Set, Setting, and Surrender:
The Influences on Psychedelic Experiences and Their Impact on Wellbeing

Yasmeen Hayat

DClinPsy Thesis (Volume 1)
2023
University College London

UCL Doctorate in Clinical Psychology

Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signature: 

Name: Yasmeen Hayat

Date: 29/06/2023

Overview

The potential therapeutic implications of psychedelics, from treating mental health disorders to promoting wellbeing, combined with the complexity of their effects, make their study a fascinating area of research. However, as they continue to gain popularity for their capacity to transform human consciousness, it is increasingly important to conduct comprehensive research to understand their mechanisms, optimize their application, and ensure their safe and effective use.

As part of a joint project (Appendix D) with the overall aim of understanding how 'set and setting' factors interact and influence the psychedelic experience, this study aimed to explore the impact of extroversion on the ability to surrender in a group context. We further aim to examine if this interaction influences the psychedelic experience and predicts changes to wellbeing.

Part One. A conceptual introduction reviews the literature on the presented topic. It highlights the knowledge regarding the therapeutic effects of psychedelics followed by a narrowed focus on the role of the relevant constructs 'mystical experiences', 'surrender', 'communitas' and personality.

Part Two. An empirical paper describing an extensive cross-sectional survey of psychedelic users. The paper presents the findings of several path analyses exploring the association between surrender, extroversion, acute experiences and changes to wellbeing.

Part Three. A critical appraisal reflects on the process of completing the research in this field. This includes a consideration of the reasons for choosing this subject, the process of conducting the study and the challenges faced along the way.

Impact Statement

The "psychedelic renaissance" (Sessa, 2012) refers to the recent resurgence of interest in and research on psychedelic substances following a period of stigma and prohibition. Studies show promising results for these substances in treating various mental health conditions and increasing overall wellbeing. However, it's worth noting that, despite these findings, the use of psychedelics remains controversial, and these substances are still classified as Class A drugs in many places, including the UK. Should these substances possess the capacity to provide therapeutic benefits, it may be considered ethically questionable to withhold such potentially effective treatments from those in need. Thus, rigorous and meticulous research is pivotal in driving policy reform and aiding in the destigmatisation of these substances.

While clinical trials comprise a significant portion of psychedelic research, it's important to recognise that most psychedelic use occurs in nonclinical, often recreational, contexts. Therefore, it is essential to better understand the impacts and implications of psychedelic use in these nonclinical settings. Recent research has highlighted the value of psychedelic group use and the effect of the shared experience on positive change (Kettner et al., 2021); however, little is known about the contributing mechanisms, including the influence of mindset and personality. Thus, the current project aims to further our understanding of these contributing factors. Given the inclination of extroverted individuals towards social settings, it warrants investigation whether extroversion may serve as a predictive factor for positive changes in wellbeing within a group context. Moreover, it would be interesting to examine whether such potential associations could be attributed to their inherent comfort in social interactions. Such understanding could enable us to define the parameters surrounding group use of psychedelics to enhance benefits and minimise risks.

Table of Contents

List of Tables

Part 2. Empirical Paper

List of Figures

Part 1: Literature Review

Part 2: Empirical Paper

Acknowledgement

First and foremost, I'd like to thank everyone who took the time to participant in our (not so short) survey. Your responses and contribution have been invaluable! To the communities, organisation and individuals who shared our survey, your support has not only been helpful but heart-warming as well.

To my supervisor Professor Sunjeev Kamboj, thank you for your guidance and reassurance during overwhelming times. Ros McAlpine, thank you for always taking from your own time to help, you have been a lifeline throughout!

Fi & Max, teamwork makes the dream work! And working with you has been the best part of this experience. I am so grateful for the connection and friendship that has come from this.

To our DClinPsy Cohort, thank you for being the amazing supportive bunch that you are. Every single one of you is a star. I am so proud to be a part of the 'COVID Cohort' family!

To Mama, thank you for always being truly interested in the topics I am passionate about and for all the deep discussions that have come from this. To Baba, thank you for all your dad jokes and the calmness you brought during the most stressful of times. I am here today because of all the unconditional love and support you have given me.

Thank you to my family and friends, to Sundus & Luj for inspiring me; Gha for your emotional support & lending me your (but really our) dogs for cuddles!

Finally, thank you to my love, Hamood. You are the most selfless person I know. Thank you endlessly for your patience and support. I am so lucky to have you and really couldn't have done ANY of this without you. I can't wait to be back home & sick of you again! Time to get a puppy☺

Part 1: Literature Review

Trait, State and Setting on the Acute Psychedelic Experience and Long-term Changes

A Conceptual Introduction

Abstract

This literature review (Chapter 1) is presented as a conceptual introduction, providing an extensive review of the literature pertaining to psychedelic research and, specifically, the constructs investigated in Chapter 2 of the thesis. The conceptual introduction aims to paint a picture of the 'extra-pharmacological model' of psychedelic use. It will begin with an introduction to classic psychedelics and their studied therapeutic effect. What follows is a discussion on the acute experiences associated with psychedelic consumption and their vital role in mediating changes to wellbeing. The review then explores the set and setting variables that may impact these experiences and their critical role in the therapeutic model of psychedelics. Regarding group psychedelic use, the impact of the constructs 'surrender', 'communitas' and 'extroversion' are highlighted, and the association with 'mystical experiences' and changes to wellbeing is made. The review concludes by outlining the direction and aim of the empirical work discussed in Chapter 2 of the thesis.

Introduction

The therapeutic implications of psychedelics have garnered considerable attention in recent years, stimulating robust discussions and debates both in the scientific community and the broader public. Current clinical trials using psychedelics have alluded to remarkable positive outcomes on mental health, which at first glance appear to far surpass the capacity of current psychotropic medications (Carhart-Harris et al., 2017). Still, the use of psychedelics remains controversial due to their psychoactive properties, reported adverse reactions, history of illicit use, and associated cultural stigma (Pollan, 2018). Critics argue that the promising outcomes observed in controlled clinical trials may not be readily generalisable to recreational or unmonitored settings. Since recreational contexts are where most psychedelic use occurs today, there is valid concern regarding the possible risks associated with such non-therapeutic use.

In controlled settings, such as research trials and the small number of authorised/ regulated clinics, participants tend to have explicit expectancies about the upcoming experience and confidence that they will be cared for and supported if they experience unusual or unexpected drug effects. In contrast, uncontrolled settings are associated with much greater variability in expectancies, influenced in part by the physical environment, sensory experiences, and social context (Aday et al., 2021). Thus, central to the debate surrounding psychedelic research is the importance of set (the psychological predisposition) and setting (the context or environment) as contributors to the effects of psychedelics.

A proposed mediating factor for the mental health benefits of psychedelics is the acute psychedelic experience, termed the ‘mystical experience’ (Maclean, Johnson & Griffiths, 2011). Recently, research has focused more on the set and setting variables that predict or impact these

mystical experiences. For example, the mindset leading up to ingestion has been shown to predict these acute experiences and long-term changes (Aday et al., 2021; Russ et al., 2019). The immediate mindset itself is also partly influenced by personality traits (Carhart- Harris & Nutt, 2017; Russ et al., 2019). Also, setting variables may interact with personality traits and mental states at the time of drug ingestion, significantly influencing an individual's response to psychedelics (Carhart Harris et al., 2018). These constructs will be the focus of this review.

The current study aims to further our understanding of the critical role of set and setting in psychedelic research, specifically, the impact of personality and setting on both the acute and long-term outcomes of psychedelic use. There appears to be a gap in psychedelic research regarding the personality trait of extraversion/introversion. Recently published research has argued the value of psychedelic group use (Kettner et al., 2021); however, little is known about the contributing mechanisms, including the influence of mindset and personality. According to one theory, extroverts gain energy from social interactions, while introverts do so when withdrawn from social situations (Diener, Larsen, & Emmons, 1984). Research has shown that extroverts were likelier to take psychedelics in less intimate social environments (e.g., parties and social gatherings) and tended to interact with others during a psychedelic experience rather than pursue a meditative state (Johnstad, 2020).

Given these findings, the current research (Chapter 2) explores whether participants respond differently to psychedelic group use depending on their level of extroversion, focusing on aspects of participants' mindset at the start of the experience (precisely the capacity to connect to others or to surrender to the experience). We explore whether this ultimately predicts the quality of an individual's mystical experiences and any changes in reported long-term wellbeing. We address this question using retrospective data from an online survey of adults with

at least one psychedelic drug experience. By employing mediation and moderated-mediation analysis (Hayes, 2018), the empirical study in Chapter 2 will first aim to replicate previous findings where 'mindset' predicted an increase in wellbeing by mediating the quality of an individual's mystical experiences. Next, we explore the impact of extroversion levels in moderating this model when a psychedelic is taken in a group setting.

The so-called 'psychedelic renaissance' has likely made casual/recreational use of psychedelics more prevalent, and these drugs are also increasingly being used 'therapeutically' in retreats and ceremonies (as well, of course, as in laboratory settings). Given likely increasing use, it is beneficial to understand the dynamic 'optimal environment' (intrapsychic and external) that most likely results in desired/intended acute (and possibly, long-term) effects while minimising the risks of highly adverse reactions. By determining influencing factors, we can aim to better predict and account for psychedelics' acute and long-term effects. This information can potentially be used to reform drug safety among recreational users. The clinical implications of the work may also improve participant selection if these drugs become psychiatric treatments in the future.

To provide a more thorough backdrop to the empirical work, this conceptual introduction will provide a comprehensive review of the literature relevant to the issues of personality and mindset on acute and long-term psychedelic drug effects.

Psychedelics

Psychedelics are considered psychoactive substances for their capacity to transform an individual's perception, mood, and cognition (Osmond, 1957). They may influence potentially profound changes to both senses and perceptions, altering the consumer's consciousness

significantly, sometimes in a beneficial way. Historically, various cultures around the world have harnessed the profound effects of psychedelics for spiritual, therapeutic, and ritualistic purposes (Nicholas, 2016). While numerous drugs may be classified as hallucinogens or have hallucinatory effects, psychedelics, by definition, are those substances that work on specific parts of the brain. Psychedelics all have an agonist action at the 2A receptor serotonergic system (the 5-HT2A receptor subtype) (Woolley & Shaw,1954; Nichols, 2016). Binding to this pathway classifies a substance as a 'classic' psychedelic. These substances include lysergic acid diethylamide (LSD), psilocybin (found in mushrooms), and N-dimethyltryptamine (DMT) (found in ayahuasca). The 5-HT2A receptor is highly dense in areas of the brain involved in perception, emotion, and cognition, such as the prefrontal cortex and the thalamus (Vollenweider & Kometer, 2010). When a psychedelic drug binds to the 5-HT2A receptor, it alters the neuron's activity to which it is attached. This shift in activity patterns leads to the characteristic effects of psychedelics, such as altered perception, enhanced introspection, and increased emotional sensitivity (Carhart-Harris et al., 2018).

As they work on critical brain areas, psychedelics have shown the potential to alter rigid neural patterns associated with mental health issues (Carhart-Harris & Nutt, 2017). The premise that psychedelics positively impact wellbeing is the driving force behind much of the research in the field. This concept is also vital to the study discussed in Chapter 2. Thus, a discussion on the findings of the impact of psychedelics on changes to wellbeing is reviewed in the following section.

The Therapeutic Effects of Psychedelics

Studying the therapeutic effects of psychedelics emerged in two waves. The gap between reflected political and legal issues surrounding the use of psychedelics and their classification as dangerous and illegal drugs (Grinspoon & Bakalar, 1998). Early research may have lacked rigid and clear guidelines for their study, limiting the ability to draw conclusions from the research completed at that time (Carhart-Harris & Goodwin, 2017). Nevertheless, early studies helped guide and shape the science of psychedelics today. Conclusions drawn from the first wave indicated their therapeutic effects for people struggling with long-term health issues, such as chronic pain and cancer (Grof et al., 1973; Kast, 1964). There was also evidence that psychedelics could help combat substance misuse and addiction (Krebs & Johansen, 2012). Early studies have also suggested a therapeutic effect on mood disorders. A 2016 systematic review of earlier studies of psychedelic therapy for mood disorders suggested a significant improvement in depressive symptoms after treatment with a psychedelic (Rucker et al., 2016).

Modern research has witnessed an increased interest in the study of psychedelics as they continue to gain attention for their potential therapeutic effects. With advances in technology and research design, our understanding of the mechanisms in which psychedelics work has grown exponentially. Moreover, more controlled experiments have been conducted in clinical settings by implementing clear guidelines for research and safety. Demonstrating the safety and efficacy of psychedelics is imperative for the field. A systematic review of 16 published papers showed that concerning safety, the use of classic serotonergic psychedelics in controlled, therapeutic settings was generally well-tolerated, with minimal adverse effects and a low potential for abuse

(Anderson et al., 2021). In all these trials, the drug was administered in a private, designated space with therapeutic staff available to the participant throughout the session. Also, participants were guided to listen to pre-selected music while in a resting position with eyeshades on or with dimmed lighting. The findings of this review showed significant therapeutic effects of psychedelics after just a single treatment. They appeared to persist for weeks or months afterwards, providing encouraging initial results regarding their effectiveness in treating depression, anxiety, OCD, and substance use disorders (Anderson et al., 2021).

A systematic review and meta-analysis found that psychedelics significantly reduced depressive symptoms, with large effect sizes observed for single-dose and multi-dose interventions (Goldberg et al., 2020). Similarly, participants who received psilocybin demonstrated more significant reductions in depressive symptoms and higher remission rates than those who received a common antidepressant (Carhart-Harris et al., 2021). Additional research found that both psilocybin and ayahuasca led to rapid and sustained reductions in depressive symptoms, with a significant amount of people achieving remission (Griffith et al., 2016; Osório et al., 2015). Anxiety and existential distress were also shown to be significantly reduced by psychedelics, with effects lasting up to 12 months (Gasser et al., 2014). Substance use disorder is another area where psychedelics have shown promise, where psilocybin-assisted therapy led to significant reductions in alcohol consumption and cravings, with the benefits persisting for up to nine months post-treatment (Bogenschutz et al., 2015).

While most clinical trials on the therapeutic effects of psychedelics have focused on clinical populations, some non-clinical studies have also provided valuable insights into the potential benefits of these substances. These studies have often explored the effects of psychedelics on ‘healthy volunteers’ and their impact on psychological wellbeing and personal

growth. Research suggests that naturalistic psychedelic use in 'healthy' participants is associated with fostering personal growth and wellbeing. Psychedelic users reported improvements in mental health, relationships, and life satisfaction, as well as a greater sense of connection to nature, spirituality, and the self (Davis et al., 2020). Ayahuasca was associated with reductions in psychopathology and improved emotional regulation, mindfulness, and quality of life in non-clinical participants (Uthaug et al., 2021). LSD was associated with increased optimism, wellbeing, psychological flexibility, and enhanced creativity in problem-solving tasks (Noorani et al., 2018).

In regards to the duration of effect, a non-clinical study on the long-term effects of psilocybin on healthy volunteers found that 14 months after the administration of psilocybin, 58% of participants reported a lasting increase in wellbeing and life satisfaction (Griffiths et al., 2008). Regression analysis showed that these positive effects positively correlated with participants' acute psychedelic experiences during their psilocybin sessions (Griffiths et al., 2008). Furthermore, following a psilocybin psychedelic experience, people reported a significant increase in the personality trait of openness, which is linked to creativity, curiosity, and aesthetic appreciation (MacLean, Johnson, and Griffiths, 2011). This increase in openness persisted for more than a year after the psilocybin was taken, suggesting long-term benefits in psychological functioning. Psilocybin has also been shown to impact attitudes towards nature and life purpose in healthy individuals (Barrett, Johnson, and Griffiths, 2015). The study found that participants who underwent psilocybin sessions reported a greater sense of connection to nature and a clearer understanding of life purpose compared to a control group that received a low dose of the substance.

Acute Psychedelic Experience

Some researchers argue that a psychedelic-induced life-changing psychological experience (e.g. intensely meaningful, spiritual or mystical experience) is essential for a 'positive' (i.e. therapeutic) outcome (Barret et al., 2015; Griffith et al., 2011; MacLean et al., 2011). Sure enough, research has demonstrated that adequately dosed psychedelic sessions consistently elicit powerful psychological experiences that individuals report as being among the most impactful in their lives (Griffith et al., 2006). These experiences are considered 'acute' as they occur during the short time that the psychedelic is pharmacologically active; however, these experiences could have a lasting impact on a person's thoughts and feelings in the days to years following the incident. Current research finds that drug-occasioned acute experiences, referred to as 'mystical experiences,' act as a mediator for the therapeutic effects observed after psychedelic use (Barret et al., 2015; Garcia-Romeu et al., 2015; Griffiths et al., 2006; Maclean, Johnson & Griffiths, 2011). Stance (1960) defined mystical experiences as having a transcendence of space and time, a sense of unity, a profound sense of sacredness, and ineffability, often reported after using psychedelics (Griffiths et al., 2006). Mystical experiences could include a sense of unity with oneself, others, nature and the dissolution of one's ego (Barret, Johnson & Griffiths, 2015).

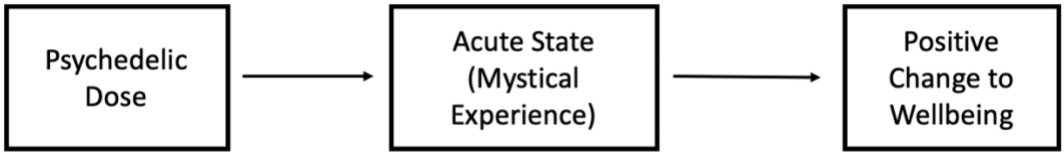
The intensity of mystical experiences following psychedelic use has been shown to predict long-term positive changes to wellbeing and a reduction in depression and anxiety scores (Barret, Johnson & Griffith, 2015; Roseman, Nutt & Carhart-Harris, 2018; Yaden & Griffith, 2020). A systematic review of 12 studies found that in nine of those studies, the occurrence of mystical experiences predicted long-term positive changes (Ko et al., 2022). Regarding the anti-depressive effects of psychedelics, Roseman et al. (2018) found a relationship between mystical

experiences or ‘mind-revealing’ experiences and positive outcomes. Specifically, mystical experiences significantly predicted positive changes to wellbeing, while hallucinations (i.e., visual and auditory changes) did not. Alternately, experiencing greater anxiety or dread predicted less favourable outcomes (Roseman et al., 2018). The authors concluded that their findings support the belief that the therapeutic effects of psychedelics are not a pharmacological result but rather a psychological one. Current research has specified these acute psychological experiences as ‘mystical experiences’ and has highlighted their importance in shaping long-term outcomes (Carhart-Harris, 2017; Haijen et al., 2018). Thus, mystical experiences have been quantified and validated in the literature, and demonstrating what constitutes a ‘complete’ mystical experience’ has also been established (Barret et al., 2015.

Summary and Measures

To summarise the research reviewed up until this point, psychedelics have displayed therapeutic effects in both clinical populations and ‘healthy’ populations. Those effects are believed to be associated with the psychedelic experience itself (and not just a pharmacological change in the brain). This experience is usually described as having mystical qualities that have been shown to lead to lasting positive changes in wellbeing. These findings lend themselves to a basic premise in the study: The acute experience mediates the relationship between psychedelic ingestion and changes to wellbeing (See Figure 1). To measure mystical experiences and change to wellbeing, the MEQ30 and WEMWBS were used, respectively. What follows is a brief review of these measures.

Figure 1 Acute Experiences Mediate Wellbeing Changes



The MEQ and Measuring a 'Mystical Experience'

Clearly defining how consciousness is altered and what dimensions of altered consciousness led to long-term change is essential for understanding the mechanisms in which psychedelics work. Measures such as the Altered Consciousness Scale (OAV), The Hood Mystical Experience Scale, and the Mystical Experience Questionnaire (MEQ) were designed to capture all elements of the acute psychedelic experience. For the purpose of this review, the MEQ30 will be reviewed and discussed.

The revised MEQ, known as the MEQ30, composed of four subscales, was developed from the MEQ43, composed initially of seven subscales (Griffith et al., 2006). The four subscales of the MEQ30 include items from all the MEQ43 subscales. They are comprised of (1) Mystical: This factor captures the unitive, transcendent, and deeply felt positive mood aspects of mystical experiences. It includes items related to a sense of unity, interconnectedness, sacredness, and feelings of awe, wonder, and amazement. (2) Positive Mood: This factor reflects the positive emotions and feelings of joy, love, and peace that often accompany mystical experiences. (3) Transcendence of Time and Space: This factor refers to the alterations in perceptions of time and space commonly reported during mystical experiences. Individuals may

experience a sense of eternity, timelessness, or a loss of spatial boundaries. (4) Ineffability: This factor represents individuals' difficulty in describing and articulating their mystical experiences, as these experiences are often considered beyond ordinary language and understanding.

Through retrospective accounts of 'mystical' experiences during psychedelic use, MacLean and colleagues' (2012) factor analysis validated the 30 items that comprise the four factors in the MEQ30. They found that the MEQ30 maintains every subscale in the original MEQ43 while maintaining fewer dimensions. The authors conclude that the MEQ30 should not be considered an alternative version of the MEQ43 but a psychometrically validated tool developed based on the MEQ. Both the reliability and internal validity of the MEQ30 have been demonstrated (Barret et al., 2015). Its external validity was demonstrated using structural equation modelling, which showed ratings on the MEQ30 predicted long-term changes in behaviours, wellbeing and attitudes, even when controlling for reported drug intensity (Barret et al., 2015). The findings further support the use of the MEQ30 as an effective and valid measure of mystical experiences. Moreover, the analysis revealed a greater predictive validity of MEQ30-total scores rather than each of the four-factor scores. Thus, it is recommended by the authors to use the total MEQ30 score in future investigations as a predictor of long-term outcomes. For this purpose, the MEQ30 was employed in the current research to measure acute psychedelic experiences.

The WEMWBS and Measuring Wellbeing

Given such findings of improvements in clinical and non-clinical samples, the current study aims to assess wellbeing post-psychedelic experience. While the aforementioned literature has used various methods to evaluate changes in wellbeing, given this study design, subjective

accounts of the change in wellbeing were collected. Tennant et al. (2007) developed and validated the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS), designed to measure mental wellbeing in the general population. The 7-item WEMWBS includes positively-worded statements that cover various aspects of mental wellbeing, such as cognition, affect, and relationships. The WEMWBS offers an efficient tool for assessing mental wellbeing in various contexts, as it has demonstrated both validity, reliability, and internal consistency (Stewart-Brown et al., 2009). The WEMWBS has been used in various psychedelic research to assess changes in wellbeing using pre- and post-measures (e.g. Carhart-Harris, 2020; Haijen et al., 2018; Kettner et al., 2021; Spriggs et al., 2020).

Context (Extra-Pharmacological Factors)

Initially, in psychedelic research, it was thought that if one took a large enough dose of a psychedelic, they would have a strong acute experience, subsequently leading to long-term change. This basic model is what is depicted in Figure 1. Psychedelic dose does have a significant impact on experience. Studerus et al.'s (2012) pooled analysis of 24 studies highlighted the importance of dose as the main predictor of psilocybin response, with its effect size being the largest and predicting the occurrence of mystical experiences twice as much as other predictors. However, it is essential to note that studies have also shown that even when the dose is kept constant, psychedelic responses still strongly varied between and within subjects. (Studerus et al., 2012) This pooled analysis's findings of a high inter-subject and moderate inter-study variability suggest that dose alone is insufficient to explain psychedelic effects and experience. Countless studies highlight the impact of expectations, preparation, personality,

interpersonal support, immediate mindset and setting (see Johnson et al., 2008; Studerus et al., 2012).

Individual predispositions have been shown to have an impact on experience. Genetic factors, personality traits, and mental health history can influence an individual's response to psychedelics. For instance, individuals who have a personal or familial history of psychotic disorders might potentially be more susceptible to negative psychological outcomes. (Johnson et al., 2008). Trait absorption, the propensity to immerse oneself in an experience, is a strong direct predictor of mystical experiences (Russ et al., 2019; Studerus et al., 2012).

Immediate context has also been shown to play a significant role in a person's quality of experience. The individual's mindset (set) and the environment in which the psychedelic is taken (setting) can significantly impact the experience. An unsupportive or unfamiliar setting, negative expectations, or pre-existing anxiety can increase the likelihood of adverse effects (Hartogsohn, 2016). On the other hand, feeling prepared and being offered support during a psychedelic experience decreases the probability of adverse effects and is associated with more positive and valued experiences (Leary et al., 1963).

Considering these factors when using psychedelics to minimise the risk of adverse effects and maximise potential benefits is essential. Such significant findings lend themselves to the extra-pharmacological model (Carhart-Harris & Nutt, 2017) or the 'set and setting" theory of therapeutic effects of psychedelics (Leary, Litwin & Metzner, 1963).

Set and Setting

In psychedelic research, there is a consensus that extra-pharmacological or 'set' and 'setting' play a major role in constructing the psychedelic experience and subsequent long-term outcomes (Leary, 1963). The set and setting hypothesis states that the quality and intensity of

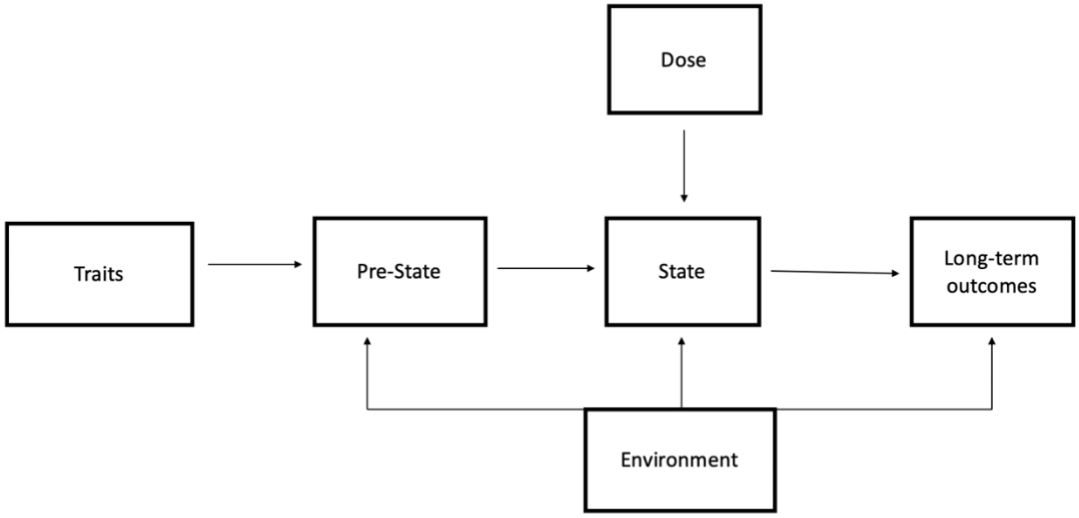
psychedelic experiences are conditional on an individual's internal mental state and external environment or context. This model posits that factors beyond the pharmacological properties of the psychedelic compound can significantly influence the nature and outcome of the experience (Hartogsohn, 2016). 'Set' refers to the influence of personality, intention, expectation, and preparation before or during the psychedelic experience. 'Setting' refers to the environment within which drug use occurs and is not limited to just the physical environment but also the social and cultural environment (Hartogsohn, 2016) (See Figure 2).

A path analysis examining the causal relationship between set and setting in modulating the mystical experiences and persisting effects of psilocybin revealed that set and setting factors had both direct and indirect impacts on the mystical experiences elicited by psilocybin (Russ et al., 2019). Specifically, the authors found that participants' attitudes, moods, and expectations before the session (set) and the quality of the interpersonal support provided during the session (setting) were significant predictors of the intensity of the mystical experiences. Furthermore, the intensity of the mystical experiences strongly predicted the persisting positive effects on well-being, life satisfaction, and personal meaning. Interestingly, through principal component and regression analyses, Haijen et al. (2018) found that set and setting variables were more predictive of changes in wellbeing than the acute experience. They used validated scales to measure personality traits (such as neuroticism, openness and absorption), intentions (purpose for taking the psychedelic) and immediate state before taking the psychedelic (anxiety, apprehension, surrender), and collected data on the setting, defining it as the environment in which the psychedelic was taken, the people present, and how close one felt to those present (Haijen et al., 2018). The study collected data on the acute experience one day after using the MEQ30 and changes to wellbeing at +1 day, +14 days and + 28 days using the WEMWBS. Results showed

that together ‘set’, ‘setting’ and ‘clear intentions’ predicted 53% of the variance in the change to wellbeing scores (Haijen et al., 2018). The results also support previous research on the impact of set and setting on acute experiences, showing a significant effect of factors, such as trait absorption, on the degree of mystical experiences (Haijen et al., 2018).

These findings align with other research on the importance of the set and setting on the psychedelic experience (Carhart-Harris et al., 2018; Hartogsohn, 2016; Leary et al., 1963). The following section of the review will discuss set and setting factors separately and their impact on positive outcomes and mystical experiences. Regarding the current project, a detailed look will be taken regarding the constructs ‘surrender’, ‘communitas’ and extroversion in the group context.

Figure 2: Extra-Pharmacological Model



Note: See Carhart-Harris & Nutt, 2017

Setting

The "setting" of the psychedelic experience plays a crucial role in shaping the experience, as it can significantly influence the individual's mindset. Setting refers to both the physical environment and the emotional atmosphere created by the therapists or guides and the support provided to the individual undergoing the experience. A comfortable, safe, and supportive setting has been shown to minimise the risk of negative experiences, such as anxiety or paranoia, and promote positive psychological outcomes (Hartogsohn, 2016). For example, a supportive, comfortable, and aesthetically pleasing environment (such as incorporating music, images, flowers, and candlelight) can enhance positive emotions, reduce anxiety, and promote feelings of safety and trust. Conversely, an unfamiliar, chaotic, or threatening environment can trigger negative emotions, increase anxiety, and lead to paranoid or delusional thinking. The context, or the cultural and social norms surrounding the use of psychedelic drugs, can also shape the meaning and interpretation of the experience (Carhart-Harris et al., 2018). One of the most intriguing early studies on the impact of 'setting' was conducted in 1960 by Hyde, who found that participants who took LSD alone experienced more adverse reactions than those in groups. Hyde (1960) identified several other non-pharmacological factors influencing LSD responses, including familiarity with the environment and the presence of those sharing a common experience (Hyde, 1960). It is fair to wonder whether different settings would be considered anxiety-provoking for different personality types. For instance, those who report being more extroverted may prefer larger groups, while those who report being more introverted may prefer more intimate settings, which subsequently could impact the comfort level in each of these contexts.

Use of Psychedelic Drugs in a Group Context

The use of psychedelics in group settings dates back centuries, as they have been used for sacred and religious ceremonies (Guerra-Doce, 2015). Influential yet controversial early group studies include Leary's 'Concord Prison Experiment' and Pahnke's 'Good Friday Experiment'. The Concord Prison Experiment was an early attempt at exploring the potential benefits of psilocybin-assisted group psychotherapy for reducing recidivism among incarcerated individuals (Leary, 1969). While the initial findings appeared promising, subsequent analyses have raised questions about the study's methodology and validity. 'The Good Friday Experiment' examined the degree of mystical experiences in psychedelic group use. Most participants who received psilocybin reported experiencing profound mystical experiences during the Good Friday service, while those who received the placebo did not (Pahnke & Richards, 1966). Expectation bias and small sample size were only some issues concerning the experiment's validity. Lastly, it is essential to note that while these trials included a group setting, there are no comparisons to individual psychedelic use. Thus, one could not conclude which could lead to a more positive outcome.

Since these early experiments, there has been an interest in understanding the impact of group settings on the psychedelic experience and subsequent outcomes. Most clinical trials on the therapeutic effects of psychedelics have had participants experience the psychedelic alone with the support of a therapist or guide. Other observational studies have looked at different aspects of set and setting but did little to compare the impact of group vs individual use. Recently

some studies have alluded to the benefit of psychedelic group use, but the mechanisms that contribute to these benefits still need to be addressed.

In a 2019 systematic review of psychedelic-assisted group therapy, the authors found that in most studies, positive outcomes were reported from group uses (Trope et al., 2019). These improvements included psychological wellbeing, social connectedness, and reduced symptoms of mental disorders and substance misuse.

The review found that psychedelics enhanced the therapeutic effects of group settings, possibly due to a sense of shared experiences and creating a community that fosters healing and personal growth. An important observation is that none of the studies included in this review compared group therapy to individual therapy. All the studies compared psychedelic-assisted group therapy to group therapy as usual. Therefore, interpretations are limited to the benefits of adding psychedelics to a group setting but not the other way around (added benefits of a group setting to the psychedelic experience itself). Finally, the authors concluded that there is preliminary evidence to suggest that psychedelic-assisted group therapy could be a promising approach for various mental health conditions. However, they also emphasised the need for more rigorous, large-scale studies to establish the effectiveness and safety of this treatment modality, highlighting the importance of proper screening, preparation, and integration sessions.

Using a cross-sectional survey design, St. Arnaud and Sharpe (2022) found that recreational psychedelic use may be associated with an increase or decrease in mental health depending on the contextual parameters of use. They employed hierarchical regression analysis to explore the association between group use and mental health in psychedelic users. Group psychedelic use significantly predicted both growth and adjustment and negatively predicted distress. While the study suggests that careful group use may contribute to positive wellbeing

outcomes, the same study found that when intentions were 'recreational', group use became associated with problematic psychedelic overuse (St. Arnaud & Sharp, 2022). The authors caution that certain traits (such as higher extroversion) may contribute to pursuing psychedelic group use. These traits need to be further explored as they may impact any measure of positive changes.

Connectedness & 'Communitas'

Group use has been linked to 'connectedness', associated with positive psychedelic outcomes (Carhart-Harris et al., 2017; Watts et al., 2017). 'Connectedness" is defined as a greater sense of connection to oneself, others, or the world. The literature describes two paths for which this could occur. 'Connectedness' could improve directly or indirectly, depending, in part, on the context of the psychedelic experience.

Indirect Connectedness: Connectedness has been observed to be enhanced indirectly during a psychedelic experience by developing traits related to social functioning and improving subsequent wellbeing (Carhart- Harris et al., 2017; Erritzo, 2018). Improvements in participants with treatment-resistant depression who had undergone psilocybin-assisted one-on-one therapy were mediated by social connectedness, implying that it might be an essential factor promoting positive change (Watts et al. 2017; Carhart-Harris et al. 2017). The authors explored the themes of connectedness and acceptance as potential factors contributing to the therapeutic effects of psilocybin. Participants reported experiencing a profound sense of unity and interconnectedness during their psilocybin sessions, which involved a greater sense of connectedness to oneself, others, and the world. The authors suggest that the experiences of increased connectedness may be crucial factors in the therapeutic effects of psilocybin for treatment-resistant depression, even in an individual setting (Watts et al. 2017).

Direct Connectedness: Social connectedness also has a direct impact on wellbeing when psychedelics are taken in a group setting and an experience of 'communitas' is shared by the participants, providing a direct experience of collective functioning or social collectiveness (Kettner et al., 2021). Communitas could be considered an intersubjective experience, referring to individuals' psychological, emotional, and social reciprocity.

Communitas refers to a sense of deep connection, belonging, and shared humanity experienced during intense collective events, such as religious rituals, music festivals, or group psychedelic experiences (Turner, 1969). In the context of psychedelics, this refers to the profound interconnectedness and unity people often report during psychedelic experiences. Kettner and colleagues (2021) aimed to investigate whether the degree of communitas during psychedelic group sessions impacts positive and lasting changes to wellbeing and social connectedness. The researchers measured the quality of communitas experienced during the psychedelic sessions using the Communitas Scale (COMS), which captures shared experience, unity, and emotional connection between individuals. Results showed that participants who reported higher levels of 'communitas' (i.e., more profound intersubjective experiences) during the psychedelic group sessions showed more significant improvements in psychological wellbeing and social connectedness at the two-month follow-up (Kettner et al., 2021). This relationship remained significant even after controlling for the intensity of the individual psychedelic experience. The findings suggest that the quality of shared experiences during psychedelic group sessions substantially predicts long-term improvements in psychological wellbeing and social connectedness. Specifically, the revised path analysis proposed by this study was that 'retreat communitas' or the communitas reported regarding the retreat as a whole, rather than during the psychedelic experience, significantly predicted wellbeing at the one-month

follow-up. Retreat communitas was indicated directly by the communitas experienced during the psychedelic experience and indirectly mediated by the level of self-disclosure experienced. Acute psychedelic communitas was significantly influenced by the strength of the relationship with the guides before the ceremony. The emotional support felt during the ceremony also directly and indirectly mediated this sense of communitas (Kettner et al., 2021).

Set

Research on the impact of set on mystical experiences and long-term changes has also found significant results (Studerus et al., 2012; Carhart-Harris et al., 2018; Russ et al., 2019). An individual's mindset, expectations, intentions, and emotional states can significantly shape their psychedelic experience (Carhart-Harris et al., 2018). Positive expectations were associated with more positive experiences, while negative expectations or emotional states increased the probability of challenging experiences (Carhart-Harris et al., 2018). Aday et al. (2021) conducted a systematic review of both clinical and non-clinical populations to identify states and traits that may predict acute drug effects. The authors found evidence that certain personality traits, such as openness and absorption, were positively associated with mystical experiences during acute drug effects. In contrast, traits like neuroticism were linked to challenging or adverse experiences. Furthermore, acceptance and the ability to surrender to the occasion were predictive of positive and mystical-type experiences, whereas preoccupation, apprehension, or confusion were more predictive of acute negative experiences (Aday et al., 2021).

Surrender

Surrender, also referred to as "letting go" or "acceptance," is a psychological attitude that entails willingly relinquishing control and embracing the unfolding experience, especially during

challenging or intense situations. In the context of psychedelic experiences, the ability to surrender may play a pivotal role in determining the nature and outcomes of the experience. Roseman, Nutt, and Carhart-Harris (2018) conducted a study investigating the influence of psychological factors on the challenging experiences and related distress caused by psilocybin. They found that surrendering or letting go during the psychedelic experience was associated with lower levels of anxiety, paranoia, and other adverse effects. Conversely, resisting the experience or trying to maintain control was linked to increased distress and challenging experiences.
In a study by Russ et al. (2019), the authors aimed to replicate and extend this model predicting response to psilocybin. Their findings revealed that greater levels of surrender and lower levels of emotional excitability predicted a more positive response to psilocybin and reduced anxiety and other negative effects. These findings further support the importance of surrender in shaping the nature and outcomes of psychedelic experiences.

In their study, Russ et al. (2019) found that surrender, measured by the State of Surrender (SoS) scale, was a significant predictor of mystical experience scores on the MEQ30. Path analyses demonstrated that higher levels of surrender during a psychedelic experience were positively associated with higher MEQ scores. The authors also examined other predictors, including personality trait absorption and drug session factors, such as drug intensity. Their results revealed that the level of surrender was a more robust predictor of mystical experience scores than other factors, highlighting the importance of an individual's ability to let go and accept the experience during a psychedelic session (Russ et al., 2019). "Surrender" at the beginning of a psychedelic session explained well over half of the variance in mystical experience scores (Russ et al., 2019). Conversely, anxiety and a lower comfort and trust in the people present during the experience were positively correlated with adverse experiences and

negatively correlated with mystical experiences. (Leary et al., 1963, Studerus et al., 2012; Barrett et al., 2017). Russ and Elliot (2017) found the critical predictor of mystical experiences to be a state of surrender at the start of the experience—conversely, preoccupation and distress predicted the experience of dread. Furthermore, using hierarchical regression, Russ and colleagues (2019) extend their model to show a positive relationship between surrender and long-term changes to wellbeing. Their model showed that surrender directly predicted positive long-term changes to wellbeing. The model also showed that surrender indirectly predicted these positive changes through mystical experiences. In fact, adding mystical experiences as a mediator significantly increased the expected variance in positive change (Russ et al., 2019).

These findings underscore the significance of surrender in shaping the outcomes of psychedelic experiences, particularly the occurrence of mystical experiences and long-term effects. By understanding the role of surrender and incorporating it into the context of psychedelic-assisted therapies, clinicians and researchers can potentially optimise therapeutic protocols to enhance the positive effects and minimise the challenging aspects of such experiences.

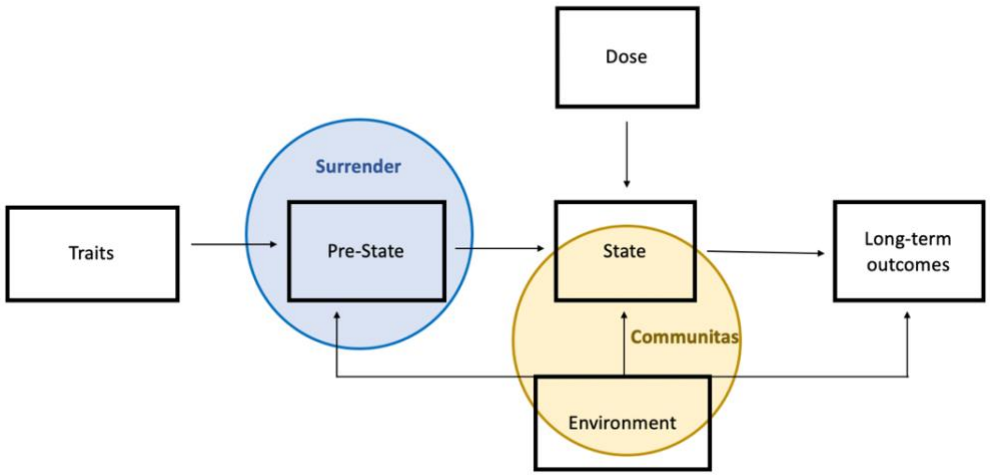
Summary and Measures

Surrender and communitas have been associated with positive well-being changes following a psychedelic experience (Kettner et al., 2021; Russ et al., 2019). Surrender could be considered the immediate mindset (or pre-state) before the beginning of acute psychedelic experiences. On the other hand, communitas is a social context or the mindset during the psychedelic experience brought on by contextual factors, such as the presence of other individuals (see Figure 3). While both surrender and communitas have been associated with

mystical experience and wellbeing, no study has explored their relationship with each other to date. It would be useful to determine what other contextual factors predict communitas in a group setting and whether an individual's ability to surrender directly impacts communitas. If so, this could encourage further research into the factors that promote surrender in a group setting.

Russ and colleagues (2019) developed the state of surrender scale (SoS) to measure surrender. Likewise, to measure communitas, Kettner and colleagues developed the communitas scale (COMS). In the following section of the review, these two scales will be reviewed and discussed.

Figure 3: Surrender and Communitas in the Extra-Pharmacological Model



Measures

The SoS scale

Russ et al. (2019) developed and validated the State of Surrender (SoS) scale to precisely measure the extent to which individuals can "surrender" during a psychedelic experience. The scale consists of 9 items rated on a 5-point Likert scale, with higher scores indicating a greater level of surrender. The authors conducted exploratory and confirmatory factor analyses to determine the scale's factor structure and assessed its reliability and validity. The SoS scale demonstrated good internal consistency and a one-factor structure, suggesting that the scale measures a single construct of surrender. The scale also showed good concurrent validity and positively correlated with other relevant measures, such as the Mystical Experience Questionnaire (MEQ) and the Challenging Experience Questionnaire (CEQ). Specifically, a higher level of surrender, as measured by the SoS scale, was associated with more intense mystical experiences and reduced challenging experiences.

The development and validation of the SoS scale provides researchers with a valuable tool for assessing the level of surrender during psychedelic experiences. For the purpose of this research, this scale could contribute to a better understanding of how surrender influences the therapeutic outcomes of the psychedelic experience in different contexts.

COMS

The Communitas Scale (COMS) aims to capture the various aspects of communitas that emerge during these occasions, including feelings of unity, equality, and mutual support (Kettner et al., 2021). The authors conducted a series of investigations to develop the COMS and examine its psychometric properties, including its reliability and validity. They used data from multiple

samples involving participants who had taken part in psychedelic ceremonies and individuals who had experienced communitas in various other contexts. The authors identified a three-factor structure for the COMS through exploratory and confirmatory factor analyses. The three factors were: (1) shared humanity, (2) self-transcendence, and (3) connection through struggle. The scale demonstrated good internal consistency for the three factors, indicating high reliability.

Regarding validity, the COMS showed convergent validity, as it correlated positively with measures of related constructs such as social connectedness, empathy, and compassion. Furthermore, the scale exhibited discriminant validity, evidenced by weaker correlations with measures of less-related constructs like life satisfaction and self-esteem. Overall, the Communitas Scale developed by Kettner et al. (2021) is a promising tool for assessing the experience of communitas across various contexts. The scale demonstrates good reliability and validity, making it a useful instrument for researchers studying the psychological and social aspects of collective experiences.

Baseline Traits – Personality

The final part of this review focuses on baseline traits and their impact on acute and long-term outcomes of the psychedelic experience. Aspects of personality have been shown to play a significant role in shaping an individual's psychedelic experience (Studerus et al., 2012; Haijen et al., 2018). The immediate mindset around the time of psychedelic ingestion has also been shown to be influenced by personality traits (Carhart- Harris & Nutt 2017; Ruess et al., 2019). The most commonly researched personality traits in psychedelic research are derived from the Five-Factor Model of personality (the 'big five'), which includes openness, conscientiousness, extraversion, agreeableness, and neuroticism (Costa & McCrae, 1992)

Openness and neuroticism significantly influence the psychedelic experience (Barret, Johnson & Griffith, 2017; Haijen et al., 2018). Higher levels of openness have been linked to more profound mystical-type experiences, greater psychological insight, and a higher likelihood of experiencing positive long-term outcomes after using psychedelics (Russ et al., 2019). In contrast, the trait of neuroticism has been found to be a risk factor for adverse experiences during a psychedelic session. Individuals with higher levels of neuroticism may be more prone to experience anxiety, paranoia, or challenging emotional states during a psychedelic experience (Carbonaro et al., 2016; Studerus et al., 2012). Neuroticism may be associated with an immediate mindset of dread or preoccupation. Contrary to surrender, Russ et al. (2019) found that being preoccupied or feeling dread or anxiety before a psychedelic experience were negatively associated with mystical experiences and predicted adverse incidents (Russ et al., 2019).

Absorption is a psychological trait that reflects an individual's propensity to fully immerse in their experiences, such as engaging in imaginative activities or being captivated by sensory stimuli (Tellegen & Atkinson, 1974). Research has shown that the trait of absorption can influence the subjective effects and therapeutic outcomes of psychedelic experiences. Individuals with higher levels of absorption may be more likely to experience positive mood effects during the acute psychedelic experience and to report lasting positive changes in wellbeing (Studerus et al., 2011; Haijen et al., 2018).

The relevance of absorption and openness to the current study is the implications they have. Both traits highlight the importance of being open to, or immersing oneself in, an experience. Thus, it is proposed that perhaps other set and setting variables influence immersion, openness, surrender or acceptance. For instance, extroversion may interact with group settings to heighten a sense of immersion. As it stands, no extant research provides a direct answer to these

specific questions. However, certain studies investigating the correlation between extroversion levels and psychedelic experiences have contributed valuable insights, thereby informing the direction and hypothesis of the current research project.

Extroversion

Extraversion/Introversion is considered a primary dimension of personality in practically all personality theories (Costa & McCrae, 1992). While individuals typically fall on a scale and are usually neither entirely introverted nor extroverted, introverts are generally regarded as low in extroversion. This explains why the 'big five' includes only the extraversion dimension rather than introversion *and* extraversion. The more extroverted a person is, the more sociable, gregarious, talkative and energetic they are likely to be, which has also been linked to higher subjective wellbeing and lower rates of depression (Lucas & Baird, 2004; Jylhä & Isometsä, 2006).

Extroversion has been demonstrated to predict positive outcomes in group therapy (Ogrodniczuk et al., 2003). The authors found that extroversion predicted improvements in general symptoms, goal achievements and life satisfaction (Ogrodniczuk et al., 2003). Additionally, research that has linked higher extroversion levels to lower stress has found that this relationship is mediated by perceived support and belonging (Swickert et al., 2001). Specifically, extroverts tended to perceive that they had more support and a greater sense of belonging, and this predisposition predicted lower stress levels (Swickert et al., 2001). Finally, some evidence suggests extroverted individuals display higher levels of social engagement and communication, which can positively influence group cohesion and contribute to a supportive

group environment. Extroverts, however, may face challenges in the more introspective aspects of therapy (Cain, 2013).

Extroversion and Psychedelics

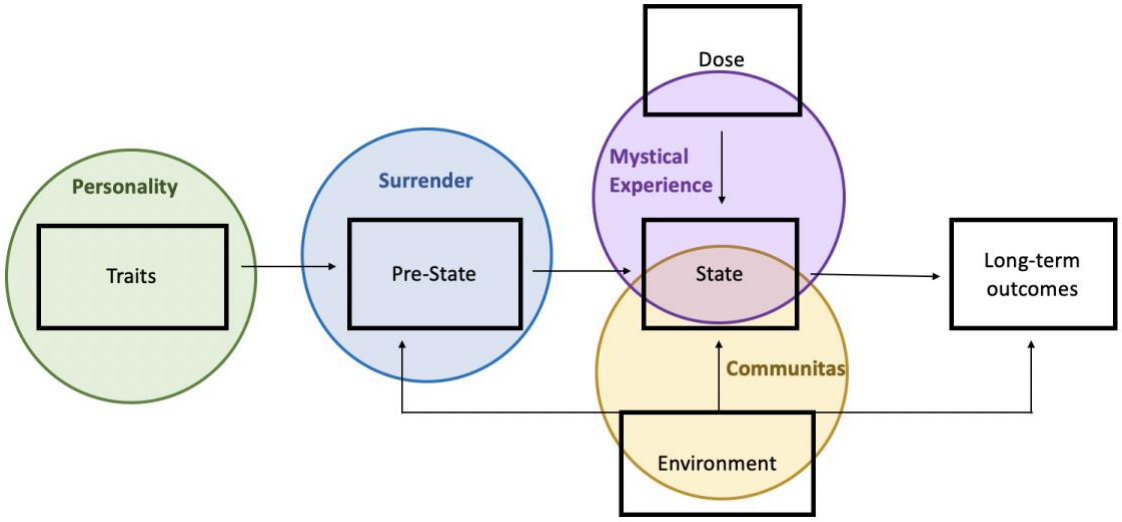
Regarding the impact of baseline extroversion on the psychedelic experience, a pooled analysis found a negative effect of extroversion on acute spiritual experiences and a significant relationship between extroversion and audio-visual hallucinations (Studerus et al., 2012). Another study looking at the naturalistic use of psychedelics had similar findings, with the impact of extroversion showing strong significance (Johnstead et al., 2020). The analysis showed a negative association between extroversion and an inner meditative state, specifically the experience of transcendence and peace (Johnstead et al., 2020). The authors suggested that introverted individuals may be more attuned to their internal experiences and more likely to self-reflect during the psychedelic experience. However, the analysis also showed a negative association between extroversion and fear, concluding its association with introversion. For introverts, this may reflect the fear associated with solitary psychedelic use, but it may also reflect an introvert's preoccupation or apprehension when taking psychedelics in a group environment. This theory is supported by the fact that introversion is more likely to be associated with social anxiety (Naragon-Gainey, Watson, & Markon, 2009)**.** Johnstead et al. (2020) most notably show that extroversion was significantly associated with an improved connection to other people. While these findings are exciting and could be explained by personality differences, they could also be explained by an individual's setting preferences. Extroverts are less likely to take psychedelics in intimate social environments, and extroversion was associated with less solitary use (Johnstead et al., 2020). This preference could moderate the type of

experience observed for introverts or extroverts and thus needs further investigation. Overall, the relationship between extroversion and psychedelic experience is complex and may be influenced by various factors, including the individual's motivations for taking the drug, the setting where the drug is consumed, and the individuals around during that time.

Summary and Measures

Personality traits have been shown to influence immediate states (pre-state) and acute experiences in the context of psychedelic use (Haijen et al., 2018; Russ et al., 2019; Studerus et al., 2012). In Carhart-Harris and Nutt's (2017) extra-pharmacological model, the impact of personality is depicted in Figure 6. In terms of extroversion, while some studies have explored its effects on acute experiences, there is a gap in the literature focusing on the interaction of extroversion with other sets and setting factors, such as the ability to surrender in group or individual settings. The current project addresses this literature gap by considering extroversion's influence on acute experiences in a group setting.

Figure 4: Current Total Extra-Pharmacological Model



BFI

Extroversion has often been assessed using the Big Five Inventory (BFI) (John & Srivastava, 1999). The BFI has demonstrated both validity and reliability across numerous studies. Convergent validity is evidenced by the strong correlations between the BFI and other established measures of the Big Five (Costa & McCrae, 1992). Discriminant validity is supported by the fact that the BFI factors have relatively low correlations with one another, suggesting that each factor represents a distinct dimension of personality (John & Srivastava, 1999). The BFI exhibits acceptable to high levels of internal consistency and test-retest reliability (John & Srivastava, 1999).

The Big Five Inventory has been widely recognised as a valid and reliable measure for assessing the five broad dimensions of personality. It has been used extensively in research and clinical settings, contributing to our understanding of personality and its relationship to various psychological, social, and health outcomes. The BFI has been used repeatedly to assess personality in the psychedelic literature (e.g. Barret, Johnson & Griffith, 2017; Paterniti et al., 2022).

The Current Study

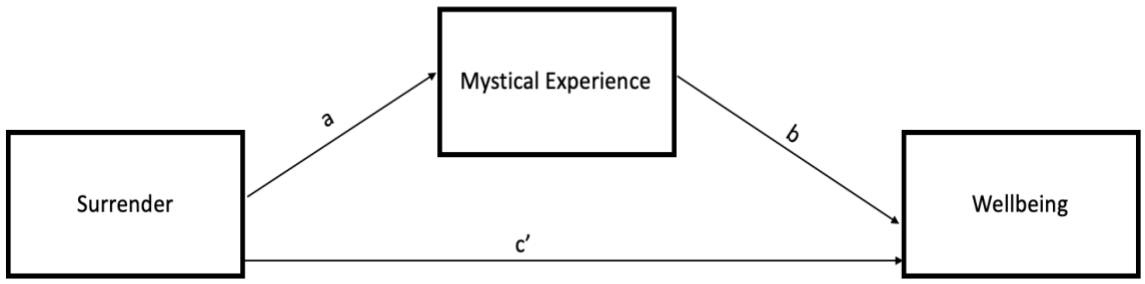
Given the robust body of existing research and our current understanding of the complex nature of psychedelic experiences, a critical gap remains in comprehensively understanding how 'set and setting' factors, personality traits, and willingness to surrender can interactively influence these experiences. The nuance of these interactions can potentially offer insights into

optimising therapeutic outcomes in both clinical and non-clinical contexts. Furthermore, the role of group dynamics in the psychedelic experience, particularly as it relates to the experience of communitas, is a relatively uncharted territory that warrants further exploration. Therefore, synthesising these distinct lines of inquiry provides a unique opportunity to advance our understanding of psychedelic experiences. Guided by the evidence and theories discussed, the present study explores the following hypotheses using path analyses.

Hypothesis 1 and 2

H1. In individual and group settings, the degree of surrender measured by SoS will predict change to wellbeing as measured by the WEMWBS (total effect: 'c'). This is partly mediated by mystical experience as measured by the MEQ30 (paths 'a1' and 'b1'). See Figure 5

Figure 5: Hypothesis 1

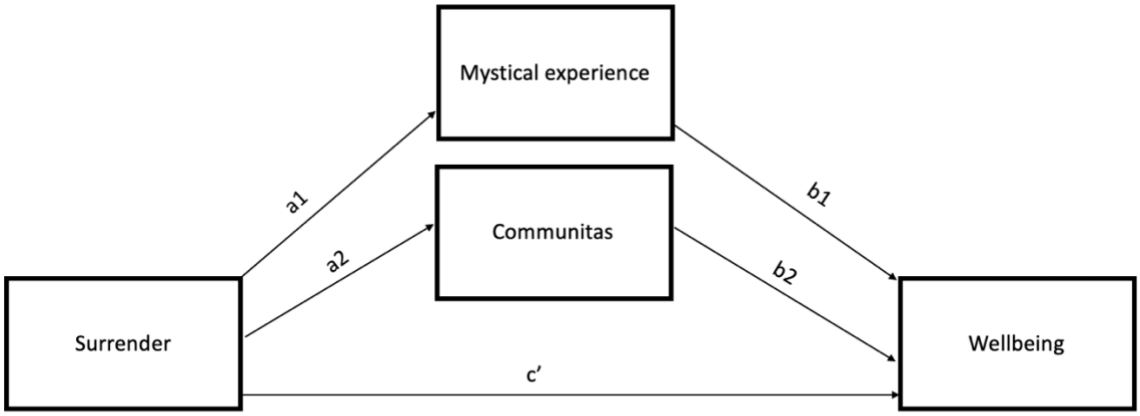


Note (a)(b) = indirect effect of surrender on wellbeing through mystical experience
c' = direct effect of surrender on wellbeing

H2. In a group setting, the degree of surrender measured by SoS will predict change to wellbeing as measured by the WEMWBS (total effect: 'c'). This is partly mediated by mystical experience as measured by the MEQ30 (paths 'a1' and 'b1'). Additionally, adding communitas

as measured by the COMS as a second mediator will increase the predicted variance in change to wellbeing scores (paths a2 and b2). See Figure 6

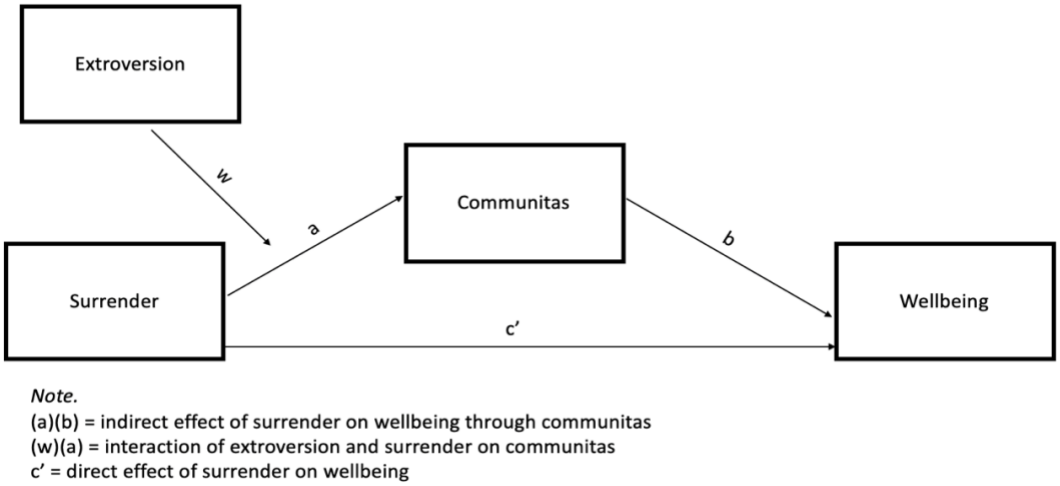
Figure 6: Hypothesis 2



Note.
(a1)(b1) = indirect effect of surrender on wellbeing through mystical experience
(a2)(b2) = indirect effect of surrender on wellbeing through communitas
c' = direct effect of surrender on wellbeing

H3. In a group setting, the level of extroversion, as measured by the BFI, will moderate the relationship between surrender and communitas (path w), with higher extroversion predicting higher degrees of communitas experienced. See Figure 7

Figure 7: Hypothesis 3



Path Analysis

The current study employs path analysis to investigate the intricate relationships among variables. Path analysis allows us to test for mediation by quantifying and testing the significance of indirect effects (Preacher & Hayes, 2008). Given our interest in exploring the underlying processes through which the set and setting factors, personality traits, and the willingness to surrender affect the psychedelic experience, mediation analysis will help to uncover the mechanism by which these variables exert their influence. Path analysis allows us to also test for moderated mediation, enabling us to investigate whether the mediation relationships vary under different conditions or levels of another variable (e.g., high extroversion versus low extroversion). Given the complexity of the psychedelic experience and its sensitivity to the interplay between various factors, exploring moderated mediation will offer more nuanced insights into these processes.

As discussed previously in this review, path analysis has enabled scholars to tease apart the influence of specific variables, such as personality traits (Studerus et al., 2011), surrender (Russ et al., 2019), and communitas (Kettner et al., 2021), on distinct aspects of psychedelic

experiences. Moreover, it has facilitated the understanding of how mystical experiences during psychedelic sessions mediate between drug use and long-term wellbeing (Griffiths et al., 2006; Maclean, Johnson & Griffiths, 2011). As such, applying path analysis in our study is advantageous in untangling the complexities and interdependencies among the set, setting, and individual attributes within the realm of psychedelic therapy.

Clinical Implications

Finally, the implications of this work may hold some potential to enrich our knowledge and improve therapeutic outcomes in both clinical and non-clinical environments. This could start as early as participant selection or allocation. Screening participants for inclusion in psychedelic retreats and/or clinical trials is a vital step to ensure both the safety and efficacy of the intervention. Rigorous pre-screening not only evaluates medical and psychological safety but can help match participants to the most suitable therapeutic setting based on their individual needs and characteristics (Johnson, Richards, & Griffiths, 2008). Thus, the implications of the current research could lend themselves to the idea of a more flexible or dynamic screening process. Much like formulating in psychological interventions, a more flexible approach to understanding an individual's psychological experiences is offered, and the interplay of internal and external factors is emphasised. It allows for the exploration of the unique psychosocial and environmental factors that shape an individual's experiences, fostering a therapeutic environment that is responsive to the evolving needs and insights of the individual. By working to understand an individual's subjective experiences, clinicians can co-create personalised and integrative interventions, thereby moving away from a one-size-fits-all model. This may involve gauging an individual's prior knowledge about psychedelics, their motivations for participation, any previous psychedelic experiences, and their comfort level with various settings, such as group or

individual sessions. Specific to the constructs discussed, the findings from this research may offer additional knowledge to collaboratively design the most conducive environment for promoting surrender and connectedness (be it direct or indirect), tailored to each client's unique personality traits, notably their degree of extroversion, and therapeutic goals. This individualised approach ensures that interventions are not only evidence-based but also person-centred, fitting the needs and preferences of the individual and enhancing the likelihood of positive therapeutic outcomes.

References

Aday, J. S., Davis, A. K., Mitzkovitz, C. M., Bloesch, E. K., & Davoli, C. C. (2021). Predicting reactions to psychedelic drugs: A systematic review of states and traits related to acute drug effects. *ACS Pharmacology & Translational Science*, *4*(2), 424–435. https://doi.org/10.1021/acsptsci.1c00014

Andersen, K. A., Carhart-Harris, R., Nutt, D. J., & Erritzoe, D. (2020). Therapeutic effects of classic serotonergic psychedelics: A systematic review of Modern-era clinical studies. *Acta Psychiatrica Scandinavica*, *143*(2), 101–118. https://doi.org/10.1111/acps.13249

Barrett, F. S., Bradstreet, M. P., Leoutsakos, J.-M. S., Johnson, M. W., & Griffiths, R. R. (2016). Challenging experience questionnaire. *PsycTESTS Dataset*. https://doi.org/10.1037/t59060-000

Barrett, F. S., Johnson, M. W., & Griffiths, R. R. (2015). Validation of the revised mystical experience questionnaire in experimental sessions with psilocybin. *Journal of Psychopharmacology*, *29*(11), 1182–1190. https://doi.org/10.1177/0269881115609019

Bogenschutz, M. P., Forcehimes, A. A., Pommy, J. A., Wilcox, C. E., Barbosa, P. C. R., & Strassman, R. J. (2015). Psilocybin-assisted treatment for alcohol dependence: A proof-of-concept study. *Journal of Psychopharmacology*, *29*(3), 289–299. https://doi.org/10.1177/0269881114565144

Brust, J. C. M. (2004). Hallucinogens. *Neurological Aspects of Substance Abuse*, 259–274. https://doi.org/10.1016/b978-0-7506-7313-6.50012-x

Cain, S. (2013). *Quiet the power of introverts in a world that can't stop talking*. Broadway Paperbacks.

Carbonaro, T. M., Bradstreet, M. P., Barrett, F. S., MacLean, K. A., Jesse, R., Johnson, M. W., & Griffiths, R. R. (2016). Survey study of challenging experiences after ingesting psilocybin mushrooms: Acute and enduring positive and negative consequences. *Journal of Psychopharmacology*, *30*(12), 1268–1278. https://doi.org/10.1177/0269881116662634

Carhart-Harris, R. L., & Goodwin, G. M. (2017). The therapeutic potential of psychedelic drugs: Past, present, and future. *Neuropsychopharmacology*, *42*(11), 2105–2113. https://doi.org/10.1038/npp.2017.84

Carhart-Harris, R. L., & Nutt, D. J. (2017). Serotonin and brain function: A tale of two receptors. *Journal of Psychopharmacology*, *31*(9), 1091–1120. https://doi.org/10.1177/0269881117725915

Carhart-Harris, R. L., Bolstridge, M., Rucker, J., Day, C. M., Erritzoe, D., Kaelen, M., Bloomfield, M., Rickard, J. A., Forbes, B., Feilding, A., Taylor, D., Pilling, S., Curran, V. H., & Nutt, D. J. (2016). Psilocybin with psychological support for treatment-resistant depression: An open-label Feasibility Study. *The Lancet Psychiatry*, *3*(7), 619–627. https://doi.org/10.1016/s2215-0366(16)30065-7

Carhart-Harris, R. L., Erritzoe, D., Haijen, E., Kaelen, M., & Watts, R. (2017). Psychedelics and connectedness. *Psychopharmacology*, *235*(2), 547–550. https://doi.org/10.1007/s00213-017-4701-y

Carhart-Harris, R. L., Leech, R., Hellyer, P. J., Shanahan, M., Feilding, A., Tagliazucchi, E., Chialvo, D. R., & Nutt, D. (2014). The Entropic Brain: A Theory of conscious states informed by neuroimaging research with psychedelic drugs. *Frontiers in Human Neuroscience*, *8*. https://doi.org/10.3389/fnhum.2014.00020

Carhart-Harris, R. L., Roseman, L., Bolstridge, M., Demetriou, L., Pannekoek, J. N., Wall, M. B., Tanner, M., Kaelen, M., McGonigle, J., Murphy, K., Leech, R., Curran, H. V., & Nutt, D. J. (2017). Psilocybin for treatment-resistant depression: Fmri-measured brain mechanisms. *Scientific Reports*, *7*(1). https://doi.org/10.1038/s41598-017-13282-7

Carhart-Harris, R. L., Roseman, L., Haijen, E., Erritzoe, D., Watts, R., Branchi, I., & Kaelen, M. (2018). Psychedelics and the essential importance of context. *Journal of Psychopharmacology*, *32*(7), 725–731. https://doi.org/10.1177/0269881118754710

Carhart-Harris, R., Giribaldi, B., Watts, R., Baker-Jones, M., Murphy-Beiner, A., Murphy, R., Martell, J., Blemings, A., Erritzoe, D., & Nutt, D. J. (2021). Trial of psilocybin versus escitalopram for depression. *New England Journal of Medicine*, *384*(15), 1402–1411. https://doi.org/10.1056/nejmoa2032994

Codish, D., & Ravid, G. (2014). Adaptive Approach for gamification optimisation. *2014 IEEE/ACM 7th International Conference on Utility and Cloud Computing*. https://doi.org/10.1109/ucc.2014.94

Davis, A. K., Barsuglia, J. P., Lancelotta, R., Grant, R. M., & Renn, E. (2018). The epidemiology of 5-methoxy-*N*, *n*-dimethyltryptamine (5-MEO-DMT) use: Benefits, consequences, patterns of use, subjective effects, and reasons for consumption. *Journal of Psychopharmacology*, *32*(7), 779–792. https://doi.org/10.1177/0269881118769063

Depue, R. A., & Collins, P. F. (1999). Neurobiology of the structure of personality: Dopamine, facilitation of incentive motivation, and extraversion. *Behavioral and Brain Sciences*, *22*(3), 491–517. https://doi.org/10.1017/s0140525x99002046

Diener, E., Larsen, R. J., & Emmons, R. A. (1984). Person × situation interactions: Choice of situations and congruence response models. *Journal of Personality and Social Psychology*, *47*(3), 580–592. https://doi.org/10.1037/0022-3514.47.3.580

Dolder, P. (2016). Acute dose-response effects of LSD in healthy humans. https://doi.org/10.26226/morressier.5785edc6d462b80296c99329

Erritzoe, D., Roseman, L., Nour, M. M., MacLean, K., Kaelen, M., Nutt, D. J., & Carhart-Harris, R. L. (2018). Effects of psilocybin therapy on personality structure. *Acta Psychiatrica Scandinavica*, *138*(5), 368–378. https://doi.org/10.1111/acps.12904

Furnham, A., Forde, L., & Ferrari, K. (1999). Personality and work motivation. *Personality and Individual Differences*, *26*(6), 1035–1043. https://doi.org/10.1016/s0191-8869(98)00202-5

Gable, R. S. (2006). Risk assessment of ritual use of oral dimethyltryptamine (DMT) and Harmala alkaloids. *Addiction*, *102*(1), 24–34. https://doi.org/10.1111/j.1360-0443.2006.01652.x

Garcia-Romeu, A., Griffiths, R., & Johnson, M. (2015). Psilocybin-occasioned mystical experiences in the treatment of tobacco addiction. *Current Drug Abuse Reviews*, *7*(3), 157–164. https://doi.org/10.2174/1874473708666150107121331

Gasser, P., Kirchner, K., & Passie, T. (2014). LSD-assisted psychotherapy for anxiety associated with a life-threatening disease: A qualitative study of acute and sustained subjective effects. *Journal of Psychopharmacology*, *29*(1), 57–68. https://doi.org/10.1177/0269881114555249

Goldberg, S. B., Shechet, B., Nicholas, C. R., Ng, C. W., Deole, G., Chen, Z., & Raison, C. L. (2020, December). *Post-acute psychological effects of classical serotonergic*

psychedelics: A systematic review and meta-analysis. Psychological medicine. Retrieved April 22, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7855004/

Griffiths, R. R., Johnson, M. W., Carducci, M. A., Umbricht, A., Richards, W. A., Richards, B. D., Cosimano, M. P., & Klinedinst, M. A. (2016). Psilocybin produces substantial and sustained decreases in depression and anxiety in patients with life-threatening cancer: A randomised double-blind trial. *Journal of Psychopharmacology*, *30*(12), 1181–1197. https://doi.org/10.1177/0269881116675513

Griffiths, R. R., Johnson, M. W., Richards, W. A., Richards, B. D., McCann, U., & Jesse, R. (2011). Psilocybin occasioned mystical-type experiences: Immediate and persisting dose-related effects. *Psychopharmacology*, *218*(4), 649–665. https://doi.org/10.1007/s00213-011-2358-5

Griffiths, R. R., Richards, W. A., Johnson, M. W., McCann, U. D., & Jesse, R. (2008). Mystical-type experiences occasioned by psilocybin mediate the attribution of personal meaning and spiritual significance 14 months later. *Journal of Psychopharmacology*, *22*(6), 621–632. https://doi.org/10.1177/0269881108094300

Griffiths, R. R., Richards, W. A., McCann, U., & Jesse, R. (2006). Psilocybin can occasion mystical-type experiences having substantial and sustained personal meaning and spiritual significance. *Psychopharmacology*, *187*(3), 268–283. https://doi.org/10.1007/s00213-006-0457-5

Grinspoon, L., & Bakalar, J. B. (1998). Psychedelic drugs reconsidered. Lindesmith Center.

Grob, Charles S., McKenna, Dennis J., Callaway, James C., Brito, Glacus S., Neves, Edison S., Oberlaender, Guilherm E., Saide, Oswaldo L., Labigalini, Elize U., Tacla, Cristiane., Miranda, Cladio T., Strassman, Rick J., & Boone, Kyle B. (1996). Human

psychopharmacology of hoasca, a plant hallucinogen used in ritual context in Brazil. *The Journal of Nervous and Mental Disease*, *184*(2), 86–94. https://doi.org/10.1097/00005053-199602000-00004

Grof, S., Goodman, L. E., Richards, W. A., & Kurland, A. A. (1973). LSD-assisted psychotherapy in patients with terminal cancer. *International Pharmacopsychiatry*, *8*(3), 129–144. https://doi.org/10.1159/000467984

Guardian News and Media. (2021, November 7). *Will the magic of Psychedelics Transform Psychiatry?* The Guardian. Retrieved April 22, 2023, from https://www.theguardian.com/science/2021/nov/07/will-the-magic-of-psychadelics-transform-psychiatry

Guerra-Doce, E. (2015). Psychoactive substances in prehistoric times: Examining the archaeological evidence. *Time and Mind*, *8*(1), 91–112. https://doi.org/10.1080/1751696x.2014.993244

Haijen, E. C., Kaelen, M., Roseman, L., Timmermann, C., Kettner, H., Russ, S., Nutt, D., Daws, R. E., Hampshire, A. D., Lorenz, R., & Carhart-Harris, R. L. (2018). Predicting responses to psychedelics: A prospective study. *Frontiers in Pharmacology*, *9*. https://doi.org/10.3389/fphar.2018.00897

Hartogsohn, I. (2016). Set and setting, psychedelics and the placebo response: An extra-pharmacological perspective on Psychopharmacology. *Journal of Psychopharmacology*, *30*(12), 1259–1267. https://doi.org/10.1177/0269881116677852

Hayes, A. F. (2022). Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. The Guilford Press.

Hock, P. (1957). Remarks on LSD and mescaline. *The Journal of Nervous and Mental Disease, 125*(3), 442–443. https://doi.org/10.1097/00005053-195707000-00018

John, O. P., Robins, R. W., & Pervin, L. A. (2010). Handbook of personality: Theory and research. Guilford Press.Johnson, M. W., Richards, W. A., & Griffiths, R. R. (2008). Human hallucinogen research: Guidelines for safety. *Journal of Psychopharmacology, 22*(6), 603–620. https://doi.org/10.1177/0269881108093587

Johnson, M., Richards, W., & Griffiths, R. (2008a). Human hallucinogen research: Guidelines for safety. *Journal of Psychopharmacology*, *22*(6), 603–620. https://doi.org/10.1177/0269881108093587

Johnstad, P. G. (2020). The psychedelic personality: Personality structure and associations in a sample of psychedelics users. *Journal of Psychoactive Drugs*, *53*(2), 97–103. https://doi.org/10.1080/02791072.2020.1842569

Kast, E. C., & Collins, V. J. (1964). Study of lysergic acid diethylamide as an analgesic agent. *Anesthesia & Analgesia*, *43*(3). https://doi.org/10.1213/00000539-196405000-00013

Kettner, H., Rosas, F. E., Timmermann, C., Kärtner, L., Carhart-Harris, R. L., & Roseman, L. (2021). Psychedelic communitas: Intersubjective experience during psychedelic group sessions predicts enduring changes in psychological wellbeing and social connectedness. *Frontiers in Pharmacology, 12*. https://doi.org/10.3389/fphar.2021.623985

Kline, R. (2023). *Principles and practice of structural equation modeling*. GUILFORD.

Ko, K., Knight, G., Rucker, J. J., & Cleare, A. J. (2022). Psychedelics, mystical experience, and therapeutic efficacy: A systematic review. Frontiers in Psychiatry, 13. https://doi.org/10.3389/fpsyt.2022.917199

Krebs, T. S., & Johansen, P.-Ø. (2012). Lysergic acid diethylamide (LSD) for alcoholism: Meta-analysis of randomised controlled trials. *Journal of Psychopharmacology*, *26*(7), 994–1002. https://doi.org/10.1177/0269881112439253

Leary, T. (2021). *Psychedelic experience: A Manual based on the Tibetan Book of the Dead*. CITADEL PR.

Leary, T., Litwin, G., & Metzner, R. (1963). Reactions to PSILOCYBJN administered in a supportive environment. *The Journal of Nervous and Mental Disease*, *137*(6), 561–573. https://doi.org/10.1097/00005053-196312000-00007

Loizaga-Velder, A., & Verres, R. (2014). Therapeutic effects of ritual ayahuasca use in the treatment of substance dependence—qualitative results. *Journal of Psychoactive Drugs*, *46*(1), 63–72. https://doi.org/10.1080/02791072.2013.873157

Lucas, R. E., & Baird, B. M. (2004). Extraversion and emotional reactivity. *Journal of Personality and Social Psychology*, *86*(3), 473–485. https://doi.org/10.1037/0022-3514.86.3.473

MacLean, K. A., Johnson, M. W., & Griffiths, R. R. (2011). Mystical experiences occasioned by the hallucinogen psilocybin lead to increases in the personality domain of openness. *Journal of Psychopharmacology*, *25*(11), 1453–1461. https://doi.org/10.1177/0269881111420188

MacLean, K. A., Leoutsakos, J.-M. S., Johnson, M. W., & Griffiths, R. R. (2012). Factor analysis of the mystical experience questionnaire: A study of experiences occasioned by the hallucinogen psilocybin. *Journal for the Scientific Study of Religion*, *51*(4), 721–737. https://doi.org/10.1111/j.1468-5906.2012.01685.x

McCrae, R., Costa, P., & JR. (2003). Personality in adulthood. https://doi.org/10.4324/9780203428412

Myers, I. B. (1962). Interpretation and use of the indicator. *The Myers-Briggs Type Indicator: Manual (1962).*, 65–82. https://doi.org/10.1037/14404-008

Naragon-Gainey, K., Watson, D., & Markon, K. E. (2009). Differential relations of depression and social anxiety symptoms to the facets of extraversion/positive emotionality. *Journal of Abnormal Psychology*, *118*(2), 299–310. https://doi.org/10.1037/a0015637

Nichols, D. E. (2016). Psychedelics. *Pharmacological Reviews*, *68*(2), 264–355. https://doi.org/10.1124/pr.115.011478

Noorani, T., Garcia-Romeu, A., Swift, T. C., Griffiths, R. R., & Johnson, M. W. (2018). Psychedelic therapy for Smoking Cessation: Qualitative analysis of participant accounts. *Journal of Psychopharmacology*, *32*(7), 756–769. https://doi.org/10.1177/0269881118780612

Ogrodniczuk, J. S., Piper, W. E., Joyce, A. S., McCallum, M., & Rosie, J. S. (2003). NEO-Five factor personality traits as predictors of response to two forms of group psychotherapy. *International Journal of Group Psychotherapy*, *53*(4), 417–442. https://doi.org/10.1521/ijgp.53.4.417.42832

Osmond, H. (1957). Function as the basis of Psychiatric Ward Design. *Psychiatric Services*, *8*(4), 23–27. https://doi.org/10.1176/ps.8.4.23

Osório Fde L;Sanches RF;Macedo LR;Santos RG;Maia-de-Oliveira JP;Wichert-Ana L;Araujo DB;Riba J;Crippa JA;Hallak JE; (n.d.). *Antidepressant effects of a single dose of ayahuasca in patients with recurrent depression: A preliminary report*. Revista brasileira

de psiquiatria (Sao Paulo, Brazil : 1999). Retrieved April 22, 2023, from https://pubmed.ncbi.nlm.nih.gov/25806551/

Pahnke, W. N., & Richards, W. A. (1966). Implications of LSD and experimental mysticism. Journal of Religion and Health, 5(3), 175–208. https://doi.org/10.1007/bf01532646

Paterniti, K., Bright, S., & Gringart, E. (2022). The relationship between psychedelic use, mystical experiences, and pro-environmental behaviors. *Journal of Humanistic Psychology*, 002216782211110. https://doi.org/10.1177/00221678221111024

Pollan, M. (2019). *How to change your mind: The new science of psychedelics*. Penguin Books.

Preacher, K. J., & Hayes, A. F. (2008). Contemporary approaches to assessing mediation in Communication; Research. The SAGE Sourcebook of Advanced Data Analysis Methods for Communication Research, 13–54. https://doi.org/10.4135/9781452272054.n2

Roseman, L., Nutt, D. J., & Carhart-Harris, R. L. (2018). Quality of acute psychedelic experience predicts therapeutic efficacy of psilocybin for treatment-resistant depression. *Frontiers in Pharmacology*, *8*. https://doi.org/10.3389/fphar.2017.00974

Rucker, J. J. H., Jelen, L. A., Flynn, S., Frowde, K. D., & Young, A. H. (2016). Psychedelics in the treatment of Unipolar Mood Disorders: A systematic review. *Journal of Psychopharmacology*, *30*(12), 1220–1229. https://doi.org/10.1177/0269881116679368

Russ, S. L., Carhart-Harris, R. L., Maruyama, G., & Elliott, M. S. (2019). Replication and extension of a model predicting response to psilocybin. *Psychopharmacology*, *236*(11), 3221–3230. https://doi.org/10.1007/s00213-019-05279-z

Russ, S. L., Carhart-Harris, R. L., Maruyama, G., & Elliott, M. S. (2019). States and traits related to the quality and consequences of psychedelic experiences. *Psychology of*

Consciousness: Theory, Research, and Practice, *6*(1), 1–21. https://doi.org/10.1037/cns0000169

Spriggs, M. J., Kettner, H., & Carhart-Harris, R. L. (2020). Positive effects of psychedelics on depression and wellbeing scores in individuals reporting an eating disorder. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *26*(4), 1265–1270. https://doi.org/10.1007/s40519-020-01000-8

St. Arnaud, K. O., & Sharpe, D. (2022). Contextual parameters associated with positive and negative mental health in recreational psychedelic users. *Journal of Psychoactive Drugs*, *55*(1), 30–39. https://doi.org/10.1080/02791072.2022.2039815

Stace, W.T (1960) Mysticism and Philosophy. New York: MacMillan Press

Stewart-Brown, S., Tennant, A., Tennant, R., Platt, S., Parkinson, J., & Weich, S. (2009). Internal construct validity of the Warwick-Edinburgh mental well-being scale (WEMWBS): A Rasch analysis using data from the Scottish Health Education Population Survey. *Health and Quality of Life Outcomes*, *7*(1). https://doi.org/10.1186/1477-7525-7-15

Studerus, E., Gamma, A., & Vollenweider, F. X. (2010). Psychometric evaluation of the Altered States of Consciousness Rating Scale (OAV). *PLoS ONE*, *5*(8). https://doi.org/10.1371/journal.pone.0012412

Studerus, E., Gamma, A., Kometer, M., & Vollenweider, F. X. (2012). Prediction of psilocybin response in Healthy Volunteers. *PLoS ONE*, *7*(2). https://doi.org/10.1371/journal.pone.0030800

Studerus, E., Kometer, M., Hasler, F., & Vollenweider, F. X. (2010). Acute, subacute and long-term subjective effects of psilocybin in healthy humans: A pooled analysis of

experimental studies. *Journal of Psychopharmacology*, *25*(11), 1434–1452. https://doi.org/10.1177/0269881110382466

Swickert, R. J., Rosentreter, C. J., Hittner, J. B., & Mushrush, J. E. (2002). Extraversion, social support processes, and stress. *Personality and Individual Differences*, *32*(5), 877–891. https://doi.org/10.1016/s0191-8869(01)00093-9

Tellegen, A., & Atkinson, G. (1974). Openness to absorbing and self-altering experiences ("absorption"), a trait related to hypnotic susceptibility. *Journal of Abnormal Psychology*, *83*(3), 268–277. https://doi.org/10.1037/h0036681

Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., Parkinson, J., Secker, J., & Stewart-Brown, S. (2007). The Warwick-Edinburgh mental well-being scale (WEMWBS): Development and UK validation. *Health and Quality of Life Outcomes*, *5*(1). https://doi.org/10.1186/1477-7525-5-63

Trope, A., Anderson, B. T., Hooker, A. R., Glick, G., Stauffer, C., & Woolley, J. D. (2019). Psychedelic-Assisted Group therapy: A systematic review. *Journal of Psychoactive Drugs*, *51*(2), 174–188. https://doi.org/10.1080/02791072.2019.1593559

Tweedy, C. (2022, June 23). *How psychedelic drugs might treat depression*. BBC Future. Retrieved April 22, 2023, from https://www.bbc.com/future/article/20220606-psilocybin-how-psychedelic-drugs-might-treat-depression

Vattano, A. J. (1981). Psychedelic drugs reconsidered. by Lester Grinspoon and James B. Bakalar. New York: Basic books, 1979. 343 pp. $15.95 cloth. *Children & Schools*, *4*(1), 71–72. https://doi.org/10.1093/cs/4.1.71

Vollenweider, F. X., & Kometer, M. (2010). The neurobiology of psychedelic drugs: Implications for the treatment of mood disorders. *Nature Reviews Neuroscience*, *11*(9), 642–651. https://doi.org/10.1038/nrn2884

Watts, R., Day, C., Krzanowski, J., Nutt, D., & Carhart-Harris, R. (2017). Patients' accounts of increased "connectedness" and "acceptance" after psilocybin for treatment-resistant depression. *Journal of Humanistic Psychology*, *57*(5), 520–564. https://doi.org/10.1177/0022167817709585

Weiss, B., Nygart, V., Pommerencke, L. M., Carhart-Harris, R. L., & Erritzoe, D. (2021). Examining psychedelic-induced changes in social functioning and connectedness in a naturalistic online sample using the five-factor model of personality. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.749788

Woolley, D. W., & Shaw, E. (1954). A biochemical and pharmacological suggestion about certain mental disorders. *Proceedings of the National Academy of Sciences*, *40*(4), 228–231. https://doi.org/10.1073/pnas.40.4.228

Yaden, D. B., & Griffiths, R. R. (2020). The subjective effects of psychedelics are necessary for their enduring therapeutic effects. *ACS Pharmacology & Translational Science*, *4*(2), 568–572. https://doi.org/10.1021/acsptsci.0c00194

Yaden, D. B., Haidt, J., Hood, R. W., Vago, D. R., & Newberg, A. B. (2017). The varieties of self-transcendent experience. *Review of General Psychology*, *21*(2), 143–160. https://doi.org/10.1037/gpr0000102

Part 2. Empirical Paper:

Set, Setting, and Surrender:
The Influences on Psychedelic Experiences and Their Impact on Wellbeing

Abstract

Background. The importance of ‘set and setting’ factors in influencing the psychedelic experience and long-term changes should not be underscored. Past studies have highlighted the influence of surrendering to the experience on its quality and subsequent long-term benefits. Additionally, investigations into group-based psychedelic use have emphasised the crucial nature of communitas (a sense of deep communal connection) in establishing positive changes to wellbeing. Building on this foundation, there's a need to further examine the interplay between these constructs and the factors that contribute to fostering them, with the aim of refining and optimising psychedelic therapy.

Methods. Nine hundred and thirty-four participants completed an online retrospective survey regarding their ‘most significant’ psychedelic experience. Data was collected using the SoS scale, measuring surrender; the COMS, measuring communitas; the MEQ30, measuring ‘mystical experience’ and the WEMWBS, measuring wellbeing.

Results. Independent sample t-tests showed that group users were significantly more extroverted than individual users and had a considerably lower degree of surrender. Path analyses revealed that surrender was a significant predictor of wellbeing in individual and group settings. In the group setting, surrender was a significant predictor of communitas and mystical experience. Adding mystical experiences and communitas as mediators increased the predicted variance in surrender-related wellbeing change scores. Extroversion did not significantly moderate the relationship between surrender and communitas in a group setting.

Conclusions. In group settings, communitas and mystical experiences were critical factors in establishing positive changes to wellbeing. The study sought to assess what additional variables influence the occurrence of these acute experiences. Surrender was a significant 'set' factor in determining communitas and mystical experiences, indicating the importance of creating a space conducive to its occurrence in group settings. On the other hand, extroversion was not a predictor of communitas and did not influence changes in wellbeing. This is an interesting finding as it contradicts previous results on the role of extroversion in group settings.

Introduction

Historically, various cultures have used psychedelic substances for spiritual and healing purposes. Still, it is only in the last few decades that they have gained scientific attention for their potential therapeutic properties (Nichols, 2016). They are known for their psychoactive properties, altering perception, mood, and cognitive processes, often leading to experiences of self-transcendence and altered states of consciousness (Nichols, 2016). Psychedelics include substances such as psilocybin (found in certain mushrooms), LSD (lysergic acid diethylamide), DMT (dimethyltryptamine, found in ayahuasca) and some others. These classic psychedelics primarily operate on the serotonin 2A receptor pathway in the brain, differentiating them from other psychoactive substances (Nichols, 2016).

Regarding their therapeutic potential, psychedelics exhibit a capacity to address a variety of mental health issues, including depression (Carhart-Harris et al., 2017; Carhart-Harris et al., 2021; Goldberg et al., 2020; Griffith et al., 2016; Osório et al., 2015), anxiety (Gasser et al., 2014; Griffith et al., 2016), and substance use disorders (Bogenschutz et al., 2015). In addition to symptom reduction, these therapies often lead to long-lasting improvements in wellbeing and life satisfaction (Griffiths et al., 2016). The ability of these substances to potentially address underlying psychological maintenance mechanisms across different presentations suggests their potential as versatile treatment options. Also, their potential for enduring changes indicates that psychedelic substances might facilitate transformative experiences leading to personal growth and pro-social attitudes. For this reason, psychedelic substances are also being researched for

their potential benefits in non-clinical populations, extending beyond the therapeutic context. Griffiths et al. (2006) found that most participants (healthy volunteers) reported their psilocybin experience as one of the most meaningful in their lives. They reported positive changes in attitudes and behaviour, which family and friends corroborated, and which persisted 14 months after the session. Schmid and Liechti (2017) reported that LSD increased feelings of wellbeing, life satisfaction, and closeness to others in healthy participants. Similar effects have been reported with ayahuasca, a traditional Amazonian brew containing dimethyltryptamine (DMT), in non-clinical participants (Uthaug et al., 2018). Also, psychedelics have been shown to promote lasting changes in personality traits, especially increases in trait openness, which is associated with creativity, aesthetic appreciation, and tolerance of others' viewpoints (MacLean, Johnson, & Griffiths, 2011).

Notably, studies involving healthy volunteers have highlighted the potential of these substances to induce short-lived but profound acute changes in consciousness, often leading to personal growth and positive changes in life perspective (MacLean, Johnson, & Griffiths, 2011). Specifically, psychedelic-occasioned acute experiences referred to as ‘mystical experiences’ have been found to act as a mediator for the beneficial effects on wellbeing and mental health observed after psychedelic use (Barret et al., 2015; Griffiths et al., 2006; Maclean, Johnson & Griffiths, 2011). Mystical experiences are commonly distinguished by sensations of oneness, a sense of the sacredness, the impression of encountering profound truth, and feelings of peace and joy. These experiences are also marked by their ineffability - they are often beyond verbal description. (MacLean, Johnson, & Griffiths, 2011). Barrett et al. (2015) found that individuals who had what they classified as a "complete" mystical experience (meeting specific ‘intensity’ criteria across various dimensions of the experience) during their psychedelic session had better

therapeutic outcomes. This was measured by enduring changes in attitudes, behaviours, and wellbeing attributed to the mystical qualities of the experience. More recent research replicated these findings, suggesting that the degree of the mystical experience induced by psilocybin positively correlated with improvements in depressive symptoms (Roseman, Nutt, & Carhart-Harris., 2018). Even during long-term follow-up on the effects of psychedelics, the mystical nature of the experience mediated the relationship between dose and positive changes in attitude, behaviour and affect (Griffiths et al., 2016).

This research collectively highlights the essential role of mystical experiences in facilitating psychedelics' therapeutic and transformative effects. However, it should be emphasised that while these findings are promising, adverse reactions can and do occur, particularly when these substances are taken outside of supportive, controlled environments (Carbonaro et al., 2016). Challenging psychedelic experiences have been shown to have a negative impact on long-term positive change (Carbonaro et al., 2016; Haijen et al., 2018). This emphasises the need for continued research on the factors that contribute to shaping the acute psychedelic experience. The accumulating evidence suggests that multiple factors influence the efficacy of psychedelics. Central among these are the concepts of 'set' and 'setting', a term first coined by Leary, Metzner, and Alpert (1963). 'Set' refers to the individual's mindset, expectations, mood, and personal characteristics, while 'setting' denotes the physical, cultural, and social environment where the psychedelic experience takes place.

As the renaissance of psychedelic research flourishes, and we move towards a more thorough comprehension of these compounds and their therapeutic potentials, examining the interplay between set and setting becomes increasingly useful. A growing body of research has examined the various variables related to the 'set and setting' of a psychedelic experience. These

variables include personality traits, state of mind, drug pre-experience, social variables, preparation, and context or setting (Aday et al., 2021; Barret, Johnson & Griffith, 2015; Carhart-Harris et al., 2018; Hartogsohn, 2016; Haijen et al., 2018; Johnstad et al., 2021; Russ et al., 2019; Studerus et al., 2012). The 'set' variables most relevant to the current project are outlined next.

Surrender. When considering the immediate state of mind before entering the psychedelic experience, the most robust predictors of pleasant and mystical-type experiences were low levels of apprehension and preoccupation and high levels of the ability to accept and surrender to the experience (Studerus et al., 2012; Aday et al., 2021). Surrender could be described as the ability to relinquish control and embrace the unfolding experience, especially during challenging or intense situations. This state of mind is understood to occur prior to the onset of any acute psychedelic change to cognition (Russ et al., 2019). Russ et al. (2019) explored whether surrendering to the experience at the time of ingestion mediated state and trait predictors of mystical experiences. Trait absorption (a trait indicating a person's propensity for total immersion in experiences) alone predicted 41% of the variance in mystical experiences. In comparison, including surrender as a mediator increased the prediction of the total model to 62%. This finding emphasises the pivotal role of surrender in mediating the relationship between traits and mystical experiences. The authors extend this model and explore the relationship between mystical experiences and long-term changes to wellbeing. Separate hierarchical regression analysis showed that trait and surrender variables alone predicted only 22.5% of the variance in positive change. The addition of mystical experiences as a mediator increased the explained variance in positive change to 39%. Thus, the findings suggest that through mystical experiences, surrender indirectly predicted long-term positive changes (Russ et al., 2019). Interestingly, other research found that changes in wellbeing after a psychedelic experience are

less influenced by the acute (mystical or challenging) experience and more by immediate mindset and trait personality factors (Haijen et al., 2018). Such findings suggest that while surrender may indirectly predict positive changes through mystical experiences, it appears to also directly predict positive changes in the absence of this mediator. These findings reinforce the long-standing theory that both the mindset (set) and the physical and social environment (setting) in which psychedelic experiences occur significantly impact the positivity of the experience (Carhart-Harris et al., 2018; Hartogsohn, 2016; Leary et al., 1963). The findings also highlight the importance of exploring mediators other than mystical experiences in predicting long-term outcomes from immediate mindsets.

Context and Communitas. Another set of factors that significantly predicts short- and long-term outcomes are those that contribute to setting. Changes in environment, including the context of use and cultural attitudes towards psychedelics, substantially influence the experiences and outcomes reported in the scientific literature, and shape the meaning and interpretation of the experience (Carhart-Harris et al., 2018; Hartogsohn., 2016). Individuals comfortable with their environment, including those present, reported higher wellbeing scores two weeks post-experience (Haijen et al., 2018). Carhart-Harris et al. (2018) extended this understanding by incorporating a psychosocial component, finding that providing support and ensuring safety during the psychedelic experience led to a significantly better therapeutic outcome. Sure enough, the idea of 'connectedness', whether with oneself, the world, or others, has been a hallmark of the psychedelic experience (Carhart- Harris et al., 2017; Erritzo, 2018).

Given that connection and support can foster a positive acute and long-term experience, the interest in understanding the impact of psychedelic group use increased. To date, most clinical trials on the effects of psychedelics have taken place in individualistic settings.

Furthermore, very little survey data on the psychedelic experience considers the impact of group vs individual use, although the importance of connection and context is nevertheless highlighted (Carhart- Harris et al., 2017; Watts et al., 2017). This specific area of psychedelic research is still relatively new, and the mechanisms at work are yet to be fully understood. Group psychedelic use has been shown to positively or negatively impact wellbeing depending on the contextual parameters of use (St. Arnaud & Sharpe, 2022). For instance, group use significantly predicted both growth and adjustment and negatively predicted distress, however when a person intends to use these drugs recreationally in group settings, group use becomes more predictive of problematic use (i.e. psychedelic drug abuse associated with increased mental distress) (St. Arnaud & Sharpe, 2022).

Interested in furthering our understanding of positive group use, Kettner et al. (2021) proposed the idea of 'communitas' as a predictive factor for increased wellbeing. Communitas refers to a sense of deep connection, belonging, and shared humanity experienced during intense collective events, such as religious rituals, music festivals, or group psychedelic experiences (Turner, 1969). Similarly, a sense of unity is considered a factor of mystical experiences (Barret et al., 2015). Communitas can, therefore, also be understood as an 'intersubjective' experience. Kettner et al. (2022) sought to assess the influence communitas has in shaping the psychedelic experience. Their path analysis showed that higher levels of communitas predicted greater improvements in psychological wellbeing and social connectedness at the two-month follow-up. The authors also reported a strong correlation between communitas and mystical experiences. The findings suggest that the quality of shared experiences during psychedelic group sessions has some relationship to the mystical experiences and is also an essential factor in predicting long-term improvements in psychological wellbeing. These results suggest the importance of

looking at the benefits of psychedelics in a group setting, as there is an obvious need for further research on the factors that contribute to group psychedelic use and well-being.

It is essential to further our understanding of psychedelic group use as it could have the potential to be a more efficient and feasible way of administering psychedelics as a therapeutic treatment. For this current study, we consider whether a state of surrender might serve as a significant predictive factor for the emergence of the shared experience of communitas. Surrender theoretically temporally proceeds communitas and mystical experiences as it occurs at the time of drug ingestion (Russ et al., 2019). Communitas and mystical experiences occur once the psychedelic's effect has taken place (typically up to an hour later). They both have been shown to predict variance in long-term wellbeing scores (Griffith et al., 2016; Kettner et al., 2021). In the group setting, communitas was a significant mediator for long-term wellbeing. The act of surrender could potentially foster a more receptive state, enhancing the likelihood of participants experiencing profound interpersonal connections within the group setting. Hence, enabling a comfortable environment where one can surrender may lead to greater communitas and increased wellbeing. Thus, investigating the interplay between individual surrender and the manifestation of communitas within group settings could provide valuable insights into the optimisation of group-based psychedelic therapies.

Personality. Another set of factors worth considering are long-standing traits and their impact on acute and long-term outcomes. An example of this would be personality traits and how they could impact immediate mindset, choice of context, response to context, acute experiences and long-term outcomes. Some research has looked at the role of personality in shaping the psychedelic experience. Being low in the personality trait neuroticism and high in the trait openness and absorption has been associated with more positive acute mystical experiences

(Studerus et al., 2012). Meanwhile, unpleasant experiences were predicted by higher scores on emotional excitability and lower scores on wellbeing and life satisfaction (Studerus et al., 2012). Extroversion was found to be negatively correlated with spiritual experiences, the experience of transcendence, and the experience of peace during a psychedelic trip (Studerus et al., 2012; Johnstead, 2020). Johnstead (2020) also reported that extroverts were less likely to experience fear during psychedelic use and were less inclined to engage in solitary use. The likelihood of extroverts taking psychedelics in social settings could explain the reported association with an improved connection to others (Johnstead, 2020). The interpretation that extroverts tend to experience external psychedelic phenomena (visual and audio experiences) and introverts tend to experience internal ones (spiritual and introspective experiences) could be directly due to personality traits, or it could be due to their preferred choice of setting and context. Higher extroversion may contribute to the pursuit of psychedelic group use, which needs further exploration as it may impact positive outcomes in group settings. Johnstead (2020) showed that extroversion is associated with different acute psychedelic experiences, one of which is a greater connection to other people. Communitas is considered an intersubjective experience based on connection; thus, this could mean that extroversion may be positively associated with communitas.

While studies have indicated that both personality characteristics and setting can independently influence the nature and quality of psychedelic experiences, research directly investigating the interaction between personality types and different settings during a psychedelic experience is relatively scarce. It seems plausible that such interaction exists and could potentially modulate the outcomes of these experiences. Given the role of personality traits in shaping an individual's perceptions and interactions with their environment, it is possible that

individual personality differences could influence how a person experiences and responds to the 'set and setting' of a psychedelic session. This remains an open area for future research and has the potential to challenge a one-size-fits-all model for this therapeutic intervention (Johnstone, 2017). By encompassing interacting factors such as introversion/extroversion, mindset, and setting, this perspective emphasises the importance of personalised, context-specific care tailored to the unique psychological makeup and environmental context of each individual (Hartogsohn, 2016). Particularly in group settings, the hypothesised differing experiences and needs of extroverts and introverts encourage thoughtful consideration, with the dynamics of communitas and the capacity for surrender playing significant roles in shaping these outcomes (Russ et al., 2019; Kettner et al., 2021). Thus, recognising the interplay of personality facets, mental states, and environmental variables enables practitioners to formulate more person-centred therapeutic interventions, thereby optimising the therapeutic potential of psychedelics.

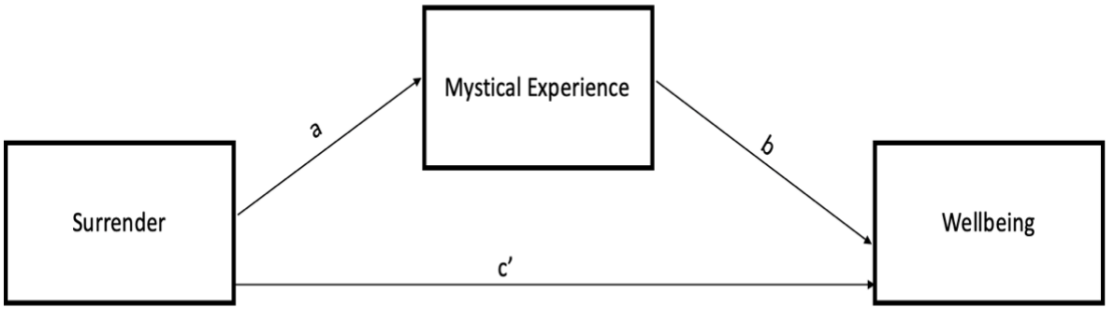
In summary, several studies have illuminated the substantial role of the factors that shape the quality, intensity, and therapeutic outcomes of psychedelic experiences (Carhart-Harris et al., 2018; Hartogsohn, 2016). Notwithstanding, there remains a dearth of empirical data investigating the complex interactions between multiple set and setting factors, their joint influence on the psychedelic experience, and how these interactions may inform optimal therapeutic models. Addressing these gaps could shed light on how to maximise positive outcomes and minimise potential adverse effects, thereby paving the way for more effective and personalised psychedelic-assisted therapies. To contribute to addressing some of these gaps, the present study proposes the following hypotheses:

H1. The study's first aim is to replicate the findings found in Russ et al. (2019). We predict that surrender at the time of ingestion significantly predicts mystical experiences. Moreover, these mystical experiences further predict long-term positive changes to reported changes to wellbeing (Δ wellbeing). We also predict that surrender will predict long-term positive change even without mystical experiences as a mediator (See Figure 1).

H2. The second aim of the current study is to extend our understanding of an effective psychedelic experience amongst those who consumed a psychedelic drug in a group setting (e.g. those who took a psychedelic with at least one other person). We include communitas as a second mediator to the previous model. We hypothesise that in a group setting, surrender at the time of ingestion will predict the level of communitas experienced. Communitas will subsequently act as a mediator between surrender and positive Δ wellbeing along with mystical experiences (See Figure 2)

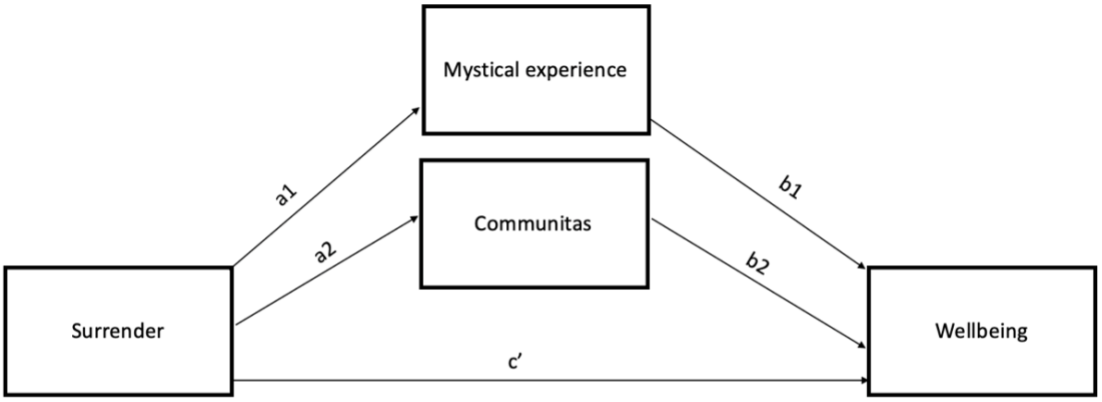
H3. If communitas is shown to be a significant mediator between surrender and Δ wellbeing in a group setting, we aim to explore whether an individual's level of extroversion moderates this relationship. We hypothesise that a) people who take psychedelics in groups will be higher in extroversion than those who take psychedelics alone, and b) in a group setting, extroversion moderates the relationship between surrender at the time of ingestion and feelings of communitas while the psychedelic is in effect. This relationship is hypothesised to have a subsequent effect on reported Δ wellbeing (See Figure 3).

Figure 1. Mystical Experiences Mediate the Relationship Between Surrender and Δ Wellbeing



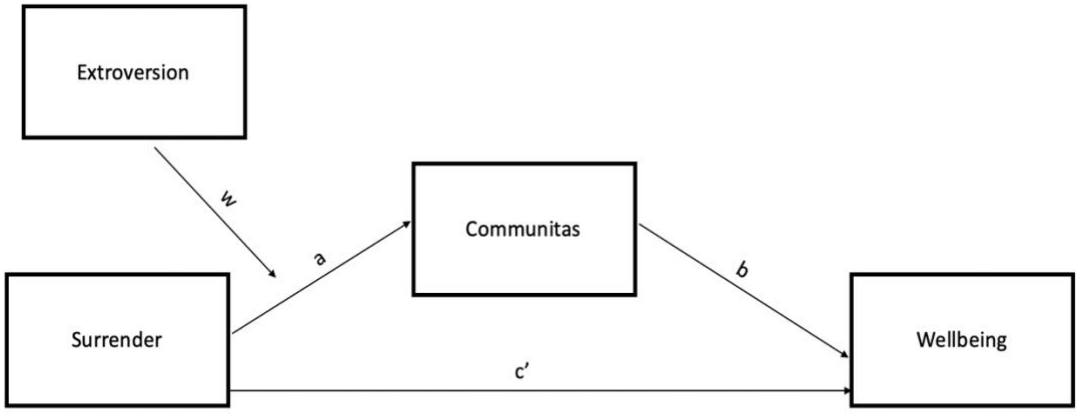
Note (a)(b) = indirect effect of surrender on wellbeing through mystical experience
c' = direct effect of surrender on wellbeing

Figure 2. Communitas and Mystical Experiences Mediate the Relationship Between Surrender and Δ Wellbeing in a Group Context



Note.
(a1)(b1) = indirect effect of surrender on wellbeing through mystical experience
(a2)(b2) = indirect effect of surrender on wellbeing through communitas
c' = direct effect of surrender on wellbeing

Figure 3. Extroversion Moderates the Relationship Between Surrender and Communitas in a Group Setting



Note.
(a)(b) = indirect effect of surrender on wellbeing through communitas
(w)(a) = interaction of extroversion and surrender on communitas
c' = direct effect of surrender on wellbeing

Method

Participants.

Participants were recruited through an advert shared on various online platforms (Appendix A). This predominantly included psychedelic communities on various social media platforms; this included psychedelic community subreddits on Reddit and psychedelic community pages on Instagram. The survey was also shared on the Multidisciplinary Association for Psychedelic Studies (MAPS) Instagram page and the Psychedelic Society UK newsletter. Snowballing recruitment was also utilised by sharing our advert on the Twitter accounts of several UCL faculty, the researcher's personal Instagram pages and through word of mouth.

Inclusion criteria included being over the age of 18 and having taken a classic psychedelic at least once before. Those who indicated taking a drug other than a classic psychedelic were excluded from the analysis. Participants who did not complete the survey were also excluded from the study.

Of the 1590 individuals who consented and began the survey, 966 completed it. After cleaning the data and removing those who did not meet the inclusion criteria, a total of 934 participants were included in this study, and 656 (70.2%) were included in the portion of the analysis that focused on psychedelic group use (Figure 4).

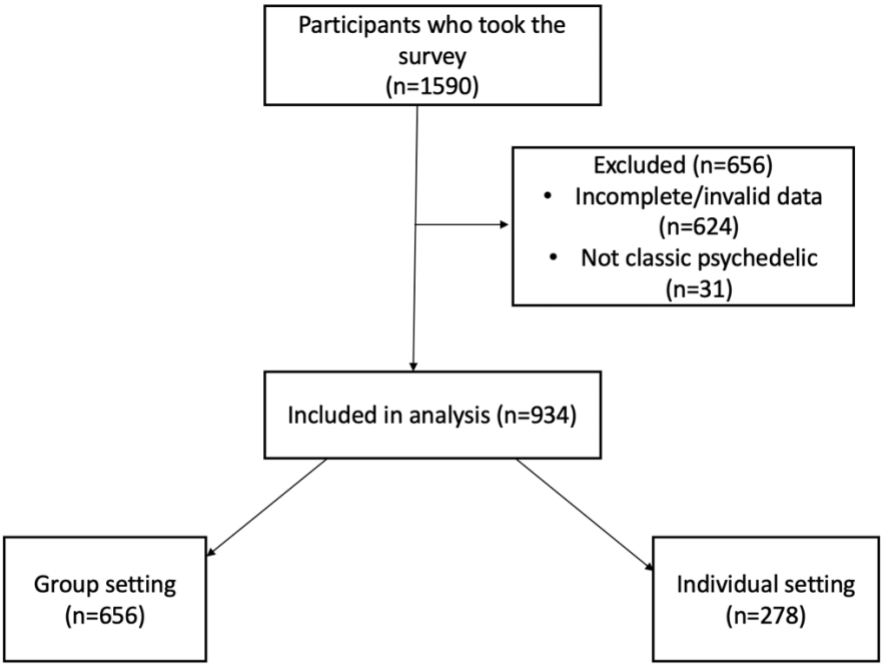
The sample size for the mediation analysis was informed by Fritz and MacKinnon's (2007) estimations of the required sample sizes for detecting mediation using percentile bootstrapping. Their approach to empirically calculating power was through the use of simulations. First, they created 2,000 new samples from an original data set, each the same size (N) as the original and could include the same data point more than once. For each of the 2,000 new samples, they calculated the indirect effects (the measure of mediation) and used them to build confidence intervals. A significant mediating effect is suggested if these confidence intervals don't contain zero. This process was repeated 1,000 times for each sample size. Finally, the authors calculate the test's power, which was the proportion of those 1,000 repeats that showed a significant mediation effect in the bootstrap confidence intervals. Thus, the sample size required to achieve a power of 0.8 and detect a small significant (α=0.05, B=0.14) indirect effect was N=558 (Fritz & MacKinnon, 2007).

The sample size for the moderation analysis was calculated using the G*Power3 software (Faul et al., 2007). As a t-test is used to assess the significance of the interaction (denoting moderation), the sample size was calculated for a linear multiple regression test. The input

parameters included significance at $\alpha = 0.05$ and power = 0.8 with the 3 test predictors. Finally, a small effect size of $d = 0.2$ was used as it is preferred to assume small effect sizes for survey design correlational studies (Judd & Yzerbyt, 2014). The sample size for this moderation analysis was calculated as $N = 395$.

Thus, it is concluded that our large sample sizes of N(all participants) = 934 and n(group setting) = 656 are more than sufficient for these types of analyses.

Figure 4. Flowchart of Total Number of Participants



Procedure.

A survey was created using the Qualtrics survey design website. As the survey aimed to address several distinct research questions, the measures relevant to the current study were included as part of several other measures (Appendix D). Any data from completed surveys was stored securely on a password-protected UCL Qualtrics account, and only researchers working

on the included studies had access to this account. The advert for the survey was posted on social media and newsletters and included both a URL link and a QR code directing participants to the survey (Appendix A). Participants were only able to complete the survey online. The first page of the survey provided instructions and information regarding anonymity and the time required to complete the survey (20-30 minutes). The first page also contained all the informed consent information, and participants were required to indicate they'd understood. They provided their consent by clicking 'I consent' before being taken to the survey (Appendix B). Participants were asked to refer to their most significant and impactful psychedelic experience when considering and answering the questions in the survey. The survey was designed to have a temporal flow, starting with basic information gathering, followed by a block of measures regarding pre-psychedelic information, then measures referring to the acute psychedelic experience and finally, measures assessing post-psychedelic change.

Ethics

The study was approved by University College London Graduate School Research Ethics Committee (Project ID/Title: 19437/002) (See Appendix C). The primary ethical considerations were the inclusion of sensitive topics and the potential for distress recalling challenging emotional experiences. To address this, participants were informed of their right to withdraw from the survey at any time with no penalty. Prior to starting the survey, participants were informed about the aims and purpose of the study. In line with the Data Protection Act 1998, informed consent was collected, and confidentiality and anonymity for participants were ensured as no identifiable information was collected or stored. Storage of and access to data was also restricted to researchers only.

Measures

The study collected demographic details, including gender, age, level of education, ethnicity, and religion. A history of drug use was also collected. Further, participants were required to indicate their intention/purpose for psychedelic experience in questions, choosing from a list that included (1) fun/recreation, (2) personal growth, (3) spiritual or religious purposes, (4) psychological or emotional healing, (5) To help manage a physical health problem. Participants were also permitted to include another intention if theirs was not listed. Information regarding the environment was also collected, with participants indicating the physical environment where the psychedelic was taken. If participants had taken the psychedelic with others, they were asked to indicate how many and the level of closeness they felt to the other from 1 (not at all) to 7 (completely).

All information was collected retrospectively. Information regarding four time points was collected: 1 = before the psychedelic experience, 2 = at the point of ingestion, 3 = at the point of feeling the effects, and 4 = after the experience.

This research employed a battery of psychometric measures to assess the key variables of interest. These include the State of Surrender Questionnaire (SoS), the Communitas Questionnaire (COM), the Mystical Experience Questionnaire (MEQ-30), the Extroversion domain of the Big Five Inventory (BFI), and the Warwick-Edinburgh Mental Well-being Scale (WEMWBS).

Surrender. The State of Surrender Questionnaire (SoS) (Russ et al., 2019) was used to gauge the participants' ability to surrender to the current experience. It comprises ten items rated

on a 5-point Likert scale, ranging from 1 (Strongly disagree) to 5 (Strongly agree). Example items from the SoS include "I'd stopped resisting and was ready to give up control" and " I was ready to receive whatever was ahead, even if difficult" (Russ et al., 2019). Higher scores on the questionnaire indicated a greater level of surrender. Internal consistency of the scale was replicated in the current sample, with Cronbach's Alpha for the present survey showing excellent consistency, $\alpha = .902$. Surrender was measures at time-point 2 (point of ingestion).

Communitas. The Communitas Questionnaire (COM) (Kettner et al., 2022) captured the participants' feelings of interconnectedness and togetherness. It includes nine items rated on a 5-point Likert scale, from 1 (Strongly disagree) to 5 (Strongly agree), with higher scores indicating a greater sense of communitas. Sample items from the COM include "I felt a bond with fellow members that felt unique to the experience" and "I felt a sense of sharing with the others" (Kettner et al., 2022). Exploratory and confirmatory factor analyses identified three factors, including (1) shared humanity, (2) self-transcendence, and (3) connection through struggle. The scale previously demonstrated good reliability and validity (Kettner et al., 2022), and internal consistency was further replicated in our sample $\alpha = .932$. Communitas was measures at time-point 3 (point of effects).

Mystical experiences. The Mystical Experience Questionnaire (MEQ-30) (Barrett et al., 2015) was used to evaluate the participants' experiences of self-transcendence, unity, and sacredness. It includes 30 items rated on a 6-point Likert scale, ranging from 1 (None) to 6 (Extreme). An average between 1 and 6 was calculated, with a higher average indicating a higher degree of mystical experience. Examples of items from the MEQ-30 include " Experience of

ecstasy." and " Feeling that you experienced something profoundly sacred and holy" (MacLean et al., 2012). Both the reliability and internal validity of the MEQ30 have been demonstrated (Barret et al., 2015), and four factors have been identified as (1) Mystical, (2) Positive Mood, (3) Transcendence of Time and Space, and (4) Ineffability (Barret et al., 2015). Participants were instructed to reference their most important/significant psychedelic experience when completing the MEQ. Excellent internal consistency was demonstrated in our sample with Cronbach's alpha at $\alpha = .963$. Mystical experience was measures at time-point 3 (point of effects).

Extroversion. The extroversion domain of the Big Five Inventory (BFI) (John et al., 1991) was used to measure the personality trait of extroversion *prior to the psychedelic experience*. This scale includes eight items, and participants respond on a 5-point Likert scale, ranging from 1 (Strongly disagree) to 5 (Strongly agree). Sample items from the BFI extroversion domain include "Before the psychedelic experience, I saw myself as someone who is talkative" and "Before the psychedelic experience, I saw myself as someone who is outgoing, sociable" (John et al., 1991). The BFI is a widely used measure that has consistently shown validity and reliability (John & Srivastava, 1999). In the present study, responses to items on the BFI extroversion had an alpha = .882. Extroversion was measures at time-point 1 (before the experience).

Δ Wellbeing. The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Tennant et al., 2007) was incorporated to assess the participants' mental well-being. The WEMWBS is a 7-item scale that measures a broad spectrum of positive mental health, including subjective well-being and psychological functioning. The WEMWBS covers one general factor of mental well-being, allowing for a comprehensive assessment of the participant's mental health status.

Previously, the scale has demonstrated good internal consistency, with a Cronbach's alpha of .91. In the current project, the measure was reworded to collect perceived changes to wellbeing (Δ wellbeing) following the psychedelic experience. Respondents rate their perceived Δ wellbeing on a 7-point Likert scale from 1 (Definitely disagree) to 7 (Definitely agree). Example items from the WEMWBS include "I've been feeling more optimistic about the future" and "I've been better at dealing with problems" (Tennant et al., 2007). Excellent internal consistency was demonstrated in the current study with responses to items on the modified WEMBS at $\alpha = .920$. Wellbeing was measures at time-point 4 (after the experience).

Study Design & Analysis

The study collected data from an online survey and employed a within-subjects cross-sectional correlational design. The conducted path analyses used Hayes's PROCESS macro for SPSS (Hayes, 2018) to test the relationships between surrender, communitas, mystical experience, extroversion, and perceived Δ wellbeing. This type of analysis is suitable for moderated mediation as it employs ordinary least squares (OLS) regression for continuous outcome variables (Clement & Garcia, 2022). Our hypotheses for this study were tested in a three-step process. Initially, we evaluated a basic mediation model using Hayes's PROCESS macro model 4 (see Figure 1 above; H1). Secondly, we used model 4 again with the addition of a second mediator to expand the model and evaluate a proposed parallel mediation model (see Figure 2 above; H2). The first two hypotheses assess both the direct and indirect effect of the predictor variable on the outcome variable, proposing that surrender influences Δ wellbeing through mystical experiences (H1) and communitas in a group setting (H2). Tests of such mediation hypotheses have often followed Baron and Kenny's (1986) multistep approach.

However, this approach has been superseded by more modern bootstrapping strapping techniques, which were employed here to obtain confidence intervals (CIs) and to determine whether a 'significant' indirect mediating path exists (i.e. the interval does not include zero; (Meule, 2019).

Moderated mediation was assessed using Hayes's PROCESS macro model 7 (see Fig 3 above; H3). The presence of interaction indicates that the level of extroversion would alter the relationship between surrender and communitas in a group setting (Figure 3). Here, Hayes PROCESS macro allows for the application of the suggested bootstrapping techniques and offers a method for probing the significance of conditional indirect effects at varying levels of the moderating variable (extroversion). Mean centring was used for the moderated mediation, and a pairwise comparison of indirect effects was obtained.

Before proceeding with the analyses, assumptions of independence, linearity, normality, multicollinearity, and homoscedasticity were assessed for both the mediation and moderated mediation analysis (Field, 2012; Hayes, 2018).

The assumption of the independence of the residuals was met (Durbin-Watson value = 1.996). The assumption of normality was assessed through visual inspection of histograms of standardised residuals. P-P plot and Q-Q plot of standardised residuals revealed that our data was normally distributed as errors showed a close fit to the diagonal line. Visual inspection of scatterplots of standardised predicted and residual values indicated that the assumption of linearity and homoskedasticity was sufficiently met. However, due to some observed large clustering of observations, heteroskedasticity consistent standard errors (HC4) was used to correct the t and p values assuming heteroskedasticity (Cribari-Neto, 2004; Hayes, 2007).

Finally, the multicollinearity assumption was met regarding the two IVs in the moderation. Tests to see if the data met the assumption of collinearity indicated that multicollinearity was not a concern (Surrender, Tolerance = 0.99, VIF = 1.00; Extroversion, Tolerance = 0.99, VIF = 1.00).

When running the mediation, parallel mediation and moderated mediation analyses, the significance level was set to $p < .05$. Confidence intervals were set to 95%, and the bootstrapping samples were set to 5,000 when assessing indirect effects. Standardised coeffects were reported in the mediation analysis.

Finally, exploratory between-group differences (e.g., extroversion level for those who chose to do psychedelics in a group or individual setting) were assessed using independent sample t-tests. The assumption of normality, independence, and homogeneity of variance appears to be met in our data.

Results

Demographics

Out of the 934 participants in the study, 70.2% of them took the indicated psychedelic with at least one other person. For the specified psychedelic experience, 41.8% took psilocybin, 31.3% took LSD, and 15.2% took DMT/ayahuasca. Overall, the average amount of times a psychedelic was taken in our sample was just under five times (*M*= 4.8, Mdn= 5, *SD*=1.3).

The age of participants ranged from 18 to 80 years old, with the average age being 38 years old (*M*=37.6, Mdn=35, *SD*=12.1). 46.7% were male, 48.9% were female, and 4.2% identified as non-binary 'other'. Most participants identified as White/Caucasian (79.7%), 10.5% as Latino/Hispanic, and the remaining ~10% comprised of Arab, South Asian, Native American, Black, South-East Asian, and 'other' or 'mixed race'. Regarding religious beliefs, most people considered themselves spiritual (51.3%) or not religious (43.6%). Most participants reported that the highest level of education completed was an undergraduate degree or equivalent (38.5%), followed by a post-graduate degree or equivalent (35.9%) and finally, a high school or college degree (25.5%). Most participants took the psychedelic for the purpose of healing (23.4%), personal growth (36.7%) or recreational purposes (27.6%). Half the participants indicated the most significant experience they reported on in our survey occurred over 2 years ago (48.8%), and a quarter reported on an experience that occurred 1 to 12 months ago (25.1%). Information on demographics is displayed in Table 1. The average reported strength of the psychedelic experience was very strong (*M*=4.3, Mdn=4, *SD*=0.8), with most participants (45%) giving the highest possible strength rating (See Tables 2).

In our sample, the reported average scores for the dependent and independent variables are displayed in Table 3. All variables showed moderate correlations to one another $r(934) = 0.41$ to 0.47 $p < .001$ and $r(656) = 0.43$ to 0.48 $p < .001$, except for extroversion which was not significantly correlated with any other variable (Table 4).

Table 1. Demographics

		N = 934	%
Gender	Male	436	46.7%
	Female	457	48.9%
	Other	41	4.2%
Education	Undergraduate or =	360	38.6%
	Postgraduate or =	335	35.9%
	High School/College	238	25.5%
Drug	Psilocybin/Mushroom	495	41.8%
	LSD	371	31.3%
	DMT/ayahuasca	87	15.2%
Time since taken	≤ 1 month	66	7.1%
	1 to 12 months	234	25.1%
	1 to 2 years	178	19.1%
	> 2 years	456	48.8%
Purpose	Recreation	424	27.6%
	personal growth	563	36.7%
	Spiritual/religious	124	8.1%
	Psychological/ emotional healing	359	23.4%
	Manage a physical health problem	25	1.6%
	Other	41	2.7%
Environment	Retreat/Ceremony	130	11.3%
	Festival/Party	89	7.7%
	Clinic/Hospital	11	1.0%
	Own Home	358	31.0%
	Someone else's home	169	14.6%
	Urban/outdoor	86	7.5%
	Rural/natural outdoor	257	22.3%
	Other	54	4.7%

Note. Multiple selections were permitted.

Table 2. Sample Statistics

Total *N* = 934	Mean	Median	SD	Min	Max
Age	37.7	35	12.1	18	80
Times in life psychedelics taken	4.8	5	1.3	1 time	≥ 20 times
Strength of psychedelic	4.3	4	0.8	1.0	5.0

Table 3. Variable Statistics

	N	Min	Max	Mean	SD
Δ wellbeing	934	7.00	49.00	37.7	8.0
Communitas	655	9.00	63.00	50.8	11.0
Mystical Experience	934	1.22	6.00	4.8	0.9
Extroversion	934	1.00	5.00	3.0	0.9
Surrender	934	1.00	5.00	3.8	0.7

Table 4. Study Variable Intercorrelations

	Δ wellbeing	Communitas	ME	Extroversion	Surrender
Δ wellbeing	-				
Communitas	.43**	-			
ME	.47**	.48**	-		
Extroversion	-0.01	0.03	-0.002	-	
Surrender	.410**	.433**	.431**	0.018	-

Note. Correlation is significant at the 0.01 level (2-tailed). ME=Mystical Experience

Independent sample t-tests were run to assess differences between the group and individual use groups. An independent sample t-test was conducted to compare surrender in those who took a psychedelic alone (n = 274) and those who took a psychedelic with at least one other person (n = 656). A Levene's test showed the assumption of homogeneity of variance was met, p = .89; therefore, a two-tailed independent samples t-test based on equal variances was performed between the two groups. The results showed a significant difference in the scores for individual use (*M*=3.9, *SD*=0.7) and group use (*M*=3.8, *SD*=0.8); t(930) = 2.411, p= 0.016, indicating that those who took a psychedelic alone surrendered more than those who took a psychedelic in a group (See Table 5).

Another independent sample t-test was conducted to compare extroversion levels in those who took a psychedelic alone (n = 274) and those who took a psychedelic with at least one other person (n = 656). A two-tailed independent samples t-test based on equal variances was performed between the two groups. The results showed a significant difference in the scores for individual use (*M*=2.9, *SD*=0.9) and group use (*M*=3.1, SD=0.9); t(930) = 3.059, p= 0.002,

indicating that those who took a psychedelic in a group were significantly more extroverted than those who took a psychedelic alone. See Table 5. Table 6 displays the intentions and gender in each setting group.

Table 5. Mean Differences Between Group and Individual Settings

		Mean	**SD**	**t-value**	**p-value**
Surrender	Individual	3.9	0.7	2.447*	0.016
	Group	3.8	0.8		
Extroversion	Individual	2.9	0.9	3.059**	0.002
	Group	3.1	0.9		
Mystical Experiences	Individual	4.8	1.0	0.385^	0.385
	Group	4.8	0.9		
Δ wellbeing change	Individual	38.5	7.3	2.09*	0.37
	Group	37.3	8.2		
Strength of psychedelic	Individual	4.3	0.8	0.058	0.954
	Group	4.3	0.8		
Age	Individual	39.0	12.7	2.206*	0.028
	Group	37.1	11.8		

*p<0.05 **p<0.001 ^Equal variance not assumed

Table 6. Percentages within Settings

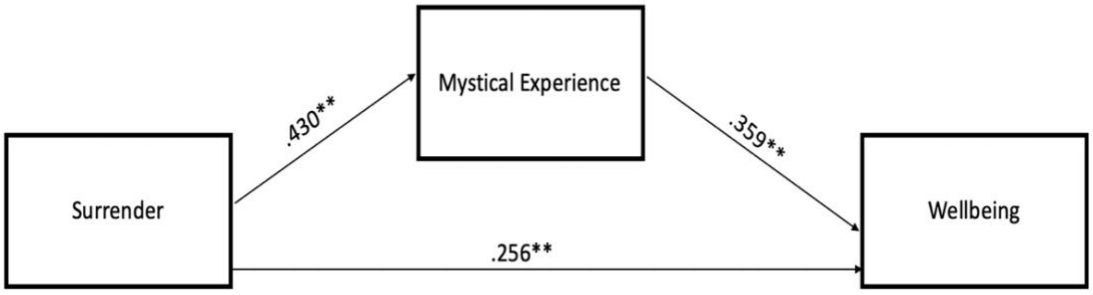
		Individual	Group
Intention	Fun/recreation	12.6%	55.2%
	Growth/healing	71.0%	55.1%
Gender	Male	57.6	42.1%
	Female	36.2	54.3%

Note. More than one selection was permitted.

H1: Mystical experiences mediate the relationship between surrender and Δ wellbeing

The study assessed the mediating role of mystical experiences (associated with participants' most impactful psychedelic experience) on the relationship between surrender and Δ wellbeing. The results revealed a significant indirect effect of surrender on perceived Δ wellbeing $B = 0.154$, $p < 0.001$; 95% CI [0.119, 0.193], supporting H1. The direct effect of surrender on Δ wellbeing in the presence of the mediator also remained significant $B = 0.256$, $p < 0.001$; 95% CI [2.076, 3.37], indicating that mystical experiences partially mediated the relationship between surrender and Δ wellbeing (Figure 5).

Figure 5. Coefficients of H1 Mediation



H2: Communitas and mystical experiences mediate the relationship between surrender and Δ wellbeing.

Beyond replicating the mediation evidenced in prior research (Kettner et al., 2021; Russ et al., 2019), the current study aimed to explore if communitas also mediates the relationship between surrender and Δ wellbeing amongst those who took a psychedelic substance in a group setting. A simple mediation with communitas as the mediator between surrender and Δ wellbeing showed communitas to be a significant mediator $B = 0.131$, $p < .001$, 95%CI = [0.084, 0.184]. Surrender remained a direct predictor of Δ wellbeing $B = .283$, $p < .001$, 95%CI = [2.263, 3.884], making the mediation only a partial one (Figure 6).

We expanded this model to a parallel mediation with two mediators, communitas and mystical experiences, to assess if this could further explain the variance in Δ wellbeing scores predicted by surrender. This parallel mediation analysis showed that surrender is indirectly related to Δ wellbeing through its relationship with both mystical experiences and communitas, supporting H2. First, as can be seen in Figure 7, surrender significantly predicted both mystical experience $B = .441$, $p < .001$, 95%CI [0.440, 0.604] and communitas $B = .434$, $p < .001$, 95%CI = [5.300, 7.316]. A 95% bias-corrected confidence interval based on 5,000 bootstrap samples revealed that communitas mediates between surrender and Δ wellbeing $B = .079$, $p < 0.001$, 95%CI [0.036, 0.126]. Additionally, the indirect effects through mystical experience were also different than zero $B = .151$, $p < 0.001$, 95% CI [0.111, 0.193]. Finally, a direct effect was also significant in our model $B = 0.183$, $p < 0.001$, 95% CI [1.20, 2.80].

Figure 6. Coefficients of H2a Mediation

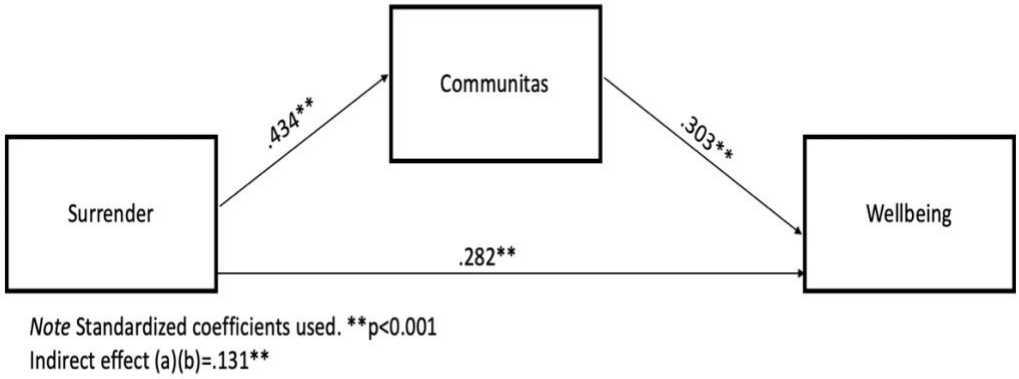
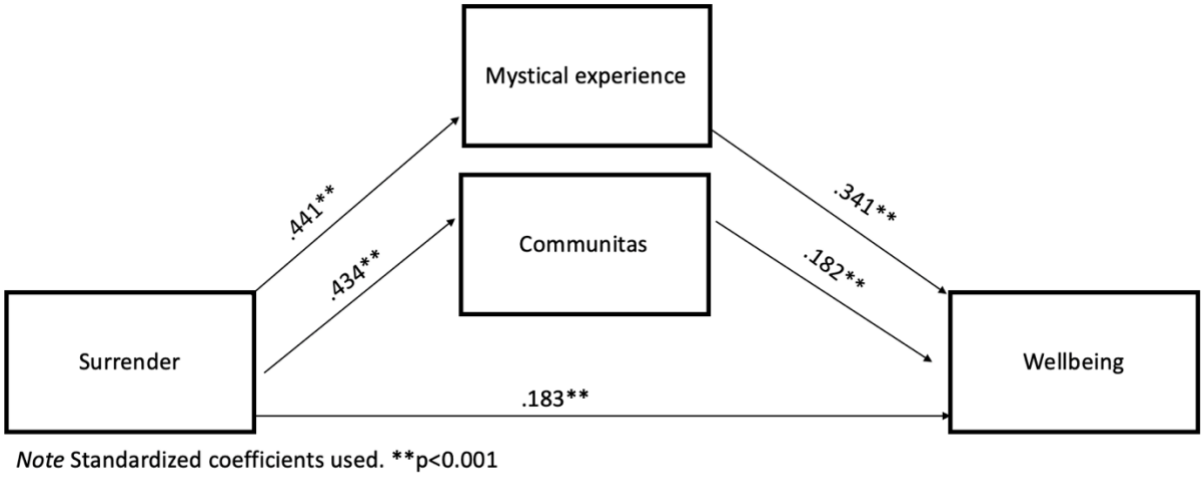


Figure 7. Coefficients of H2b Mediation

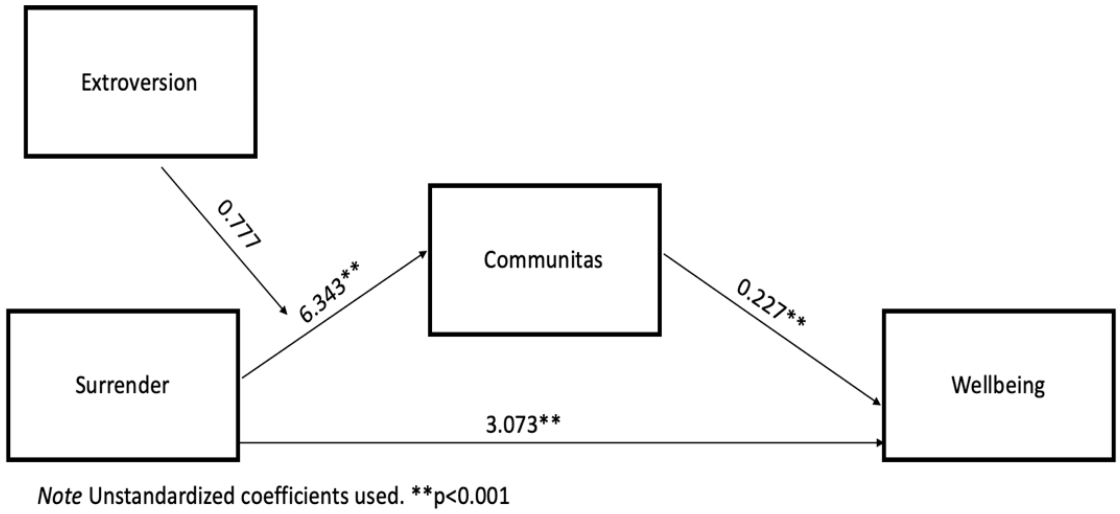


H3. Extroversion as a moderator of the relationship between surrender and communitas.

We further examined an aspect of the model depicted in Figure 8 by including extroversion as a moderator to the positive relationship between surrender and communitas. Results indicated

that surrender significantly affected communitas, *B* = 6.343, p <0.001, 95% CI [5.004, 7.682]. Communitas also showed a significant effect on Δ wellbeing, *B* = 0.227, p <0.001, 95% CI [0.150, 0.304]. Finally, surrender had a significant direct effect on Δ wellbeing, *B* = 3.073, t = 5.988, p <0.001, 95% CI [2.066, 4.081]. The results showed no interaction of extroversion and surrender on communitas, *B* = 0.777, p =0.2767, 95% CI [-0.625, 2.179]. Surrender remained a significant predictor of communitas on all levels of extroversion; thus, this model indicates a significant mediation with no moderation effect. This finding suggests that surrender predicts Δ wellbeing and communitas in a group setting regardless of the person's level of extroversion.

Figure 8. Coefficients of H3 Moderated Mediation



Discussion

The present study aimed to further our understanding of the impact of psychedelic group use on wellbeing and the factors that may impact those improvements. Previous research on group use has demonstrated the importance of communitas in establishing positive change (Kettner et al., 2021). However, the factors contributing to fostering communitas have not been fully explored or understood. In our sample, when considering the most significant psychedelic experiences, of the 934 participants, 656 had this experience with at least one other individual present, indicating that the majority of the 'most significant' experiences may have, to some degree, an element of communitas. In the recent psychedelic literature, the critical role of surrender has been established as a predictor for both mystical experiences and positive change. More so, mystical experiences have also been shown to be a key predictor of positive change in wellbeing and mental health in numerous studies (Barret et al., 2015; Garcia-Romeu et al., 2015; Griffiths et al., 2006; Maclean, Johnson & Griffiths, 2011). A link between surrender and communitas has not been previously explored. However, gaining an improved understanding of the nature of this link and its impact on wellbeing is essential, given the predominant tendency for the use of psychedelics (outside of a research context) in group settings (see Figure 4). Thus, the current research aimed to assess whether surrender was an essential and significant predictor of communitas in a group setting and whether this impacted perceived changes in wellbeing. We also aimed to explore if this association between surrender and communitas was impacted by extroversion, a trait previously associated with an increased propensity for group therapy as well as better outcomes in such a context (Codish & Ravid, 2014; Furnham et al., 2002; Ogrodniczuk et al., 2003).

Through the distribution of an online survey, this study was able to reach a large sample of psychedelic users. We collected data from 934 participants who have used a psychedelic drug at least once. The average use of a psychedelic found in our sample was about five times. Our sample was predominantly White/Caucasian and university graduates, as is usually the case in psychedelic research (Johnson et al., 2019). However, our study managed to obtain data equally from both males and females, which has sometimes been a limitation in previous studies, with males typically making up a larger proportion of participants (Johnson et al., 2019). However, an interesting observation in our research is that gender proportions changed when comparing group and individual settings, with males being more likely to take a psychedelic alone and females being slightly more likely to take a psychedelic in a group. Also, over half of our participants approached the psychedelic experience with the intention of personal growth or psychological healing, and about a quarter approached the experience recreationally. When comparing group to individual use, these proportions differed as well. We observed over half of the people who took a psychedelic in a group setting had the intention of recreation/fun, and the other half had the intention of growth and healing. In solitary use, 71% had the intention of growth and healing, and only 12% had the purpose of recreation. Accordingly, reflections on our results concerning perceived change in wellbeing should be considered within this context, as intentions considered are a reported important factor in determining outcomes (Haijen et al., 2018). For instance, we observed a significant difference in the ability to surrender between those in a group versus an individual setting, with those in the individual setting exhibiting greater surrender. One way to interpret these results is to consider the difference in intention between the two groups. Previous research has made an association between intention and better outcomes, and surrender may

contribute to this relationship (Haijen et al., 2018). Such questions are beyond the scope of this study but are worth considering in future research on group psychedelic use.

Our data reflected a moderate positive correlation between surrender, mystical experiences and perceived positive changes to wellbeing, in line with previous findings (Aday et al., 2021; Griffith et al., 2011; Griffith et al., 2008; Maclean et al., 2011; Russ et al., 2019; St. Anaund & Sharp, 2022). The results also showed moderate positive correlations between communitas, mystical experiences and perceived change to wellbeing. The current study shows an additional moderate positive correlation between surrender and communitas, a finding which has not previously been looked at or reported. This finding suggests that as surrender increases in our sample, so does communitas.

Attention should be given to the factors that impact communitas and subsequently changes to wellbeing in group settings. Our findings aim to build on this understanding of group use as they have demonstrated a positive association between surrender and positive Δ wellbeing through communitas in a group setting.

Firstly, we wanted to assess if previous results on the impact of surrender on wellbeing through mystical experiences were replicated in our sample. Our findings converge with Russ et al. (2019), showing both a direct and indirect effect of surrender on well-being improvements. As suggested, mystical experiences mediated this indirect effect. A total effects model showed that, in the absence of mystical experiences, surrender alone explained about 17% of the variance in the Δ wellbeing scores. When mystical experience scores were included as a mediator, the model predicted 27% of the variance in Δ wellbeing scores. These findings are similar to previous ones (Russ et al., 2019), although our effect size was more modest than that reported by Russ et al., which was reported as predicting 39% of the variance in wellbeing scores. This

discrepancy may reflect differences in sample characteristics as well as differences in setting factors which have not been reported in the initial study. Therefore, future studies must strive for rigorous methodology and transparency in reporting to enhance the reliability and reproducibility of research in this field.

Nevertheless, as the consensus seems to be in the literature, the aforementioned findings further support the notion that a single, profound acute experience may act as a facilitator for enduring perceived change in wellbeing. (Barret et al., 2015; MacLean et al., 2011).

In group settings, we posit that a state of surrender may serve as a critical link between individual and group experiences, fostering a more receptive state that enhances interpersonal connections and promotes the emergence of communitas. As surrender temporally proceeds communitas, we explored its role in predicting Δ wellbeing through communitas. Indeed, in the present study, we see that the degree of surrender predicted 19% of the variance in communitas. We also observed communitas to partially mediate the association between surrender and perceived improvement in wellbeing. In fact, in our second model, surrender alone again predicted about 17% of the variance in Δ wellbeing scores; with the addition of communitas as a mediator, the expected variance increased to about 24%. This finding suggests that communitas is another explanation of how surrender impacts positive psychological change.

Our parallel mediation further explained the variance in positive Δ wellbeing associated with the degree of surrender. When both mystical experiences and communitas were included as mediators in this model, 33% of the variance in Δ wellbeing scores was explained by surrender. This difference, again, is about double the variance predicted by surrender alone.

Lastly, the study aimed to assess if the personality trait extroversion moderated the strength of the relationships between surrender and communitas. Our moderated mediation

analyses found no interaction between extroversion and surrender on communitas. Contrary to our hypotheses - our results imply that even at low levels of extroversion, surrender still moderately predicts the degree of communitas experiences in a group setting. Adopting a state of surrender before a psychedelic experience will foster communitas and increase wellbeing even in individuals who tend to be more introverted. These results are interesting as they could imply that extroverts do not perform better in psychedelic groups, unlike other group therapy or group activity settings (Ogrodniczuk et al., 2003).

On the other hand, the absence of an interaction between extroversion and surrender in predicting the degree of communitas may have also been influenced by the higher prevalence of extroversion in the group use setting, as our study had found a significantly higher degree of trait extroversion in the group context compared to the individual context. This finding was similar to earlier ones on extroversion and psychedelic group use (Johnstad, 2020). Thus, our study may not have genuinely reflected the impact of very low extroversion scores (introverts) as they appeared less likely to take the psychedelic in a group setting. As for extroverts, the group setting may have provided a platform for their sociable tendencies to be expressed, leading to stronger feelings of communitas without necessarily requiring a high degree of surrender. Furthermore, the finding that extroverts prefer group psychedelic settings may bear clinical implications for tailoring psychedelic therapy. Recognising these preferences can lead to a more personalised therapeutic approach: extroverts may prefer and benefit from more interpersonal interactions, while introverts may find individual or smaller, more intimate settings more comfortable and beneficial. Consequently, addressing these personality-driven inclinations can aid in designing therapeutic interventions to best fit individual needs, potentially improving surrender and overall wellbeing.

While this study adds to our understanding of the psychedelic experience, it is not without its limitations. As with any research in the realm of psychedelic therapy, the question of generalisability arises due to the inherently subjective nature of these experiences. Furthermore, a group setting was defined as having taken a psychedelic with at least one other individual. Given the highly context-sensitive nature of psychedelic experiences (Carhart-Harris et al., 2018), the current study may have overlooked important nuances between different group settings and their potential impact on the study outcomes. The type of group environment—whether structured or unstructured, task-focused or socially-focused, supportive or confrontational—can significantly affect an individual's feelings of communitas, their ability to surrender, and overall mental wellbeing. For instance, a group setting more focused on shared tasks or goals may enhance feelings of communitas. In contrast, a more socially focused or confrontational group may impact the ability to surrender differently. Future research would benefit from incorporating measures or observations to categorise and evaluate the group environments, enabling a more nuanced understanding of the interplay between group dynamics and individual psychological experiences. Some or most of this evidence may have to rely on naturalistic data – as used here – especially because of the issues of statistical power that limit the exploration of such relationships in experimental studies and clinical trials. In the same vein, the relationship between extroversion and surrender might differ based on these variations. In more intimate or supportive groups, extroverts might find it easier to let go and surrender, thereby deepening their experience of communitas. In larger or less intimate groups, this relationship might be less pronounced.

An additional limitation of the current study lies in the sampling strategy employed. The participants were predominantly sourced from online psychedelic communities. While these

platforms house a rich and diverse community of individuals interested in psychedelics, this strategy likely introduced selection bias into the study. Participants from these platforms will probably be more knowledgeable, experienced, or positively inclined towards psychedelics, which may not reflect the broader population's experiences and attitudes. Moreover, our sample appeared to share specific socio-demographic characteristics, limiting the generalisability of our findings to other population segments. For future research, it is recommended that the sampling strategy be broadened to incorporate a more diverse range of participants.

The use of retrospective self-reported data also presents some limitations. A key issue is the potential for recall bias in our sample, especially since there were no exclusion criteria for how long ago the experience was. The reported 'time since psychedelic experience' for about half of the participants was 1-2 years, which may present as both an impact and limitations on the study findings. A longer interval since the psychedelic session might dilute the immediacy and specificity of recalled experiences, potentially introducing recall bias or the influence of subsequent life events on retrospective assessments. On the other hand, it may highlight the long-term persistence and impact of the effects, suggesting the sustainability of outcomes or changes induced by the psychedelic experience.

Mediations and moderated mediation analyses are powerful statistical tools that can aid in understanding the processes underlying observed relationships among variables (Hayes, 2018). However, they have limitations, which should be considered when interpreting results. One of the primary limitations is the assumption of causal relationships among the variables involved. However, cross-sectional data imposes serious limitations on causal inference. Experimental or longitudinal data would be needed to provide more robust evidence for causal claims, although this presents its own logistical challenges. Another challenge is the assumption of no omitted

confounding variables, meaning that the analysis assumes no other variables influence the relationships among the measured variables, which is rarely the case in complex, real-world scenarios. Unmeasured confounders could bias the estimated effects, leading to potentially misleading conclusions. Finally, in the context of this study, a potential limitation is the difficulty in capturing the nuanced and dynamic nature of psychological phenomena such as extroversion, surrender, and feelings of communitas using a single mediation model. The relationships among these variables are likely multifaceted and bidirectional, and may evolve over time in ways not captured by a static analysis. Thus, while mediation analysis provides valuable insights into potential mechanisms underlying observed relationships, the results should be interpreted with caution. Future studies could consider more complex models or use longitudinal or experimental designs to provide more robust evidence for mediation effects.

Despite these limitations, our findings underscore the importance of careful attention to both individual psychological states and group dynamics in the implementation of psychedelic therapy. Taken together, the implications of our results highlight the importance of fostering an environment conducive to the manifestation of surrender in groups to cultivate a sense of communitas. This is especially important as our results also indicate that it may be harder for individuals to surrender in a group setting, and thus understanding what contexts lead to surrender could help in understanding how communitas and mystical experiences are achieved, ultimately leading to positive changes. As the field continues to evolve, it will be crucial to maintain a nuanced understanding of these interactions to maximise therapeutic benefits and potentially contribute to establishing effective parameters for psychedelic group therapy.

References

Aday, J. S., Davis, A. K., Mitzkovitz, C. M., Bloesch, E. K., & Davoli, C. C. (2021). Predicting reactions to psychedelic drugs: A systematic review of states and traits related to acute drug effects. *ACS Pharmacology & Translational Science, 4*(2), 424–435. https://doi.org/10.1021/acsptsci.1c00014

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173

Barrett, F. S., Johnson, M. W., & Griffiths, R. R. (2015). Validation of the revised mystical experience questionnaire in experimental sessions with psilocybin. *Journal of Psychopharmacology, 29*(11), 1182–1190. https://doi.org/10.1177/0269881115609019

Carbonaro, T. M., Bradstreet, M. P., Barrett, F. S., MacLean, K. A., Jesse, R., Johnson, M. W., & Griffiths, R. R. (2016). Survey study of challenging experiences after ingesting psilocybin mushrooms: Acute and enduring positive and negative consequences. *Journal of Psychopharmacology, 30*(12), 1268–1278. https://doi.org/10.1177/0269881116662634

Carhart-Harris, R. L., Erritzoe, D., Haijen, E., Kaelen, M., & Watts, R. (2017). Psychedelics and connectedness. *Psychopharmacology, 235*(2), 547–550. https://doi.org/10.1007/s00213-017-4701-y

Carhart-Harris, R. L., Roseman, L., Haijen, E., Erritzoe, D., Watts, R., Branchi, I., & Kaelen, M. (2018). Psychedelics and the essential importance of context. *Journal of Psychopharmacology*, *32*(7), 725–731. https://doi.org/10.1177/0269881118754710

Carhart-Harris, R. L., Roseman, L., Bolstridge, M., Demetriou, L., Pannekoek, J. N., Wall, M. B., Tanner, M., Kaelen, M., McGonigle, J., Murphy, K., Leech, R., Curran, H. V., & Nutt, D. J. (2017). Psilocybin for treatment-resistant depression: Fmri-measured brain mechanisms. *Scientific Reports*, *7*(1). https://doi.org/10.1038/s41598-017-13282-7

Carhart-Harris, R., Giribaldi, B., Watts, R., Baker-Jones, M., Murphy-Beiner, A., Murphy, R., Martell, J., Blemings, A., Erritzoe, D., & Nutt, D. J. (2021). Trial of psilocybin versus escitalopram for depression. *New England Journal of Medicine*, *384*(15), 1402–1411. https://doi.org/10.1056/nejmoa2032994

Clement, L. M., & Bradley-Garcia, M. (2022). A step-by-step tutorial for performing a moderated mediation analysis using process. *The Quantitative Methods for Psychology*, *18*(3), 258–271. https://doi.org/10.20982/tqmp.18.3.p258

Codish, D., & Ravid, G. (2014). Adaptive Approach for gamification optimization. *2014 IEEE/ACM 7th International Conference on Utility and Cloud Computing*. https://doi.org/10.1109/ucc.2014.94

Cribari-Neto, F. (2004). Asymptotic inference under heteroskedasticity of unknown form. *Computational Statistics & Data Analysis*, *45*(2), 215–233. https://doi.org/10.1016/s0167-9473(02)00366-3

Erritzoe, D., Roseman, L., Nour, M. M., MacLean, K., Kaelen, M., Nutt, D. J., & Carhart-Harris, R. L. (2018). Effects of psilocybin therapy on personality structure. *Acta Psychiatrica Scandinavica*, *138*(5), 368–378. https://doi.org/10.1111/acps.12904

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, Behavioral, and Biomedical Sciences. *Behavior Research Methods*, *39*(2), 175–191. https://doi.org/10.3758/bf03193146

Field, A. P., Miles, J., & Field, Z. (2012). *Discovering statistics using R*. Sage.

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, *18*(3), 233–239. https://doi.org/10.1111/j.1467-9280.2007.01882.x

Furnham, A., Forde, L., & Ferrari, K. (1999). Personality and work motivation. *Personality and Individual Differences*, *26*(6), 1035–1043. https://doi.org/10.1016/s0191-8869(98)00202-5

Garcia-Romeu, A., Griffiths, R., & Johnson, M. (2015). Psilocybin-occasioned mystical experiences in the treatment of tobacco addiction. *Current Drug Abuse Reviews*, *7*(3), 157–164. https://doi.org/10.2174/1874473708666150107121331

Gasser, P., Kirchner, K., & Passie, T. (2014). LSD-assisted psychotherapy for anxiety associated with a life-threatening disease: A qualitative study of acute and sustained subjective effects. *Journal of Psychopharmacology*, *29*(1), 57–68. https://doi.org/10.1177/0269881114555249

Goldberg, S. B., Shechet, B., Nicholas, C. R., Ng, C. W., Deole, G., Chen, Z., & Raison, C. L. (2020, December). *Post-acute psychological effects of classical serotonergic psychedelics: A systematic review and meta-analysis*. Psychological medicine. Retrieved April 22, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7855004/

Griffiths, R. R., Johnson, M. W., Carducci, M. A., Umbricht, A., Richards, W. A., Richards, B. D., Cosimano, M. P., & Klinedinst, M. A. (2016). Psilocybin produces substantial and

sustained decreases in depression and anxiety in patients with life-threatening cancer: A randomized double-blind trial. *Journal of Psychopharmacology*, *30*(12), 1181–1197. https://doi.org/10.1177/0269881116675513

Griffiths, R. R., Johnson, M. W., Richards, W. A., Richards, B. D., McCann, U., & Jesse, R. (2011). Psilocybin occasioned mystical-type experiences: Immediate and persisting dose-related effects. *Psychopharmacology*, *218*(4), 649–665. https://doi.org/10.1007/s00213-011-2358-5

Griffiths, R. R., Richards, W. A., Johnson, M. W., McCann, U. D., & Jesse, R. (2008). Mystical-type experiences occasioned by psilocybin mediate the attribution of personal meaning and spiritual significance 14 months later. *Journal of Psychopharmacology*, *22*(6), 621–632. https://doi.org/10.1177/0269881108094300

Griffiths, R. R., Richards, W. A., McCann, U., & Jesse, R. (2006). Psilocybin can occasion mystical-type experiences having substantial and sustained personal meaning and spiritual significance. *Psychopharmacology*, *187*(3), 268–283. https://doi.org/10.1007/s00213-006-0457-5

Haijen, E. C., Kaelen, M., Roseman, L., Timmermann, C., Kettner, H., Russ, S., Nutt, D., Daws, R. E., Hampshire, A. D., Lorenz, R., & Carhart-Harris, R. L. (2018). Predicting responses to psychedelics: A prospective study. *Frontiers in Pharmacology*, *9*. https://doi.org/10.3389/fphar.2018.00897

Hartogsohn, I. (2016). Set and setting, psychedelics and the placebo response: An extra-pharmacological perspective on Psychopharmacology. *Journal of Psychopharmacology*, *30*(12), 1259–1267. https://doi.org/10.1177/0269881116677852

Hayes, A. F. (2017). Partial, conditional, and moderated moderated mediation: Quantification, inference, and interpretation. *Communication Monographs*, *85*(1), 4–40. https://doi.org/10.1080/03637751.2017.1352100

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: ǂa ǂregression-based approach*. ǂThe ǂGuilford Press.

John, O. P., Robins, R. W., & Pervin, L. A. (2010). *Handbook of personality: Theory and research*. Guilford Press.

Johnson, M. W., Hendricks, P. S., Barrett, F. S., & Griffiths, R. R. (2019). Classic psychedelics: An integrative review of epidemiology, therapeutics, mystical experience, and brain network function. Pharmacology & therapeutics, 197, 83-102

Johnstad, P. G. (2020). The psychedelic personality: Personality structure and associations in a sample of psychedelics users. *Journal of Psychoactive Drugs*, *53*(2), 97–103. https://doi.org/10.1080/02791072.2020.1842569

Johnstone, L. (2017). Psychological formulation as an alternative to psychiatric diagnosis. *Journal of Humanistic Psychology*, *58*(1), 30–46. https://doi.org/10.1177/0022167817722230

Jose, Paul E. (Paul Easton),. (2013). *Doing statistical mediation and moderation*. Guildford Press.

Judd, C. M., Yzerbyt, V. Y., & Muller, D. (2014). Mediation and moderation. *Handbook of Research Methods in Social and Personality Psychology*, 653–676. https://doi.org/10.1017/cbo9780511996481.030

Ko, K., Knight, G., Rucker, J. J., & Cleare, A. J. (2022). Psychedelics, mystical experience, and therapeutic efficacy: A systematic review. *Frontiers in Psychiatry, 13*. https://doi.org/10.3389/fpsyt.2022.917199

Leary, T., Litwin, G., & Metzner, R. (1963). Reactions to PSILOCYBJN administered in a supportive environment. *The Journal of Nervous and Mental Disease, 137*(6), 561–573. https://doi.org/10.1097/00005053-196312000-00007

MacLean, K. A., Johnson, M. W., & Griffiths, R. R. (2011). Mystical experiences occasioned by the hallucinogen psilocybin lead to increases in the personality domain of openness. *Journal of Psychopharmacology, 25*(11), 1453–1461. https://doi.org/10.1177/0269881111420188

MacLean, K. A., Leoutsakos, J.-M. S., Johnson, M. W., & Griffiths, R. R. (2012). Factor analysis of the mystical experience questionnaire: A study of experiences occasioned by the hallucinogen psilocybin. *Journal for the Scientific Study of Religion, 51*(4), 721–737. https://doi.org/10.1111/j.1468-5906.2012.01685.x

Meule, A. (2019). Contemporary understanding of Mediation Testing. *Meta-Psychology, 3*. https://doi.org/10.15626/mp.2018.870

Nichols, D. E. (2016). Psychedelics. *Pharmacological Reviews, 68*(2), 264–355. https://doi.org/10.1124/pr.115.011478

Ogrodniczuk, J. S., Piper, W. E., Joyce, A. S., McCallum, M., & Rosie, J. S. (2003). NEO-Five factor personality traits as predictors of response to two forms of group psychotherapy. *International Journal of Group Psychotherapy, 53*(4), 417–442. https://doi.org/10.1521/ijgp.53.4.417.42832

Osório, F. L.; Sanches R.F.; Macedo L.R.; Santos R.G.; Maia-de-Oliveira J.P.; Wichert-Ana L; Araujo D.B.; Riba J;Crippa J.A.;Hallak JE; (n.d.). *Antidepressant effects of a single dose of ayahuasca in patients with recurrent depression: A preliminary report*. Revista brasileira de psiquiatria (Sao Paulo, Brazil : 1999). Retrieved April 22, 2023, from https://pubmed.ncbi.nlm.nih.gov/25806551/

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, *42*(1), 185–227. https://doi.org/10.1080/00273170701341316

Roseman, L., Nutt, D. J., & Carhart-Harris, R. L. (2018). Quality of acute psychedelic experience predicts therapeutic efficacy of psilocybin for treatment-resistant depression. *Frontiers in Pharmacology*, *8*. https://doi.org/10.3389/fphar.2017.00974

Russ, S. L., Carhart-Harris, R. L., Maruyama, G., & Elliott, M. S. (2019). Replication and extension of a model predicting response to psilocybin. *Psychopharmacology*, *236*(11), 3221–3230. https://doi.org/10.1007/s00213-019-05279-z

Russ, S. L., Carhart-Harris, R. L., Maruyama, G., & Elliott, M. S. (2019). States and traits related to the quality and consequences of psychedelic experiences. *Psychology of Consciousness: Theory, Research, and Practice*, *6*(1), 1–21. https://doi.org/10.1037/cns0000169

Schmid, Y., & Liechti, M. E. (2017). Long-lasting subjective effects of LSD in normal subjects. *Psychopharmacology*, *235*(2), 535–545. https://doi.org/10.1007/s00213-017-4733-3

St. Arnaud, K. O., & Sharpe, D. (2022). Contextual parameters associated with positive and negative mental health in recreational psychedelic users. *Journal of Psychoactive Drugs*, *55*(1), 30–39. https://doi.org/10.1080/02791072.2022.2039815

Studerus, E., Gamma, A., Kometer, M., & Vollenweider, F. X. (2012). Prediction of psilocybin response in Healthy Volunteers. *PLoS ONE, 7*(2). https://doi.org/10.1371/journal.pone.0030800

Uthaug, M. V., van Oorsouw, K., Kuypers, K. P., van Boxtel, M., Broers, N. J., Mason, N. L., Toennes, S. W., Riba, J., & Ramaekers, J. G. (2018). Sub-acute and long-term effects of ayahuasca on affect and cognitive thinking style and their association with ego dissolution. *Psychopharmacology, 235*(10), 2979–2989. https://doi.org/10.1007/s00213-018-4988-3

Watts, R., Day, C., Krzanowski, J., Nutt, D., & Carhart-Harris, R. (2017). Patients' accounts of increased "connectedness" and "acceptance" after psilocybin for treatment-resistant depression. *Journal of Humanistic Psychology*, *57*(5), 520–564. https://doi.org/10.1177/0022167817709585

Part 3. Critical Appraisal

Introduction

This critical appraisal reflects on the experience of having conducted research in the field of psychedelics. I reflect on the rationale for selecting this project and its theoretical orientation. Secondly, I reflect on the controversy, challenges and apprehensions of conducting research in this emerging field. Next, examining the research process more closely, I reflect on the strengths and vulnerabilities inherent in our study design, taking an honest look at the recruitment process and our interpretation of the findings. Each stage presented its complexities, and I share my reflections on how we navigated these and what I might have done differently. In the final stages of this appraisal, I reflect on what this process has taught me and how this experience has helped to refine my comprehension of this rapidly evolving field.

Project Selection

Conducting research in the field of psychedelics presented unique both opportunities and challenges due to the complex nature of psychedelic experiences and the historical and sociopolitical context of these substances (Pollan, 2019). I was drawn to this subject because of its potential to contribute significantly to our understanding of consciousness, cognition, and mental health. The powerful effects of psychedelics on perception, emotion, and thought provide a unique lens through which to explore these fundamental aspects of the human experience (Nichols, 2016). For this reason, the implications of psychedelics for psychology are profound,

particularly in light of their promising potential to revolutionise the approach to psychological treatment.

The transformative experiences often elicited by these substances have been associated with rapid and lasting improvements in mental health and wellbeing, frequently after just a single dose (Carhart-Harris & Goodwin, 2017; Ross et al., 2016). This represents a paradigm shift from the current pharmacological treatments, which typically require regular and long-term use to maintain their effects (Warden, 2007). I was also interested in the implication that these improvements can be achieved without the adverse physical side effects of many traditional psychiatric medications, usually leading to decreased adherence to treatment (Marasine et al., 2020). When administered in a controlled setting, psychedelics have been reported to have a favourable safety profile with few, if any, long-term physical side effects (Anderson et al., 2020). Lastly, psychedelics also appear to enhance psychotherapeutic interventions, potentially making them more efficient. They have been reported to increase psychological flexibility, enhance introspection, and boost the therapeutic alliance, all of which can contribute to better therapeutic outcomes (Watts et al., 2017).

Theoretical Orientation

I have always been incredibly in awe of the human brain. Additionally, as a trainee psychologist, I find myself drawn to third-wave cognitive behavioural therapies. Mindfulness, a cornerstone of these therapies, involves directing attention to the present moment non-judgmentally and has a fascinating representation on a neural level. Mindfulness intersects with our understanding of the default mode network (DMN), a large network of brain regions active

during rest and associated with self-referential thinking and mind wandering. A high level of DMN activity has been related to ruminative and obsessive thinking, characteristic of many psychological disorders (Killingsworth & Gilbert, 2010). Mindfulness reduces activity in the DMN, fostering a shift from self-referential thinking to a more present-focused awareness (Brewer et al., 2011). This shift disrupts unhelpful thought patterns, promoting mental flexibility and well-being.

While practising and mastering mindfulness could be a lengthy process, research has shown that psychedelics also significantly alter the DMN (Carhart-Harris et al., 2012). This alteration has been linked to the dissolution of one's sense of self or ego, a common feature of the psychedelic experience. These changes in self-perception and consciousness provide psychologists with a unique perspective into the neural underpinnings of consciousness and the self and how this could relate to different states of wellbeing. Theoretically, I am immensely intrigued by the implications of this to expedite or enhance complex therapeutic processes. These findings could also suggest a radical new approach to mental health treatment, shifting away from the chronic use of medication towards brief and targeted interventions that leverage the transformative potential of psychedelic experiences. However, this approach requires a major rethinking of current mental health treatment models and poses significant logistical and regulatory challenges.

Apprehensions and Challenges

Psychedelic research has been stigmatised and suppressed for decades, leading to a dearth of rigorous, high-quality research (Sessa, 2012). Thus, with the new wave of interest in the field,

modern research must approach this area cautiously, challenging our biases and assumptions and rigorously interrogating our methods and findings. Such rigour can help ensure our research is trustworthy and help establish the field's legitimacy. Moreover, the resurgence of interest in psychedelic research mirrors popular public opinions about these substances, with increasing advocacy for their therapeutic use and even legalisation. Before starting this research, I was swayed by the allure of their promise. Still, as researchers, we must proceed with extreme caution, especially at such an easily persuasive time, so as to not overpromise or over-endorse the use of psychedelics based on limited or preliminary findings. It's crucial to remember that robust conclusions about the therapeutic potential of psychedelics should be based on large, well-controlled trials that replicate promising early results.

Following all the research I have read and evaluated throughout this process, it is clear that much more is needed to optimise the therapeutic use of psychedelics, understand the mechanisms underlying their effects, and explore their safety and efficacy, especially in different populations and conditions. These substances possess powerful psychoactive properties that can profoundly alter cognition, emotion, and perception. Without appropriate safeguards, their use could result in negative experiences or adverse effects (Carbonaro et al., 2016). As researchers, we must ensure that our study designs prioritise participant safety and ethical conduct above all.

Last but certainly not least, the history of psychedelic use intertwines cultures and practices that deserve respect and consideration. As we bring these substances under the magnifying glass, we must remain mindful of the risk of cultural appropriation and the importance of acknowledging and respecting the traditional knowledge and practices associated with these substances (Labate & Cavnar, 2014). We must also constantly remind ourselves that psychedelics are a very subjective experience; culture and prior beliefs significantly shape the

psychedelic experience. It is vital to recognise that psychedelic researchers tend to approach their study with Western theories and constructs. Also, most studies include a heavily skewed demographic that is typically predominantly White/Caucasian. Researchers must be cautious not to overgeneralise their findings when interpreting the results of their studies.

Overall, it's paramount that we approach our work with caution, scepticism, and a sense of responsibility. Our aim should be to balance the need for scientific rigour, ethical conduct, and cultural sensitivity as we work to understand the potential of these intriguing substances.

Study

The Conceptual Introduction

Choosing to undertake a conceptual introduction over a systematic review was influenced by the nature of this particular study as a young and emerging field of research.
A systematic review is particularly valuable when there is a substantial body of research to analyse and synthesise. However, in this still-developing field, I found that the existing literature was not as extensive as initially anticipated. This scarcity made it challenging to conduct a meaningful systematic review that could provide a comprehensive understanding of the topic.

On the other hand, a conceptual introduction offered the flexibility and depth needed to explore the broader concepts, theories, and ideas surrounding the therapeutic effects of psychedelics. This approach allowed for a discussion on a range of topics and enabled the shaping of a comprehensive narrative that reflects the complexity and multifaceted nature of psychedelic experiences.

In retrospect, while the decision meant forgoing the structured robustness of a systematic review, it also opened avenues for a more in-depth exploration of the topic. It highlighted the necessity of aligning the research methodology with the nature of the field.

The Research Direction

The exhaustive review of the existing literature not only enriched my understanding of the subject matter but also highlighted the significant gaps in our current knowledge. Although I was aware that this was an emerging field, as I explored the research, I was surprised to realise the relative scarcity of comprehensive studies, signifying the youthfulness of this field. This was a moment of recognition of the challenges that lay ahead in my own study. While rich in insights, the limited existing research provided fewer guideposts than I initially anticipated. There were moments of doubt and uncertainty where I questioned the feasibility of our anticipated study. On the other hand, there were also moments of excitement. While the lack of comprehensive literature limited the scope and depth of my research, it also highlighted the importance of my work, which could have the potential to contribute to the slowly growing body of knowledge in this fascinating field.

Upon reflection on choosing the research question and analyses chosen, I recall the obstacles and strengths of this approach. I had settled on conducting path analyses because of their ability to explore complex relationships and consider both direct and indirect effects between multiple independent and dependent variables. This analysis allowed me to examine all the relationships in my proposed models simultaneously. However, settling on this choice of analysis from the start limited the options of variables I could consider for this project. Thus, it

felt that my choice of statistic informed my research question rather than vice versa. This, at times, felt constraining as I was keen to include other variables in my model; however, because the literature did not previously support their associations, it would not have been appropriate to include them in the model. This emerging field is still in its infancy, therefore, well-established associations between constructs are still quite limited in the literature. Had I chosen a more lenient statistical analysis, I would have been able to explore a broader range of associations and potentially contribute preliminary evidence to the field. On the other hand, choosing a path analysis allowed my research to strengthen our understanding of previously explored constructs. I recognise that this, too, is a significant contribution.

The Research Design

This research field poses substantial methodological and practical challenges. The subjective nature of psychedelic experiences makes them difficult to measure and quantify, requiring psychometric tools that capture these nuanced experiences reliably and validly. The set and setting are crucial in shaping these experiences, adding further complexity to study designs and interpretations (Hartogsohn, 2016). Our research design also presented its own obstacles. This project was explicitly interested in constructs that have a vital temporal component. While questions were worded to obtain responses reflecting the intended time points, the cross-sectional nature of our design might have posed some issues in doing so. Participants were required to recall and report their psychedelic experiences, which can be influenced by memory distortion, reinterpretation of experiences, or social desirability bias. Reporting on perceived change may have also been subjected to such bias. Given the nature of the project and the associated time constraint, we were limited with the type of design we could utilise.

Nevertheless, having a cross-sectional survey design did allow us to reach a large sample of participants and gave our research relatively strong power.

We were fortunate to get a sufficient sample of participants; however, I am conscious of the bias this sample may have presented. Most of our participants were reached through psychedelic communities and associations, implying they already advocate for these drugs. This favourable view towards psychedelics may have influenced their responses. It even may have prompted them to take the survey in the first place, with those who have had adverse experiences opting out of taking such a survey. Moreover, the illegal status of many psychedelic substances in many jurisdictions, combined with societal stigma, may also influence participants' willingness to participate in research, their responses to study measures and the generalisability of findings.

Conclusion

Overall, the process has not only deepened my understanding of psychedelics and their potential therapeutic effects but also gave me a more realistic expectation of them. The process was sometimes daunting, but I appreciate that it has enriched my research skills. Despite the challenges, I've come to appreciate the immense value of rigorous, well-conducted research in advancing our understanding of such complex and fascinating phenomena. I also understand that a research finding doesn’t have to be profound to be impactful. It reinforced the idea that every research project, irrespective of the breadth of literature available, has the potential to contribute to our collective knowledge. Even with little steps, the journey, filled with both ups and downs, has ultimately emphasised the dynamic nature of the research process.

References

Andersen, K. A., Carhart-Harris, R., Nutt, D. J., & Erritzoe, D. (2020). Therapeutic effects of classic serotonergic psychedelics: A systematic review of Modern-era clinical studies. Acta Psychiatrica Scandinavica, 143(2), 101–118. https://doi.org/10.1111/acps.13249

Brewer, J. A., Worhunsky, P. D., Gray, J. R., Tang, Y.-Y., Weber, J., & Kober, H. (2011). Meditation experience is associated with differences in default mode network activity and connectivity. Proceedings of the National Academy of Sciences, 108(50), 20254–20259. https://doi.org/10.1073/pnas.1112029108

Carbonaro, T. M., Bradstreet, M. P., Barrett, F. S., MacLean, K. A., Jesse, R., Johnson, M. W., & Griffiths, R. R. (2016). Survey study of challenging experiences after ingesting psilocybin mushrooms: Acute and enduring positive and negative consequences. Journal of Psychopharmacology, 30(12), 1268–1278. https://doi.org/10.1177/0269881116662634

Carhart-Harris, R. L., Erritzoe, D., Williams, T., Stone, J. M., Reed, L. J., Colasanti, A., Tyacke, R. J., Leech, R., Malizia, A. L., Murphy, K., Hobden, P., Evans, J., Feilding, A., Wise, R. G., & Nutt, D. J. (2012). Neural correlates of the psychedelic state as determined by fmri studies with psilocybin. Proceedings of the National Academy of Sciences, 109(6), 2138–2143. https://doi.org/10.1073/pnas.1119598109

Hartogsohn, I. (2016). Set and setting, psychedelics and the placebo response: An extra-pharmacological perspective on Psychopharmacology. *Journal of Psychopharmacology*, *30*(12), 1259–1267. https://doi.org/10.1177/0269881116677852

Killingsworth, M. A., &; Gilbert, D. T. (2010). A wandering mind is an unhappy mind. Science, 330(6006), 932–932. https://doi.org/10.1126/science.1192439

Labate, B. C., & Cavnar, C. (2016). The therapeutic use of ayahuasca. Springer.

Marasine, N. R., Sankhi, S., Lamichhane, R., Marasini, N. R., & Dangi, N. B. (2020). Self-reported antidepressant drug side effects, medication adherence, and its associated factors among patients diagnosed with depression at the Psychiatric Hospital of Nepal. *Depression Research and Treatment*, *2020*, 1–7. https://doi.org/10.1155/2020/7024275

Nichols, D. E. (2016). Psychedelics. *Pharmacological Reviews*, *68*(2), 264–355. https://doi.org/10.1124/pr.115.011478

Pollan, M. (2019). *How to change your mind*. Penguin.

Sessa, B. (2012). The Psychedelic Renaissance: Reassessing the role of psychedelic drugs in 21st Century psychiatry and society. Choice Reviews Online, 50(09). https://doi.org/10.5860/choice.50-5307

Warden, D., Rush, A. J., Trivedi, M. H., Fava, M., & Wisniewski, S. R. (2007). The STAR*D project results: A comprehensive review of findings. *Current Psychiatry Reports*, *9*(6), 449–459. https://doi.org/10.1007/s11920-007-0061-3

Watts, R., Day, C., Krzanowski, J., Nutt, D., & Carhart-Harris, R. (2017). Patients' accounts of increased "connectedness" and "acceptance" after psilocybin for treatment-resistant depression. Journal of Humanistic Psychology, 57(5), 520–564. https://doi.org/10.1177/0022167817709585

Appendices

Appendix A: Survey Advert

Appendix B: Informed Consent

Participant Information Sheet for Respondents of Online Questionnaire on Effects of Previous Psychedelic Use.

UCL Research Ethics Committee Approval ID Number: 9437/002

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Title of Study: Psychedelics online survey: an investigation into various predictors, mediators, and psychological mechanisms of action.

Department: Research Department of Clinical, Educational and Health Psychology

Name and Contact Details of the Researcher(s):
Sunjeev Kamboj (Professor) - [redacted]
Rosalind McAlpine (PhD Student) - [redacted]uk
Agathe Fauchille (PhD Student) - ag[redacted]
Yasmeen Hayat (DClinPsy Trainee) [redacted]k
Fiona Bailey (DClinPsy Trainee) - [redacted]
Max Wood (DClinPsy Trainee) - n[redacted]
Katarina Krajnovic (Undergraduate Student) – k[redacted]uk.

Name and Contact Details of the Principal Researcher:
Prof. Sunjeev Kamboj - sunjeev.kamboj@ucl.ac.uk

You are being invited to take part in a study about the use of psychedelics.

Before you decide whether you will consent to participating, it is important for you to understand why the research is being done and what participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part.

Thank you for reading this.

What is the project's purpose?
The aim of this online questionnaire is to investigate how psychedelics effect mental wellbeing and personal beliefs.

We are interested in the following two hypotheses:

1) How *prior* preparatory practices, 'set and setting', and behaviours *during* the psychedelic experience influence the quality of the psychedelic experience
2) How these influence the consequent self-reported changes in mental health symptoms, well-being, and beliefs.

We hope these findings will improve our understanding of the use of psychedelics for therapeutic purposes, and potentially help us to develop new treatments for disorders like anxiety, depression, and PTSD.

Why have I been chosen?
We aim to recruit 1000 participants aged 18+ to take part in this study. You have been identified as you have indicated that you have previously used psychedelics (in any setting) and have found our Qualtrics survey that we have disseminated on social media, shared with psychedelic research groups, and posted in online psychedelic user forums.

Do I have to take part?
No, it is up to you to decide whether to take part or not. If you do take part, you will be asked to sign an online consent form. You are free to withdraw from the study at any time without giving a reason, even after giving your consent and without any loss to any benefits to which you are entitled.

If you decide to withdraw, you have a choice with what will happen to any data you have provided. All data will initially be anonymized.

What will happen to me if I take part?
Before participating in the study, you will be asked to complete a consent form. If you decide to take part in this study, you will be able to complete an online questionnaire that will ask you for a series of questions relating to some of the following variables:

- Demographics
- Previous psychedelic and drug use (requirement for taking part in the study)
- Mental health history
- Preparatory practices
- Priming and exposure to psychedelic culture
- Personality traits
- Attachment styles
- Set and intention prior/during the psychedelic trip
- Setting during the psychedelic trip (e.g., group settings vs. alone; use of music)
- Quality of the acute psychedelic experience
- Psychological variables
- Mental health and wellbeing post psychedelic trip
- Spiritual and/or religious beliefs

This online questionnaire will be completed only once and should take around 30-40 minutes to complete.

Will I be recorded and how will the recorded media be used?

There will be no video monitoring of you during the study.

What are the possible disadvantages and risks of taking part?
Overall, we believe the risks of taking part in this study are low. However, like any research, we cannot guarantee zero risk to you. From our current knowledge, we do not know of any significant risks associated with completing this type of questionnaire. However, it is important to know that you will reflect on your psychedelic experiences, which may bring up some personal feelings and emotional memories. This may cause some moderate temporary feelings of distress in some people.

Nonetheless, you should not take part if you believe that recalling or describing an emotionally memory will cause you a lot of distress. You can of course stop taking part at any stage of the questionnaire. You will not be asked to re-join the study.

What are the possible benefits of taking part?
Whilst there are no immediate benefits for those people participating in the project, it is hoped that you will find participation in this study interesting. Your participation will also help improve our general understanding of psychedelic processes which may be relevant in the development of new psychological therapies.

What if something goes wrong?
If you have any complaints about taking part in this study, you should contact the principal supervisor Professor Sunjeev Kamboj (*details at the top of this document*). If you feel your complaint is not handled to your satisfaction after speaking to Professor Kamboj, you can contact the Chair of the UCL Research Ethics Committee ethics@ucl.ac.uk.

Will my taking part in this project be kept confidential?
Information about you that is collected during your participation in this research will be kept strictly confidential and stored securely in accordance with the Data Protection Act 2018. Only researchers directly involved in the study will have access to the data. The results of this research may be disseminated in peer-reviewed scientific journals, but you will in no way be identifiable in any publication. You may request feedback when the study is completed.

Limits to confidentiality
Please note that confidentiality will be maintained as far as it is possible, however if anything is disclosed that indicates that someone might be in danger of harm, I or the University might have to inform relevant agencies of this. Confidentiality will be respected subject to legal constraints and professional guidelines and will be maintained unless there are compelling and legitimate reasons for this to be breached, for example if we were seriously concerned for your safety or the safety of others. If this was the case, we would inform you of any decisions that might limit your confidentiality.

What will happen to the results of the research project?
The data from this research project will be disseminated through standard scientific outlets, for example in peer-reviewed papers, talks and conference posters. The data will also be included in Master's and/or PhD theses.

Your data may be stored indefinitely and numerical data and limited (non-identifiable) data may be shared with others outside the research group for the purposes of further scientific research. Any information you provide will be kept securely for the duration of the study (or longer, if you consent to being contacted for future research) and would not be included in any data shared with other researchers. The data you provide through participating in the study may be archived online as "open data" following publication of any resulting papers, in a de-identified form. Any such data could be downloaded by anyone with an internet connection and used for any purpose. Any data that could identify you personally would be removed before online archiving. You can request to be sent a copy of the published results.

Local Data Protection Privacy Notice
The data controller for this project will be University College London (UCL). The UCL Data Protection Office provides oversight of UCL activities involving the processing of personal data and can be contacted at data-protection@ucl.ac.uk. UCL's Data Protection Officer can also be contacted at data-protection@ucl.ac.uk.

If you are concerned about how your data is being processed, please contact UCL in the first instance at data-protection@ucl.ac.uk. If you remain unsatisfied, you can also contact the Information Commissioner's Office (ICO). Contact details, and details of data subject rights, are available on the ICO website at: https://ico.org.uk/for-organisations/data-protection-reform/overview-of-the-gdpr/individuals-rights/

This 'local' privacy notice sets out the information that applies to this study. Further information on how UCL uses participant information can be found in our 'general' privacy notice:

For participants in health and care research studies, see http://www.ucl.ac.uk/legal-services/privacy/participants-health-and-care-research-privacy-notice
The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices.

Who is organising and funding the research?
The research is organised by the Clinical, Education and Health Psychology Department, UCL.

Contact for further information
Please discuss the information above with others if you wish, and please contact the researchers if there is anything that is not clear or if you would like more information. You will be given a copy of this information sheet and a consent form to keep.

Thank you for reading this information sheet and for considering taking part in this research study.

CONSENT FORM FOR PREVIOUS PSYCHEDELIC USERS

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: Psychedelics and mental health online survey: an investigation into various predictors, mediators and psychological mechanisms of action.

Department: Faculty of Brain Sciences
Name and Contact Details of the Researcher(s):

- Rosalind McAlpine [redacted]
- Agathe Fauchille [redacted]
- Max Wood [redacted]
- Yasmeen Hayat [redacted]
- Fiona Bailey [redacted]
- Katarina Krajnovic [redacted]

Name and Contact Details of the Principal Researcher: Sunjeev Kamboj sunjeev.kamboj@ucl.ac.uk
Name and Contact Details of the UCL Data Protection Officer: Alexandra Potts data-protection@ucl.ac.uk
This study has been approved by the UCL Research Ethics Committee: Project ID number: 9437/002

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet, please ask the researcher before you decide whether to join in.

I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

		Tick Box
1.	I confirm that I have read and understood the Information Sheet for the above study. I have had an opportunity to consider the information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction and would like to take part in an online survey.	
2.	I understand that I will be able to withdraw my data at any time before completion of the survey	
3.	I consent to participate in the study. I understand that the information I provide *(*including my age, gender, ethnicity, and the location and personal aspects of my psychedelic experience*)* will be used for the purposes explained to me. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing.	
4.	I understand that my data gathered in this study will be stored anonymously and securely. It will not be possible to identify me in any publications.	

5.	I understand that my information may be subject to review by responsible individuals from the University or monitoring and audit purposes.	
6.	I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason.	
7.	I understand the potential risks of participating.	
8.	I understand the direct/indirect benefits of participating.	
9.	I understand that I will not benefit financially from this study or from any possible outcome it may result in in the future.	
10.	I agree that my anonymised research data may be used by others for future research. No one will be able to identify you when this data is shared.	
11.	I understand that the information I have submitted will be published as a report and I wish to receive a copy of it. Yes/No	
12.	I consent to my online survey being stored and understand that the content will be: (a) Stored anonymously, using password-protected software and may be used for training, quality control, audit and specific research purposes.	
13.	I hereby confirm that: (a) I understand the exclusion criteria as detailed in the Information Sheet; (b) I do not fall under the exclusion criteria.	
14.	I am aware of who I should contact if I wish to lodge a complaint.	
15.	I understand my (anonymised) quotes may be used in published papers and theses.	
16.	I voluntarily agree to take part in this study.	
17.	I would be happy for the data I provide to be archived on a secure portal at UCL. I understand that other authenticated researchers will have access to my anonymised data.	

If you would like your contact details to be retained so that you can be contacted in the future by UCL researchers who would like to invite you to participate in follow up studies to this project, or in future studies of a similar nature, please tick the appropriate box below.

	Yes, I would be happy to be contacted in this way	
	No, I would not like to be contacted	

Appendix C: Ethical Approval

UCL RESEARCH ETHICS COMMITTEE
OFFICE FOR THE VICE PROVOST RESEARCH

21st July 2022

Professor Sunjeev Kamboj
Research Department of Clinical, Educational and Health Psychology
UCL

Cc: Rosalind McAlpine, Agatha Fauchille, Fiona Bailey, Yasmeen Hayat, Maximillian Wood & Katarina Krajnovic

Dear Professor Kamboj

Notification of Ethics Approval with Provisos
Project ID/Title: 19437/002: Psychedelics and mental health online survey: an investigation into various predictors, mediators and psychological mechanisms of action

Further to your satisfactory responses to the Committee's comments, I am pleased to confirm in my capacity as Chair of the UCL Research Ethics Committee (REC) that your study has been ethically approved by the UCL REC until **1st June 2024.**

Ethical approval is subject to the following conditions:

Notification of Amendments to the Research
You must seek Chair's approval for proposed amendments (to include extensions to the duration of the project) to the research for which this approval has been given. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing an 'Amendment Approval Request Form' https://www.ucl.ac.uk/research-ethics/responsibilities-after-approval

Adverse Event Reporting – Serious and Non-Serious
It is your responsibility to report to the Committee any unanticipated problems or adverse events involving risks to participants or others. The Ethics Committee should be notified of all serious adverse events via the Ethics Committee Administrator (ethics@ucl.ac.uk) immediately the incident occurs. Where the adverse incident is unexpected and serious, the Joint Chairs will decide whether the study should be terminated pending the opinion of an independent expert. For non-serious adverse events the Joint Chairs of the Ethics Committee should again be notified via the Ethics Committee Administrator within ten days of the incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol.

The Joint Chairs will confirm that the incident is non-serious and report to the Committee at the next meeting. The final view of the Committee will be communicated to you.

Office of the Vice Provost Research, 2 Taviton Street
University College London
Tel: +44 (0)20 7679 8717
Email: ethics@ucl.ac.uk
http://ethics.grad.ucl.ac.uk/

Final Report

At the end of the data collection element of your research we ask that you submit a very brief report (1-2 paragraphs will suffice) which includes in particular issues relating to the ethical implications of the research i.e. issues obtaining consent, participants withdrawing from the research, confidentiality, protection of participants from physical and mental harm etc.
In addition, please:

- ensure that you follow all relevant guidance as laid out in UCL's Code of Conduct for Research;
- note that you are required to adhere to all research data/records management and storage procedures agreed as part of your application. This will be expected even after completion of the study.

With best wishes for the research.

Yours sincerely

Professor Lynn Ang
Joint Chair, UCL Research Ethics Committee

Appendix D: All Measures and Investigated Areas

List of Measure

Self-constructed Demographic Questionnaire

Adapted Psychedelic Preparation Scale

BFI: extraversion subscale

The Experience in Close Relationship Scale - short form (ECR-S)

Inclusion of Self in Other Scale

State of Surrender (SoS)

Mystical Experiences Questionnaire Challenging Experience Questionnaire

The adapted psychedelic Communitas Scale (COMS)

Emotional breakthrough Inventory (EBI)

Response to Challenging Experiences Self-constructed measure by co- researcher, Max Wood

Self-constructed Impact of Experience Measure by co- researcher Ros McAlpine

Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS)

Areas Investigated

1. Fiona Bailey (Dclinpsy): Relationship between attachment style, mystical experience, communitas and changes in wellbeing
2. Max Wood (Dclinpsy): Exploring different acute management strategies of challenging experiences as predictors for emotional breakthrough
3. Rosalind McAlpine (PhD): Relationship between preparation, acute and long-term experiences.
4. Agathe Fauchille (PhD): Relationship between pre-existing spiritual beliefs, music and short- and long-term outcomes.