the topic of interest. Many users disclosed the context of their PTSD causing events, including but not limited to first responders, veterans, victims of sexual violence and victims of family and intimate partner violence. Despites the array of trauma types, the psilocybin experiences of people with PTSD were predominantly positive regardless of dosage, with many describing productive changes in psychological wellbeing, cognitive function, emotional processing, neurobiological processes and PTSD symptomology at varying doses. More than this, some users described the relief from PTSD symptoms and psychological benefits to be lifesaving, and even as a replacement for pharmaceutical drugs traditionally prescribed for PTSD. These findings align with previous research that demonstrates the therapeutic potential of psilocybin and suggests that the observed benefits may extend beyond the applications of previous studies to the treatment of PTSD (Grob et al., 2011; Johnson et al., 2014; Mertens et al., 2020). The results of this study necessitate further research into the therapeutic potential of psilocybin for PTSD treatment. However, the results also indicate that psilocybin’s effects become more intense and unpredictable as the dose increased past 1g, with some people

having experiences that were very detrimental to their wellbeing. Interestingly, this study suggests that macrodoses of psylocibin seem to promote the occurrence of flashbacks in people with PTSD, however most people described these instances to be part of a productive and therapeutic experience. Additionally, psilocybin promoted the confrontation and processing of traumatic experiences and emotions. This aided therapeutic outcomes and improved various areas of wellbeing and cognition, often resulting in productive behavioural changes. The motivations of people with PTSD who have used or intended to use psylocibin were revealed to be overwhelmingly treatment related and users reported taking varying doses of psilocybin with this intention.

While the mechanisms for these observed benefits are not well understood and require more research, the results of this study offer preliminary evidence for neurobiological theories, specifically those that emphasise the role of serotonin neuroplasticity and glutamate system regulation. Participants frequently reported experiences indicative of neuroplasticity, such as open mindedness, gaining new perspectives on their trauma and experiencing shifts in their sense of self. Individuals with PTSD often struggle with breaking from ingrained maladaptive beliefs regarding shame around their trauma that lead to low self-esteem (Lanius et al., 2020). The context of the changes in perspective were often related to these factors, resulting in compassion for oneself and disruption of negative thought patterns. The current literature points to increased serotonin being a catalyst for neuroplasticity, which enables new perspectives and learning ability by new creating pathways in the brain (Smausz et al., 2022). Due to the metabolized form of psilocybin (psilocyn) being chemically similar to serotonin, psilocyn is able to engage with serotonin receptors and may also produce neuroplasticity (Baugh, 2024). The implication that the observed benefits may be due to psilocybin induced neuroplasticity could explain the user's ability to consider and believe more productive

perspectives on their lives, trauma and experiences even after the trip is over due to creation of new neural pathways associated with these realisations.

In addition to this, people with PTSD often exhibit an overactive glutamate system, which is facilitated by chronic stress (Averill, 2017). This contributes to symptoms such as nervous system hyper arousal (exaggerated startle response, irritability, overstimulation, difficulty relaxing) and avoidance of trauma related thoughts, emotions, places and people (Averill, 2017). Psilocybin may dampen glutamate system overactivity in people with PTSD (Mason et al., 2020). The posts included in this study frequently reported experiences that may indicate positive glutamate system alterations, such as feelings of peace and calm, reduced emotional avoidance, confrontation and processing painful emotions, and release of repressed emotions. These experiences were often associated with productive and therapeutic outcomes. This suggests that the potential dampening of the glutamate system during a psilocybin experience may provide individuals with PTSD a unique opportunity to process challenging emotions they have been avoiding—a task that is often extremely difficult to achieve in a sober state due to the pervasive nature of avoidance in PTSD. The processing that occurs because of this potential dampening could explain why some users reported reduced dissociation, flashbacks and nervous-system hyperarousal post-psilocybin experience, as it is believed that PTSD is caused by under-processing in the hippocampus during a traumatic event, which impedes the event's categorisation as a memory and interferes with the sufferer's ability to move past the event/s (Bremner, 2006). This positive effect on these primary PTSD symptoms combined with the suspected effects of serotonin induced neuroplasticity may be a catalyst for the improvements observed in secondary PTSD symptoms such as depression and anxiety and addiction and improvement in wellbeing generally. Interestingly, the therapeutic outcomes of this psilocybin induced confrontation appear to mimic the function of exposure therapy, with many users communicating that they

are not as frightened or avoidant of trauma related thoughts, feelings, places or people as compared to before their psilocybin experience. The mechanisms of psilocybin may facilitate a novel approach to engagement with traumatic memories and emotions. For example, the increased emotional sensitivity and introspective state of mind created by psilocybin could promote deeper processing and integration of traumatic experiences and emotions. Additionally, the profound states of consciousness produced by psilocybin such as altered perception of time, enhanced introspection, spiritual experiences and feelings of interconnectedness may contribute to a more immersive and transformative experience that minimises therapeutic barriers present in traditional exposure therapy such as avoidance and overwhelming feelings of discomfort (Foa et al., 2002). Compared to traditional exposure therapy wherein a client is provided the treatment in a controlled, clinical setting, the introspective and profound experience of a psilocybin 'trip' may promote feelings of self-actualisation, and therefore stronger internalisation of the value and benefits of confronting and processing traumatic memories and emotions. Furthermore, the duration of a medium to high dose psilocybin experience (6-8 hours depending on macrodose), creates an intense, immersive space wherein if an individual does encounter confrontation and processing as a part of their experience, there is no way of 'opting out' like there is with traditional exposure therapy. Because of this, psilocybin induced confrontation and processing may bypass barriers to therapeutic progress created by avoidance, resulting in enhanced therapeutic outcomes.

The results of this study corroborate the findings of previous research that investigate the psychological benefits of psilocybin. The study conducted by Grob et al. (2011) which examined the effect of psilocybin on end-of-life anxiety in cancer patients found that measures of depression and anxiety post- psilocybin experience were significantly lower than before the psilocybin administration. These effects were observed up to the final check in

point at six months with persistent improvement in mood. These results mirror the sustained reduction in depression and anxiety observed in user reports in the current study. Similar to the way depression and anxiety are secondary symptoms of PTSD, the depression and anxiety investigated in Grob et al. (2011) were resultant of terminal cancer diagnosis. Additionally, the study reported that participants felt a deep connection with family and friends following the experience and gained what felt were felt to be productive new perspectives and insights. This study is unique in its relatability to the results of the current study, as both produced instances of connectedness to others in the face of two very isolating experiences and were able to provide productive/positive insights and perspectives on otherwise devastating events. The current study also supports prior research on psilocybin's ability to catalyse addiction cessation. A study conducted by Johnson et al. (2014) examined psilocybin's potential in treating tobacco use disorder. The research found that a significant portion of the participants-maintained abstinence from smoking up to 6 months. The present study corroborates previous research findings that state that individuals who successfully quit smoking after psilocybin use had made attempts to quit with other methods before (Johnson et al., 2014). The results of the current study also corroborate previous research on decrease in heavy drinking behaviour (Bogenshutz et al., 2022) and abstinence from alcohol (Bogenshutz et al., 2015) following psilocybin use. Interestingly, the findings of the current study produced reports of cessation with other addictions such as prescription opioids, heroin, alcohol, marijuana, food and shopping addictions, of which there is no published research on to date (Van der Meer et al., 2023). These findings appear to add to the mounting evidence that psilocybin may be a powerful tool in combatting addiction.

Investigation into the role of the amygdala in the therapeutic effects of psilocybin has produced interesting results. In 2015 Kraehenmann et al. found that the reactivity of the amygdala is lessened during a psylocibin experience in people with a healthy brain. The

study measured this by recording participant's emotional reactions to various expressive faces before and after psilocybin administration. Conversely, Mertens et al. (2020) conducted a similar study using the same emotive face stimuli and found that psilocybin revives emotional responsiveness (stimulates the amygdala) in people with treatment resistant depression. Positive mood increased significantly after psilocybin administration and none of the participants experienced negative changes in mood even when shown faces that would usually induce fear. The present study found that many Reddit users described experiencing improvements in mood after using psilocybin, highlighting the perceived therapeutic benefits of the substance from a user point of view. However, some users did report feelings of fear and or anxiety ranging from mild to extreme, most commonly when flashbacks or confrontation of trauma occurred. This is likely due to the fact that fear and hyperarousal are more central to the dysfunction of the amygdala in people with PTSD as compared to non-traumatic major depression wherein apathy and anhedonia are more characteristic of amygdala disfunction (Mertens et al., 2020; Pitman et al., 2006). The sum of these studies indicates that effects on the amygdala during a psilocybin experience is dependent on whether the person has a mental illness, what that mental illness is, and how that mental illness affects a person's neurobiology.

The results of this study highlight psilocybin assisted therapy as a potential avenue for PTSD treatment, evidenced by user reports of improved psychological well-being and reductions in PTSD symptomology. In Australia in 2023, psilocybin was legalised as a treatment for treatment resistant depression. The findings of this study and future studies that build upon the current results may lead further changes in psilocybin treatment policy that include the development of treatment guidelines pertaining to psilocybin assisted therapy for PTSD. Nevertheless, the results of this study emphasise the importance of further research

into the safety and efficacy of psilocybin as a treatment for PTSD, potentially facilitating its implementation in future clinical PTSD treatment.

Being a professional qualified to administer psilocybin in a treatment setting is still fairly rare in Australia despite last year's legalisation. The results of this study strengthen the body of evidence regarding psilocybin assisted therapy for PTSD and other mental disorders, including addiction cessation. To meet the potential demand for psilocybin-assisted therapy, it is imperative that funding is invested in psilocybin therapy training programs and to make accreditation more achievable for healthcare professionals. Improving access to psilocybin-assisted therapy will require a collective effort from policymakers, researchers, healthcare professionals and educational institutions to create a comprehensive and evidence-based training program Australia-wide that increases the number of professionals authorised to provide this treatment.

This study highlights the immediate need for more effective PTSD treatments, as demonstrated by the numerous individuals that sought relief in unapproved treatment such as psilocybin. It is hoped that these findings will encourage policymakers to explore and invest in more innovative approaches to PTSD treatment, such as psilocybin-assisted therapy, to address the complex needs of people suffering with PTSD.

The use of Reddit as a data source was a key strength in this study, as it allowed researchers access to the unfiltered narratives and lived experiences of psilocybin users with PTSD. Access to these accounts helped researchers to build a comprehensive and data-informed understanding of the psilocybin experiences and motivations of people with PTSD. Content analysis of the posts from Reddit allowed this study to capture a wide scope of experiences and effects produced by psilocybin in people with PTSD, providing informative and comprehensive starting point for the area of PTSD-psilocybin research. This naturalistic observational approach allowed access to an unusually large and diverse population, which

shed light on organic psilocybin experiences and added dimension to the existing findings of quantitative research. Despite these strengths, the results of the current study should be considered in the context of the following limitations.

This study relies on self-reported experiences from Reddit users, which may limit the reliability of the data because the experiences reported cannot be verified. Verification of PTSD diagnosis within the sample was not possible due to the nature of reddit, which may mean that some of the effects/experiences reported were not a product of psilocybin's interactions with PTSD. While Reddits user base is large and varied across gender, age, ethnicity and socioeconomic statis across the platform, little is known about the participant characteristics of those who are participating in discussions about PTSD and psilocybin, which reduce the generalisability of the results. Additionally, self-reports of past psilocybin experiences are subject to recall bias and confirmation bias, where individuals may misremember or selectively report their experiences due to the overall positive attitude towards psilocybin on Reddit. Additionally, the studies use of Reddit data does not allow for consistency across dosages, participant mindset or environment (Set and setting). This lack of control creates variability in the data that does not allow researchers to make absolute conclusions about psilocybin's effects on PTSD. These significant, uncontrolled factors limit the reliability of the findings and their applicability to clinical practice. The study's data extraction and coding were conducted manually by a single researcher, which introduces the potential for biases in the selection, interpretation, and coding of posts. This may have changed the intended meaning of posts and introduced variability in the coding of experiences, affecting the accuracy and consistency of the results. Because the screening of Reddit data was performed manually by a single researcher, there may be instances of human error regarding missing points of data that could have been included in the study to improve generalisability of findings. Additionally, the absence of inter-rater reliability undermines the

objectivity and consistency coded of experiences, making it possible that the categorisation of themes and patterns were subjective, possibly impacting the study's overall reliability and validity. Similarly, the researcher who coded the data was a novice at qualitative content analysis and their choices were not overseen by another researcher, possibly producing inconsistencies in coding which effect the frequencies of each code produced. Additionally, because the final data file product was never checked by another researcher, there could be minor discrepancies regarding the inclusion criteria of posts that were included in the study.

The most logical step forward from this research is to conduct studies on the safety of administering psilocybin to people with PTSD, and then to examine the effects of psilocybin on PTSD using a quantitative longitudinal placebo-controlled clinical research trial administering psychological measures of PTSD symptoms before and after at varying time points post psilocybin administration to discern an average of how long the reported benefits last. To enhance understanding further, it would be helpful to include brain scans that can detect neurobiological states before, during and after psilocybin administration.

The results of this study produced enlightening and novel insights into how psilocybin effects and is experienced by people with PTSD. The sample’s experience with psilocybin was shown to be predominantly positive with both micro and macro doses. Many users reported receiving benefits to their psychological wellbeing and PTSD symptoms, the extent of which was not uncommonly described as lifesaving changing or lifesaving. However, the study also found that as macrodosage increased, experiences became more intense and unpredictable. Most described these high dose experiences as profoundly moving and productive despite challenges, but some had significant adverse reactions due to intense and immersive flashbacks of their trauma on high doses. This suggests that high dose experiences which are likely to promote confrontation may pose a risk to people with PTSD. This study highlights the immediate need for more effective PTSD treatments, as demonstrated by the

numerous individuals that sought relief in unapproved treatment such as psilocybin. It is hoped that these findings will encourage policymakers to explore and invest in more innovative approaches to PTSD treatment, such as psilocybin-assisted therapy, to address the complex needs of people suffering with PTSD.

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