

A Longitudinal Study of Resilience Among Participants Attending Ayahuasca Retreats
in Latin America

Dissertation

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By

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Abstract

Ayahuasca, a psychoactive drug from the Amazon basin, may occasion a dynamic set of both positive and negative acute effects. Some of the most common acute effects involve difficult and challenging physical (e.g., nausea, vomiting, diarrhea) and emotional (e.g., frightening hallucinations, paranoia) experiences, and yet many people also report that these difficult and challenging effects contribute to healing and beneficial outcomes (e.g., improved spiritual well-being, life satisfaction, and meaning in life). To understand how people experience different acute effects of ayahuasca, especially the acute challenging effects, and achieve positive psychospiritual outcomes, a Resilience Framework was applied in this study to explore whether levels of resilience could explain this phenomenon. To date, no research study has assessed whether resilience influences acute ayahuasca effects and if resilience is a potential moderator of the relationship between acute ayahuasca effects and psychospiritual outcomes.

This dissertation adopted a longitudinal study design with three timepoints (baseline before retreats: T1; right after retreats: T2; One-month follow-up: T3). In total, 267 participants completed the baseline (T1) survey and enrolled in this study, 247 completed the post-retreat (T2) survey, and 233 completed the one-month (T3) survey. There are 233 participants who completed all three timepoints ($M_{age}=41.20$, $SD=11.41$). The majority of participants were from the North America, reported their biological sex was female, identified as White/Caucasian, reported have at least attended/completed college degree, reported past psychedelic use experience before the retreats, and reported intention for treatment and spiritual improvement by attending ayahuasca retreats.

Findings from hierarchical regression analyses revealed that baseline resilience was a significant predictor of the acute challenging experiences of ayahuasca after controlling for neuroticism ($\Delta F(1,230)=5.797, p=0.017, \text{Adjusted } R^2=.053$). There was a positive association between resilience and acute challenging experience ($\beta=0.183, t=2.408, p=0.017$) indicating higher levels of baseline resilience predicted more intense acute challenging experience of ayahuasca. Additionally, results from multiple regression analyses with interaction terms demonstrated significant moderation effects of baseline resilience on the relationship between acute challenging experiences and the search for meaning in life ($\beta=0.154, t=2.444, p=.015$) as well as on the relationship between uncomfortable ayahuasca experiences and the search for meaning in life ($\beta=0.134, t=2.134, p=0.034$) while controlling for neuroticism. Lastly, findings revealed a significant positive canonical correlation ($F_{144,1659.596}=2.978, R_c=0.761, p<.001$) between the independent set of acute effects of ayahuasca (emotional breakthrough, mystical experience, psychological insight experience) and the dependent set of psychospiritual outcomes (satisfaction with life, presence of meaning in life, spirituality index well-being life-scheme, and persisting effects on sense of personal well-being, sense of life's purpose, sense of life's meaning, social relationships, attitudes about life, attitudes about self, mood, behaviors, how spiritual you are, and attitudes about death), while controlling for acute challenging effects, setting, neuroticism, spiritual intention, search for meaning in life, spiritual index well-being self-efficacy, and human flourishing. The canonical correlation explained 55.94% of the variance in the model.

The study findings contribute to the understanding of the mechanisms of ayahuasca effects and resilience, highlighting ayahuasca's therapeutic potential from a resilience standpoint.

The innovative attempt in adopting a Resilience Framework in ayahuasca research has provided unique perspectives of the complex mechanisms during natural healing process which also emphasized the importance to be culturally sensitive when integrating traditional healing wisdom in scientific and clinical approaches. Future studies should consider integrating resilience framework with other potential supplementary conceptual frameworks, such as the Eastern philosophy of Integrative Body-Mind-Spirit model, to provide a more comprehensive understanding of ayahuasca effects and related outcomes by viewing individuals in the totality of their psychological, spiritual, and physical dimensions of health and well-being.

Dedication

To my resilient self.

Acknowledgments

I would like to express my heartfelt gratitude to the organizations and individuals who made this research possible. First, this project was made possible through the generous support of five research grants: the Alumni Grants for Graduate Research (Dissertation) at the Ohio State University (OSU), the College of Social Work Student Seed Grant at OSU, the Office of International Affairs International Research and Scholarship Grant at OSU, the 2022 Dissertation Grant from the Center for Psychedelic Drug Research and Education at OSU, and the 2022 Student Grant from the Source Research Foundation. Additionally, special thanks go to Soltara Healing Center and its co-founder, Ms. Melissa Stangl, for their significant assistance in data collection by sending out recruitment emails to their registered upcoming participants on my behalf throughout the entire recruitment period. Furthermore, I sincerely appreciate all the study participants who dedicated time and effort to completing the surveys, sharing their ayahuasca experiences, and sending me encouraging emails. Your support of my research demonstrated the collective dedication and community involvement to advance scientific development. I am deeply grateful for it.

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opportunities you have presented, the encouragement you have provided during the moments of hesitation and self-doubt, and our meaningful conversations that have motivated me to keep pushing forward. Thank you for the countless hours you spent meeting with me to discuss my research ideas and brainstorm with me, connecting me with valuable resources, and writing me many recommendation letters when I was seeking scholarship and job opportunities. I could not have achieved what I have today without your mentorship. Thank you for being that gardener who nurtured my growth from an academic “seed” into a thriving “plant”.

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Field of Study

Major Field: Social Work

Specialization: Mental Health and Substance Use

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Chapter 1. Introduction

This chapter sets the study foundation by outlining the background of ayahuasca use and ayahuasca effects, presenting statements of problems that this study aims to address, identifying knowledge gaps in the field, and reviewing the study design, rationale, and its significance to psychedelic science.

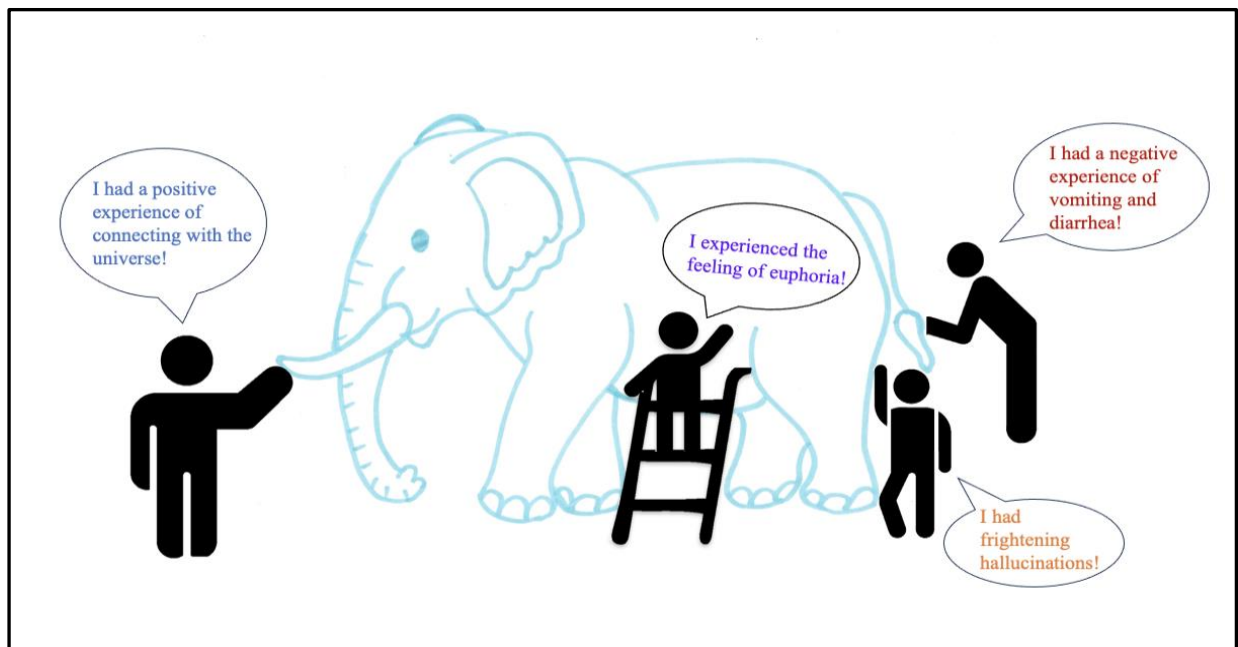
Background

Ayahuasca, the “great medicine” from the Amazon basin, is a powerful psychoactive brew that has been used traditionally by indigenous people as an herbal or plant medicine for religious and therapeutic purposes (González et al., 2019; González et al., 2020; Labate & Cavnar, 2014; Schultes et al., 1992). As the authors of the book *Plants of Gods* mentioned: “the use of hallucinogenic plants has been a part of human experience for many millennia, yet modern Western societies have only recently become aware of the significance that these plants have had in shaping the history of primitive and even of advanced cultures” (Schultes et al., 2001). It is widely believed that the history of the traditional use of ayahuasca in the Upper Amazon has lasted over centuries for spiritual and healing purposes (Tupper, 2008), but was relatively unknown to the outside world until the first arrival of the Europeans (Labate & Cavnar, 2014).

Just like William Shakespeare said, “There is nothing either good or bad but thinking makes it so” (1599~1601). Ayahuasca itself cannot be defined simply as good or bad, and ayahuasca experiences cannot be categorized roughly as beneficial or challenging. Over centuries, some religions employed hallucinogenic plants such as ayahuasca, in their religious or spiritual events to communicate with their God(s) and to promote spiritual growth (Vozar, 2019); wherein ayahuasca experiences were often tied with difficult and challenging physical

experiences (i.e., vomiting, diarrhea) and challenging emotional effects (i.e., frightening hallucinations, paranoia, gained new insights too fast and not ready for it). However, self-reported ayahuasca experiences can be largely impacted by individual differences, the uniqueness of their ayahuasca experiences, and the way they interpret the perceived acute drug effects. As the old saying goes, “No two leaves are alike, and yet there is no antagonism between them or between the branches on which they grow” (Mohandas Karamchand Gandhi, n.d.). No two individuals experiencing the same ayahuasca experience, and each person’s ayahuasca experiences usually are only parts of the bigger picture of the overall ayahuasca experience. This concept mirrors the lesson from the poem “the blind men and the elephant” demonstrated (refer to *Figure 1*), where each blind man perceives only a part of the whole experience.

Figure 1.
Ayahuasca Experience



Note. Poem by John Godfrey Saxe (1816-1887); Cartoon originally copyrighted by the author.

In recent years, interest and attention has grown regarding ayahuasca, becoming popular worldwide among people seeking a mystical experience for spiritual growth or healing from past trauma. Indeed, many people from the United States (U.S.) and elsewhere travel to Central and South America (e.g., Costa Rica, Brazil, Peru) to attend Ayahuasca ceremonies in retreat centers with guidance by experienced Shipibo shamans (Kubala, 2019). However, the risks and benefits of ayahuasca use and whether it should be banned or implemented for therapeutic use has sparked considerable controversy (Labate & Cavnar, 2014).

Statement of the Problem

With the renaissance of herbal/plant medicine research and culture over the past few years, increasing interest has been given to ayahuasca for its therapeutic potential in treating various mental disorders and psychospiritual healing related to trauma (Nielson et al., 2021). Recently, there is a boom in ayahuasca tourism, which refers to Western tourists traveling to Central and South America intending to consume ayahuasca in the Amazon for spiritual/mystical experiences, healing from past trauma, or recovery from serious illnesses and addictions (Babe, 2016; Nielson et al., 2021). One factor contributing to the booming ayahuasca tourism industry is the illegality of ayahuasca in almost all Western countries (e.g., U.S., Canada, Europe, Australia), whereas the consumption of ayahuasca is legal in most Latin American countries (e.g., Peru, Costa Rica, Brazil). An estimated tens of thousands of western tourists travel to Peru to experience ayahuasca traditional ceremonies each year (Macdonald, 2017); and hundreds of retreat centers can be easily found online in Latin America for tourists to review and register for ayahuasca tourism (Retreat Guru, n.d.). According to anecdotal data, the biggest ten ayahuasca retreats in Peru can make nearly \$6.84 million annually by hosting westerners (Barrett, 2019);

and most clients participate in a 5-night or 7-night ayahuasca retreat experience with 3-4 ayahuasca ceremonies in Latin America which cost up to \$2600-\$9800 on average in the retreat center depending on the packages (e.g., type of suite, size of bed, food, floral baths, one-on-one consultation with the shaman, etc.) (Álvarez, 2019; Crisafulli, 2019; Macdonald, 2017; Soltara, n.d.).

Some of the most reported acute psychoactive effects of ayahuasca involve difficult and challenging physical experiences and emotional distress. Some participants described these experiences in trip as “bad trip”, and yet many people also self-report that these difficult and challenging effects contribute to healing and beneficial outcomes and described their trip as “good trip”. To understand how people experience different acute effects and psychospiritual outcomes, the Resilience Framework, which specifies the protective role of resilience and protective processes on buffering effects in health that has been supported in prior studies (Havnen et al., 2020; Joyce et al., 2019; Masten et al., 2008; Rutter, 2012), was applied in this study. For this study, resilience is defined as one’s capability to achieve positive adaptation despite challenges and find positive meaning from it. Furthermore, ayahuasca shares a rich history in many cultures as a sacred plant to seek for healing from past trauma and spiritual growth, exploring its therapeutic potentials would be beneficial for our understanding that healing can take different paths in different ways. However, more knowledge is needed about how and in what ways one’s levels of resilience and past challenges may affect their ayahuasca experiences should one choose to seek out these experiences.

Knowledge Gap and Theoretical Overview

To date, no study has assessed whether resilience influences acute ayahuasca effects, especially acute challenging effects of ayahuasca, and the potential moderating role of resilience on the relationship between acute ayahuasca effects and psychospiritual outcomes. As more and more people travel to Latin America for the ayahuasca retreats, little is known by the public about the acute and enduring effects of ayahuasca and what they should expect after taking ayahuasca. There is a need for research studies that focus on ayahuasca effects and related outcomes and potential buffering factors (e.g., resilience) in outcomes for public education. Therefore, I pursued the following three specific aims in this dissertation study using a longitudinal study design with three timepoints among attendees at an ayahuasca retreat center in Costa Rica and Peru (conceptual model in *Figure 2*): **Aim 1**: Explore the effect of baseline (time 1: T1) resilience on acute challenging effects of ayahuasca reported at the end of the retreat experience (time 2: T2). **Aim 2**: Assess whether the baseline resilience moderates the relationship between acute challenging ayahuasca effects reported at T2 and psychospiritual outcomes reported one-month post-retreat (T3). **Aim 3**: Examine the potentially additive relationships between challenging effects and other acute effects of ayahuasca (e.g., mystical, insight, emotional breakthrough) reported at T2 and psychospiritual outcomes reported at T3.

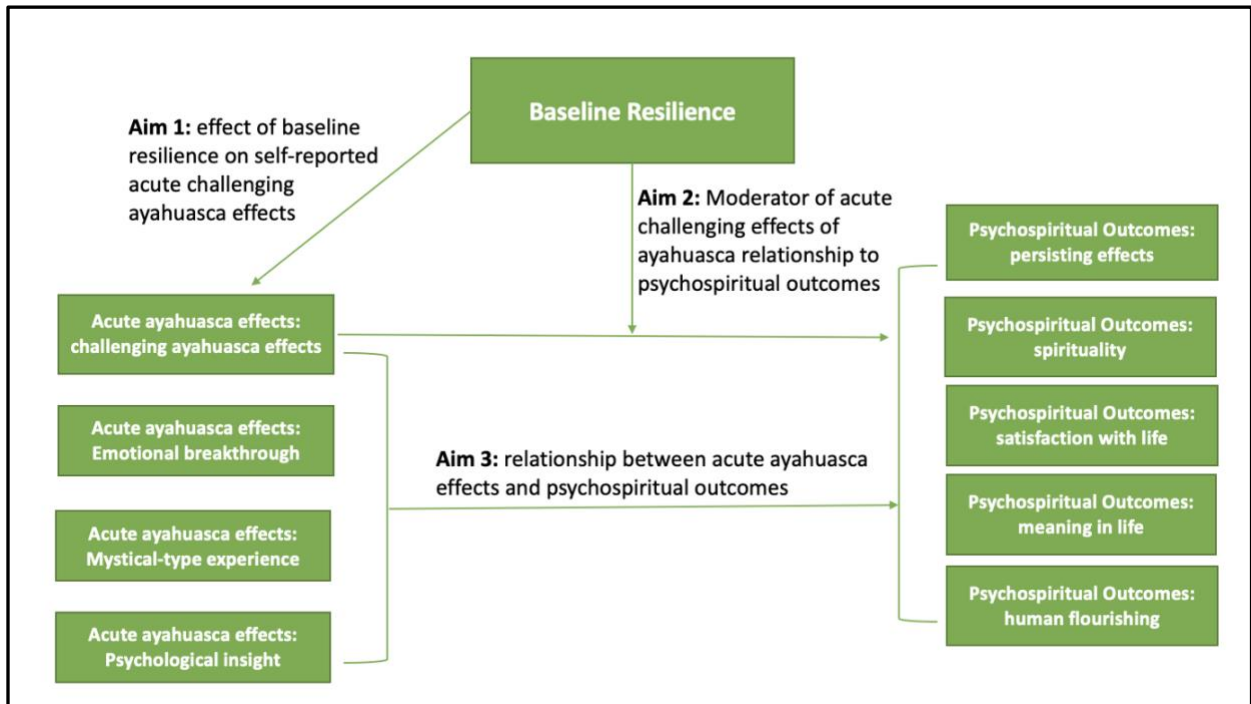
Overview of the Study

Study Context

To address these aims, I partnered with the Soltara Healing Center and recruited participants attending its ayahuasca retreats from two locations: Costa Rica and Peru. The retreat center agreed to support this dissertation study by allowing the researcher to use their center as a

study site (see the support letter from Soltara in *Appendix A*). Following Institutional Review Board (IRB) approval (IRB #2022B0158), a Certificate of Confidentiality (CoC) from the National Institutes of Health (NIH) was obtained as a layer of protection to protect participants' data privacy and security. With CoC, we are not required to disclose any identifiable and sensitive information collected about our participants as a part of this study in a lawsuit or legal proceeding without participants' consent. Then, a representative from Soltara Healing Center continued to send out the recruitment email to all their registered and upcoming clients for the ayahuasca retreat, starting from August 2022 until this study reached the planned sample size in August 2023. The email included a link leading them to the confidential Qualtrics survey with informed consent and study introduction. Participants who confirmed their eligibility in the consent form and completed the screening survey was contacted by the researcher via email for

Figure 2.
Conceptual Model of The Study

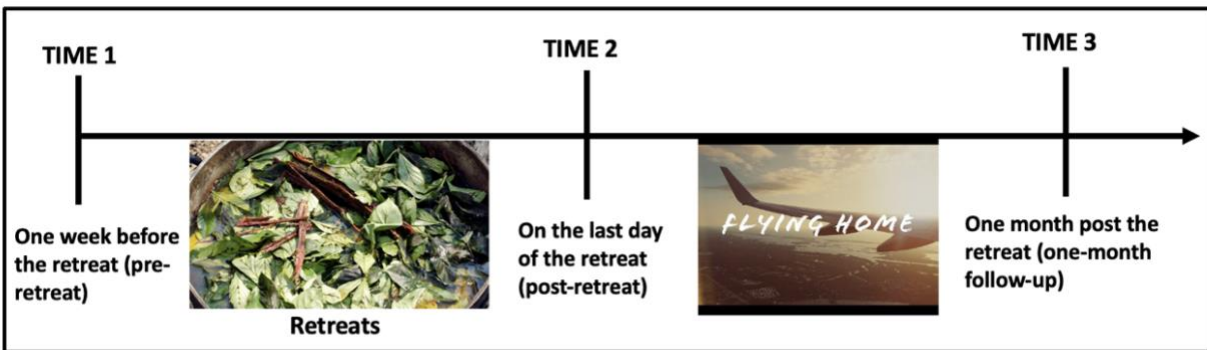


invitation to the formal study surveys and incentive distribution at different timepoints. All data collected from participants remain confidential, as documented by the CoC.

Study Overview

Research Design. Data of eligible participants for this study was collected via online surveys built in Qualtrics and deployed at three timepoints (timepoint flowchart, see *Figure 3*). This study design allowed linkage of baseline characteristics and later outcomes and present interesting potential causal/interaction mechanisms (Park & Rainsberry, 2020).

Figure 3.
Timepoint Flowchart of The Study



Procedure. Eligibility criteria to participate in the study, include: **1)** at least 18 years old; **2)** passed Soltara’s medical intake screening to attend ayahuasca ceremonies; **3)** are able to read, write, and speak English fluently; **4)** attended 5-7 nights of retreats experience with 3-4 ayahuasca ceremonies. Incentives are provided for eligible participants who completed the survey at the following rate: \$15 at T1, \$20 at T2, \$25 at T3 (\$60 in total).

Sample. During the study design phase, a sample of 313 participants was proposed to be enrolled and 250 (goal of 80% retention) complete all surveys for the study based on power analyses conducted in G*Power 3 (Faul et al., 2007) and SPSS version 27 (IBM Corp., 2020).

The researcher calculated sample size for my primary outcome measures (Aim 1) based on data from a similar study design that assessed resilience and its predicting role on outcome variables (e.g., depression, satisfaction with life, spirituality, functional independence) during rehabilitation after a traumatic injury event (Correlation range $r=0.3-0.5$, $p<.05$; White et al., 2010). I believed the White et al.'s study (2010) was the most appropriate study for sample size calculation because of the similarity of the study design and primary variables, which examined the role of predictor for resilience on psychospiritual outcomes (e.g., spirituality, satisfaction with life) among participants who had challenging experiences. In White et al.'s study (2010), findings revealed that greater levels of resilience are associated with lower levels of depression ($r=0.48$, $p<0.05$), greater levels of satisfaction with life ($r=0.69$, $p<0.05$) and spirituality ($r=0.56$, $p<0.05$). Based on the data from White et al., (2010), a sample size calculation was conducted in SPSS and G*Power for the current study with a large effect of baseline resilience on predicting positive acute effects of ayahuasca which further predicts positive psychospiritual outcomes, and statistic results indicated that a sample size of 250 with a moderate coefficient of 0.30. will provide a statistical power of 95% at an alpha level of .05 with 2 sided tails. With a goal of 80% retention, this study needed to recruit at least $250/80\%=313$ participants initially for the survey at T1. Furthermore, I was not aware of any experimental study that assessed the moderation role of baseline resilience among the relationship between acute effects of drugs and psychospiritual outcomes for me to use for sample calculation. However, one prior research study examined resilience as a moderating factor between stress and alcohol-related consequences (e.g., feel sick, be late for duty, been arrested, got into physical fight) among veterans of the U.S. National Guard (Morgan et al., 2018). Morgan et al.'s study surveyed a sample size of 320 participants,

and results revealed that resilience significantly moderated the relationship between stress and alcohol-related consequences (Morgan et al., 2018). Given the similarity of my calculated sample size (N=313) based on White et al.'s data (2010) and the sample size (N=320) from Morgan et al.'s study (2018), my proposed sample size of 313 based on prior literature and statistical calculation should be appropriate and meet statistical guidelines for my study.

Rationale & Significance to The Field

The *objectives* of this research study were to investigate baseline resilience as a predictor of acute challenging ayahuasca effects and its potential moderating role in the relationship between acute challenging effects and psychospiritual outcomes. The *rationale* for this study was the potential of utilizing the findings of this study to promote public understanding of ayahuasca retreats and related effects through the concept of Resilience Framework, and how it might align with the harm-reduction approach in today's clinical treatment on personal health; and develop knowledge about how and in what ways one's levels of resilience and past challenging situations might affect their ayahuasca experiences should one choose to seek out these experiences, and how resilience and individuals' personal perspectives (e.g., life satisfaction) might change due to the ayahuasca retreat should one expect to experience.

This dissertation study is the first study of its kind to explore roles of baseline resilience on acute challenging ayahuasca effects and psychospiritual outcomes. Indeed, with the current epidemics of depression, anxiety and suicide happening in today's society, especially during the global COVID-19 pandemic, police brutality, racial and gender injustice, environmental disasters, economic recession, political conflicts between regions and countries, and all other aspects of crises, people of all walks of life need a chance to recover and heal from their traumas,

pain, distress, and emotional scars (Labate & Cavnar, 2021). Ayahuasca shares a rich history in many cultures as a sacred plant to seek for healing from past trauma and spiritual growth, exploring its therapeutic potentials in science today would be beneficial for human being's healing journey and awakening transformation. Researching ayahuasca within the context of current global changes would offer a unique opportunity to reflect on human well-being and foster resilience toward healing. However, more knowledge is needed about how and in what ways one's levels of baseline resilience and past challenging situations may affect their ayahuasca experiences should one choose to seek out these experiences, and how resilience and individuals' personal perspectives (e.g., life satisfaction) may change due to the ayahuasca retreat should one expect to experience.

Findings from this dissertation study have the potential to fill the knowledge gap in the literature about baseline resilience's predicting role on acute challenging ayahuasca effects, and baseline resilience's moderating role on the relationship between acute challenging ayahuasca effects and psychological outcomes. With thousands of people traveling to Latin America for the ayahuasca retreats and increasing interests in this plant medicine in the health field (e.g., public health, medicine, social work, psychology, psychiatry), limited information is known by the public about the effects of ayahuasca retreats and what outcomes they should expect after consuming ayahuasca, and little support has been given to ayahuasca retreats participants after coming home due to the lack of knowledge and evidence about ayahuasca retreats and ayahuasca's acute and enduring effects in the clinical field. Evidence from this dissertation study will also provide more information for public education about ayahuasca experiences and effects, and improve clinicians' ability to provide ayahuasca-related case management or counseling

sessions with research evidence for individuals who seek out for help following their ayahuasca retreat experience or those who are interested in attending retreats. Study findings from this project and the Resilience Framework may inspire researchers and clinicians in intervention designs for individuals who participated in ayahuasca retreats but reported challenging experiences to learn to conceptualize their experience through the Resilience Framework, which may further help them integrate their experience.

Chapter 2. Literature Review and Theoretical Underpinnings

In this chapter, a comprehensive review of existing literature and theoretical underpinnings on ayahuasca legality, ongoing debates about drug scheduling, the acute and enduring effects of ayahuasca, ayahuasca use-related psychospiritual outcomes, existing baseline predictors of psychedelic experiences, and the resilience concept and resilience theories are presented. Additionally, this chapter also demonstrates study's conceptual framework and highlights its innovative contributions to the field.

Ayahuasca Legality & Debates on Drug Scheduling

One factor contributing to the booming ayahuasca tourism industry is the illegality of ayahuasca in almost all Western countries (e.g., U.S., Europe, Canada, Australia), whereas the consumption of ayahuasca is legal in most Latin American countries. The main active ingredients of ayahuasca include N,N-Dimethyltryptamine (DMT), a structural analogue of serotonin that could be found commonly and naturally within plants and in human brains and body fluids (Nielson et al., 2021). However, in many western countries' laws, DMT and other psychedelic drugs (e.g., Peyote and mescaline, psilocybin, ketamine, Lysergic acid diethylamide (LSD), and 3,4-Methylenedioxymethamphetamine (MDMA)) are “controlled substances” and therefore are generally prohibited from possessing or consuming unless an exemption is granted from the legal authority (DEA, n.d.; Government of Canada, 2020). Drugs/substances are classified into different schedules based on their acceptable medical use and drug addiction or dependency potential: schedule I drugs are considered to have the highest potential for drug addiction and severe psychological and physical outcomes; the addiction potential and severity of outcomes are alleged to decrease for schedule II drugs, schedule III drugs, and so on (DEA,

n.d.). Different countries have different regulations for psychedelics in drug schedules. For example, in the U.S., according to the U.S. Federal Comprehensive Drug Abuse Prevention and Control Act of 1970, which is also known as the Controlled Substances Act (CSA) of 1970 (Pharmacist's manual, 2020; Abood, 2001), DMT, LSD, MDMA, psilocybin (magic mushroom), Peyote and mescaline are all classified as Schedule I drugs, which have no accepted medical use due to their high potential for drug addiction; and ketamine is classified as a Schedule III drug, indicating its moderate to low potential for drug dependence (DEA, n.d.). Whereas in Canada, Health Canada regulates DMT under their Controlled Drugs and Substances Act (CDSA) as a Schedule III drug, MDMA and ketamine as schedule I drugs, and LSD and psilocybin are Schedule III drugs (McDonald & Rock, 2020).

Interestingly, more and more data and debates today on drug scheduling directing that the designation is not consistent with scientific evidence. Increasing research studies revealing that psychedelic drugs might contribute to beneficial effects on mental and physical health outcomes and showing a lack of evidence of addiction (Barbosa et al., 2012). For example, recent evidence shows that DMT, the main psychoactive ingredient of ayahuasca, plays a neuroprotective role in the brain by activating the sigma-1 receptor (Sig-1R), a protein in the endoplasmic reticulum (ER) membranes to correct the transmission of ER stress into the nucleus which leads to enhanced anti-stress and anti-anxiety protein production (Szabo et al., 2016). In other words, it creates more survival opportunities for the neuronal cells under hypoxic stress, indicating its therapeutic potential in dealing with intense stress in the body (Szabo et al., 2016; Scheidegger, 2021). Moreover, prior studies stated that almost no hallucinogen users had difficulty cutting down or controlling use compared with other drugs (Morgenstern et al., 1994), the reinforcing

effects of DMT is weak (Fantegrossi et al., 2004), and ayahuasca was reported to have few or none of the negative psychosocial implications caused by drugs of abuse (Fábregas et al., 2010). Furthermore, several studies explored the safety issues of ayahuasca use and more research evidence suggested that regular ayahuasca use is considerably safe without concern of pharmacological tolerance even after repeated administration (Barbosa et al., 2012; Dos Santos et al., 2012; Scheidegger, 2021), which is *inconsistent* with the drug scheduling criteria (i.e., DMT is classified as a Schedule I drug in CSA of 1970, meaning the highest potential for drug addiction). Nevertheless, the inconsistency between drug scheduling and research evidence contributes to a situation wherein access to ayahuasca is restricted in the U.S. and encourages international travel to locations where ayahuasca can be experienced in legal contexts, such as in Latin American countries.

Effects of Ayahuasca

Acute Effects of Ayahuasca

In psychedelic context, acute effects generally refer to the short-term responses or alterations that occur to physical, psychological, and emotional states rapidly after taking the hallucinogens, and effects last for the duration of the drug's pharmacological activity (e.g., several hours, depending on the drug type) (Nichols, 2016). Ayahuasca may cause a wide-ranging and dynamic set of positive and challenging acute effects (e.g., challenging experience; mystical-type experience; psychological insight; emotional breakthrough). Many ayahuasca users described a transcendental experience in a spiritual world, encountering plant or animal spirits, or even connecting with their "God" or higher power, experiencing the oneness and connectedness with the universe, and the feeling of euphoria or profound peace, with newly

gained understanding for death and afterlife (Hamill et al., 2019). For example, prior studies have demonstrated that orally taken/activated DMT in ayahuasca produced significant subjective effects (e.g., perceptual modifications, positive mood activation, increased rates of thinking) in a relatively slow and progressive way that effects start 45-60 minutes after drinking ayahuasca, reaching peak effects within 1-2 hours, and reducing in intensity after 4-6 hours (Bickel et al., 1976; Riba et al., 2001; Riba et al., 2003). In another study that explored the acute effects of ayahuasca, they reported a significant increase in “decentering ability” and a significant decrease in “judgmental processing of experience” (Soler et al., 2016), which suggests an overall increase in mindfulness capacities and psychological well-being.

Regarding challenging experiences, consuming ayahuasca could cause emotional symptoms like frightening hallucinations, anxiety, panic, paranoia; and physical symptoms such as increased blood pressure and heart rate, nausea, vomiting, diarrhea, chest pain, which could be dangerous to people who have heart conditions or other severe physical health issues (ADF, 2020; Bilhimer et al., 2018; Riba et al., 2003). Importantly, to maximum the plant medicine experience and reduce the potential negative medication interaction during acute effects of ayahuasca, each ayahuasca retreat center has its own dietary and medication requirements for screening eligible participants to attend their ayahuasca ceremonies. Examples of dietary requirements, including avoiding use of recreational drugs and alcohol, blue cheese or dairy, sexual or sensual activity, for at least two weeks; limiting salty/spicy foods and pork and red meat for at least two weeks; avoid caffeine and ice/ice-cold drinks for at least one week (Soltara, n.d.). Without following the dietary and medication requirements, especially the substance use restriction, it could be dangerous due to potential drug interactions for participants who are

actively taking other medications (e.g., anti-depression medicine, cough medicines, weight loss medications) (Malcolm, & Lee, 2018). In the past few years, as the ayahuasca industry continues growing in Latin America, more deaths associated with ayahuasca have been reported. Since 2015, there have been at least five people reported dead after consuming ayahuasca in South America (Macdonald, 2017). Although circumstances around these deaths are generally unclear, there is an assumption that inappropriate screening of participants for dietary and medication requirements contributed to a negative drug interaction (Malcolm et al., 2018).

Although it is not uncommon to experience intense effects on the body, such as vomiting, diarrhea, weeping, trembling, strong visual and auditory hallucinations after taking ayahuasca (Graziano et al., 2017), people react to these acute ayahuasca effects differently. Some people coped well with the physical and emotional distress, viewed these acute effects as part of an ongoing relationship with the substance (Diament et al., 2021) and reported healing from the “cleaning experience” “spiritual purging” (i.e., vomiting, diarrhea) (Labate & Cavnar, 2021). Those people reported that they experienced desired effects for it to be a “healing experience” (Nielson et al., 2021) after taking ayahuasca, such as “feeling of enlightenment” (Kubala, 2019), “tears of joy, tears of love, tears of gratitude” (Maté, 2018), feeling of “the ability to surrender and ‘let go’” (Nielson et al., 2021). Especially, those who reported positive experience claimed that “an alleviation of their symptoms” (e.g., posttraumatic stress disorder (PTSD), depression, anxiety, self-harm, suicidality) (Lafrance et al., 2021; Nielson et al., 2021), reduced cravings and use of drugs (Lafrance et al., 2021), improved personal meaning spiritual significance of these experiences in their life (Griffiths et al., 2006; Griffiths et al., 2019), and enhanced psychological insight (Bouso et al., 2012; González et al., 2020; Halpern et al., 2008) because of the ayahuasca

experience. On the contrary, some people reported having challenging ayahuasca experience as “bad trips,” “suffering,” and “not better but worse” (Barrett et al., 2016; Moran, 2019) due to the discomforts caused by acute physical and emotional effects of ayahuasca. Those acute effects, including severe physical purging (e.g., vomiting/diarrhea), feeling extremely cold/hot/heavy/dizzy (e.g., “overheating, need to get some air”; Kagan, 2020), feeling physical uncomforted (e.g., “problem breathing” “painful like giving birth”) (Lafrance et al., 2021; Nielson et al., 2021), feelings of sadness/fear/anxiety/overwhelmed/panic (e.g., “feeling out of control” “presence of unfriendly entities”; Nielson et al., 2021). Some people reported being triggered and even traumatized because their perceived acute challenging effects of ayahuasca was “too much, too fast, too soon” and “near-death” (Moran, 2019), especially for those who experienced past trauma in their life and are not emotionally ready for the acute visions and challenging insights brought by ayahuasca might experience overwhelming and unsettling effects (Labate & Cavnar, 2021) and suffer the “reactivation of early childhood trauma” (Moran, 2019). However, it is still unclear the extent to which differences in one’s interpretation of the experience of the challenging acute ayahuasca experience depend on one’s individual psychological differences.

Enduring Effects of Ayahuasca and Outcomes

In psychedelic context, enduring effects refers to long-term or persisting effects that persist beyond the initial phase of acute effects after hallucinogen use (Nichols, 2016). Similar to acute effects, enduring effects of ayahuasca can be both positive and challenging. Regarding positive effects, prior studies demonstrated that regular ayahuasca use could trigger regulations in mood, emotion, and many neurotransmitter systems (Labate & Cavnar, 2014), and there is a

possibility that long-term outcomes of ayahuasca use could include positive behavior changes, such as addiction cessation (Nielson & Megler, 2012; Labate & Cavnar, 2014). For example, Thomas et al.'s (2013) study revealed that repeated ayahuasca-assisted therapy showed statistically significant effects in reducing cravings and problematic drug use (e.g., tobacco, alcohol, and cocaine).

Persisting effects of the ayahuasca experience on attitudes, moods, and spiritual experience has also been explored (i.e., Kiraga et al., 2021; van Oorsouw et al., 2021). For instance, Kiraga et al.'s study (2021) found a significant increase on enhanced emotional empathy (e.g., arousal levels when confronted with emotional expressions) after the ayahuasca ceremony, which is significantly correlated towards positive stimulus and persisting changes in satisfaction with life and increased positive mood states lasting up to one-week post-ayahuasca retreat (Kiraga et al., 2021). Similarly, van Oorsouw et al.'s (2021) study findings also revealed that long-term effects of ayahuasca on reduced anxiety and somatization symptoms and increased levels of non-judging lasting up to four weeks (van Oorsouw et al., 2021).

Prior research also suggests that repeated ayahuasca administration may aid in healing trauma- and stressor-related disorders, such as acute stress disorder, PTSD, depression, and anxiety (Nielson & Megler, 2012). For example, recent data from a clinical trial study (Osório et al., 2015) reported that a single dose of ayahuasca contributed to immediate improvements in symptoms of depression among depressed patients, and effects remain up to three weeks (Osório et al., 2015). Likewise, a recent double-blind randomized controlled trial (Palhano-Fontes et al., 2019) confirmed significant anti-depressant effects of ayahuasca after a single dose among treatment-resistant patients with depressive symptoms (Palhano-Fontes et al., 2019). However, a

newly published placebo-controlled study revealed that improvements in mental health among participants of ayahuasca retreats could be driven by non-pharmacological/extra pharmacological factors (e.g., setting, such as music, room decoration, environment) and also pharmacological factors (e.g., use of ayahuasca) (Uthaug et al., 2021). Uthaug et al's study (2021) emphasizes the importance of having placebo-controlled designs to further explore the impacts of non-pharmacological factors on the ayahuasca experiences, and it also stresses the substantial need in the research field to verify ayahuasca's therapeutic efficacy under controlled conditions (Scheidegger, 2021) before ayahuasca being applied in clinical treatment. This study is not a placebo-controlled study design, which could not prevent potential impacts caused by study settings or other non-pharmacological factors (people's mindset, past experience with other psychedelics) on the effects of ayahuasca. However, in order to ease the study limitations of the design of the study, I included another two measures of Lifetime Use of Psychedelic Compounds (Weiss et al., 2020) and the Setting Questionnaire for the Ayahuasca Experience (Pontual et al., 2021) as control variables to measure the potential correlations between ayahuasca setting and participants' ayahuasca experience.

As a controlled substance, ayahuasca is known for its psychedelic properties produced by a mix of two plants, that one contains monoamine oxidase inhibitors (MAOIs) which confers the ability for the DMT properties, which is contained by the other plant, to become orally active (Malcolm et al., 2018). One concerning risk has been noticed involving ayahuasca as its effects may worsen psychiatric symptoms for people with pre-existing severe mental disorders, such as schizophrenia (Bilhimer et al., 2018). Prior research data revealed that long-term using ayahuasca might have potential high-risk interaction with selective serotonin reuptake inhibitors

(e.g., anti-depressants; Callaway & Grob, 1998) and should also be avoided the combination with other psychoactive drugs (e.g., MDMA, LSD) (dos Santos, 2013; Lanaro et al., 2015; Ott, 1999; Wiltshire et al., 2015). Although a few studies suggested that it is considered safe for individuals to use ayahuasca regularly without concerns about substance tolerance or addiction (Barbosa et al., 2012; Dos Santos et al., 2013; Scheidegger, 2021), with limited research evidence on the enduring effects of ayahuasca, it is not safe to say long-term repeating consuming ayahuasca will bring no risks to health. Exploring the enduring effects on participants by conducting follow-up surveys is much needed in the field today. This study followed up participants one month post their ayahuasca retreats, which could help fill the literature gap by exploring the short-term enduring effects on participants after they return home.

Psychospiritual Outcomes

Psychospiritual well-being, or psychospiritual outcome, refers to one construct that interconnects psychological well-being and spiritual dimensions (Taylor, 1993), reflecting people's experiences and the effects of their experiences on psychological well-being and spiritual well-being/meaning in life (Bash, 2004). Because spiritual well-being is difficult to measure and must be expressed through other human dimensions, it is frequently a conduit through the psychological dimension where spiritual well-being is later combined with psychological well-being into one construct, the psychospiritual well-being/outcome (Bash, 2004; Ellison & Smith, 1991; Manning-Walsh, 2005). In prior studies, elements of psychospiritual well-being/outcome could include attributes, such as optimism and peacefulness (Miller et al., 1996), meaning/purpose in life (Ferrell et al., 1998), connectedness with self, others, environment, and higher powers (McSherry, 1998; Walton, 1999), and improved

emotional regulation (e.g., Flemming, 1997). For this study, psychospiritual outcome is defined as a subjective experience that incorporates emotional health, human flourishing, persisting effects of ayahuasca, meaning in life, satisfaction with life, and spiritual well-being (Daaleman & Frey, 2004; Diener et al., 1985; Griffiths et al., 2006; Steger et al., 2006; VanderWeele, 2017).

When exploring effects of psychedelic drugs on psychospiritual outcomes, prior research studies demonstrated positive effects of psychedelic drugs on psychospiritual outcomes, such as changes in the levels of personal well-being or life satisfaction after using psychedelic drugs (Hamill et al., 2019). Regarding ayahuasca, several studies revealed that ayahuasca users reported higher scores on personal well-being, satisfaction with life, and life's purpose compared to the control group (Bouso et al., 2012), and claimed more positive psychospiritual outcomes (e.g., increased self-awareness, being a loving and empathetic person, experiencing a more meaningful inner world) (Kjellgren et al., 2009). Cakic et al.'s study (2010) reported that improved spiritual benefits (e.g., self-exploration) was one of the most common self-reported positive effects among recreational DMT users and religious and ceremonial ayahuasca users. Cakic et al.'s study (2010) revealed that interest in psychospiritual benefits and curiosity about the effects of DMT appears to be an important factor influencing initiation of ayahuasca use and continued use of DMT (Cakic et al., 2010), which is consistent with the reasons for ritualized use of ayahuasca by members of the UDV and Santo Daime reported in other research evidence (McKenna, 2004; Shanon, 2002). Additionally, enduring effects has been heavily used in psychedelic research studies to assess psychospiritual outcomes in attitudes, moods, behaviors, and spiritual experiences based on prior research (Doblin, 1991; Griffiths et al., 2006; Pahnke, 1969). For instance, Davis et al.'s (2019) study revealed that 5-methoxy-N, N-

dimethyltryptamine (5-MeO-DMT), the close relative to DMT, is self-reported as effective for symptoms improvements among 80% of participants with depression and 79% of participants with anxiety conditions. Moreover, in Griffiths et al.'s study (2019), participants who reported "God encounter experiences" under effects of classic psychedelics (i.e., psilocybin, LSD, ayahuasca, or DMT) rated the encounter experience has moderate to strong persisting positive influences in their levels of life satisfaction and purpose in life. Among the four groups of psychedelic uses (psilocybin, LSD, ayahuasca, or DMT) of the study, participants who used ayahuasca tended to report the highest rates of endorsing positive experiences/changes and enduring consequences of the experience, compared to those participants who consumed psilocybin and LSD (Griffiths et al., 2019).

Baseline Predictors of Acute Psychedelic Effects

Several studies have examined baseline predictors (e.g., personality, age, acceptance, surrender, intention) of acute drug effects in order to better understand who will and will not experience such effects. For example, Aday et al.'s (2021) systematic review discussed findings from 14 studies that included different baseline participant characteristics/factors predicting acute psychedelic effects (e.g., positive vs. challenging acute effects). In summary, Aday et al.'s (2021) systematic review demonstrated that positive and mystical experience is negatively correlated to baseline measures such as apprehension, barriers, deservingness, recreational intention, personal mindset/beliefs; and positively correlated to baseline measures such as clear intention, spiritual motivations, surrender, absorption/openness, acceptance, attachment anxiety, meditation depth, optimistic attitude toward life (Aday et al., 2021). Similarly, challenging experiences are positively related to baseline measures, such as absorption, attachment

avoidance; and negatively related to baseline measures, such as openness, history of psychoactive drug use (Aday et al., 2021) (those measures would be considered as potential control variables in the study design). In other words, more past psychedelic experience was related to less intense drug effects, positive and open mindset towards the psychedelic sessions are more likely to have a positive experience with benefits, clear spiritual motivation and recreational intention were less likely to report adverse effects, and older age was related to a less intense acute subjective effects of psychedelics (Aday et al., 2021). Recently, a new published study revealed that younger age and greater symptom severity in depression and anxiety before treatment predict greater improvements in mental health and psychological outcomes (e.g., acute effects on personal meaningfulness and spiritual significance) among U.S. Special Operations Forces Veterans seeking ibogaine-and-5-methoxy-N,N-dimethyltryptamine treatment program treatment in Mexico (Xin et al., 2023). These findings also revealed the importance of consider age and baseline mental health severity in evaluating psychedelic effects.

Moreover, Bienemann et al.'s (2020) study revealed that females were more likely to report “bad trips” than males, which suggests biological sex might be another predicting factor on how recreational psychedelics users respond to drug effects (Bienemann et al., 2020). However, this preliminary finding still needs more research evidence to support its validity before claiming biological sex is a predicting factor related to psychedelic drug effects. Furthermore, research findings on other baseline predictors have also been explored recently. Indeed, non-pharmacological factors (e.g., set and setting) have been revealed in research studies about their impacts on the behavioral and psychological effects of psychedelics (Hartogsohn, 2016). Setting, the context (e.g., physical, social, and cultural environment) of psychedelic use,

such as the decoration used and activities that were performed during the ceremony, interpersonal and intrapersonal relationships established with other participants and spiritual leaders, the type of metaphysical beliefs shared within the group (Hartogsohn, 2016; Pontual et al., 2021; Zinberg, 1984).

Resilience and Resilience theory

Because acute effects of ayahuasca for some people can be perceived as difficult, challenging, and yet are reported to contribute to healing and beneficial outcomes, baseline factors related to how people cope with difficult and challenging experiences may help us understand how these acute ayahuasca experiences might influence enduring effects and psychospiritual outcomes. Prior evidence showed different baseline factors predicting the outcomes of challenging experiences, such as younger age might be correlated to a more positive outcome after a challenging experience (Watanitanon et al., 2018), and less substance misuse history is more likely to have a higher life satisfaction level even after a challenging experience (Corrigan et al., 2001). And importantly, one significant factor that has demonstrated its effectiveness and importance in coping with challenging, difficult, or stressful situations is resilience (Agaibi & Wilson, 2005). Therefore, resilience theory could provide a conceptual framework when considering a strengths-based approach (Zimmerman, 2013) to understand people's reactions to the acute challenging effects of ayahuasca. Resilience, originating from the Latin word *resilire*, "to jump back" (Fletcher & Sarkar, 2015), generally refers to the process of achieving positive adaptation to "bounce back" despite experiencing challenges and adversities (Masten et al., 1990; Masten, 2006). For this study, resilience is defined as people's capability (strength-based approach) to achieve positive adaptation despite challenges and find positive

meaning from it. For example, people who self-reported acute challenging ayahuasca effects (i.e., emotionally and physically challenging experiences) during ayahuasca retreat experience may achieve positive adaptation and find positive meaning from it (e.g., psychospiritual growth, healing from past trauma).

Research on resilience has been conducted over the past decades, and it is well believed that the resilience theory was initially developed in 1974 by Dr. Norman Garmezy, one of the best-known contributors to resilience theory (Moore, 2021). Dr. Norman Garmezy created the Project Competence Longitudinal Study (PCLS) in 1974 to enable more structured and rigorous resilience research for studying and understanding how to prevent mental illness through protective factors among youth who were initially exposed to severe risk factors as children, somehow grew up to be healthy adults (Garmezy, 1991; Masten, et al., 2009; Masten & Tellegen, 2012; Rutter, 1987; Werner & Smith, 1982). In the past, psychology researchers often focused on identifying risk factors that contribute to the negative outcomes in order to develop prevention interventions (Zimmerman, 2013). The appearance of resilience theory has caused a paradigm shift, which replaced the prior deficit-focused approach (e.g., identify risk factors) with a strength-focused approach (e.g., identify protective factors), which explains how protective factors could help children overcome negative impacts of risk exposure (Fergus & Zimmerman, 2005; Fraser et al., 1999). Since then, resilience theory has quickly developed and enriched in different fields (e.g., social work, psychology, psychiatry, medicine, education); and the foci of resilience research has also expanded in the past 40 years from a more individual level (children, youth), to family, community, and to most recently, cultural and societal levels (Fleming & Ledogar, 2008). For example, Walsh's study (2016) focuses on key processes in family

resilience and the positive adaptation of family units; Berkes and Ross's study (2013) was designed to examine the social-ecological approach and developmental psychology perspective on understanding community resilience; Vogus and Sutcliffe's study (2007) attempted to use elements such as relational, cognitive, structural to define organizational resilience and examine its mechanisms; and van Breda's review (2018) of resilience theory and its relevance for social work explored how to engage with the study of resilience in South African cultures and social systems.

Unlike many other theories, resilience theory does not have pre-determined hypotheses or principles. Instead, it continues evolving through research conducted by diverse fields and scientists with varied resilience definitions for different research purposes. Over the past 40 years' development, resilience theory has evolved into a collective resilience model/framework developed by many researchers with numerous concepts from different disciplines. Generally, a Resilience Framework specifies protective factors and processes on buffering effects in health, and the protective role of resilience has been supported in prior research studies (e.g., Havnen et al., 2020; Joyce et al., 2019; Masten & Obradović, 2008; Rutter, 2012). For example, Joyce et al.'s (2019) study findings demonstrated that self-reported greater levels of resilience at baseline predicting less symptoms of PTSD and depression among first responders who exposed to repeated stressful and challenging situations. Likewise, studies reported that greater levels of baseline resilience is more likely associated with more positive outcomes, such as a greater level of resilience at baseline protects against adverse effects of stress exposure (Havnen et al., 2020), predicts better efficacy of substance use intervention/treatment outcomes (i.e., larger reduction in days drug use) (Kurtz et al., 2019), and acts as a good predictor for efficient emotion regulation

and individual's ability to find positive meaning in life during times of difficulties (Hjemdal et al., 2012; Tugade & Fredrickson, 2004). Furthermore, prior studies also revealed resilience's moderating role on the relationship between stress/challenges and psychological outcomes (e.g., Havnen et al., 2020; Nuttman-Shwartz, 2019). For example, Havnen et al.'s (2020) study explored resilience's role on mental health during the COVID-19 pandemic and reported that resilience moderated and weaken the relationship between stress and negative symptoms of depression and anxiety (Havnen et al., 2020). Similarly, Dr. Nuttman-Shwartz and her team surveyed near 1,300 children and teenagers living around the war zone, and reported that resilience factor (i.e., resilience resources) moderated and weaken the relationship between continuous traumatic stress situations (i.e., sense of fear) and psychological distress (Nuttman-Shwartz, 2019). Specifically, prior research evidence has demonstrated a negative association between challenging experiences and negative psychological outcomes (Klainin-Yobas et al., 2021), revealing that increased perceived stress predict decreased negative triad factor of psychological well-being (improved outcomes in the context of negative measures; e.g., "Maintaining close relationships has been difficult and frustrating for me" (Ryff, 1989). This relationship suggested that higher levels of perceived stress/challenges might foster growth and lead to improvement of positive psychological well-being in the context (Klainin-Yobas et al., 2021).

Notable contributions on forming the resilience model/framework include Garmezy's resilience theory (i.e., the capacity to recover and maintain adaptive behaviors following stressful situations; Garmezy, 1991), Rutter's resilience theory (i.e., an interactive concept that combines risk experiences with relatively good outcomes compared to other individuals who shared the

same experiences; Rutter, 2012), Werner's resilience theory (i.e., the capacity to cope stresses effectively, so people can "worked/played/loved/expected well"; Werner, 1989), Luthar's resilience theory (i.e., a dynamic process to adapt within the significant adversity positively; Luthar et al., 2000), Masten's resilience theory (i.e., the capacity of a dynamic system to adapt disturbances successfully; Masten, 2014), and Ungar's resilience theory (i.e., both the individuals' capacity to navigate adverse situations for resources and the environmental resources provided to the individual; Ungar, 2013).

Among these representative resilience theories, Masten's resilience theory was selected as the guiding theory and foundational framework for this study. Emphasizing the dynamic system/process of resilience, Masten's resilience theory aligns well with the longitudinal design of this study which examines resilience across various timepoints. Indeed, Masten's resilience theory has been broadly utilized in research studies for populations who have encountered significant challenging experiences (e.g., Masten, 2014b; Masten & Tellegen, 2012), which made it particularly relevant to this study's key construct of acute challenging effects of ayahuasca. By conceptualizing resilience as a dynamic and evolving process that facilitates positive adaptation in the face of challenges, Masten's resilience theory offers valuable insight to understand how ayahuasca retreat attendees achieve positive psychospiritual outcomes despite experiencing acute challenging effects in their healing journey.

Conceptual Framework

In summary, the resilience theory summarizes a variety of practices that address the challenges to empower action and promote healthy adaptation. For this study, because people who consume ayahuasca commonly experience acute challenging effects, such as vomiting,

diarrhea, strong visual and auditory hallucinations, which could be perceived as difficult and stressful for some people. The conceptual model in this study (as displayed in *Figure 2*) tested the relationships between baseline resilience, acute ayahuasca effects, and psychospiritual outcomes, which help our understanding of how individuals can bounce back after experiencing challenges in their life with a strength-focused approach (Masten & Obradovic, 2006). The strength-focused approach emphasizes individuals' unique set of strengths and capacity (e.g., resilience) to overcome challenging situations and make progress to healing/recovery (Xie, 2013). The conceptual model also investigated whether baseline resilience would buffer/moderate the impacts of acute challenging ayahuasca effects on psychospiritual outcomes.

In the case of this study, baseline resilience is the resilience level at the baseline timepoint—before attending the ayahuasca retreats; acute ayahuasca effects refer to the acute effects after taking ayahuasca, including challenging effects, mystical experience, psychological insight, emotional breakthrough; and psychospiritual outcomes are outcomes/influences on psycho-spirituality after the ayahuasca experience, including persisting effects, spiritual well-being, life satisfaction, life meaning, and human flourishing.

Innovation

Even more solid scientific support is given to the effects of ayahuasca and its therapeutic potential in recent years, previous studies have not answered several important questions related to the potential impact of resilience at the baseline level on the acute challenging effects of ayahuasca, and on the relationship between acute effects of ayahuasca and psychospiritual outcomes (e.g., Aday et al., 2021; Weiss et al., 2021). More than that, one of the primary goals of using/experiencing ayahuasca is to heal from the past trauma/pain and illness (Labate, & Cavnar,

2021). As healing and building up resilience are longitudinal in nature, until today, no longitudinally designed study has tested resilience among ayahuasca ceremony participants, and how it works on people's healing journey experiencing effects of ayahuasca and following psychospiritual outcomes. This study, as the first study utilizing a longitudinal study design on the topic, will advance our knowledge on the roles of resilience in ayahuasca ceremonies, acute effects of ayahuasca, and how psychospiritual outcomes fluctuate over time.

Findings from this study will also contribute to the social work field and have the potential to inform policy changes. With thousands of people traveling to Latin America for the ayahuasca retreats, little support has been given to these people after coming home due to the lack of knowledge and information about ayahuasca retreats and ayahuasca's acute and enduring effects. The study is innovative for its potential to improve professional preparations for clinicians to treat clients with post-ayahuasca retreat effects by providing information about ayahuasca retreat and its acute and enduring effects. Results from this study could also be used to support local service agencies to organize continuing education units (CEUs) to broaden knowledge of ayahuasca effects, psychedelic drugs, and the role of baseline resilience in clinical treatment. Importantly, examining the possibility of baseline resilience as a predicting factor on acute effects of ayahuasca may also help clinical practice increase the likelihood of developing an effective and safe ayahuasca-assisted psychotherapy in treatment after US Food and Drug Administration (FDA) approval in the future, which offers a new possibility to reduce the prevalence and impacts of adverse experiences on patients. Especially under the influence of the COVID-19 pandemic and all types of crises in our today's society, people of all walks of life need a chance to heal from their past traumas and emotional scars. Ayahuasca, as the popular

sacred plant for healing over centuries, exploring its therapeutic potentials in science today would be beneficial for our healing journey and awakening transformation. However, more knowledge is needed about how and in what ways one's levels of resilience and past challenging situations may affect their ayahuasca experiences should one choose to seek out these experiences, and how resilience and individuals' personal perspectives (e.g., life satisfaction) may change due to the ayahuasca retreat should one expect to experience. Furthermore, respecting people's choices on ayahuasca retreats as a healing approach aligns with the core ethical values of self-determination in the social work profession, and the primary mission of public health for healing facilitation.

Chapter 3. Methods

Chapter 3 presents the methodology of study design, study eligibility criteria and target sample, incentive payments information, data collection procedures, longitudinal retention strategies, and study constructs and measures. Additionally, this chapter details the analytic plan for this study, including data preparation, handling missing data, initial preliminary analyses, and primary aims analyses. This chapter also briefly discusses potential limitations of the study methods and procedures.

Study Design

To date, no study has assessed whether resilience influences acute challenging ayahuasca effects, and the potential moderating role of resilience on the relationship between acute challenging ayahuasca effects and psychospiritual outcomes. Therefore, I pursued the following specific aims in this dissertation study using a longitudinal study design with three timepoints among attendees at a traditional ayahuasca retreat setting in Latin America. This study obtained The Ohio State University (OSU)'s IRB approval (IRB #2022B0158).

Aim 1: Explore effect of baseline (T1) resilience on acute challenging effects of ayahuasca reported at the end of the retreat (T2); ***Hypotheses:*** Based on prior studies (e.g., Aday et al., 2021; Havnen et al., 2020; Hjemdal et al., 2012; Joyce et al., 2019; Kurtz et al., 2019; Masten & Obradović, 2008; Rutter, 2012; Tugade & Fredrickson, 2004) on the findings that greater levels of baseline resilience are correlated with less challenging experience and related stress-exposed symptoms (e.g., less symptoms of PTSD and depression) and greater levels of awareness of challenging moments and emotional breakthrough (e.g., efficient emotion regulation in finding positive meaning in life during times of difficulties), I hypothesize that

higher levels of baseline resilience will predict less challenging experience among ayahuasca retreats participants who perceive acute effects of ayahuasca as challenging and difficult.

Aim 2: Assess whether the baseline resilience moderates the relationship between acute challenging ayahuasca effects reported at T2 and psychospiritual outcomes reported at T3;

Hypotheses: Based on prior studies on the findings that baseline resilience's role in moderating and weakening the relationship between challenges and negative symptoms of depression and anxiety (Havnen et al., 2020), and moderating and weakening the effects on psychological distress and aggression in response to the sense of fear and continuous traumatic stress situations (Nuttman-Shwartz, 2019), I hypothesize that baseline resilience will not only moderate but also strengthen the relationship between the acute challenging ayahuasca effects and the positive psychospiritual outcomes at a one-month follow-up. Specifically, prior research evidence has demonstrated a negative association between challenges and negative triad factor psychological well-being (Klainin-Yobas et al., 2021), I hypothesize a positive association where greater levels of acute challenging ayahuasca effects may lead to enhanced positive psychospiritual outcomes.

Aim 3: Examine the potentially additive relationships between challenging effects and other acute effects of ayahuasca (e.g., mystical, insight, emotional breakthrough) reported at T2 and psychospiritual outcomes reported at T3. ***Hypotheses:*** Based on prior studies on the findings that acute effects of DMT/ayahuasca or general psychedelic drugs generally predict positive psychospiritual outcomes with increased self-awareness and well-being (Cakic et al., 2010; Roseman et al., 2019), I hypothesize that acute effects of ayahuasca will predict positive psychospiritual outcomes with greater persisting effects on short-term changes in current senses

of life purpose/life's meaning/social relationship, more positive attitudes about life/self/death, improved spiritual well-being, higher levels of life satisfaction, greater levels of flourishing.

Participants of The Study

My target population group included adults who passed the medical intake screening (e.g., not pregnant or in preparation, personal and family psychiatric or medical history) requested by each ayahuasca retreat to get involved in the ayahuasca experience in Latin America. After getting IRB approval, participants were recruited from Soltara Healing Center's two locations: Costa Rica and Peru. Soltara sent out the screening survey on the behalf of the research team to all their registered upcoming retreat participants and also shared a blog including the study information with a screening survey link to their ayahuasca community (blog post, *see Appendix B*). The email included a link leading them to the confidential Qualtrics screening survey with informed consent and study introduction. Participants who confirmed their eligibility in the consent form and completed the screening survey were contacted by the researcher via email for T1, T2, and T3 surveys and incentive distribution.

In Soltara, approximately two retreat groups were hosted each month on average, with approximately 20 people in each retreat group. My dissertation study recruitment started in August 2022 and concluded in August 2023, spanning a total of 12 complete months. The recruitment emails were sent to approximately 480 registered participants (20 people*2 groups*12 months) in Soltara. Among the potential participants who saw my research project information and were interested in participating, 374 clicked the screening survey and 291 of them completed the screening survey and met inclusion criteria of the study. A sample of 267 participants completed the baseline survey and were enrolled in the study. At follow-ups, 247

completed the T2 survey (92.5% retention rate from T1 to T2), and 233 completed the T3 survey (94.3% retention rate from T2 to T3). Those 233 participants who completed T3 survey all completed other timepoint surveys. In total, 233 completed all surveys for the study (87% retention rate from T1 to T3), which is higher than the proposed retention rate of 80% based on power analyses conducted in G*Power 3 and SPSS for a large effect of baseline resilience on predicting positive acute effects of ayahuasca which further predicts positive psychospiritual outcomes (Aday et al., 2021; Rutter, 2012).

To be eligible for this study, participants must be: at least 18 years and older, passed Soltara's medical intake screening to attend ayahuasca ceremonies, are able to read, write, and speak English fluently, and attended 5-7 nights of retreats experience with 3-4 ayahuasca ceremonies.

Incentive Payments

Incentives were provided at the following rate: \$15 at T1, \$20 at T2, \$25 at T3. Participants who completed all survey measures at T1, T2, and T3 received \$60 in total e-gift cards to a local retail store of their choice from the list of OSU-approved vendors.

Data Collection

Data was collected via an online survey built in Qualtrics. Potential participants were emailed a detailed description about the study, study inclusion criteria, and the direct link to the Qualtrics survey containing the screening survey (*recruitment email templates see Appendix C*). Consent (*consent form see Appendix D*) to participate was included on the first page of the Qualtrics surveys. Eligible participants who were interested in participating in the study would click the "Next" button at the bottom of the screen indicating informed consent to participate in

the study. Participants who decide to not participate or exit the survey after started can close the survey at any time.

This study employed a longitudinal study design with three timepoints. Because I was interested in exploring the roles of baseline resilience in ayahuasca experience, having a longitudinal study design brought the following advantages: provided me with more details about my participants over the three timepoints; linked the earlier characteristics and events (e.g., baseline resilience, ayahuasca experience) and later outcomes (e.g., psychospiritual outcomes) and presented interesting potential causal or interaction mechanisms; allowed me to explore the patterns of changes and the dynamic of participants' behaviors over time (Park & Rainsberry, 2020). All participants of the study were asked to complete a survey at three timepoints: (as displayed in *Figure 3*)

Time 1 (T1): Baseline/pre-ayahuasca experience: one week before participants attending the retreats. ***Time 1 recruiting strategies:*** Contact information was shared by the retreat centers, as these retreat centers have helped other researchers in the past with research recruitment. Participants were emailed (email templates see *Appendix C*) one week before the date of the ayahuasca retreat with an invitation to enroll and get reminded by three days before the date of the ayahuasca retreat (reminder templates see *Appendix C*).

Time 2 (T2): Post-ayahuasca experience: on the last day of the retreat. ***Time 2 recruiting strategies:*** Participants were emailed (email templates see *Appendix C*) on the last day of their retreat with a secure link for the post-survey. Participants who did not completed the survey one week after the last day of the retreat experience, got reminded again by email and text messages to complete the survey. Participants who have not completed the survey two weeks post the last

day of the retreat experience, received a final reminder delivered through email, text, and phone call to remind them to complete the survey (reminder templates see *Appendix C*).

Time 3 (T3): one-month: one-month follow-up after their retreats. ***Time 3 recruiting strategies:*** Participants were contacted (email templates see *Appendix C*) one month following their last day of retreat experience to complete the one-month follow-up survey and get reminded one week later. Participants who have not completed the survey one week after the first reminder got reminded again by email and text messages to complete the survey. Participants who have not completed the survey two weeks post the first reminder email, received a final reminder delivered through email, text, and phone call to remind them to complete the survey (reminder templates see *Appendix C*).

At baseline (T1), participants were asked to report (survey measures see *Appendix E*) their contact information, demographics (e.g., age, race, biological sex, gender, education, annual household income, religious beliefs, English proficiency), dimensions of personality, baseline level of resilience, previous use of classic psychedelic drugs or experience of ceremonial use of ayahuasca. At post-retreat follow-up (T2), participants were asked to report their updated contact information, demographic information, dimensions of personality, resilience level, acute ayahuasca experience (e.g., mystical experience, challenging experience, psychological insight, emotional breakthrough), psychospiritual outcomes (e.g., 10-item persisting effects on current senses of personal well-being/life-satisfaction, life's purpose, life's meaning, social relationship, attitudes about life/self/death, mood, behavioral changes, and how spiritual they are; spirituality index of well-being; satisfaction with life; meaning in life; human flourishing), ayahuasca experience inventory, use of other classic psychedelic drugs during the retreat, setting

questionnaire for the ayahuasca experience. At one-month follow-up (T3), participants were asked to report their updated contact information, demographic information, dimensions of personality, resilience level, psychospiritual outcomes, ayahuasca experience inventory, setting questionnaire for the ayahuasca experience, use of classic psychedelic drugs or ayahuasca within one month after the retreat.

Longitudinal Retention Strategies

Because of the nature of longitudinal studies (e.g., long duration, repeated measures), systematic attrition is hard to avoid, which may further threaten data validity and limit generalization of the outcomes (e.g., a significant reduction in sample size) (Gustavson et al., 2012). To reduce attrition in longitudinal studies, many researchers have explored various retention strategies (e.g., Booker et al., 2011; Teague et al., 2018). For example, Teague et al.'s (2018) systematic review screened 143 peer-reviewed longitudinal cohort studies and identified 95 retention strategies that could be used to retain samples in longitudinal studies (Teague et al., 2018). Several retention strategies mentioned in Teague et al.'s (2018) study were considered in this longitudinal study process to help retain my study participants.

Retention strategies were used in this study, including: **1)** providing compensation to motivate participants to complete the surveys: \$15 at T1, \$20 at T2, \$25 at T3; **2)** using email/text/phone-call reminders to remind participants to re-visit and complete the survey (the Certificate of Confidentiality (CoC) from the National Institutes of Health (NIH) was obtained to protect participants' confidentiality); **3)** emphasizing study benefits in recruitment documents/communications (e.g., contribution to the research area; findings will be shared in the field to further help program development) and showing my appreciation for participants (e.g.,

thank you words in the recruitment/follow-up emails); **4**) increasing effective communication with participants when they have questions regarding the study or incentives (e.g., timely and professional responses).

Study Constructs and Measures

The survey of this study was developed based on previously published questionnaires (measures see *Table 1* below; full survey measures see *Appendix E*). Each participant was asked to self-report their level of resilience in six categories (perception of the self, planned future, social competence, family coherence, social resources, structured style) through the Resilience Scale for Adults (RSA) (Friborg et al., 2003). Moreover, each participant was asked to self-report the acute effects of ayahuasca related to emotions, beliefs, memories, and relationships examined in the Psychological Insight Questionnaire (PIQ; Davis et al., 2021), Mystical-type Experiences (MEQ; Barrett et al., 2015; MacLean et al., 2011) and Challenging Experiences (CEQ; Barrett et al., 2016) after taking ayahuasca on 6-point scales ranging from 0 (not at all) to 5 (extremely). Participants were asked to report acute effects of ayahuasca regarding moments of participants' emotional breakthrough and ayahuasca challenging experiences following the planned ayahuasca experiences. Furthermore, participants were asked to self-report psychospiritual outcomes of ayahuasca experience at T2 and T3 through 10 items of Persisting Effects Questionnaire (PEQ; Griffiths et al., 2006), the Spirituality Index of Well-Being (SIWB; Daaleman & Frey, 2004), Satisfaction with life scale (SWLS; Diener et al., 1985), Meaning in life questionnaire (MLQ; Steger et al., 2006).

Measures of psychospiritual outcomes were chosen carefully based on literature review and research evidence. MLQ and SWLS both have been evaluated in prior research studies as

valid and reliable instruments with good high internal consistency and reliability for use with different age groups and populations, including people with substance misuse issues (Csabonyi & Phillips, 2020; Galanakis et al., 2017; Naghiyae et al., 2020; Pavot & Diener, 2009). The human flourishing questionnaire (HFQ; VanderWeele, 2017) and Persisting effects questionnaire (PEQ; Griffiths et al., 2006) were also included in this study to evaluate psychospiritual outcomes related to spirituality and changes in moods and behaviors after the ayahuasca experience. HFQ was included due to its integrated nature across disciplines and for the purpose of testing its validity among people attending ayahuasca retreats. For this study, the human flourishing measure was included to measure psychospiritual outcomes of ayahuasca in six domains: happiness and life satisfaction; mental and physical health; meaning and purpose; character and virtue; close social relationship; financial and material stability (VanderWeele, 2017). Besides HFQ, PEQ, MLQ, and SIWB, the Spirituality Index of Well-being (SIWB) was also included in this study for its cross-cultural reliability and validity. SIWB has been considered as one of the most well-validated measures in assessing people's current spiritual state (Monod et al., 2012), and SIWB shows associations in health and well-being across primary care and geriatric outpatient settings (Daaleman et al., 2004). Indeed, SIWB has also been translated into different language versions and was determined to be a valid and reliable assessment instrument among different countries' populations, such as Chinese (Wu et al., 2017; Lee & Salman, 2016), Turkish (Serbest & Şahin, 2021), and Colombian (Alpi et al., 2016). Because participants for ayahuasca retreats can be western tourists and eastern tourists, including a measure validated among both western and eastern populations would ease potential limitations caused by unvalidated measures among different populations. Other measures, such as the

Ayahuasca Experience Inventory (Weiss et al., 2021), Lifetime Use of Psychedelic Compounds (Weiss et al., 2021), and Setting Questionnaire for the Ayahuasca Experience (SQAE; Pontual et al., 2021) were also included in the study as potential control variables based on theoretical evidence to measure thoughts/feelings/behaviors/attitudes that arise or change within ayahuasca ceremonies, previous use of classic psychedelics, and the impact of setting on the ayahuasca experience. Questions also included items evaluating participants' demographics.

Table 1.

Measures and Key Constructs of This study

Measure	T1	T2	T3
Contact Information	X	X	X
Demographics	X		
Brief Version of the Big Five Inventory (BFI-10; Rammstedt & John, 2007)	X	X	X
<i>Acute ayahuasca experiences:</i>		X	
Mystical-type experience (MEQ; Barrett et al., 2015; MacLean et al, 2011).			
<i>Acute ayahuasca experiences:</i>		X	
Challenging effects:			
- Challenging experience (CEQ; Barrett et al., 2016).			
- Ayahuasca Experience Inventory-discomfort subscale items (Weiss et al., 2020)			
- Ayahuasca purging experience inventory (self-created)			
<i>Acute ayahuasca experiences:</i>		X	
Psychological insight questionnaire (PIQ; Davis et al., 2021)			
<i>Acute ayahuasca experiences:</i>		X	
Emotional breakthrough inventory (EBI; Roseman et al., 2019)			
Resilience Scale for Adults (RSA; Friborg et al., 2003)	X	X	X
<i>Psychospiritual outcomes:</i>		X	X
10-item Persisting Effects Questionnaire (PEQ; Griffiths et al., 2006)			
<i>Psychospiritual outcomes:</i>	X	X	X
The Spirituality Index of Well-Being (SIWB; Daaleman & Frey, 2004)			
<i>Psychospiritual outcomes:</i>	X	X	X
Satisfaction with life scale (SWLS; Diener et al., 1985)			
<i>Psychospiritual outcomes:</i>	X	X	X
Meaning in life questionnaire (MLQ; Steger et al., 2006)			
<i>Psychospiritual outcomes:</i>	X	X	X
Human flourishing questionnaire (VanderWeele, 2017)			

Lifetime use of psychedelic compounds (Weiss et al., 2020)	X	X
Setting Questionnaire for the Ayahuasca Experience (SQAE; Pontual et al., 2021)		X X

Basic Information (Contact Information, Demographics)

Contact Information: This measure was designed to collect participants’ information of full name, email address, one alternate email address, phone number, for the researcher (me) to contact participants for follow-up and incentive distribution.

Updated Contact Information: This measure was designed to collect participants’ updated information of full name, email address, one alternate email address, phone number for the researcher (me) to contact participants for follow-up and incentive distribution.

Demographics: Participants were asked to report age, gender, biological sex, race, Hispanic ethnicity, resident country, the highest level of education, occupation, annual household income, employment status, religious beliefs, relationship status, and English proficiency (read, write, and speak English fluently).

Resilience Scale

Resilience Scale for Adults (RSA): The Resilience Scale for Adults (RSA) is a 33-item measure of participants’ protective factors of resilience that promote adaptation to adversity in six categories: perception of self (e.g., “My personal problems: are unsolvable vs. I know how to solve”), planned future/perception of future (e.g., “My plans for the future are: difficult to accomplish vs. possible to accomplish”), social competence (e.g., “I enjoy being: together with other people vs. by myself”), family coherence (e.g., “I feel: very happy with my family vs. very unhappy with my family”), social resources (e.g., “I can discuss personal issues with: no one vs. friends/family-members”), structured style (e.g., “When I start on new things/projects: I rarely

plan ahead, just get on with it vs. I prefer to have a thorough plan”) (Friborg et al., 2003). The original RSA scale was designed with the format of semantic differential response to reduce “potential acquiescence bias” (Friborg et al., 2006). For this study, modifications were made to have participants self-report their response to statements that best describe their level of resilience on a 5-point scale, ranging from 1 (e.g., negative response) to 5 (e.g., positive response). The RSA is a frequently used measure of resilience in adults, and prior studies demonstrated that RSA has good construct validity, internal consistency, criterion-related validity (Morote et al., 2017), and reliability (Anyan et al., 2020). Previous evidence also showed RSA’s promising cross-cultural validity after being tested in diverse cultural settings (e.g., English-speaking population sample (Anyan et al., 2020), Spanish-speaking population sample (Morote et al., 2017), Belgium and Brazil (Hjemdal et al., 2011; Hjemdal et al., 2015), South Africa (Cowden et al., 2016), Iran (Jowkar et al., 2010), China (Li et al., 2012). Considering the diverse background of my participants, RSA appeared to be the most suitable resilience measure for this study. Internal consistency reliability for the scale was excellent (T1 $\alpha=0.90$; T2 $\alpha=0.89$; T3 $\alpha=0.91$).

Acute Ayahuasca Experiences

Acute Challenging Ayahuasca Effects:

Challenging Experience Questionnaire (CEQ): The Challenging Experience Questionnaire (CEQ) is a 26-item measure (Barrett et al., 2016) that was included in this study to evaluate challenging experiences related to the ayahuasca experience (i.e., feelings of grief, experience of fear, feeling of despair, death, isolation/loneliness). Participants were oriented to think back on their ayahuasca experience and rate their challenging experience (e.g., “I had the

profound experience of my own death”) on a 6-point scale ranging from 0 (No/Not at all) to 5 (Extremely/More than ever before in my life). Internal consistency reliability for the scale was excellent ($\alpha=0.94$).

Ayahuasca Experience Inventory-Discomfort Subscale (AEI-DS): The updated validation version of the Ayahuasca Experience Inventory-Discomfort Subscale (AEI-DS) is a 15-item measure (Weiss et al., 2020). Considering some of the duplicate statements with the CEQ, only 12-item from the discomfort subscale was included in this study to capture unpleasant or uncomfortable feelings (e.g., “I experienced everything as frighteningly distorted”). Participants were oriented to think back on their ayahuasca experience and rate the degree of thoughts/feelings that arise within ayahuasca ceremonies on a 6-point scale ranging from 0 (None; not at all) to 5 (Extreme). The Mean score of the subscale was calculated. Internal consistency reliability for the subscale was excellent ($\alpha=0.91$).

Ayahuasca Purging Experience (APE): The Ayahuasca Purging Experience (APE) is a 16-item measure that designed for this study to assess participants’ purging experience (i.e., diarrhea, vomiting, shivering, laughing, crying). Participants were oriented to think back on the entirety of their ayahuasca experience and rate their purging experience after taking ayahuasca on a 6-point scale ranging from 0 (None; not at all) to 5 (Extreme; one of the most significant purging memories/experiences in life). Internal consistency reliability for the scale was acceptable ($\alpha=0.76$).

Other Acute Ayahuasca Effects:

Mystical Experience Questionnaire (MEQ): The Mystical Experience Questionnaire (MEQ) is a 30-item measure (Barrett et al., 2015; MacLean et al., 2011) that was included in this

study to investigate participants' mystical-type experiences they might have after drinking ayahuasca (e.g., "Loss of your usual sense of time"). Participants were oriented to think back on their ayahuasca experience and rate their mystical-type experience on a 6-point scale, ranging from 0 (None/Not at all) to 5 (Extremely/More than ever before in my life). Internal consistency reliability for the scale was excellent ($\alpha=0.97$).

Emotional Breakthrough Inventory (EBI): The Emotional Breakthrough Inventory (EBI) is a 6-item measure (Roseman et al., 2019) that was included in this study to explore the moments of participants' emotional catharsis/breakthrough (i.e., important realization, shift/changes in perspective) following a planned psychedelic experience (e.g., "I experienced a resolution of a personal conflict/trauma"; "I felt able to explore challenging emotions and memories"). Participants were oriented to think back on their ayahuasca experience and rate their emotional breakthrough on a 10-point scale ranging from 0 (No, not more than usually) to 100 (Yes, entirely or completely). EBI has also shown great validity and high internal consistency as a supplement to CEQ and MEQ in exploring psychological outcomes after psychedelic experiences (Roseman et al., 2019). Internal consistency reliability for the scale in this study was excellent ($\alpha=0.91$).

Psychological Insight Questionnaire (PIQ): The Psychological Insight Questionnaire (PIQ) is a 23-item measure (Davis et al., 2021) of participants' insights had during the ayahuasca experience that related to emotions, beliefs, memories, and relationships (e.g., "Discovered clear similarities between my past and present interpersonal relationships"). Participants were oriented to think back on their ayahuasca experience and rate their insights on a 6-point scale ranging

from 0 (None/Not at all) to 5 (Extremely/More than ever before in my life. Internal consistency reliability for the scale in this study was excellent ($\alpha=0.96$).

Psychospiritual Outcomes

10-item Persisting Effects Questionnaire (PEQ): Selected ten items from Persisting Effects Questionnaire (PEQ) (Griffiths et al., 2006) were included in this study to explore if participants' overall ayahuasca ceremony experience, has led to short-term and persisting changes in current senses of personal well-being/life-satisfaction, life's purpose, life's meaning, social relationship, attitudes about life/self/death, mood, behavioral changes, and how spiritual they are. This ten-item from PEQ has been used in prior studies (e.g., Griffiths et al., 2006; Griffiths et al., 2019) and proved its validity and feasibility to explore short-term outcomes after using psychedelic drugs. Participants were asked to report changes because of the ayahuasca experience on a 6-point scale ranging from -3 (Strong negative change that I consider undesirable) to 3 (Strong positive change that I consider desirable). Internal consistency reliability for the scale in this study was excellent (T2 $\alpha=0.93$; T3 $\alpha=0.93$).

The Spirituality Index of Well-Being (SIWB): The Spirituality Index of Well-Being (SIWB) is a 12-item measure (Daaleman & Frey, 2004) was included in this study to measure participants' perceptions of their spiritual quality of life. The 12-item measure was categorized into two subscales: self-efficacy subscale (1 to 6 items; e.g., "I am overwhelmed when I have personal difficulties and problems"), and life-scheme subscale (7 to 12 items; e.g., "I have a lack of purpose in my life"). Items were measured on a 5-point scale ranging from 1 (Strongly agree) to 5 (Strongly disagree). Prior studies demonstrated that SIWB has very good instrument

reliability and good internal consistency (Daaleman & Frey, 2004). Internal consistency reliability for the scale was good (T1 $\alpha=0.90$; T2 $\alpha=0.88$; T3 $\alpha=0.91$).

Satisfaction with Life Scale (SWLS): The Satisfaction with Life Scale (SWLS) is a 5-item scale (Diener et al., 1985) that was included in this study to measure participants' own judgments about their level of life satisfaction or well-being (e.g., "So far I have gotten the important things I want in life") on a 7-point scale ranging from 1 (Strongly disagree) to 7 (Strongly agree). Prior studies demonstrated that SWLS has very good internal consistency and excellent test-retest reliability (Magyar-Moe, 2009). Internal consistency reliability for the scale was good (T1 $\alpha=0.88$; T2 $\alpha=0.87$; T3 $\alpha=0.89$).

Meaning in Life Questionnaire (MLQ): The Meaning in Life Questionnaire (MLQ) is a 10-item measure (Steger et al., 2006) that was included in this study to assess two dimensions of meaning in life: "presence of meaning" subscale which examines how participants feel about their lives of meaning (items 1, 4, 5, 6, 9; e.g., "My life has a clear sense of purpose"); and "search for meaning" subscale which examines how participants feel engaged and motivated to find meaning or deepen their understanding of meaning in their lives (items 2, 3, 7, 8, 10; e.g., "I am always searching for something that makes my life feel significant"). Participants were asked to rate these statements on a 5-point scale ranging from -2 (Absolutely false) to 2 (Absolutely True). Internal consistency reliability for the "presence of meaning" subscale was excellent (T1 $\alpha=0.91$; T2 $\alpha=0.90$; T3 $\alpha=0.91$) and for the "search for meaning" subscale was good (T1 $\alpha=0.88$; T2 $\alpha=0.92$; T3 $\alpha=0.91$).

Human Flourishing Measure: The Human Flourishing Measure (HFM) is a 12-item questionnaire (VanderWeele, 2017) that was included in this study to assess six domains:

happiness and life satisfaction, mental and physical health, meaning and purpose, character and virtue, close social relationships, and financial and material stability. Participants were asked to rate statements (e.g., Overall, to what extent do you feel the things you do in your life are worthwhile?) from 1 (Not true/Not at all/Strongly disagree) to 10 (Completely true/Strongly agree). Prior studies have demonstrated HFM's good cross-cultural validation in different cultural settings (e.g., the U.S.; China; Srilanka; Cambodia; Mexico) (Weźiak-Białowska et al., 2019). Internal consistency reliability for the scale was good (T1 $\alpha=0.87$; T2 $\alpha=0.83$; T3 $\alpha=0.88$).

Other Included Scales as Potential Control Variables

Lifetime Use of Psychedelic Compounds: The Lifetime Use of Psychedelic Compounds is a 2-item measure (Weiss et al., 2020; Weiss et al., 2021) that was used at baseline to explore participants' previous use of classic psychedelic compounds and previous ceremonial use of ayahuasca in their lifetime. For this study, when measuring participants' use of other types of psychedelic drugs or ayahuasca between the post-retreat and one-month follow-up, modifications will be made include modifying the time range on the two questions from "in your lifetime" to "past one-month post-retreat."

Setting Questionnaire for the Ayahuasca Experience (SQAE): The Setting Questionnaire for the Ayahuasca Experience (SQAE) is a 28-item measure (Pontual et al., 2021) that was used in this study to explore the influences of the setting on participants during the ayahuasca experience. Participants were asked to evaluate the setting where they consumed ayahuasca and report their experience with questions categorized into six dimensions, including social (5 items; e.g., "I have characteristics in common with that group of people"), leadership (6 items; e.g.,

“The ritual leadership gave me a sense of security”), decoration (3 items; e.g., “For my taste, the decoration was adequate”), comfort (4 items; “My physical position was comfortable during the ritual”), infrastructure (6 items; “There were accessible places for me to take care of my needs”), and instruction (4 items; “The ritual took place in the manner expected”). Participants were asked to score their experience on a 5-point scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Internal consistency reliability was excellent for the scale (T2 $\alpha=0.84$; T3 $\alpha=0.84$).

Big Five Inventory-10 (BFI-10): The brief version of the Big Five Inventory (BFI-10) is a 10-item measure (Rammstedt & John, 2007) that was used in this study to explore changes of five dimensions in personality at T1, T2, and T3: extraversion vs. introversion, agreeableness vs. antagonism, conscientiousness vs. lack of direction, neuroticism vs. emotional stability, openness vs. closedness to experience” in personality. Participants were asked to rate statements such as “I see myself as someone who is reserved” “I see myself as someone who is generally trusting” on a 5-point scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Internal consistency reliability was acceptable for the extraversion subscale (T1 $\alpha=0.69$; T2 $\alpha=0.73$; T3 $\alpha=0.75$) and neuroticism subscale (T1 $\alpha=0.73$; T2 $\alpha=0.63$; T3 $\alpha=0.69$). Internal consistency reliability was unacceptable for agreeableness subscale, conscientiousness subscale, and openness to experience subscale with Cronbach’s Alpha < 0.5 and were not included in the data analysis due to low reliability.

Analytic Plan

Data Preparation

After data recruitment was completed at T1, T2, and T3, all collected data were exported from Qualtrics, a secure online survey platform, into SPSS software for data cleaning and preliminary analysis. All participants were assigned to associated participant ID numbers at the beginning of the project for the duration of the study. All participants' contact information were deleted within the data cleaning process to ensure that identifiable information would not be retained during data analysis. The data cleaning process also included cleaning out missing data, potential outdated/incorrect information, or structural errors to improve data quality which allows for accurate analysis (Allen, 2017). All missing data was re-coded to 999, and summary variables (e.g., mean score of the scale/subscale) for some measures were calculated to make it easier for data analysis and interpretation.

Handling Missing Data

Little's Missing Completely at Random (MCAR) tests were conducted in SPSS for key primary variables (e.g., resilience, personality, acute effects, psychosocial outcomes) reported at different timepoints to test the hypothesis that study data are missing completely at random. Significances of the Little's MCAR tests reported in the Expectation Maximization (EM) Means were greater than 0.50, which means there is no statistical evidence to reject the null hypothesis for these key variables. The analysis output suggested the missingness of this study for key variables reported at different timepoints were not related to either the observed values or unobserved missing data. Chi-square tests and one-way ANOVA were also conducted to compare demographic differences among those who only completed the T1 survey (N=20), those

who only completed T1 and T2 surveys (N=14), and those who completed all three surveys (N=233). Test results revealed no significant demographic differences among the three groups based on completion rate, further suggesting the missing data were missing at random.

To deal with missing data, several well-accepted methods have been developed and utilized by researchers in the field in the data analysis process, such as listwise deletion, pairwise deletion (Allison, 2003), full information maximum likelihood (FIML; Duncan et al., 1998), and multiple imputation (MI; Allison, 2003). For this dissertation study, because of the high retention rate (87%) and the relatively small number of participants who dropped out (20 people dropped out from T1 to T2, an additional 15 people dropped out from T2 to T3), the impact of missing data in the primary analyses and research findings were minimized. It is important to note that in my dissertation, all eligible participants who met my inclusion criteria need to complete T1 survey to be formally enrolled in the study and be contacted for follow-up surveys. And among the 233 participants who completed T3 survey, none of them skipped the T2 survey. In other words, the 233 participants who completed T3 survey also completed T1 and T2 surveys which provided a consistent and complete dataset for the 233 individuals through the three timepoints. Additionally, enrolled participants who didn't complete the surveys only provided their contact information, which suggested a minimal loss of critical information for my primary analyses. Considering the high retention rate and the fully complete cases, I utilized listwise deletion method to deal with missing data to ensure the integrity and validity of the dataset. This analysis allowed for the analysis of complete cases only, ensuring the statistical inferences and conclusion drawn from the study were based on the fully reported data from participants which minimizing potential biases that could arise from imputing or analyzing partially reported records. Listwise

deletion is a commonly used method for handling missing data, especially applicable when the proportion of missing data is low and the loss of data does not significantly impact the overall analysis, in a large sample size with no power concerns (Kangm, 2013). Furthermore, given a large set of variables would be included in my analyses, utilizing FIML or MI methods which require precise assumptions with data patterns and data missingness that could potentially increase the risk of error and add complexity in maintaining data integrity and model adequacy. Given my study context, listwise deletion seems the most suitable method to deal with missing data without impacting the study's statistical power significantly.

Preliminary Analyses

For collected data, all preliminary analyses were conducted in SPSS to check the internal consistency and reliability of the data and deal with outliers and missing data (Price et al., 2015).

First, descriptive statistics on central tendency and variability/spread (e.g., mean, standard deviation, and frequency) of all study variables, especially demographic and background characteristics (e.g., age, race, gender, sex, education, occupation), were calculated in SPSS. Conducting descriptive statistics (e.g., test of normality, descriptives) enabled me to check skewness, kurtosis, as well as outliers among dependent variables (DVs) of the study aims to ensure data normality in preparation of regression analyses. There is no gold standard or rule of thumb for cutoff criteria in evaluating skewness and kurtosis for data normality assessment. Various researchers have proposed different guidelines for these cutoff values. For example, Mishra et al. (2019) suggested that absolute values of skewness and kurtosis smaller than 1 indicate that the data distribution is approximately normal (Mishra et al., 2019). However, this cutoff value [-1,1] has been critiqued for its reliability especially in studies with small-to-

moderate sample size ($n < 300$) due to its limitation in adjusting the standard error (Mishra et al., 2019). Additionally, some researchers suggested that data should be considered normal if skewness is between $[-2,2]$ and kurtosis is between $[-7,7]$ (Bryne, 2010; Hair et al. 2010). Furthermore, Kline (2011) suggested a broader range in which the absolute value of skewness should be less than 3 and the absolute value of kurtosis should be less than 10 to be considered acceptable for normal distribution (Kline, 2011). Given the varied thresholds in existing literature (e.g., skewness $[-3,3]$ and kurtosis $[-10,10]$; skewness $[-2,2]$ and kurtosis $[-7,7]$; skewness $[-1,1]$ and kurtosis $[-1,1]$) and considering my sample size of 233 ($200 < n < 300$), I have chosen to adopt the skewness value of $[-2,2]$ and kurtosis value of $[-7,7]$ which is the middle ground among all the proposed guidelines as cutoff criteria in my study to evaluate data normality. It is also important to note that Tabachnick and Fidell (2013) stated in their literature that deviation from normality of skewness and kurtosis typically have no substantive difference in the analysis when the sample size is greater than 200. Given my sample size of this study is 233, my rationale of choosing data normality cutoff values should have no substantive impacts of my analysis output. Additionally, some categorical variables were dummy recoded into binary variables, such as race (e.g., Race_White) and gender (e.g., Gender_Female), in preparation for later regression and CCA analyses.

Second. Pearson correlation and Spearman's rank correlation analyses were conducted in SPSS to determine if it is statistically necessary to include all controls in the model based on the theoretical evidence, such as age, gender identity as female, dimensions of personality, spiritual and recreational intentions, prior experience with psychedelics, along with baseline resilience level, acute ayahuasca effects, and psychospiritual outcomes (Correlation output, please see

Chapter 4, Tables 7-9). The correlation analyses revealed whether potential control variables were significantly correlated ($p < 0.05$) with my outcomes/DVs. Correlation coefficients (r : [-1,1]) were also examined to assess the strength and direction of these relationship. Although there is no universally agreed standard for r cutoff values, much of the existing literature suggested that absolute values of the coefficient r between 0 to 0.19 were considered very weak. Considering the large number of variables would be included in the primary analyses (3 measures of acute challenging effects, 6 measures of acute ayahuasca effects, and 5 measures ayahuasca psychospiritual outcomes), only those with a p -value smaller than 0.01 and a coefficient value of $r > 0.19$ were included as control variables in regression to maintain rigor and reduce the risk of type 1 error. Identifying control variables helped me ensure the internal validity of my study and decrease the impact of potential confounding variables (Thomas, 2020). To do so, a hierarchical multiple linear regression was conducted to identify potential confounders by comparing unadjusted and adjusted estimates of the variables. Besides that, I restricted entry to my study of potential confounding factors (e.g., currently using other drugs, receiving psychotherapy treatment) and strictly followed the eligibility criteria for participants selection. Additionally, in correlation analysis output, I specifically checked the correlation coefficients to see if the independent variables (iVs) were highly correlated to each other ($r > 0.70$). If the bivariate correlation coefficient is greater than 0.70, the threshold recommended by Hair et al. (2020), the variables would not be included in the same primary analysis due to the increased error terms and multicollinearity concerns.

Primary Aims Analyses

Aim 1 Analyses. A hierarchical multiple linear regression was utilized in SPSS to evaluate the regression between the IV of baseline resilience reported at T1 and one DV of acute challenging effects of ayahuasca reported at T2. Based on prior literature evidence, known predictors (e.g., age, personality, past psychedelic use experience, setting) were examined in correlation analyses with DVs using SPSS. This was done to determine if it is statistically necessary to include all these variables as control variables (block 1) [plots: Y=*ZRESID, X=*ZPRED] in the hierarchical regression models along with baseline resilience (block 2) and acute ayahuasca challenging effects. In the output, the R, R^2 , and the adjusted R^2 were examined to determine the percentages of variances in the outcome that could be explained by my entered control variables (block 1). “Sig” p value < 0.05 was checked to see if the predictors are significant in predicting the outcome when controlling confounding variables. The standardized beta coefficient β [-1, 1] was checked to see the strength of the effect of each individual IV to the DV (the higher the absolute value of β , the stronger the effect) (Cohen, 1988; Cohen, 1992).

Aim 2 Analyses. A multiple regression with an interaction term analysis was conducted in SPSS to test the interaction (baseline resilience reported at T1 * acute challenging effects of ayahuasca reported at T2) hypothesis: assess whether baseline resilience (moderator/interaction term) moderates the relationship between the IV of acute challenging effects of ayahuasca reported at T2 and one DV of the psychospiritual outcomes (10-item persisting effects, spirituality index of well-being, satisfaction with life, meaning in life, human flourishing) reported at T3. In each regression analysis with an interaction term, I included control variables which showed significant correlations ($p < 0.01$ and $r > 0.19$) with the DVs in my preliminary

analyses, including the influence of setting on participants' retreat experience, neuroticism, and how strong of their spiritual intentions attending ayahuasca retreats. There are five DVs for Aim 2 to measure, I conducted the linear regression five times with different DV. Because I performed regression analyses with the same IV five times on the same hypothesis, the chance of committing a type 1 error (false positive) may increase. To decrease the probability of type 1 error, prior researchers (e.g., Andrade, 2019) suggested Bonferroni correction ("post-hoc": check "Bonferroni"; or manually calculate by dividing the specified alpha level by the number of statistical analyses performed) or utilize an adjusted p-value (e.g., the significance level can be minimized to .01). For this study, Bonferroni correction was utilized to avoid or minimize the risk of type 1 error. Furthermore, collinearity was checked when running the multiple regression analysis by checking "collinearity diagnostics" under "statistics". In the output, tolerance values and variance inflation factor (VIF) were checked to detect multicollinearity among iVs and see how much the variance of an estimated regression coefficient increases if my predictors are correlated. The common cutoff threshold for tolerance values is 0.10, which is corresponding VIF of 10 as suggested in Hair et al. (2020). Only variables with a tolerance values greater than 0.10 or a VIF less than 10 were included in the models, indicating multicollinearity is not a concern.

Additionally, to further address and reduce the multicollinearity concerns occurred in regression analyses, a centering methodology was used for the iVs, including baseline resilience reported at T1 (i.e., baseline resilience centered=baseline resilience – baseline resilience mean), acute challenging experiences, acute purging experiences, and uncomfortable ayahuasca experiences reported at T2 (e.g., acute challenging ayahuasca effects centered=acute challenging

ayahuasca effects— acute challenging ayahuasca effects mean), and the interaction term in analysis (e.g., baseline resilience_ acute challenging ayahuasca effects_centered = baseline resilience centered * acute challenging ayahuasca effects centered). Each regression model included control variables (block 1), IV (block 2), moderator (block 3), and their interaction term (IV*baseline resilience) (block 4) to explore the potential moderating effects of baseline resilience on the relationship between the challenging effects of ayahuasca reported at T2 and psychospiritual outcomes reported at T3. In the multiple regression output, the R , R^2 , and the adjusted R^2 were assessed to see how many percentages of the centered regression model account on the variances in the outcome. Sig” p value < 0.05 was checked to see if the interaction is statistically significant on the regression. The standardized beta coefficient β [-1, 1] was checked to see the strength of the effect of iVs to the DV (the higher the absolute value of β , the stronger the effect) (Cohen,1988; Cohen, 1992).

Aim 3 Analyses. A canonical correlation analysis (CCA) was utilized in SPSS to examine the strength of associations between the unobserved constructs/latent variables, including the acute effects of ayahuasca (independent set 1, consisting of iVs of challenging experience, mystical experience, psychological insight, emotional breakthrough) reported at T2 and psychospiritual outcomes (dependent set 2, consisting of DVs of 10-item persisting effects, spirituality index of well-being, satisfaction with life, meaning in life, human flourishing) reported at T3. CCA was considered because it is a multivariate technique that allows the inclusion of multiple related iVs and DVs in the same analysis while controlling for the intercorrelations among all variables entered in the model (Tabachnick & Fidell, 2007). In the CCA, I included control variables of influence of setting on participants’ ayahuasca experiences

reported at T2, neuroticism reported at T1, and how strong of spiritual intention to attend ayahuasca retreats reported at T1. These variables were selected as control variables based on prior preliminary statistical analyses where these variables demonstrated significant correlations with psychospiritual outcomes ($p < 0.01$ and $r > 0.19$), which suggested potential confounding effects on the relationship of the two sets of latent variables. In CCA output, “Sig” p value $< .05$ was checked to see if the sets of canonical correlation is statistically significant, and canonical loadings were examined. When the variables have a coefficient greater than 0.40, it indicates a significant relation within the set of variables (Sherry & Henson, 2005).

Potential Limitations of The Study Methods and Procedures

Data were collected through self-reported measures among participants from specific ayahuasca retreat centers, which may introduce socially desirable responses and limit diversity of the sample in terms of background. The longitudinal design of this study without control groups may involve the possibility that external factors could influence on the observed outcomes reported at T3. For a detailed discussion regarding the study’s limitations, see Chapter 5.

Chapter 4. Results

Chapter 4 outlines the results of the study. Firstly, demographic characteristics of the study sample are presented, including examining potential differences among participants from two recruitment locations (Peru vs. Costa Rica) and among participants attending two different length groups (5-night retreat group vs. 7-night retreat group). Secondly, preliminary analyses on data normality, multicollinearity, reliability of study measures, potential control variables for primary analyses, and acute and enduring effects of ayahuasca that reported by participants, are demonstrated through writing and tables. Lastly, the primary aims analyses are detailed in writing and tables/figures with evidence on the relationships between resilience, acute and enduring effects of ayahuasca, and psychospiritual outcomes.

Demographic Characteristics

Out of the 267 participants who completed T1 survey and enrolled in this study, 247 completed T2 survey, and 233 completed T3 survey, resulting in three groups based on their completion rate. Chi-square tests were conducted to compare whether there were any demographic differences among those who only completed baseline without completing follow-up surveys (T1 only group, N=20), those who completed T1 and T2 without T3 survey (T1-2 group, N=14), and those who completed all three surveys (T1-3 group, N=233). As reported in *Table 2*, the Chi-square tests revealed no significant differences among these three groups (T1 only, T1-2 group, T1-3 group). Additionally, the differences in age across three groups were evaluated through one-way ANOVA, and results showed there was no significant differences in the mean age among the three groups, $F(2,262)=1.412, p=0.245$.

Table 2 displays the demographic characteristics of the 233 participants who completed surveys at all three timepoints. The mean age of the sample was 41.20 years ($SD=11.41$). Nearly 90% of the participants (86.7%, $n=202$) were from the North America (174 came from U.S., and 28 came from Canada). Approximately one-half of participants reported their biological sex was female (56.2%) and gender identity was female (54.1%). Most participants (83.3%) identified as White or Caucasian, 3.0% identified as Black or African or African American/Canadian, 5.6% identified as Asian descent, and 0.9% were identified as indigenous people. Regarding their Hispanic ethnicity, a majority of (92.3%) reported they were non-Hispanic. The proportion identifying as having an advanced degree was high among this sample, with 95.3% reported have at least attended or completed college degree. In terms of employment and annual household income, 54.5% reported a full-time employment status and 71.2% reported their annual household income of \$75,000 or more. Additionally, approximately one third of participants (37.5%) indicated their relationship status as “never married” and 35.8% reported married and living with spouse. Furthermore, about one half of the participants (57.5%) described their religious beliefs before the ayahuasca retreat experience as “not religious”. Lastly, 79.4% of the sample reported past psychedelic use experience and 21.9% reported past Ayahuasca history prior their ayahuasca retreat experience. When asking participants’ intention for attending ayahuasca retreats prior the retreat, 83.7% of the sample reported intention for treatment, 85.4% reported intention for spiritual experience and improvement, and 24.5% reported intention for recreation.

Table 2.

Comparisons of Demographic Characteristics Between Participants Who Completed Different Timepoints and Those Who Completed All Survey Timepoints

Variables	T1 only Group (N=20)		T1-2 Group (N=14)		T1-3 Group (N=233)		Chi-Square Tests			Effect Size (Cramer's V)	
	n	%	n	%	n	%	Value	df	sig. (2- sided)		
Recruitment Site	Costa Rica	17	85.0%	13	92.9%	213	91.4%	1.110	4	0.893	0.046
	Peru	3	15.0%	1	7.1%	20	8.6%				
Retreat Night Numbers	5-night Retreat Experience	10	50.0%	4	28.6%	84	36.1%	1.963	2	0.375	0.086
	7-night Retreat Experience	10	50.0%	10	71.4%	149	63.9%				
Country Residency	United States	17	85.0%	12	85.7%	174	74.7%	8.696	8	0.369	0.128
	Canada	2	10.0%	1	7.1%	28	12.0%				
	Europe	0	0	0	0	15	6.4%				
	Asia	0	0	1	7.1%	2	0.9%				
	Other	1	5.0%	0	0	14	6.0%				
Race	White or Caucasian	15	75.0%	11	78.6%	194	83.3%	3.700	10	0.960	0.083
	Black or African or African American/Canadian	1	5.0%	0	0	7	3.0%				
	Asian	1	5.0%	1	7.1%	13	5.6%				
	Native American, American Indian, Indigenous Canadian, or Alaskan Native	0	0	0	0	2	0.9%				
	Native Hawaiian or Pacific Islander	0	0	0	0	1	0.4%				
	Other	3	15.0%	2	14.3%	16	6.9%				
Hispanic Ethnicity	Hispanic	1	5.0%	1	7.1%	18	7.7%	0.200	2	0.905	0.027
	Non-Hispanic	19	95.0%	13	92.9%	215	92.3%				
Biological Sex	Male	9	45.0%	5	35.7%	102	43.8%	.371	2	0.831	0.037
	Female	11	55.0%	9	64.3%	131	56.2%				
Gender Identity	Male (identify primarily as a man)	8	40.0%	5	35.7%	103	44.2%	3.800	8	0.875	0.084
	Female (identify primarily as a woman)	11	55.0%	9	64.3%	126	54.1%				
	Gender-fluid	0	0	0	0	1	0.4%				

	Gender-queer	1	5.0%	0	0	2	0.9%				
	Other	0	0	0	0	1	0.4%				
Education Background	Grade 7 to 12 (without graduating)	0	0	0	0	2	0.9%	14.573	12	0.266	0.165
	High school diploma, GED, or equivalent	0	0	1	7.1%	9	3.9%				
	Part College	8	40.0%	2	14.3%	32	13.7%				
	Graduated 2-4 year college	3	15.0%	5	35.7%	95	40.8%				
	Part graduate/professional school	1	5.0%	0	0	13	5.6%				
	Completed graduate/professional school	8	40.0%	6	42.9%	82	35.2%				
Relationship Status	Married and living with spouse	6	30.0%	1	7.0%	83	35.8%	12.935	8	0.114	0.156
	Living with partner	3	15.0%	5	35.7%	26	11.2%				
	Divorced or separated	1	5.0%	3	21.4%	32	13.8%				
	Widowed	1	5.0%	0	0	4	1.7%				
	Never married	9	45.0%	5	35.7%	87	37.5%				
Employment Status	Employed Full-Time	11	55.0%	7	50.0%	127	54.5%	10.565	10	0.392	0.141
	Employed Part-Time	0	0	1	7.1%	23	9.9%				
	Employed as a contractor	2	10.0%	4	28.6%	19	8.2%				
	Seeking opportunities	2	10.0%	0	0	15	6.4%				
	Retired	2	10.0%	0	0	17	7.3%				
	Other	3	15.0%	2	14.3%	32	13.7%				
Annual household income	Under \$25,000	0	0	3	21.4%	13	5.6%	17.782	14	0.217	0.182
	\$25,000-\$34,999	1	5.0%	0	0	10	4.3%				
	\$35,000-\$49,999	1	5.0%	0	0	13	5.6%				
	\$50,000-\$74,999	1	5.0%	0	0	31	13.3%				
	\$75,000-\$99,000	3	15.0%	1	7.1%	30	12.9%				
	\$100,000-\$124,999	3	15.0%	0	0	28	12.0%				
	\$125,000-\$150,000	0	0	1	7.1%	17	7.3%				
Over \$150,000	11	55.0%	9	64.3%	91	39.1%					
Religious Belief	I am not religious	9	45.0%	10	71.4%	134	57.5%	6.964	10	0.729	0.114
	Christianity (Catholic protestant or any other Christian denominations)	4	20.0%	1	7.1%	39	16.7%				
	Judaism	0	0	1	7.1%	11	4.7%				

	Buddhism	3	15.0%	0	0	16	6.9%				
	Hinduism	0	0	0	0	3	1.3%				
	Other	4	20.0%	2	14.3%	30	12.9%				
Intention to Attend Ayahuasca Retreats	Intention for treatment	14	70.0%	10	71.4%	195	83.7%	10.559	8	0.228	0.141
	Intention for spiritual experience/improvement	17	85.0%	11	78.5%	199	85.4%	6.112	6	0.411	0.107
	Intention for recreation	6	30.0%	4	28.5%	57	24.5%	7.946	8	0.439	0.122
Past Psychedelic History	Never	3	15.0%	0	0	48	20.6%				
	Once	1	5.0%	1	7.1%	11	4.7%				
	Two to four times	6	30.0%	0	0	43	18.5%	11.588	8	0.171	0.147
	Five to ten times	2	10.0%	5	35.7%	45	19.3%				
	Greater than ten times	8	40.0%	8	57.1%	86	36.9%				
Past Psychedelic Use Type	Psilocybin/Magic mushrooms	15	75.0%	14	100.0%	163	70.0%				
	Ecstasy or "Moll" (MDMA)	6	30.0%	9	64.3%	130	55.8%				
	Lysergic acid diethylamide (LSD)	6	30.0%	7	50.0%	106	45.5%				
	N,N-dimethyltryptamine (DMT)	5	25.0%	1	7.1%	55	23.6%				
	Ketamine	5	25.0%	7	50.0%	54	23.2%				
	Mescaline	3	15.0%	0	0	24	10.3%				
	Peyote	1	5.0%	0	0	9	3.9%				
Past Ayahuasca History	Other	2	10.0%	2	14.3%	29	12.4%				
	Never	15	75.0%	13	92.9%	182	78.1%				
	Once	0	0	0	0	14	6.0%				
	Two to four times	3	15.0%	1	7.1%	17	7.3%	5.107	8	0.746	0.098
	Five to ten times	1	5.0%	0	0	10	4.3%				
	Greater than ten times	1	5.0%	0	0	10	4.3%				

Demographic Differences Between Two Recruitment Locations

This study's participants were recruited from two locations: Costa Rica and Peru. To investigate whether there are significant differences between two recruitment locations across all demographic variables, Independent Samples T-test and Chi-square tests were conducted in SPSS. Independent Samples T-test results showed there was no significant differences in the mean age among the two recruitment locations, $t(26.898)=1.759, p=0.090$. Chi-square test results revealed no significant differences between two recruitment locations across all other demographic variables. The Chi Square output was displayed in *Table 3*. The Independent Samples T-test and Chi Square test results suggested that there were no significant differences between two recruitment locations across all demographic variables, and recruitment location should not be included as control variables in primary analyses.

Demographic Differences Between Two Retreat Length Groups and Influence of Retreat Length on Acute Ayahuasca Effects

This study's sample includes individuals registered either 5-night retreat experience or 7-night retreat experience. To investigate if there are significant difference among demographic variables among the two retreat length groups (5-night vs. 7-night), Independent Samples T-test and Chi-square tests were conducted in SPSS. Independent Samples T-test results showed there was no significant differences in the mean age among the two retreat length groups, $t(198.697)=-1.304, p=0.194$. As displayed in *Table 3*, Chi-square test output revealed no significant differences among the retreat length groups across demographic variables, and retreat length should not be included as control variables in primary analyses. Furthermore, because the length of the retreat could impact perception and reporting of acute ayahuasca effects and

psychospiritual outcomes, Independent Samples T-test was further utilized to compare the mean scores of acute ayahuasca effects and psychospiritual outcomes between these two retreat length groups. As reported in *Table 4*, the T-test results showed there were no significant differences in the DVs and IVs of primary aims across the two groups (5-night vs. 7-night) and further suggested retreat length should not be included as control variables in primary analyses.

Table 3.

Comparisons of Demographic Characteristics Among Participants Who Attended Different Recruitment Locations and Retreat Length Groups (N=233)

Variables		Costa Rica	Peru	Chi-Square Tests			Effect Size	5-night group	7-night group	Chi-Square Tests			Effect Size
		n	n	Value	df	sig. (2-sided)		n	n	Value	df	sig. (2-sided)	
Sex	Male	91	11	1.12	1	0.290	-0.069 ^a	41	61	1.352	1	0.245	0.076 ^a
	Female	122	9					43	88				
Gender	Male (identify primarily as a man)	92	11	1.286	4	0.864	0.074 ^b	42	61	6.686	4	0.153	0.169 ^b
	Female (identify primarily as a woman)	117	9					40	86				
	Gender-fluid	1	0					0	1				
	Gender-queer	2	0					2	0				
	Other	1	0					0	1				
Race	White or Caucasian	179	15	11.064	5	0.050	0.218 ^b	68	126	2.215	5	0.819	0.097 ^b
	Black or African or African American/Canadian	4	3					4	3				
	Asian	12	1					5	8				
	Native American, American Indian, Indigenous Canadian, or Alaskan Native	2	0					1	1				
	Native Hawaiian or Pacific Islander	1	0					0	1				
	Other	15	1					6	10				
	Hispanic	15	3					1.624	1				
Residency	Non-Hispanic	198	17	3.597	4	0.463	0.124 ^b	73	142	2.216	4	0.696	0.098 ^b
	United States	157	17					67	107				
	Canada	28	0	8	20								

	Europe	13	2					4	11				
	Asia	2	0					1	1				
	Other	13	1					4	10				
	Grade 7 to 12 (without graduating)	2	0					0	2				
	High school diploma, GED, or equivalent	8	1					4	5				
	Part College	28	4					11	21				
Education	Graduated 2-4 year college	88	7	3.874	6	0.694	0.129 ^b	37	58	2.883	6	0.823	0.111 ^b
	Part graduate/professional school	12	1					3	10				
	Competed graduate/professional school	75	7					29	53				
	Under \$25,000	9	4					7	6				
	\$25,000-\$34,999	9	1					3	7				
	\$35,000-\$49,999	12	1					1	12				
Income	\$50,000-\$74,999	30	1	10.706	7	0.152	0.214 ^b	6	25	15.419	7	0.031	0.257 ^b
	\$75,000-\$99,000	29	1					11	19				
	\$100,000-\$124,999	25	3					10	18				
	\$125,000-\$150,000	16	1					4	13				
	Over \$150,000	83	8					42	49				
	Employed Full-Time	115	12					52	75				
	Employed Part-Time	22	1					4	19				
Employment	Employed as a contractor	16	3	3.596	5	0.609	0.124 ^b	5	14	7.441	5	0.190	0.179 ^b
	Seeking opportunities	14	1					6	9				
	Retired	17	0					8	9				
	Other	29	3					9	23				
	I am not religious	121	13					49	85				
Religious Belief	Christianity (Catholic protestant or any other Christian denominations)	35	4	3.246	5	0.662	0.118 ^b	17	22	6.688	5	0.245	0.169 ^b

	Judaism	11	0					2	9				
	Buddhism	16	0					8	8				
	Hinduism	3	0					0	3				
	Other	27	3					8	22				
	Married and living with spouse	76	7					30	53				
Relationship Status	Living with partner	25	1	2.439	4	0.656	0.103 ^b	12	14	1.684	4	0.794	0.085 ^b
	Divorced or separated	30	2					10	22				
	Widowed	3	1					1	3				
	Never married	79	8					31	56				
Past Psychedelic History	Never	42	6					19	29				
	Once	11	0					1	10				
	Two to four times	42	1	5.433	4	0.246	0.153 ^b	17	26	6.138	4	0.189	0.162 ^b
	Five to ten times	39	6					20	25				
	Greater than ten times	79	7					27	59				
Never	165	17	70					112					
Past Ayahuasca History	Once	13	1					6	8				
	Two to four times	16	1	1.293	4	0.863	0.074 ^b	7	10	9.515	4	0.049	0.202 ^b
	Five to ten times	9	1					0	10				
	Greater than ten times	10	0					1	9				

Note. ^aPhi; ^bCramer's V

Table 4.

Comparisons of Primary Independent and Dependent Variables Between Participants Who Attended 5-night Retreat Group and Those Who Attended 7-night Retreat Group

Variables	<i>F</i>	<i>t</i>	<i>df</i>	Significance (2-Sided <i>p</i>)	Mean Difference	95% CI	
						Lower	Upper
Baseline Resilience	0.059	-0.878	231	0.381	-2.13	-6.911	2.651
Acute Challenging Experiences	2.429	-0.08	231	0.936	-0.011	-0.282	0.26
Acute Purging Experiences	0.107	-1.66	231	0.098	-0.154	-0.338	0.029
Uncomfortable Ayahuasca Experience	1.869	0.298	231	0.766	0.046	-0.26	0.352
Emotional breakthrough	0.132	-0.393	231	0.694	-0.123	-0.741	0.494
Mystical-type experience	4.282	-0.025	199.761	0.980	-0.004	-0.289	0.282
Psychological insight	2.498	-1.247	231	0.214	-0.179	-0.463	0.104
Satisfaction with Life	0.02	-1.66	231	0.098	-1.45	-3.172	0.271
Presence of Meaning in life	0.013	-1.796	231	0.074	-1.091	-2.288	0.106
Search for Meaning in life	7.344	1.676	203.314	0.095	1.112	-0.197	2.42
Spirituality Index of Well-Being Self-efficacy	0.24	-0.708	231	0.48	-0.355	-1.344	0.634
Spirituality Index of Well-Being life-scheme	0.829	-1.838	231	0.067	-1.267	-2.625	0.091
Human Flourishing	0.095	-1.601	231	0.111	-3.668	-8.18	0.845
PE: current sense of personal well-being or life satisfaction	5.635	-0.8	218.268	0.425	-0.118	-0.407	0.172
PE: the sense of life's purpose	1.772	-1.125	231	0.262	-0.171	-0.469	0.128
PE: the sense of life's meaning	0.557	-1.826	231	0.069	-0.281	-0.584	0.022
PE: social relationships as a whole	2.893	-1.121	231	0.263	-0.168	-0.462	0.127

PE: attitudes about life	4.229	-0.387	214.468	0.699	-0.054	-0.331	0.223
PE: attitudes about self	2.547	-1.278	231	0.203	-0.185	-0.469	0.1
PE: mood	5.542	-0.534	213.763	0.594	-0.082	-0.384	0.22
PE: behaviors	3.435	-0.59	231	0.556	-0.089	-0.385	0.208
PE: how spiritual you are	0.137	-1.099	231	0.273	-0.171	-0.479	0.136
PE: attitudes about death	2.031	-2.076	231	0.039	-0.355	-0.691	-0.018

Note. PE=Persisting Effects; *df*=degree of freedom; CI=confidence interval.

Preliminary Analyses

Data Normality

Assessments of data normality, focusing on skewness and kurtosis, were comprehensively reported in *Table 5*. All DV data were considered normal based on the adopted cutoff values, which was crucial for the statistical methods applied in the primary analyses contributing to the reliability of study findings.

Table 5.

Skewness and Kurtosis Tests of Acute Effects of Ayahuasca and Psychospiritual Outcome Variables

Variables	Skewness	SE of Skewness	Kurtosis	SE of Kurtosis
Acute Challenging Experiences	0.569	0.159	-0.460	0.318
Acute Purging Experiences	-0.135	0.159	-0.068	0.318
Uncomfortable Ayahuasca Experience	0.683	0.159	-0.233	0.318
Human Flourishing	-0.532	0.159	-0.037	0.318
Satisfaction with Life	-0.746	0.159	0.120	0.318
Presence of Meaning in life	-0.814	0.159	0.426	0.318
Search for Meaning in life	-0.739	0.159	-0.275	0.318
Spirituality Index of Well-Being Self-efficacy	-1.446	0.159	4.449	0.318
Spirituality Index of Well-Being life-scheme	-0.628	0.159	0.052	0.318
Persisting Effects: current sense of personal well-being or life satisfaction	-1.373	0.159	1.962	0.318
Persisting Effects: the sense of life's purpose	-0.752	0.159	0.957	0.318
Persisting Effects: the sense of life's meaning	-0.810	0.159	1.028	0.318
Persisting Effects: social relationships as a whole	-0.889	0.159	1.269	0.318

Persisting Effects: attitudes about life	-1.401	0.159	2.440	0.318
Persisting Effects: attitudes about self	-1.111	0.159	1.845	0.318
Persisting Effects: mood	-1.165	0.159	1.548	0.318
Persisting Effects: behaviors	-1.006	0.159	1.537	0.318
Persisting Effects: how spiritual you are	-0.474	0.159	-0.767	0.318
Persisting Effects: attitudes about death	-0.294	0.159	-0.395	0.318

Note. SE=Standard Error.

Multicollinearity

Correlation analyses output showed all the correlation coefficients were smaller than 0.70 between these iVs, which indicated there were no potentially problematic pairs of variables that may distort the results of regression analyses due to high multicollinearity. Additionally, all variables in regression analyses had tolerance values greater than 0.10 and VIF values below 10, suggesting no indication of multicollinearity.

Reliability Analysis

The internal consistency and reliability of the measures were evaluated in SPSS on all iVs, DVs, and potential control variables as suggested in existing literature (e.g., personality, setting) for Aims 1-3. Cronbach Alpha values were reported in *Table 6*. According to the output, all measures demonstrated acceptable levels of internal consistency which further justified their inclusion in my primary analyses.

Table 6.
Internal Consistency Reliability of Key Study Measures

Measure Category	Measure	T1 α	T2 α	T3 α
Key Variable	Resilience Scale for Adults (RSA)	0.90	0.89	0.91
Acute Challenging effects reported at T2	Challenging experience (CEQ)		0.94	
Acute Challenging effects reported at T2	Ayahuasca Experience Inventory-discomfort subscale items		0.91	
Acute Challenging effects reported at T2	Ayahuasca purging experience inventory		0.76	

Acute ayahuasca effects reported at T2	Psychological insight questionnaire (PIQ)	0.96		
Acute ayahuasca effects reported at T2	Emotional breakthrough inventory (EBI)	0.91		
Acute ayahuasca effects reported at T2	Mystical-type experience (MEQ)	0.97		
Psychospiritual outcomes reported at T3	10-item Persisting Effects Questionnaire (PEQ)	0.93	0.93	
Psychospiritual outcomes	The Spirituality Index of Well-Being (SIWB)	0.90	0.88	0.91
Psychospiritual outcomes	Satisfaction with life scale (SWLS)	0.88	0.87	0.89
Psychospiritual outcomes	Meaning in life questionnaire-- presence of meaning subscale (MLQ-P)	0.91	0.90	0.91
Psychospiritual outcomes	Meaning in life questionnaire-- search for meaning subscale (MLQ-S)	0.88	0.92	0.91
Psychospiritual outcomes	Human flourishing questionnaire	0.87	0.83	0.88
Potential control variable	Setting Questionnaire for the Ayahuasca Experience (SQAE)	0.84	0.84	
Potential control variable	Brief Version of the Big Five Inventory-- extraversion subscale	0.69	0.73	0.75
Potential control variable	Brief Version of the Big Five Inventory-- neuroticism subscale	0.73	0.63	0.69

Correlation Analyses for Identifying Potential Control Variables in Primary Analyses

As *Tables 7-8* show, the correlation analysis revealed that neuroticism reported at T1 was significantly and positively correlated with acute challenging experiences ($r=0.195, p=0.003$). Additionally, age showed a significant and weak negative correlation with acute purging experiences ($r=-0.195, p=0.003$). Moreover, data showed that influence of setting on participants' ayahuasca experience reported at T2 was significantly and negatively correlated with uncomfortable ayahuasca experiences ($r=-0.259, p<0.001$). Therefore, the variables of age (as a predictor for APE), neuroticism (as a predictor for CEQ), and setting (as a predictor for uncomfortable ayahuasca experiences) that met the threshold for control variables were included in the regression models.

Table 7.*Pearson Correlations Analysis to Identify Potential Control Variables for Acute Ayahuasca Effects (N=233)*

Variables		1	2	3	4	5	6	7	8	9	10
1. Age	<i>r</i>	1									
	<i>p</i>	.									
2. Neuroticism reported at T1	<i>r</i>	-.145	1								
	<i>p</i>	0.027	.								
3. Extraversion Personality reported at T1	<i>r</i>	0.023	-.179	1							
	<i>p</i>	0.729	0.006	.							
4. Setting Influence reported at T2	<i>r</i>	-0.038	-0.013	-0.039	1						
	<i>p</i>	0.565	0.843	0.55	.						
5. Spiritual Intention Attending Ayahuasca Retreats reported at T1	<i>r</i>	-0.043	-0.085	0.025	.141	1					
	<i>p</i>	0.518	0.198	0.707	0.032	.					
6. Treatment Intention Attending Ayahuasca Retreats reported at T1	<i>r</i>	-.131	.256	-0.043	0.096	.458	1				
	<i>p</i>	0.045	<.001	0.509	0.143	<.001	.				
7. Recreation Intention Attending Ayahuasca Retreats reported at T1	<i>r</i>	-.170	-.164	0.051	-0.1	-0.005	0.081	1			
	<i>p</i>	0.009	0.012	0.443	0.128	0.935	0.22	.			
8. Acute Challenging Experiences reported at T2	<i>r</i>	-0.108	.195	-0.002	-.147	0.033	0.005	-0.026	1		
	<i>p</i>	0.102	0.003	0.975	0.025	0.616	0.935	0.692	.		
9. Acute Purging Experiences reported at T2	<i>r</i>	-.195	0.112	0.019	-0.095	-0.004	0.029	0.08	.565	1	
	<i>p</i>	0.003	0.088	0.778	0.148	0.957	0.663	0.222	<.001	.	
10. Uncomfortable Ayahuasca Experience reported at T2	<i>r</i>	-0.074	0.124	-0.046	-.259	-0.032	0.004	0.047	.793	.523	1
	<i>p</i>	0.258	0.059	0.483	<.001	0.622	0.947	0.476	<.001	<.001	.

Note. *r*=Pearson Correlation Coefficient, *p*=Sig.(2-tailed); Bold values represent the relationships met the threshold of $p < 0.01$ and $r > 0.19$ and indicate the variables should be included as control variables for Acute Ayahuasca Effects in primary analyses.

Table 8.

Spearman's Rank Correlation Analysis to Identify Potential Categorical Control Variables for Acute Ayahuasca Effects (N=233)

Variables		1	2	3	4	5	6	7
1. Psychedelic History reported at T1	r_s	1						
	p	.						
2. Ayahuasca History reported at T1	r_s	.310	1					
	p	<.001	.					
3. Sex	r_s	-.187	-0.026	1				
	p	0.004	0.693	.				
4. Gender	r_s	-.194	-0.031	.981	1			
	p	0.003	0.64	<.001	.			
5. Acute Challenging Experiences reported at T2	r_s	-0.048	-0.046	0.066	0.068	1		
	p	0.463	0.486	0.315	0.303	.		
6. Acute Purging Experiences reported at T2	r_s	0.051	-.151	0.021	0.041	.572	1	
	p	0.442	0.021	0.746	0.531	<.001	.	
7. Uncomfortable Ayahuasca Experience reported at T2	r_s	-0.057	-0.035	-0.006	0.003	.806	.531	1
	p	0.384	0.594	0.928	0.968	<.001	<.001	.

Note. r_s =Spearman's rank correlation Coefficient (Spearman's rho), p =Sig.(2-tailed); None of the relationships met the threshold of $p<0.01$ and $r>0.19$ to be considered as control variables for Acute Ayahuasca Effects in primary analyses.

Similarly, in evaluating potential control variables for psychospiritual outcomes reported at T3, correlation analyses identified multiple significant factors that met control variable threshold to be included in primary analyses (results see *Table 9*): First, the influence of setting on participants' ayahuasca experiences reported at T2 was significantly and positively correlated with nearly all psychospiritual outcomes reported at T3 (r =[0.198, 0.396], p values<0.01), except for the search for meaning in life, and persisting effects in social relationships as a whole and in how spiritual you are. Second, neuroticism reported at T1 was significantly and negatively correlated with meaning in life, human flourishing, spirituality index of well-being, and satisfaction with life reported at T3 (r =[-0.307, -0.200], p values<0.01). Additionally, how strong of participants' spiritual intention in attending ayahuasca retreats reported at T1 was significantly and positively correlated with persisting effects in how spiritual you are and in attitudes about

self, presence of meaning in life, spirituality index of well-being, and human flourishing reported at T3 ($r=[0.199, 0.268]$, p values <0.01).

Table 9.
Pearson Correlations Analysis to Identify Potential Control Variables for Psychospiritual Outcomes (N=233)

Variables		Age	Neuroticism	Setting	Spiritual Intention
Satisfaction with Life	<i>r</i>	0.038	-.226	.282	.176
	<i>p</i>	0.568	<.001	<.001	0.007
Presence of Meaning in life	<i>r</i>	-0.042	-.219	.317	.265
	<i>p</i>	0.524	<.001	<.001	<.001
Search for Meaning in life	<i>r</i>	-.173	.246	-.137	0.034
	<i>p</i>	0.008	<.001	0.037	0.607
Spirituality Index of Well-Being Self-efficacy	<i>r</i>	-0.02	-.207	.396	.268
	<i>p</i>	0.758	0.002	<.001	<.001
Spirituality Index of Well-Being life-scheme	<i>r</i>	-0.052	-.200	.359	.265
	<i>p</i>	0.432	0.002	<.001	<.001
Human Flourishing	<i>r</i>	0.085	-.307	.368	.210
	<i>p</i>	0.197	<.001	<.001	0.001
Persisting Effects: current sense of personal well-being or life satisfaction	<i>r</i>	-0.05	-0.025	.249	0.08
	<i>p</i>	0.449	0.708	<.001	0.223
Persisting Effects: the sense of your life's purpose	<i>r</i>	-0.12	0.051	.240	.177
	<i>p</i>	0.067	0.442	<.001	0.007
Persisting Effects: the sense of your life's meaning	<i>r</i>	-.139	0.002	.236	.178
	<i>p</i>	0.034	0.975	<.001	0.006
Persisting Effects: social relationships as a whole	<i>r</i>	-0.12	0.035	.154	.138
	<i>p</i>	0.068	0.597	0.019	0.035
Persisting Effects: attitudes about life	<i>r</i>	-.139	0.047	.229	.145
	<i>p</i>	0.034	0.472	<.001	0.027
Persisting Effects: attitudes about self	<i>r</i>	-.142	0.052	.239	.199
	<i>p</i>	0.03	0.431	<.001	0.002
Persisting Effects: mood	<i>r</i>	-.137	0.033	.226	0.109
	<i>p</i>	0.037	0.618	<.001	0.095
Persisting Effects: behaviors	<i>r</i>	-0.124	-0.008	.198	.133
	<i>p</i>	0.059	0.908	0.002	0.043
Persisting Effects: how spiritual you are	<i>r</i>	-0.124	-0.001	.176	.212
	<i>p</i>	0.058	0.993	0.007	0.001
Persisting Effects: attitudes about death	<i>r</i>	-0.015	0.017	.229	.153
	<i>p</i>	0.825	0.793	<.001	0.019

Note. r =Pearson Correlation Coefficient, p =Sig.(2-tailed); Bold values represent the relationships met the threshold of $p<0.01$ and $r>0.19$ and indicate the variables should be

included as control variables for psychospiritual outcomes in primary analyses (only those met the threshold to be considered as control variables were reported in the table).

Acute Ayahuasca Effects

To better understand the range of acute effects that participants reported about their ayahuasca experiences, descriptive analysis was conducted in SPSS to provide a comprehensive overview of the mystical experiences, psychological insight, emotional breakthrough, challenging experiences, purging experiences, and uncomfortable experiences. The Mystical Experience Questionnaire items (MEQ; range: 0-5) highlighted mystical-type experiences participants reported related to their ayahuasca retreats, with mean scores ranging from 2.43 (“Loss of usual awareness of where you were”) to 4.21 (“Gain of insightful knowledge experience at an intuitive level). Of note, 93.50% of participants reported having at least a “moderate” (score>2) intensity of mystical experience, characterized by gaining insightful knowledge experienced at an intuitive level. Additionally, 92.20% reported experiencing at least a “moderate” intensity of sensing that the experience cannot be described adequately in words, and 90.1% reported at least a “moderate” intensity of feeling that it would be difficult to communicate their experiences to others who have not had similar experiences (results see *Table 10*). Furthermore, previous research considered the criterion for a “complete” mystical experience as achieving a score of 60% or higher of the total possible score on each dimension of the MEQ, including scores on mystical, positive mood, transcendence of time and space, and ineffability factors (Barrett et al., 2015; Pahnke, 1969). In this study, 110 participants (47.21% of the study sample) met the criterion and demonstrated a “complete” mystical experience during ayahuasca sessions.

Table 10.*Participants' Self-Reported Mystical-Type Experiences (N=233)*

Mystical Experiences (ranges from 0 to 5)	<i>M</i>	<i>SD</i>	% reporting each item on the MEQ (score >2) ^a
Gain of insightful knowledge experienced at an intuitive level.	4.21	1.01	93.50%
Sense that the experience cannot be described adequately in words.	4.03	1.12	92.20%
Experience of amazement.	3.98	1.23	88.80%
Feeling that you could not do justice to your experience by describing it in words.	3.94	1.21	89.70%
Feeling that you experienced something profoundly sacred and holy.	3.92	1.45	83.30%
Feeling that it would be difficult to communicate your own experience to others who have not had similar experiences.	3.91	1.11	90.10%
Sense of awe or awesomeness.	3.86	1.45	86.70%
Feelings of tenderness and gentleness.	3.77	1.34	84.10%
Feelings of peace and tranquility.	3.66	1.38	80.30%
Feelings of joy.	3.66	1.36	82.40%
Sense of reverence.	3.64	1.42	82.40%
Awareness of the life or living presence in all things.	3.61	1.54	80.70%
Sense of being at a spiritual height.	3.58	1.53	77.30%
Loss of your usual sense of time.	3.50	1.20	81.00%
Experience of oneness or unity with objects and/or persons perceived in your surroundings.	3.50	1.56	78.40%
Freedom from the limitations of your personal self and feeling a unity or bond with what was felt to be greater than your personal self.	3.43	1.58	76.40%
Certainty of encounter with ultimate reality (in the sense of being able to “know” and “see” what is really real) at some time during your experience.	3.42	1.47	79.70%
Experience of oneness in relation to an “inner world” within.	3.36	1.59	73.80%
Experience of the fusion of your personal self into a larger whole.	3.34	1.57	74.70%
Experience of pure being and pure awareness (beyond the world of sense impressions).	3.32	1.69	73.40%
You are convinced now, as you look back on your experience, that in it you encountered ultimate reality (i.e., that you “knew” and “saw” what was really real).	3.31	1.61	75.10%

Experience of unity with ultimate reality.	3.19	1.73	69.50%
Experience of the insight that “all is One.”	3.10	1.73	68.70%
Loss of your usual sense of space.	3.03	1.51	67.70%
Experience of timelessness.	3.00	1.56	69.10%
Being in a realm with no space boundaries.	2.97	1.71	62.20%
Experience of ecstasy.	2.88	1.76	62.20%
Sense of being “outside of” time, beyond past and future.	2.79	1.74	60.50%
Feeling that you experienced eternity or infinity.	2.70	1.83	56.00%
Loss of usual awareness of where you were.	2.43	1.58	50.60%
Mystical Experience Total Score	102.87	33.45	

Note. ^aScore>2 indicated participants reported at least a “moderate” intensity of mystical-type experience following ayahuasca use.

As displayed in *Table 11*, the Psychological Insight Questionnaire items (PIQ; range: 0-5) demonstrated participants’ insights had during the ayahuasca experiences, with mean scores ranging from 2.48 (“Discovered new insights about my work or career”) to 4.00 (“Awareness of information that helped me understand my life”). Impressively, 90.60% of participants reported having at least a “moderate” (score>2) intensity of psychological insight in gaining awareness of information that helped in understanding life. Additionally, 87.10% of participants reported experiencing at least a “moderate” (score>2) intensity of psychological insight in discovering how aspects of life are affecting their well-being.

Table 11.
Participants’ Self-Reported Psychological Insights (N=233)

Psychological Insights (ranges from 0 to 5)	<i>M</i>	<i>SD</i>	% reporting each item on the PIQ (score >2) ^a
Awareness of information that helped me understand my life.	4.00	1.17	90.60%
Discovered how aspects of my life are affecting my well-being.	3.79	1.18	87.10%
Awareness of dysfunctional patterns in my actions, thoughts, and/or feelings.	3.77	1.29	84.10%
Experienced validation of my life, character, values, or beliefs.	3.60	1.36	82.00%

Discovered I could explore uncomfortable or painful feelings I previously avoided.	3.54	1.4	81.50%
Awareness of uncomfortable or painful feelings I previously avoided.	3.53	1.35	80.70%
Realized how current feelings or perceptions are related to events from my past.	3.52	1.37	77.70%
Realized the importance of my life.	3.51	1.49	79.80%
Realized the nature and/or origins of my defenses or other coping strategies.	3.47	1.39	77.30%
Discovered new actions that may help me achieve my goals.	3.47	1.35	83.30%
Gained resolution or clarity about past traumas or hurtful events.	3.42	1.52	75.50%
Gained a deeper understanding of previously held beliefs and/or values.	3.39	1.41	75.10%
Gained a deeper understanding of events/memories from my past.	3.26	1.58	70.00%
Realized how critical or judgmental views I hold towards myself are dysfunctional.	3.25	1.53	71.20%
Awareness of beneficial patterns in my actions, thoughts, and/or feelings.	3.23	1.35	75.10%
Awareness of my life purpose, goals, and/or priorities.	3.20	1.43	70.40%
Discovered a clear pattern of avoidance in my life.	3.06	1.56	68.20%
Realized ways my beliefs may be dysfunctional.	3.06	1.60	71.20%
Realized the point of view or actions of others that had been difficult to understand previously.	2.98	1.57	69.50%
Discovered a vivid sense of the paradoxes in life.	2.97	1.63	66.50%
Discovered clear similarities between my past and present interpersonal relationships.	2.83	1.64	63.10%
Realized I could experience memories previously too difficult to experience.	2.65	1.74	58.40%
Discovered new insights about my work or career.	2.48	1.75	51.90%
Psychological Insight Total Score	75.96	24.29	

Note. ^aScore>2 indicated participants reported at least a “moderate” intensity of psychological insight experience following ayahuasca use.

As shown in *Table 12*, the Emotional Breakthrough Questionnaire items (EBI; range: 0-10) measured the moments of participants’ emotional breakthrough related to their ayahuasca experience, with mean scores ranging from 7.61 (“I faced emotionally difficult feelings that I

usually push aside”) to 8.05 (“Achieved an emotional release followed by a sense of relief”). Remarkably, 97.9% of participants reported experiencing emotional breakthrough in their ability to explore challenging emotions and memories. Similarly, 97.9% of participants reported emotional breakthrough in resolving a personal conflict or trauma.

Table 12.
Participants’ Self-Reported Emotional Breakthrough Experiences (N=233)

Emotional Breakthrough (ranges from 0 to 10)	<i>M</i>	<i>SD</i>	% reporting each item on the EBI (score>0) ^a
I achieved an emotional release followed by a sense of relief.	8.05	2.74	96.10%
I had an emotional breakthrough.	7.92	2.78	97.40%
I felt able to explore challenging emotions and memories.	7.78	2.61	97.90%
I experienced a resolution of a personal conflict/trauma.	7.62	2.69	97.90%
I faced emotionally difficult feelings that I usually push aside.	7.61	2.87	95.70%
I was able to get a sense of closure on an emotional problem.	7.50	2.80	97.00%
Emotional Breakthrough Total Score	46.45	13.76	

Note. ^aScore>0 indicated participants reported emotional breakthrough experience following ayahuasca use.

For acute challenging effects, the Challenging Experiences Questionnaire items (range: 0-5) have mean scores ranging from 0.31 (“I had the feeling that people were plotting against me”) to 3.04 (“I felt like crying”), Purging Experiences Questionnaire items (range: 0-5) have mean scores ranging from 0.66 (“Changes in the color of the face”) to 3.72 (“Yawning”), and Uncomfortable Experiences have mean scores ranging from 0.70 (“I felt threatened”) and 3.21 (“I felt exhausted”). The variance in the item scores of these acute challenging effects reflected the complexity of challenging effects related to ayahuasca retreats. Interestingly, more than half of participants indicated having at least a “moderate” (score>2) intensity in challenging experiences of emotional and/or physical suffering, body shaking/trembling, feelings of grief,

and feelings that led to crying. In contrast, less than 5.0% of participants reported experiencing at least a “moderate” intensity in challenging experiences of feeling people were plotting against them. For purging experiences, over 60.0% of participants reported experiencing at least a “moderate” intensity of yawning, crying and spontaneous tears, and changes in body temperature. Conversely, only 4.70% of participants reported experiencing at least a “moderate” intensity of changes in the color of the face. Regarding uncomfortable experiences after taking ayahuasca, more than two-thirds of participants indicated feeling at least a “moderate” intensity of exhaustion, while only one-tenth of participants reported feeling at least a “moderate” intensity of being threatened. Details see *Table 13*.

Table 13.

Participants’ Self-Reported Acute Challenging Effects of Ayahuasca (N=233)

	<i>M</i>	<i>SD</i>	% reporting each item on the challenging effects (score>2) ^a
<i>Challenging Experience (ranges from 0 to 5)</i>			
I felt like crying	3.04	1.54	68.20%
Feeling my body shake/tremble	2.83	1.76	59.20%
Emotional and/or physical suffering	2.68	1.69	58.80%
Feelings of grief	2.51	1.68	53.60%
Sadness	2.33	1.64	44.20%
Feeling my heart beating	2.29	1.59	52.80%
Experience of fear	2.29	1.75	45.90%
I felt shaky inside	2.11	1.66	45.10%
Anxiousness	2.07	1.57	39.90%
I felt frightened	2.03	1.73	40.80%
Pressure or weight in my chest or abdomen	1.66	1.73	33.90%
Feelings of despair	1.61	1.80	30.50%
Isolation and loneliness	1.58	1.61	27.00%
Panic	1.58	1.61	28.80%
I had the feeling something horrible would happen	1.42	1.74	25.80%
Despair	1.33	1.63	23.60%
Feeling of isolation from people and things	1.27	1.52	21.90%
I had the profound experience of my own death	1.27	1.84	26.60%

I felt as if I was dead or dying	1.18	1.67	23.60%
Fear that I might lose my mind or go insane	1.11	1.68	21.50%
I experienced a decreased sense of sanity	1.05	1.49	19.70%
I was afraid that the state I was in would last forever	1.04	1.57	18.50%
I felt isolated from everything and everyone	0.92	1.34	15.00%
I felt my heart beating irregularly or skipping beats	0.74	1.25	12.90%
Experience of antagonism toward people around me	0.73	1.19	10.30%
I had the feeling that people were plotting against me	0.31	0.90	4.30%
Challenging Experiences Total Score	42.96	26.19	

Ayahuasca Purging Experiences (ranges from 0 to 5)

Yawning	3.72	1.19	85.00%
Crying and spontaneous tears	2.92	1.60	60.10%
Changes in body temperature	2.90	1.33	67.40%
Sweating	2.60	1.47	55.80%
Gastrointestinal (GI) discomfort	2.58	1.44	55.80%
Mental chatter (e.g., ongoing string of thoughts, whether anxious, panicked or otherwise, which overload your mind)	2.55	1.57	55.80%
Vomiting	2.34	1.82	51.50%
Shivering	2.14	1.61	42.90%
Twitching	1.97	1.69	35.80%
Diarrhea	1.88	1.71	39.10%
Laughing	1.85	1.37	33.00%
Fart	1.64	1.31	26.60%
Changes in pulse rate	1.57	1.29	25.30%
Facial contortions	1.45	1.57	25.30%
Gasping for breath	1.06	1.52	18.90%
Changes in the color of the face	0.66	0.86	4.70%
Ayahuasca Purging Total Score	33.82	10.93	

Uncomfortable Experiences (ranges from 0 to 5)

I felt exhausted	3.21	1.36	73.40%
I felt overwhelmed by the experience	2.51	1.73	52.80%
I experienced my surroundings as strange and weird	2.15	1.79	41.20%
I felt agony	1.69	1.79	31.80%
Time passed slowly in a tormenting way	1.60	1.69	28.80%
I felt an unpleasant flow of information that I couldn't control	1.59	1.73	33.00%
I felt tormented	1.52	1.75	30.00%
I stayed frozen in a very unnatural position for an extended period of time	1.42	1.54	23.20%
I felt lost	1.24	1.49	21.90%

I experienced everything as frighteningly distorted	1.18	1.50	19.70%
I felt as if dark forces had overtaken me	0.80	1.40	15.00%
I felt threatened	0.70	1.32	12.00%
Uncomfortable Ayahuasca Experience Total score	19.61	13.63	

Note. ^aScore>2 indicated participants reported at least a “moderate” intensity of acute challenging effects following ayahuasca use.

Enduring Effects

Enduring changes reported at T3 that participants attributed to their overall ayahuasca experiences was displayed in *Table 14*. The Persisting Effects Questionnaire items (range: -3 to 3) have mean scores ranging from 1.43 (“Attitude about death) to 1.99 (“Attitudes about self” and “Attitudes about life”). The relatively high mean scores demonstrated overall positive persisting changes that participants considered desirable following their ayahuasca experiences. Notably, more than 90.0% of participants reported positive and desirable changes in their attitudes about self, attitudes about life, and current sense of personal well-being following ayahuasca experiences. And interestingly, more than 70.0% of participants indicated positive and desirable changes in their attitudes towards death, attributing to their ayahuasca experiences.

Table 14.
Participants’ Self-Reported Enduring Effects of Ayahuasca (N=233)

Enduring Effects Reported at T3 (N=233)	<i>M</i>	<i>SD</i>	% reported positive and desirable changes
Attitudes about self	1.99	1.06	92.20%
Attitudes about life	1.99	1.12	91.00%
Current sense of personal well-being or life satisfaction	1.94	1.18	91.00%
Social relationships as a whole	1.74	1.10	87.50%
How spiritual you are	1.72	1.14	80.70%
Behaviors	1.70	1.10	88.00%
Mood	1.70	1.22	86.70%
Sense of your life’s purpose	1.66	1.11	86.70%
Sense of your life’s meaning	1.64	1.13	85.50%
Attitudes about death	1.43	1.26	70.40%

Aim 1 Results

Aim 1 was to explore effect of baseline (T1) resilience on acute challenging effects of ayahuasca reported at the end of the retreat (T2). I hypothesized that higher levels of baseline resilience would predict less challenging experience among ayahuasca retreats participants who perceive acute effects of ayahuasca as challenging and difficult.

Hierarchical linear regression analyses were conducted for each DV (challenging experiences, purging experiences, and uncomfortable experiences related to ayahuasca use). Specifically, neuroticism, age, and setting were included as control variables in the first step (block 1) and baseline resilience was included as predictor in the second step (block 2). Multiple regression coefficients of predictors on acute challenging effects are reported in *Table 15*.

Role of Resilience in Predicting Acute Challenging Experiences

Model 1, including baseline neuroticism, was statistically significant, $F(1,231)=9.092$, $p=0.003$, and accounted for 3.4% (Adjusted $R^2=.034$) of variance in acute challenging experiences. Model 2, controlling for neuroticism and adding baseline resilience in Block 2, indicated there was statistically significant improvement in the model, $\Delta F(1,230)=5.797$, $p=0.017$, explaining an additional 1.9% of variance in acute challenging experiences (Adjusted $R^2=.053$). This analysis revealed that baseline resilience was a significant predictor of acute challenging experiences after controlling for baseline neuroticism, although the effect was albeit small. Specifically, higher levels of baseline resilience predicted more intense acute challenging experiences ($\beta=0.183$, $t=2.408$, $p=0.017$).

Role of Resilience in Predicting Acute Purging Experiences

Model 1, including age, was statistically significant, $F(1,231)=9.147$, $p=0.003$, and accounted for 3.4% (Adjusted $R^2=.034$) of variance in acute purging experiences. Model 2, controlling for age and adding baseline resilience in Block 2, was not significant,

$\Delta F(1,230)=0.002, p=0.967$. This analysis revealed that resilience was not a significant predictor of acute purging experiences ($\beta=-0.003, t=-0.041, p=0.967$) after controlling for age.

Role of Resilience in Predicting Uncomfortable Ayahuasca Experiences

Model 1, including setting, was statistically significant, $F(1,231)=16.657, p<0.001$, and accounted for 6.3% (Adjusted $R^2=.063$) of variance in acute purging experiences. Model 2, controlling for setting and adding baseline resilience in Block 2, was not significant, $\Delta F(1,230)=1.311, p=0.253$. This analysis revealed that baseline resilience was not a significant predictor of uncomfortable experiences ($\beta=0.074, t=1.145, p=0.253$) after controlling for setting.

Aim 1 Summary

The findings from these hierarchical regression analyses provided insights of the predictive role of baseline resilience on some aspects of acute challenging effects. Findings revealed that resilience was a significant predictor of the acute challenging experiences via the CEQ but not a predictor of purging experiences and uncomfortable experiences. These results suggest the predictive capability of resilience in some aspects of the acute challenging effects but not across all different types of experiences.

Table 15.
Baseline Predictors on Acute Challenging Effects of Ayahuasca

Dependent Variable	Predictors	Model 1				Model 2			
		B	SE	β	<i>t</i>	B	SE	β	<i>t</i>
Acute Challenging Experiences	(Constant)	4.643 E-6	0.065		0.000	4.442 E-6	0.064		0.000
	Neuroticism	0.190	0.063	0.195 **	3.015	0.288	0.074	0.294***	3.866
	Baseline Resilience					0.010	0.004	0.183*	2.408
	(Constant)	0.482	0.165		2.915	0.481	0.170		2.835

Acute Purging Experiences	Age	-0.012	0.004	0.195**	3.024	0.012	0.004	-0.195**	-2.936
	Baseline Resilience						0.000	0.003	-0.003
	(Constant)	2.006 E-5	0.072		0.000	2.017 E-5	0.072		0.000
Uncomfortable Ayahuasca Experiences	Setting	-0.708	0.174	0.259***	4.081	0.751	0.177	-0.275***	-4.234
	Baseline Resilience						0.005	0.004	0.074

Note. B=Unstandardized Coefficients Beta, SE=Standard Error, β =Standardized Coefficients Beta; *** p <.001, ** p <.01, * p <.05; bold data represented significant findings to the aim.

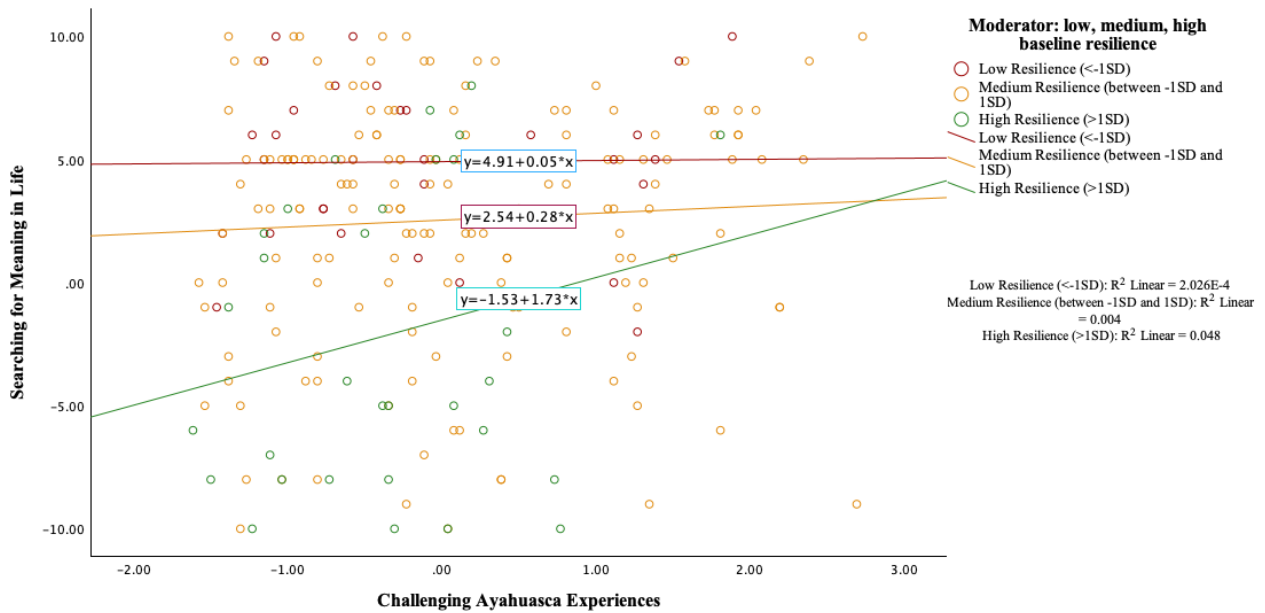
Aim 2 Results

Aim 2 was to assess whether the baseline resilience moderates the relationship between acute challenging ayahuasca effects reported at T2 and psychospiritual outcomes reported at T3. I hypothesized that baseline resilience would not only moderate but also strengthen the relationship between the acute challenging ayahuasca effects and positive psychospiritual outcomes, where greater levels of acute challenging ayahuasca effects may lead to enhanced positive psychospiritual outcomes.

For Aim 2, multiple regression with an interaction term analysis was conducted in SPSS and significant moderation regression coefficients were reported in *Table 16*. When examining the moderating effects of resilience on the relationship between acute challenging experiences and the search for meaning in life while controlling for neuroticism, there was a significant moderation effect ($\beta=0.154$, $t=2.444$, $p=.015$). This finding suggests the relationship between acute challenging experiences and search for meaning in life is moderated and strengthened by higher levels of resilience, which is consistent with the study hypothesis of resilience's moderating effects. The interaction explained an additional 2.3% of variance in the search for meaning ($\Delta R^2=0.023$, $\Delta F(1,228)=5.974$, $p=.015$). Specifically, resilience showed a negative association with the search for meaning in life ($\beta=-0.165$, $t=-2.175$, $p=0.031$), suggesting the

participants with lower levels of resilience at baseline were more likely to engage in a search for meaning in life following ayahuasca experiences. However, neuroticism ($p=0.092$) and acute challenging experiences ($p=0.205$) were not significantly associated with the search for meaning in life. The interaction effects are plotted in *Figure 4*. The levels of resilience were coded and categorized into three groups (low, medium, high) based on one SD above or below the mean, as suggested by Holmbeck (2002).

Figure 4.
Interaction Effects Plot: Challenging Experience, Search for Meaning in Life, Resilience



Similarly, when examining the moderating effects of resilience on the relationship between uncomfortable ayahuasca experiences and the search for meaning in life while controlling for neuroticism, there was a significant positive association with the search for meaning in life ($\beta=0.134$, $t=2.134$, $p=0.034$). This finding indicated the relationship between uncomfortable ayahuasca experience and search for meaning in life was moderated by higher levels of resilience, which is consistent with the study hypothesis of resilience’s moderating

effects. The interaction explained an additional 1.8% of variance in the search for meaning in life ($\Delta R^2=0.018$, $\Delta F(1,228)=4.555$, $p=0.034$). Again, resilience showed a negative association with the search for meaning in life ($\beta=-0.174$, $t=-2.316$, $p=0.021$), suggesting that participants with lower levels of resilience at baseline were more likely to engage in a search for meaning in life following ayahuasca experiences. Neuroticism ($p=0.080$) and uncomfortable ayahuasca experiences ($p=0.055$) were not significantly associated with search for meaning in life. The interaction effects are plotted in *Figure 5*.

Figure 5.
Interaction Effects Plot: Uncomfortable Experience, Search for Meaning in Life, Resilience

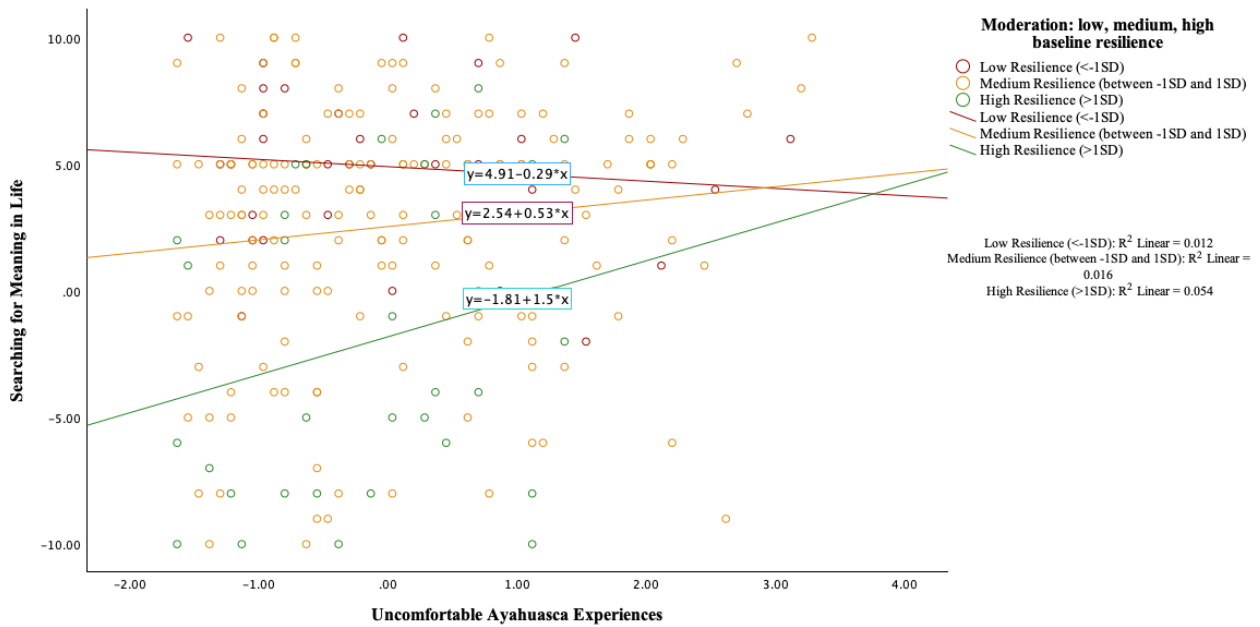


Table 16.
Significant Moderation Regression Effects on The Relationship Between Acute Challenging Effects of Ayahuasca and Search for Meaning in Life

Psycho-spiritual Outcomes	Variables	Model 1		Model 2		Model 3		Model 4	
		β	t	β	t	β	t	β	t
	Baseline Neuroticism	0.246***	3.860	0.235***	3.615	0.130	1.68	0.130	1.693

Search for Meaning in Life	Acute Challenging Experiences (CEQ)			0.057	0.871	0.081	1.248	0.082	1.27
	Baseline Resilience (RSA)					-0.184*	-2.41	-0.165*	-2.175
	RSA*CEQ							0.154*	2.444
	ΔR^2	0.061		0.003		0.023		0.023	
	ΔF	14.903		0.759		5.810		5.974	
	Sig ΔF	<0.001		0.384		0.017		0.015	
Search for Meaning in Life	Neuroticism	0.246***	3.860	0.234***	3.653	0.133	1.752	0.133	1.759
	Uncomfortable Ayahuasca Experience (AEI-Discomfort)			0.097	1.521	0.113	1.773	0.122	1.931
	Baseline Resilience (RSA)					-0.182*	-2.418	-0.174*	-2.316
	RSA*AEI-Discomfort							0.134*	2.134
	ΔR^2	0.061		0.009		0.023		0.018	
	ΔF	14.903		2.314		5.845		4.555	
	Sig ΔF	<0.001		0.130		0.016		0.034	

Note. β =Standardized Coefficients Beta; *** p <.001, ** p <.01, * p <.05; bold data represented significant findings to the aim.

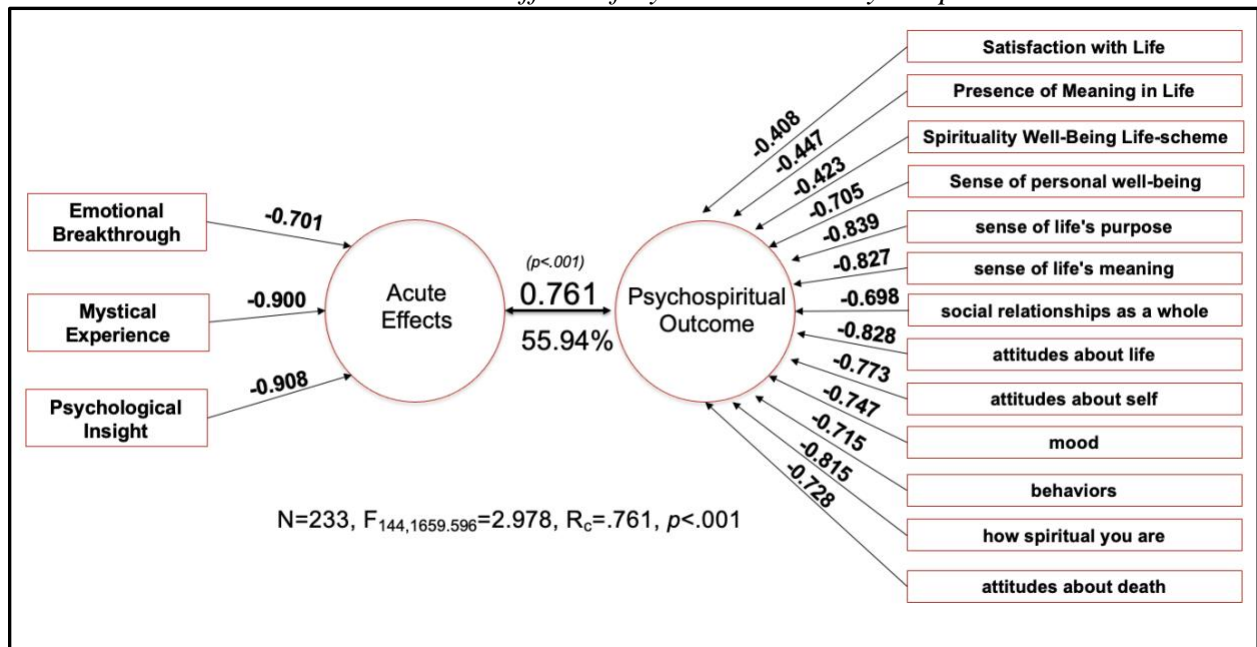
Aim 3 Results

Aim 3 was to examine the potentially additive relationships between challenging effects and other acute effects of ayahuasca (e.g., mystical, insight, emotional breakthrough) reported at T2 and psychospiritual outcomes reported at T3. I hypothesized that acute effects of ayahuasca would predict positive psychospiritual outcomes with greater persisting effects on short-term changes in current senses of life purpose/life's meaning/social relationship, more positive attitudes about life/self/death, improved spiritual well-being, higher levels of life satisfaction, greater levels of flourishing.

As Figure 6 shows, findings revealed a significant positive canonical correlation (N=233, $F_{144,1659.596}=2.978$, $R_c=0.761$, $p<.001$) between the independent set of acute effects of ayahuasca (emotional breakthrough, mystical experience, psychological insight experience) and the

dependent set of psychospiritual outcomes (satisfaction with life, presence of meaning in life, spirituality index well-being life-scheme, and persisting effects on sense of personal well-being, sense of life’s purpose, sense of life’s meaning, social relationships, attitudes about life, attitudes about self, mood, behaviors, how spiritual you are, and attitudes about death), while controlling for acute challenging effects, setting, neuroticism, spiritual intention, search for meaning in life, spiritual index well-being self-efficacy, and human flourishing. The canonical correlation explained 55.94% of the variance in the model. Findings from the CCA indicated that greater intensity of emotional breakthrough, mystical experience, and psychological insight experience were significantly positively associated with greater levels of satisfaction with life, presence of meaning in life, spiritual well-being life-scheme, and persistent effects on sense of personal well-being, sense of life’s purpose, sense of life’s meaning, social relationship, attitudes about life, attitudes about self, mood, behavior, how spiritual you are, and attitudes about death.

Figure 6.
Canonical Correlation Between Acute Effects of Ayahuasca and Psychospiritual Outcomes



Chapter 5. Discussion

The chapter presents detailed examinations of the findings related to each specific study Aim and explores the potential rationales behind these findings. A comprehensive discussion on the fit of the Resilience Framework as conceptual model within the study context is provided, as well as considerations of any potential supplementary conceptual frameworks. Additionally, an evaluation of this study's strengths and limitations is offered. Future directions and implications of the study findings are outlined.

Overview of the Study

This study aimed to investigate resilience as a predictor of acute challenging effects of ayahuasca and its potential moderating role in the relationship between acute challenging effects and psychospiritual outcomes. Additionally, this study aimed to explore the potential association between acute mystical, insight, and emotional breakthrough effects and short-term psychospiritual outcomes post ayahuasca retreat. Findings from this study revealed the role of resilience in predicting acute challenging experiences of ayahuasca while controlling for neuroticism, where higher levels of resilience predicted more intense acute challenging experiences. Moreover, findings demonstrated the moderating effects of resilience on the relationship between acute challenging experiences and the search for meaning in life, as well as the relationship between uncomfortable ayahuasca experiences and the search for meaning in life. Results suggested that higher levels of resilience enhanced the strength of the relationship between acute challenging effects of ayahuasca (e.g., challenging experiences, uncomfortable experiences) and the search for meaning in life, indicating individuals with higher levels of resilience were not only able to cope with challenging experiences better but also likely to

engage in an active search for meaning in life. Additionally, findings revealed a significant positive canonical correlation between acute mystical, insight, and emotional breakthrough effects of and psychospiritual outcomes, suggesting greater levels of acute effects of ayahuasca were significantly positively associated with greater levels of psychospiritual outcomes.

Resilience as a Predictor of Acute Challenging Experiences

Results from Aim 1 demonstrated that higher levels of resilience predicted more intense acute challenging experiences following ayahuasca retreats. These results are inconsistent with my study hypothesis that higher levels of resilience would predict less acute challenging effects based on existing research evidence of resilience's buffering effects in mitigating the impacts of stressors and challenging situations (Havnen et al., 2020; Joyce et al., 2019; Masten & Obradović, 2008; Rutter, 2012). There are several possible explanations for this discrepancy. First, it is possible that individuals with higher levels of resilience might perceive challenges or stressful situations as less severe and feel more confident in handling them, making them more open to the potential challenging experiences associated with ayahuasca use. Existing research evidence shows a close association between coping and resilience, suggesting individuals with higher levels of resilience tend to utilize more adaptive coping strategies due to their unique approach in appraisals to evaluate the severity of the stressor and their capacity to manage them (Lazarus & Folkman, 1984; Lee et al., 2016; Ward et al., 2020). Additionally, evidence demonstrates a positive association between resilience and openness, indicating individuals with higher levels of resilience are more open to experiences in life (Nakaya et al., 2006; Zager Kocjan et al., 2021). Thus, it is possible that participants with higher levels of resilience might be more open to potential challenging experience, perceive these challenging effects as less severe

and dangerous, and feel more confident in their capacity to manage these effects with adaptive coping strategies, which could lead to more intense challenging experiences reported in their self-evaluation.

Not only could participants with higher levels of resilience perceive acute challenging effects as less difficult and be more open to such experiences, it is also possible that participants' cognitive processing capability could explain why they reported more intense challenging effects. Theoretically, individuals with higher levels of resilience are better at navigating challenging situations and finding positive meanings despite these challenges, which suggests they may have a stronger processing capability (Maten, 2014; Werner, 1989). Specifically, individuals with higher levels of resilience and stronger processing capability might be more likely to rapidly evaluate their situations when any effects occur, and utilize available resources to cope with challenges effectively during their experiences. For example, the stronger processing capability might allow participants to accept and apply the standard psychedelic preparation advice to "trust, let go, and be open" (Pahnke, 1969) during their ayahuasca experiences. This approach may decrease participants' avoidance and promote an adaptive acceptance of acute effects of psychedelics, potentially bringing additional aspects of their ayahuasca experiences (Wolff et al., 2020), leading to a more profound understanding of the challenging effects and resulting in a more detailed report in the survey.

Taken together, resilience-level related perception of challenge severity, openness to experiences, and the capability to process stressful situations may explain why individuals with higher levels of resilience reported greater intensity of challenging experiences following ayahuasca retreats. Additionally, previous findings have highlighted the close connection

between resilience and growth in meaning-making, suggesting that resilient individuals not only recover from challenging experiences and sustain purposeful living, but they also report gaining new insights from such challenges (Zautra et al., 2010). In other words, the challenging experiences not only foster the pursuit of a meaningful life but also provide new opportunities for growth. Integrating these insights, it is possible that resilience has served not only as a protective factor (Havnen et al., 2020; Joyce et al., 2019; Masten & Obradović, 2008; Rutter, 2012) against challenging effects during ayahuasca retreat experiences, but also as a facilitator for personal growth by fostering deeper reflection and greater openness (Nakaya et al., 2006; Zager Kocjan et al., 2021; Zautra, et al., 2010) in sharing these challenging effects. Importantly, it is also possible that individuals who were more open to ayahuasca challenging experiences and who have undergone personal growth, may in turn further enhance their resilience. However, the exact mechanisms behind the dynamic interaction between resilience and challenging experiences, and the discrepancy between findings and study hypothesis, remain unclear and warrant further investigation.

Despite the significant positive correlation between resilience and acute challenging experiences, resilience was not a significant predictor of purging experiences or uncomfortable experiences related to ayahuasca use. This study utilized three measures to examine acute challenging effects (challenge experiences, purging experiences, uncomfortable experiences). The measure of Acute Challenging Experiences (CEQ) provided a broader picture of these acute effects, mainly focused on psychological and emotional elements, such as “Fear that I might lose my mind or go insane” (Barrett et al., 2016). The uncomfortable ayahuasca experiences were measured using Ayahuasca Experience Inventory-Discomfort Subscale (AEI), emphasizing more

towards subjective feelings and internally reactive discomfort to the stressful situations associated with ayahuasca, such as “I had the feeling something horrible would happen” (Weiss et al., 2021). And the measure of Acute Purging Experiences (APE) focuses on physical manifestation of emotional or spiritual release/cleansing associated with ayahuasca experiences, such as “Diarrhea” “Vomiting”, was designed by this researcher based on the common experiences reported among people who use ayahuasca (Graziano et al., 2017; Kagan, 2020; Labate & Cavnar, 2021; Lafrance et al., 2021; Nielson et al., 2021). The different aspects examined across CEQ, AEI, and APE scales suggest that resilience may be more strongly associated with psychological and emotional challenging experiences (e.g., as captured by items in CEQ), rather than with intense physical reactions (e.g., as captured by items in APE) or with subjective feelings and internally reactive discomfort related to ayahuasca experiences (e.g., as captured by items in AEI). Further research is needed to better investigate and understand the phenomenon among participants attending ayahuasca retreats, such as identification of which aspects of challenging effects are predicted by resilience.

Resilience as a Moderator of Acute Challenging Effects and Psychospiritual Outcomes

Results for Aim 2 demonstrated the moderating effects of resilience on the relationship between acute challenging effects of ayahuasca and the search for meaning in life, which is consistent with existing research evidence that shows resilience’s moderating effects on the relationship between stress/challenges and psychological outcomes (Havnen et al., 2020; Nuttman-Shwartz, 2019). These study findings provided evidence and confirmed the Resilience Framework as applied to this study that resilience can buffer influence on stressful situations and lead to positive outcomes (e.g., Maten, 2014), which suggested this framework is generally

suitable for understanding acute ayahuasca effects and related outcomes. Specifically, individuals with higher levels of resilience were found to be more capable of returning to their original levels of functioning after challenging situations with an enhanced capacity for adaptation (Zautra & Reich, 2010), suggesting participants may enhance their responsiveness to future stressors through this process. It is possible that these individuals were more likely to effectively utilize their adaptive capabilities to cope with stressful situations (Lazarus & Folkman, 1984; Lee et al., 2016; Ward et al., 2020), such as challenging experiences and uncomfortable experiences associated with ayahuasca use, and achieve positive outcomes from it. Additionally, individuals with higher levels of resilience report gaining new insights from their challenging experiences and view such challenges as opportunities for personal growth in meaning-making (Zautra et al., 2010). It is possible that individuals with higher levels of resilience viewed the challenging experiences as personal growth opportunities, which further facilitates a transformative reflection on their experiences and fosters an active search for meaningful life.

The study findings highlight resilience's role in both coping with stressors and thriving from them with positive outcomes, demonstrating resilience's moderating effects on the relationship between acute challenging effects of ayahuasca and psychospiritual outcomes. Importantly, given the evidence demonstrating that resilience is a protective factor in promoting health (e.g., Havnen et al., 2020; Joyce et al., 2019; Masten & Obradović, 2008; Rutter, 2012) and the growing interest in interventions to build resilience for future adversity (e.g., Macedo et al., 2014), ayahuasca retreat attendees might benefit from preparation programs promoting resilience. Such programs could be valuable in providing effective coping strategies for

managing acute challenging effects and encourage a deeper search for meaning from their experiences.

Even though findings from this study demonstrated that resilience was a moderator of the relationship between acute challenging experiences and the search for meaning in life as well as between uncomfortable experiences and the search for meaning in life, resilience was not found to moderate the relationship between purging experiences and psychospiritual outcomes. One potential explanation for this could be the distinct nature of acute challenging experience, uncomfortable experiences, and purging experiences. Specifically, acute challenging experiences and uncomfortable experiences were focused on psychological and emotional constructs, while purging experiences were characterized by intensive physical challenges. Existing research evidence on the moderating role of resilience is primarily focused on mental health and psychological outcomes (Havnen et al., 2020; Nuttman-Shwartz, 2019; Pérez-Gómez et al., 2022; Traunmüller et al., 2023), which further suggested its buffering effects against psychological stress rather than physical challenges. Future studies should explore how resilience could impact both psychological and physical constructs, especially in the context of ayahuasca use where purging experiences are commonly reported (e.g., Graziano et al., 2017). It is also possible that the way in which purging experiences were perceived varied among participants attending ayahuasca retreats. Although it is not uncommon to experience intense effects on the body after taking ayahuasca (Graziano et al., 2017), some individuals view these acute effects as part of the therapeutic process associated with ayahuasca use (Diament et al., 2021) and reported healing from what they interpreted as the “cleaning experience” “spiritual purging” (i.e., vomiting, diarrhea) (Labate & Cavnar, 2021). In other words, it is possible that participants did

not perceive those intense physical purging experiences as challenging effects, thus making them less related to resilience.

Despite the finding that resilience moderated the relationship between acute challenging effects of ayahuasca and the search for meaning in life, results from the moderation analysis also revealed that individuals with lower levels of resilience at baseline were more likely to engage in a search for meaning in life following their ayahuasca retreat experiences. Specifically, research suggests that individuals with higher levels of resilience demonstrate quicker recovery from negative emotional experiences compared to those with lower levels of resilience (Tugade & Fredrickson, 2004). It is possible that individuals with higher levels of resilience were able to bounce back and recover from psychological stress caused by the challenging ayahuasca effects quicker without major disturbances to their mental well-being. The quicker recovery might reduce participants' need to seek deeper insights of their challenging experiences related to meaning in life. On the other hand, participants with lower levels of resilience may perceive the challenging effects as significant life events that disrupted their established sense of coherence, resulting in questioning life's purpose that encouraged an active search for meaning in life (Schmitz et al., 2005; Schnell, 2016; Schnell et al., 2009; Vötter, 2020). In other words, searching for meaning in life might serve as a critical coping strategy during the process to make sense of their ayahuasca experiences among individuals with lower levels of resilience.

Relationship Between Acute Effects of Ayahuasca and Psychospiritual Outcomes

Results from Aim 3 showed a significant and positive relationship between mystical, insight, and emotional breakthrough effects and satisfaction with life, presence of meaning in life, spirituality index well-being life-scheme, and enduring effects on sense of personal well-

being, sense of life's purpose/meaning, social relationships, attitudes about life/self/death, mood, behaviors, and how spiritual you are. These findings align with the study hypothesis that acute effects of ayahuasca are significantly and positively associated with psychospiritual outcomes (Cakic et al., 2010; Roseman et al., 2019; Yaden & Griffiths, 2020). Specifically, research consistently showed a significant association between subjective psychedelic effects, such as mystical experiences, psychological insight experiences, and changes in beliefs, and enduring benefits on mental health and spiritual improvement (Cakic et al., 2010; Roseman et al., 2019; Yaden & Griffiths, 2020). It is possible that individuals who experienced acute mystical, insight, and emotional breakthrough effects associated with ayahuasca use may find significant enhancements in their psychological well-being and spiritual development. Moreover, previous studies have demonstrated a positive association between greater intensity of acute effects and greater levels of psychospiritual outcomes (Cakic et al., 2010; Roseman et al., 2019), suggesting intensity of ayahuasca effects might play a crucial role in the strength of enduring effects. Thus, it is possible that individuals experiencing more intense acute mystical, insight, and emotional breakthrough effects during ayahuasca use, may engage more deeply with their ayahuasca experiences that lead to more profound enduring improvements in their psychological well-being and spiritual growth as reported at T3.

Findings on the positive association between acute effects following ayahuasca use and short-term profound psychospiritual transformations, suggested its therapeutic potential as a modality in mental health treatment. Specifically, despite DMT's classification as a Schedule I Drug with no accepted medical use in the U.S. (DEA, n.d.), growing evidence supports ayahuasca's therapeutic potential in promoting adaptive behavior changes, such as changes in

problematic drug use and enhanced psychological outcomes (Kiraga et al., 2021; Labate & Cavnar, 2014; Nielson & Megler, 2012; Thomas et al., 2013; van Oorsouw et al., 2021). However, the exact mechanisms underlying these acute effects and related outcomes and what participants can anticipate during and after ayahuasca experiences are understudied. It is important for future research to investigate the effects of ayahuasca on various mental conditions, examine its safety and abuse potential, and evaluate the neurobiological and behavioral effects on the brain, behavior, mood, spirituality and consciousness, while taking into account individuals' differences and environmental influences (Henningfield et al., 2022; Pontual et al., 2021). Notably, emerging research evidence has demonstrated the safety and possible benefits of other classic psychedelics in the context of psychotherapy in treating people with psychiatric conditions, such as treatment-resistant depression, PTSD, end-of-life anxiety, and substance use disorder (Chi & Gold, 2020). Given the unique timing in the history of psychedelic research and growing interests in the field, it is crucial for the public and policy makers to carefully evaluate evidence-based knowledge beyond the misinformation on ayahuasca' drug effects, existing drug schedule classification related legal consequences, and safety concerns caused by uncontrolled usage of substances, before considering drug schedule reclassification and the possibility of medicine dissemination (Chi & Gold, 2020). The results from the present study highlight the positive outcomes associated with ayahuasca when used in a structured setting, supporting the need for future studies in this critical area.

The Resilience Framework & Resilience Scale

This study took an innovative approach by adopting a conceptual model of the Resilience Framework, offering a novel and insightful perspective to understand the acute ayahuasca effects

and use-related psychological and spiritual outcomes from a resilience and strength-based standpoint. Specifically, this study is the first of its kind to explore how resilience influences acute challenging effects of ayahuasca and psychospiritual outcomes across different timepoints, providing unique contributions to the psychedelic science literature. By adopting a conceptual model of the Resilience Framework and a resilience and strength-based perspective throughout, this study acknowledges participants' capability to achieve positive adaptation and empower themselves when facing challenges associated with ayahuasca effects, indicating these participants are inherently resilient and capable to take proactive engagement and potentially overcome these challenges. Additionally, the Resilience Framework as applied to this study also offered a valuable perspective on one important extra pharmacological factor, the individuals' resilience, alongside previously identified extra pharmacological factors (e.g., setting, mindset, past experience with psychedelics) that impact ayahuasca experiences (Aday et al., 2021; Pontual et al., 2021; Uthaug et al., 2021). Future studies should consider resilience as an important factor impacting participants' experiences in ayahuasca (and perhaps all classic psychedelics) studies and seek to validate and verify these findings through replication in a more diverse sample.

Although the Resilience Framework provides a novel and insightful perspective to understand acute effects of ayahuasca and associated outcomes through a resilience and strength-based standpoint, the inconsistency between study hypotheses and results indicates a possibility that the Resilience Framework may not be sufficient in explaining all study findings. Specifically, study results on resilience's moderating effects (Aim 2) and the positive association between acute effects of ayahuasca and psychospiritual outcomes (Aim 3) confirmed that resilience can buffer the impact of acute challenging experiences and achieve positive outcomes

despite such difficulties (Cakic et al., 2010; Havnen et al., 2020; Maten, 2014; Nuttman-Shwartz, 2019; Roseman et al., 2019; Yaden & Griffiths, 2020), suggesting the Resilience Framework as applied to this study is suitable and applicable in understanding some relationships between ayahuasca challenging experiences and psychospiritual outcomes. However, study results regarding whether resilience is a reductor of acute challenging experiences (Aim 1) revealed a discrepancy from the hypothesis proposed based on existing findings (Havnen et al., 2020; Joyce et al., 2019; Masten & Obradović, 2008; Rutter, 2012), highlighting an inconsistent relationship between resilience and acute challenging experiences. The discrepancy between Aim 1 hypothesis and the actual findings in this study suggested that the Resilience Framework may need to be tailored specifically for psychedelic research. For example, additional psychological constructs should be explored as predictors, such as resilience-related perceptions, openness to experiences, and processing capability of acute challenging effects, to more accurately predict the acute challenging effects associated with ayahuasca use.

Findings from this study suggest that adopting an existing definition of resilience which was not specifically designed for psychedelic science, may not fully capture the complexity of resilience as it manifests during and after ayahuasca experiences. The mismatch between the resilience definition and the conceptual demands of studying ayahuasca and other psychedelics effects and use-related outcomes through a resilience standpoint. This was revealed by the discrepancy between the study findings and hypotheses. The mismatch also highlights the need for a more comprehensive framework and conceptualization that considers physiological, emotional, and cognitive dimensions and how these elements dynamically interact with each other over time. Particularly, given the unique experience of purging experiences during

ayahuasca sessions, it is crucial to take physiological resilience into consideration, such as measuring the body's response to the intense sensory and somatic effects of ayahuasca (e.g., "My body is able to purge without resistance during ayahuasca experience" "I am able to tolerate the physical discomforts during ayahuasca sessions" "My body quickly recovered from the ayahuasca challenging effects"). Additionally, there may be emotional and cognitive characteristics that demonstrate resilience but were not fully captured by the selected Resilience Framework and Resilience Scale, which may explain the discrepancy between study hypotheses and findings as well as the small effect sizes observed in the regression analyses. As resilience is a dynamic process that evolves over time through ongoing adaptation and integration, it is important to consider incorporating diverse resilience constructs, such as physiological resilience (e.g., physical stress and recovery), emotional resilience (e.g., using more advanced psychometric tools or interviews to fully capture the self-reported changes), and cognitive resilience (e.g., belief change). It is also critical to consider adopting a longitudinal study design to measure long-term enduring effects (e.g., six-month follow-up, twelve-month follow-up) which may provide deeper insights into how resilience develops and changes over time following the experience.

Even though the Resilience Framework seems not sufficient as the sole conceptual model to fully understand predictors of acute challenging experiences among people who use ayahuasca, the Resilience Framework still demonstrated a strong alignment with the nature of ayahuasca experiences which involve navigating challenging effects but subsequently reporting positive outcomes, providing a new perspective of strength-focused approach to understand acute effects and promote natural healing journeys. Particularly, given the substantial need to examine

potential factors impacting psychedelic experiences and to verify psychedelics' therapeutic efficacy under controlled conditions before being applied in clinical treatment (Scheidegger, 2021; Uthaug et al., 2021), it is critical for future researchers to continue exploring how to adapt the Resilience Framework more specifically in psychedelic research to understand the unique elements and effects of ayahuasca or other psychedelics.

Not only does the Resilience Framework need further adaptation before being applied in psychedelic research, the choice of resilience scale to be used in psychedelic studies also demands attention. Specifically, it is important to note that the Resilience Scale of Adults (RSA; Friberg et al., 2003) utilized in this study was not originally designed to measure resilience in substance use settings. The RSA was developed to measure the presence of protective resources that promote adult resilience in general mental health research settings (Friberg et al., 2003). Although significant relationships between resilience and acute effects of ayahuasca as well as use-related psychospiritual outcomes were observed through the RSA in this study, it is possible that certain aspects of resilience demonstrated or manifested during ayahuasca experiences were not fully captured by items on the RSA. Currently, there is no existing resilience scale specifically designed or tailored for the psychedelic context that can comprehensively capture the complex psychedelic effects and the diverse ways in which individuals apply their resilience throughout their ayahuasca healing journey to navigate challenges and find positive meanings from it. Future research should focus on developing a resilience scale that is specifically tailored for the context of psychedelic research to address this crucial research gap before applying the concept of resilience into psychedelic studies.

Potential Supplementary Conceptual Framework

As discussed above, the Resilience Framework alone seems inadequate as a sole conceptual model for this study. Given the limited understanding of resilience in psychedelic context, integrating the Resilience Framework with other potential supplementary conceptual frameworks could provide a more comprehensive understanding of ayahuasca effects and related outcomes. Considering the study's primary constructs, such as acute effects of ayahuasca (e.g., mystical, insight, emotional breakthrough, challenging experiences) and enduring effects on psychospiritual outcomes (e.g., meaning in life, life satisfaction, spirituality), it is worthwhile to consider applying a model of health and healing called the Integrative Body-Mind-Spirit (I-BMS) model (e.g., Chan et al., 2001; Lee et al., 2009; Lei, 1988; Pachuta, 1989; Yang 1995) as a supplementary framework for future studies. The I-BMS model was influenced by the yin-yang perspective, Daoism, and Buddhism, and has been widely adopted in traditional Chinese medical practice, one complementary method to healing, to help understand the connection between one's emotional states and physical well-being (Chan et al., 2001; Lee et al., 2009). The I-BMS emphasizes the harmonious balance and views individuals in the totality of their psychological, spiritual, and physical dimensions (e.g., body-mind-emotion-spirit-environment) of health and well-being (e.g., Chan et al., 2001; Lei, 1988; Pachuta, 1989; Yang 1995). Given the similarity of using plant-based substances in Traditional Chinese Medicine and the plant medicine nature of Ayahuasca, it is possible that the widely adopted Eastern philosophy of I-BMS in Traditional Chinese Medicine, may be a great fit to explain the unique purging experiences ("body") and other challenging experiences examined in CEQ and AEI ("emotion") caused by ayahuasca effects as well as use-related psychospiritual outcomes ("mind," "spirit") within a natural healing

setting (“environment”). Furthermore, when using the I-BMS model to understand changes associated with ayahuasca use, the model’s emphasis on one’s mindfulness/consciousness that “utilize strength” and “live in the moment”, “compassion”, “accept and go with the flow” during various experiences (Lee et al., 2009), aligns well with this study where the resilience/strength has been highlighted as a protective factor against challenges (Maten, 2014) and the psychedelic preparation of “trust, let go, and be open” (Pahnke, 1969) has been suggested to facilitate transformative experiences. This valuable perspective warrants deeper investigation in psychedelic science.

Study Strengths

This study has several notable strengths. Firstly, this study is the first of its kind to utilize the Resilience Framework in examining ayahuasca effects and its associated outcomes. This innovative perspective on understanding the mechanisms of ayahuasca through a resilience standpoint can make a significant contribution to psychedelic literature by addressing a knowledge gap in the field. Despite the discrepancy between Aim 1 hypothesis and study findings, this study is the first that attempted to explore the possible relationships between baseline resilience and acute challenging effects associated with ayahuasca use, indicating pioneering efforts to advance the field closer to understanding the mechanisms of this relationship. Secondly, this study adopted a longitudinal study design with three timepoints (pre-retreat, post-retreat, and one-month follow-up), which allowed a deeper understanding of the dynamics of ayahuasca effects and related outcomes over time. This approach provided more comprehensive information and valuable insights into how effects of ayahuasca benefit participants in the short-term as reported at T3, which offered a broader picture of the therapeutic

potential of this plant medicine. Thirdly, this study has a high retention rate (87%) and a large sample size (N=233) which provided robust statistical power for data analyses and enhanced the reliability of the study findings. The high retention rate ensured a largely complete dataset across three timepoints, allowing for an in-depth observation of participants' changes over time with strong integrity and continuity and minimizing bias associated with participants dropouts which is especially critical in longitudinal research. Additionally, the robust sample size ensured the study results have representative power and increased confidence in the generalizability of the conclusions to the broader population who travel to Amazon basin for ayahuasca retreats. Furthermore, the study employed a primary data collection methodology to explore novel research questions regarding resilience in the context of ayahuasca use which has not been investigated in existing research. The primary data collection approach allowed the researcher to collect data with great breadth and depth focusing specifically on resilience, providing a valuable foundation for future researchers to build upon. Lastly, this study offers a unique connection between ayahuasca, a traditional plant medicine from South America, and the need for treatment of mental health conditions in Western societies, which bridges the gap between indigenous healing practices and modern healthcare. The unique connection also highlighted the importance of adopting a culturally sensitive approach to be more inclusive and holistic in mental health treatment while also respecting and incorporating indigenous healing traditions.

Study Limitations

Despite this study's strengths, there are several limitations for future consideration. Firstly, this study relied on self-reported measures for data collection, which may introduce bias such as social desirability and recall bias that potentially influence the accuracy of the data.

Secondly, the nature of this study is an observational study without control groups, which limited the ability to draw conclusions that the observed changes were naturally and directly to ayahuasca use rather than to influences of other factors. That being said, without a control group comparison, it is difficult to isolate the unique effects of ayahuasca use on mental health and psychospiritual outcomes from other extra pharmacological factors (e.g., setting, mindset, past history of psychedelics) (Uthaug et al., 2021) and draw any causal conclusions. Thirdly, to acknowledge participants' time and contribution to science, this study provided incentives for participation, which might introduce bias as participants could be motivated by incentives to provide socially desirable responses in the surveys. Additionally, the acute purging experience was measured in a scale developed for this study, which has not undergone rigorous validation and reliability tests. Even though the scale showed an acceptable internal consistency reliability, the lack of empirical validation may limit the accuracy in capturing purging experiences following ayahuasca use. Moreover, considering the substantial costs associated with attending ayahuasca retreats, it is possible that participants were likely to be a highly motivated group interested in trying out this plant medicine and seeking specific outcomes from the retreats. Such high level of motivation among participants might impact the results by providing more favorable outcomes in self-reported surveys due to their expectations and investments. Lastly, the substantial costs associated with attending ayahuasca retreat may involve a potential selection bias as participants often come from middle-to-high income backgrounds to afford their retreat experiences which may limit the generalizability of findings to broader populations.

Implications and Directions for Future Practice and Research

The findings from this study contribute to the understanding of how resilience impacts ayahuasca effects and related psychospiritual outcomes, and highlights the predictive role of resilience in understanding acute challenging effects and its moderator role of the relationship between acute challenging effects and psychospiritual outcomes. These findings suggested several areas for future research and practical implications (summary see *Table 17*). Specifically:

Directions for future practice could include:

Educational resource: Findings of the study provided valuable insights of ayahuasca ceremonies and their potential effects and outcomes, serving as an educational resource for the public and professionals to learn more about this plant medicine. Given the emerging promising research evidence on the novel safety and possible benefits of psychedelic-assisted interventions in mental health and growing interests in the field (Chi & Gold, 2020; Henningfield et al., 2022; Kiraga et al., 2021; Labate & Cavnar, 2014; Nielson & Megler, 2012; Thomas et al., 2013; van Oorsouw et al., 2021), it is crucial to provide up-to-date information to the public about ayahuasca's effects and what they should expect after taking ayahuasca.

Resilience-promotion programs & Effects integration programs: Findings from this study also highlighted the importance of incorporating a resilience promotion program pre-retreat to build individuals' resilience for future challenges (Macedo et al., 2014) associated with ayahuasca effects, and implementing an integration program post-retreat to cope with the ongoing relationship with ayahuasca (Diament et al., 2021). This approach can provide holistic support that ensures retreat attendees are well-prepared for the upcoming ayahuasca experiences and aid them in reflecting on the experiences as they transition back to normal lives. Indeed, with

thousands of people traveling to Latin and South America for ayahuasca retreats every year, little support has been given to these people after coming home due to a lack of knowledge and information about ayahuasca retreats and ayahuasca's acute and enduring effects. Findings from this study could provide valuable information for professionals to better support clients who are considering or have attended ayahuasca retreats.

Directions for future research could include:

Optimizing therapeutic protocols: The results from the study can also make significant contributions on informing the development of future therapeutic protocols where research team should consider enhancing baseline resilience to optimize the therapeutic potential of ayahuasca effects in treating mental health disorders. The resilience perspective could increase the likelihood of developing an effective and safe ayahuasca-assisted psychotherapy in treatment after US FDA approval in the future, which offers a new possibility to reduce the prevalence and impacts of challenging experiences.

Promoting interdisciplinary studies: This study identified resilience, an extra pharmacological factor, that impacts psychedelics effects. Importantly, some researchers in the psychedelic field have argued that only through interdisciplinary research and intercultural dialogue can achieve a deep understanding of the complex psychedelic effects influenced by both pharmacological (e.g., drug use) and extra-pharmacological factors (e.g., mindset, setting) (Sloshower, 2018). Thus, findings from this study may inspire and encourage further interdisciplinary collaborations for a more holistic understanding of how resilience, acute effects of ayahuasca, and ayahuasca's potential therapeutic possibilities interact with each other and may have the potential to shift the mainstream treatment modalities.

Integrating diverse theoretical frameworks & Developing resilience conceptualization specifically tailed to the psychedelic context: It is worthwhile to consider how best to integrate a resilience framework specifically tailored to the psychedelic context with other potential supplementary conceptual frameworks, such as the Eastern philosophy of I-BMS which views individuals in the totality of their psychological, spiritual, and physical dimensions of health and well-being (e.g., Chan et al., 2001; Lei, 1988; Pachuta, 1989; Yang, 1995), to comprehensively understand resilience, ayahuasca effects, and use-related outcomes. Future researchers should investigate the Resilience Framework and I-BMS model in psychedelic science to validate their applicability in enhancing our understanding of the mechanisms of ayahuasca effects and use-related outcomes. Additionally, future research should prioritize developing a resilience framework as well as a resilience scale that are specifically tailored for the context of ayahuasca research (e.g., including physiological, emotional, and cognitive elements) to address this crucial research gap and enable researchers to more accurately capture how resilience evolves during and after ayahuasca retreats. Furthermore, adopting a longitudinal study design to measure long-term enduring effects (e.g., six-month follow-up, twelve-month follow-up) would offer deeper insights into the developmental process of resilience and ayahuasca effects, potentially informing therapeutic practices and enhancing outcomes for users.

Cultural and ethical considerations: Given ayahuasca's importance as a local sacred plant in indigenous cultures, it is crucial for future clinicians and researchers to be culturally sensitive and hold ethical considerations (e.g., Michaels et al., 2018; Romero, 2022; Williams et al., 2020) when approaching ayahuasca experiences or applying ayahuasca-assisted interventions in western therapeutic context. As interests in plant medicine grows, it is necessary to approach

nature’s gifts with humility, honor the traditions where these practices come from, and practice appropriately and thoughtfully when applying traditional medicine into modern societies.

Table 17.
Implications for Practice and Research

Implication for Practice	Educational Resource	Provide up-to-date information to the public about ayahuasca’s effects and what they should expect after taking ayahuasca.
	Resilience-promotion programs	Incorporate a resilience promotion program pre-retreat to build individuals’ resilience for future challenges associated with ayahuasca effects, ensuring retreat attendees are well-prepared for the upcoming ayahuasca experiences
	Effects integration programs	Implement an integration program post-retreat to cope with the ongoing relationship with ayahuasca and aid retreat attendees in reflecting on the experiences as they transition back to normal lives.
Implication for Research	Optimizing therapeutic protocols	<p>Inform the development of future therapeutic protocols where research team should consider enhancing baseline resilience to optimize the therapeutic potential of ayahuasca effects in treating mental health disorders.</p> <p>The resilience perspective could increase the likelihood of developing an effective and safe ayahuasca-assisted psychotherapy in treatment after US FDA approval in the future, which offers a new possibility to reduce the prevalence and impacts of challenging experiences.</p>
	Promoting interdisciplinary studies	Findings from this study may inspire and encourage further interdisciplinary collaborations for a more holistic understanding of how resilience, acute effects of ayahuasca, and ayahuasca’s potential therapeutic possibilities interact with each other and may have the potential to shift the mainstream treatment modalities.
	Integrating diverse theoretical frameworks & Developing resilience conceptualization specifically tailed to the psychedelic context	<p>Integrate a resilience framework specifically tailored to the psychedelic context with other potential supplementary conceptual frameworks, such as the Eastern philosophy of I-BMS to comprehensively understand resilience, ayahuasca effects, and use-related outcomes.</p> <p>Investigate the Resilience Framework and I-BMS model in psychedelic science to validate their applicability in enhancing our understanding of the mechanisms of ayahuasca effects and use-related outcomes.</p>

		<p>Prioritize developing a resilience framework as well as a resilience scale that are specifically tailored for the context of ayahuasca research (e.g., including physiological, emotional, and cognitive elements) to address this crucial research gap and enable researchers to more accurately capture how resilience evolves during and after ayahuasca retreats.</p> <p>Adopt a longitudinal study design to measure long-term enduring effects (e.g., six-month follow-up, twelve-month follow-up) would offer deeper insights into the developmental process of resilience and ayahuasca effects.</p>
	<p>Cultural and ethical considerations</p>	<p>Given ayahuasca’s importance as a local sacred plant in indigenous cultures, it is crucial for future clinicians and researchers to be culturally sensitive and hold ethical considerations when approaching ayahuasca experiences or applying ayahuasca-assisted interventions in western therapeutic context.</p>

Conclusions

Overall, findings from this study have contributed to our understanding of the mechanisms of ayahuasca effects and resilience, highlighting ayahuasca’s therapeutic potential from a resilience standpoint. The innovative attempt in adopting a Resilience Framework in ayahuasca research has provided unique perspectives of the complex mechanisms during natural healing process which also emphasized the importance to be culturally sensitive when integrating traditional healing wisdom in scientific and clinical approaches. Future research should consider more rigorous study designs, such as control groups, to closely examine the unique impacts of resilience on ayahuasca effects and related outcomes. There remains much work to be done in ayahuasca research. As we continue exploring this field, it is important for future studies to extend beyond examining ayahuasca effects but also to address ethical and cultural implications for its use, which is a necessary foundation for providing clear guidance and suggestions for future steps.

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Appendix A. Letters of Support



Costa Rica
TEL +1 267-330-9370
letgo@soltara.co
<https://soltara.co>

December 8, 2021

Yitong Xin
PhD Candidate
College of Social Work
The Ohio State University
Columbus, OH 43210

Dear Ms. Xin,

As the Co-founder and Chief Operating Officer of the Soltara Healing Center, I am pleased to write this letter to authorize you to use the Soltara Healing Center as a study site for your dissertation proposal entitled “A Longitudinal Study of Resilience Among Participants Attending Ayahuasca Retreats in Latin America”. Specifically, we agree to offer you and your study team the opportunity to invite clients of Soltara Healing Center to fill out a survey at three timepoints (Baseline - one week before scheduled retreat experience; Post – immediately following scheduled retreat experience on the last day of the retreat; Follow-up – one month following scheduled retreat experience). Soltara Healing Center is pleased to provide a description of your study and the electronic survey link to our registered retreat participants/clients. We will also announce this scientific study collaboration in our blog post to our ayahuasca retreat participants community.

This is an exceedingly important and timely project about resilience and healing through ayahuasca retreat experience, especially under the COVID-19 pandemic. We are excited to collaborate with you, and we look forward to seeing the results of your work!

Sincerely,

A handwritten signature in black ink, appearing to read "Melissa Stangl", written in a cursive style.

Melissa Stangl
Founding Partner/Chief Operating Officer/VP of Communications

Appendix B. Ayahuasca Research Study Blog Post

Subject: Invitation to Contribute to Psychedelic Science – Paid Research Study on Ayahuasca at Soltara

Dear Soltara Community,

We are happy to announce a new, exciting research study at Soltara Healing Center headed by scientists from The Ohio State University. Led by principal investigator and experimental scientist Dr. Alan K. Davis and social work doctoral candidate, Yitong Xin, the study will investigate the roles of resilience among participants attending ayahuasca retreats. Your participation will contribute to the psychedelic science development and mental health treatment.

All data collected is confidential and protected by a Certificate of Confidentiality obtained by the National Institutes of Health (NIH) for this study. If you are eligible for the participation after screening, you will be invited to participate within four timepoints (*Time 1 survey*: one week before the retreat; *Time 2 survey*: immediately follow up after the scheduled retreat experience; *Time 3 survey*: One month post the retreat experience). Study participants will be compensated with incentives for completing surveys at each timepoint: **\$15 for Time 1, \$20 for Time 2, and \$25 for Time 3 (\$60 in total for completing three online surveys).**

If you are interested in participating in this important research, please use the link below to proceed to the brief screening survey to check if you are eligible for the study: https://osu.az1.qualtrics.com/jfe/form/SV_0cVdgBwAhAFrJ8a. If you are eligible for the study and agreed to participate, you will be invited by the research team for the Time 1 survey within a week.

Your important contribution to psychedelic science with your participation is much appreciated!

Thank you for your time,
Soltara & Research Team at The Ohio State University

Appendix C. Recruitment Emails

Screening Eligible Email

Subject: Eligible_Paid Research Study on Ayahuasca

Dear <Name>,

Congratulations! Based on your responses to the screening survey, we have determined that **you are eligible for the larger, longitudinal research study** about your experience with ayahuasca and the roles of resilience in your experience. **We will send you a link to the first survey exactly 1 week before your retreat begins.** Your important contribution to psychedelic science with your participation is much appreciated!

As a reminder, this study is being conducted by researchers from The Ohio State University (OSU) and has been approved by the OSU Institutional Review Board. Your participation in this study is completely voluntary, and you have the right to withdraw from the study at any time with no penalties. This research study uses a longitudinal cohort study design, meaning that you will complete 3 surveys on 3 occasions within 1 month. There is monetary compensation for participating in this longitudinal research study. Specifically, if you choose to enroll in the research study, then for each survey you complete you will be awarded an electronic gift card. If you enroll in the full research study you will be eligible for a total of \$60 in compensation for completing a total of 3 additional surveys after screening (**\$15 for survey 1, \$20 for survey 2, and \$25 for survey 3**) .

Please let me know if you have any questions at this point. Thank you for your contribution to science!

Thank you!
Yitong Xin

Study Number: 2022B0158
Date of IRB Approval: 06/10/2022

<The Ohio State University Logo>

Time 1 Recruitment Email

<The Ohio State University Logo>

[Email Header]

Research Study: Resilience Among Participants Attending Ayahuasca Retreats

[Email Body]

Dear <<Name>>,

Researchers at The Ohio State University (OSU) College of Social Work are studying resilience among participants attending ayahuasca retreats in Latin America. You are being asked to participate in this survey because you have passed the Soltara's medical screening and registered to attend at least 5-night retreats at Soltara Healing Center. This research study has been approved by the OSU Institutional Review Board (#2022B0158).

As part of this study, we are asking you to complete the **First** survey (https://osu.az1.qualtrics.com/jfe/form/SV_9WBzYQA32NaPUCG), which is expected to take about **15 minutes**. Following completion of this survey, you will receive a **\$15 gift card** to a local or online retail store of your choice within one week.

Because this survey includes questions that are sensitive in nature (e.g., substance use, ayahuasca use), the security of these data is protected by a Certificate of Confidentiality obtained by the National Institutes of Health (NIH) for this study. This Certificate provides extra protection for you and your study information, documents, or samples (blood, tissue, etc.). The Certificates are issued so that we cannot be required to disclose any identifiable, sensitive information collected about you as a part of this study in a lawsuit or legal proceeding. We are also prevented from releasing your study information without your consent. This is a layer of protection over and above the already existing protections in place for you and your information, documents, or samples. However, these protections do not apply in some situations. For example, we may have to release your information if a law requires us to do so, the Agency that is funding this study requests the information, or if the FDA tells us to release this information. Further, authorized requests for your records (medical record release for continuity of care) may result in research-related information being released. Please talk to the study team, or contact the Office of Responsible Research Practices at 614-688-8641, if you have questions. You may also visit the NIH website at <https://humansubjects.nih.gov/coc/faqs> to learn more.

This research study uses a longitudinal cohort study design, meaning that you will complete 3 online surveys on 3 occasions. The first survey (Baseline) is completed one-week before your retreat experience after you were determined eligible for the study and agree to participate in this research study. You will then be contacted by research study staff on the last day of your retreats to complete a second survey/post-retreat survey (Time 2). One-month post the retreat, you will be contacted again by the research study staff to complete a third survey (one-month follow-up survey; Time 3).

There is monetary compensation for participating in this screening and if you enroll in the longitudinal research study. Specifically, if you choose to enroll in the research study, then for each survey you complete you will be awarded an electronic gift card. If you enroll in the full research study you will be eligible for **a total of \$60 in compensation for completing a total of 3 online surveys (\$15 for survey 1, \$20 for survey 2, \$25 for survey 3).**

Participation in this research study begins by clicking the link below. The first survey (Baseline) will take approximately **5 minutes** to complete. The second and third online surveys will take about **30-45 minutes** to complete. You must complete the survey in one sitting for your data to be stored, used, and receive compensation for survey completion.

You are eligible to participate if you:

- 1) at least 18 years old;
- 2) passed Soltara's medical intake screening to attend ayahuasca ceremonies;
- 3) are able to read, write, and speak English fluently;
- 4) attended 5-7 nights of retreats experience with 3-4 ayahuasca ceremonies

Participation is completely voluntary, and you may discontinue at any time. Responses will be kept confidential. The study is led by PhD Candidate, Yitong Xin, and supported by assistant professor Dr. Alan K. Davis, at the OSU College of Social Work for Yitong's doctoral dissertation. For any questions about this study, please contact Yitong at xin.93@osu.edu.

Thank you for your participation, and your contribution for the psychedelic research is much appreciated!

The survey link is here:

https://osu.az1.qualtrics.com/jfe/form/SV_9WBzYQA32NaPUCG

Yitong Xin, PhD Candidate
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Study Number: 2022B0158

Date of IRB Approval: 06/10/2022

<The Ohio State University Logo>

Time 2 Recruitment Email

[Email Header]

Research Study: Resilience Among Participants Attending Ayahuasca Retreats in Latin America

<The Ohio State University Logo>

[Email Body]

Dear <<Name>>,

Thank you for completing our first survey regarding your experience of attending ayahuasca retreats! As part of this study, we are asking you to complete the **second** survey (https://osu.az1.qualtrics.com/jfe/form/SV_0kw6wc0mb1UNzkG), which is expected to take about 30-45 minutes. Following completion of this survey, you will receive a **\$20 gift card** to a local or online retail store of your choice.

As a reminder, this research study is being conducted by researchers in the College of Social Work and has been approved by the OSU Institutional Review Board. Furthermore, because this survey includes questions that are sensitive in nature (e.g., substance use, cannabis use, and other cannabis experiences), the security of these data is protected by a Certificate of Confidentiality obtained by the National Institutes of Health (NIH) for this study. This Certificate provides extra protection for you and your study information, documents, or samples (blood, tissue, etc.). The Certificates are issued so that we cannot be required to disclose any identifiable, sensitive information collected about you as a part of this study in a lawsuit or legal proceeding. We are also prevented from releasing your study information without your consent. This is a layer of protection over and above the already existing protections in place for you and your information, documents, or samples. However, these protections do not apply in some situations. For example, we may have to release your information if a law requires us to do so, the Agency that is funding this study requests the information, or if the FDA tells us to release this information. Further, authorized requests for your records (medical record release for continuity of care) may result in research-related information being released. Please talk to the study team, or contact the Office of Responsible Research Practices at 614-688-8641, if you have questions. You may also visit the NIH website at <https://humansubjects.nih.gov/coc/faqs> to learn more.

There is monetary compensation for participating in this screening and if you enroll in the longitudinal research study. Specifically, if you choose to enroll in the research study, then for each survey you complete you will be awarded an electronic gift card. If you enroll in the full research study you will be eligible for **a total of \$60 in compensation for completing a total of 3 online surveys (\$15 for survey 1, \$20 for survey 2, \$25 for survey 3).**

Participation is completely voluntary, and you may discontinue at any time. Responses will be kept confidential. The study is led by PhD Candidate, Yitong Xin, and supported by assistant professor Dr. Alan K. Davis, at the OSU College of Social Work for Yitong's doctoral dissertation. For any questions about this study, please contact Yitong at xin.93@osu.edu.

Thank you for your participation, and your contribution for the psychedelic research is much appreciated!

The survey link is here:

https://osu.az1.qualtrics.com/jfe/form/SV_0kw6wc0mb1UNzkG

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Study Number: 2022B0158
Date of IRB Approval: 06/10/2022

<The Ohio State University Logo>

Time 3 Recruitment Email

[Email Header]

Research Study: Resilience Among Participants Attending Ayahuasca Retreats in Latin America

<The Ohio State University Logo>

[Email Body]

Dear <<Name>>,

Thank you for completing our second survey regarding your experience of attending ayahuasca retreats! As part of this study, we are asking you to complete the **Third** survey (https://osu.az1.qualtrics.com/jfe/form/SV_9B7M4wB2hyLws7k), which is expected to take about 30-45 minutes. Following completion of this survey, you will receive a **\$25 gift card** to a local or online retail store of your choice.

As a reminder, this research study is being conducted by researchers in the College of Social Work and has been approved by the OSU Institutional Review Board. Furthermore, because this survey includes questions that are sensitive in nature (e.g., substance use, cannabis use, and other cannabis experiences), the security of these data is protected by a Certificate of Confidentiality obtained by the National Institutes of Health (NIH) for this study. This Certificate provides extra protection for you and your study information, documents, or samples (blood, tissue, etc.). The Certificates are issued so that we cannot be required to disclose any identifiable, sensitive information collected about you as a part of this study in a lawsuit or legal proceeding. We are also prevented from releasing your study information without your consent. This is a layer of protection over and above the already existing protections in place for you and your information, documents, or samples. However, these protections do not apply in some situations. For example, we may have to release your information if a law requires us to do so, the Agency that is funding this study requests the information, or if the FDA tells us to release this information. Further, authorized requests for your records (medical record release for continuity of care) may result in research-related information being released. Please talk to the study team, or contact the Office of Responsible Research Practices at 614-688-8641, if you have questions. You may also visit the NIH website at <https://humansubjects.nih.gov/coc/faqs> to learn more.

There is monetary compensation for participating in this screening and if you enroll in the longitudinal research study. Specifically, if you choose to enroll in the research study, then for each survey you complete you will be awarded an electronic gift card. If you enroll in the full research study you will be eligible for **a total of \$60 in compensation for completing a total of 3 online surveys (\$15 for survey 1, \$20 for survey 2, \$25 for survey 3).**

Participation is completely voluntary, and you may discontinue at any time. Responses will be kept confidential. The study is led by PhD Candidate, Yitong Xin, and supported by assistant professor Dr. Alan K. Davis, at the OSU College of Social Work for Yitong's doctoral dissertation. For any questions about this study, please contact Yitong at xin.93@osu.edu.

Thank you for your participation, and your contribution for the psychedelic research is much appreciated!

The survey link is here:

https://osu.az1.qualtrics.com/jfe/form/SV_9B7M4wB2hyLws7k

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The Ohio State University

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Study Number: 2022B0158

Date of IRB Approval: 06/10/2022

<The Ohio State University Logo>

Reminder Email

[Email Header]

[Reminder] Research Study: Resilience Among Participants Attending Ayahuasca Retreats in Latin America

<The Ohio State University Logo>

[Email Body]

Dear <<Name>>,

This is a <<first/second/final>> notification. Based on your responses to the screening survey, we have determined that you are eligible for the research study regarding your experience of attending ayahuasca retreats.

As a reminder, this study is being conducted by researchers in the College of Social Work and has been approved by the OSU Institutional Review Board. Your participation in this study is completely **voluntary**, and you have the right to withdraw from the study at any time with no penalties. Furthermore, because this survey includes questions that are sensitive in nature (e.g., substance use, cannabis use, and other cannabis experiences), the security of these data is protected by a Certificate of Confidentiality obtained by the National Institutes of Health (NIH) for this study. This Certificate provides extra protection for you and your study information, documents, or samples (blood, tissue, etc.). To learn more about CoC's protection for your privacy, please visit the NIH website at <https://humansubjects.nih.gov/coc/faqs>. Please talk to the study team, or contact the Office of Responsible Research Practices at 614-688-8641, if you have questions.

There is monetary compensation for participating in this screening and if you enroll in the longitudinal research study. Specifically, if you choose to enroll in the research study, then for each survey you complete you will be awarded an electronic gift card. If you enroll in the full research study you will be eligible for **a total of \$60 in compensation for completing a total of 3 online surveys (\$15 for survey 1, \$20 for survey 2, \$25 for survey 3)**.

Participation is completely voluntary, and you may discontinue at any time. Responses will be kept confidential. The study is led by PhD Candidate, Yitong Xin, and supported by assistant professor Dr. Alan K. Davis, at the OSU College of Social Work for Yitong's doctoral dissertation. For any questions about this study, please contact Yitong at xin.93@osu.edu.

Thank you for your participation, and your contribution for the psychedelic research is much appreciated!

The survey link is here:

<<insert link>>

Yitong Xin, PhD Candidate
College of Social Work
The Ohio State University
614-364-1331
Xin.93@osu.edu

Study Number: 2022B0158
Date of IRB Approval: 06/10/2022

<The Ohio State University Logo>

Reminder Text

[Reminder—OSU's paid research survey] Dear <<XX>>: Thank you for your participation in our research study regarding your experience of attending ayahuasca retreats. We are contacting you now to complete the <<T1/T2/T3>> survey for this research study. If you complete the survey, you will be eligible for a <<\$15/\$20/\$25>> compensation. As a reminder, participation in this study is confidential and your confidentiality is protected by the National Institutes of Health. Participation in this research study begins by clicking the link below. The survey will take approximately <<XX>> minutes to complete. You can read more details about the research study before deciding whether to participate by clicking the secure survey link: <<insert link>>

Appendix D. Electronic Consent Form

The Ohio State University Consent to Participate in Research

Study Title: A Longitudinal Study of Resilience Among Participants Attending Ayahuasca Retreats in Latin America

Researcher: Alan K. Davis; Yitong Xin;

Sponsor: None.

This is a consent form for research participation. It contains important information about this study and what to expect if you decide to participate.

Your participation is voluntary.

Please consider the information carefully. Feel free to ask questions before making your decision whether or not to participate. If you decide to participate, you will be asked to sign this form and will receive a copy of the form. You may leave the study at any time, and there is no penalty for not participating. Your participation, or the information you share, will not be used to evaluate your performance as a behavioral health provider, or affect your relationship with The Ohio State University.

Purpose: Researchers at The Ohio State University (OSU) College of Social Work are investigating the **roles of resilience among participants attending ayahuasca retreats.** Specifically, the research team will measure potential changes in resilience, acute ayahuasca effects, and psychospiritual outcomes (e.g., persisting effects, spirituality, satisfaction with life, meaning in life) within three timepoints.

Procedures/Tasks: Detailed information about this study is provided in the next few paragraphs. If you are interested in participating, then please complete the screening questions for determining your eligibility to participate in this study. You are being asked to participate in this survey because you have passed the Soltara's medical screening and registered to attend at least 5-night retreats at Soltara Healing Center. This research study has been approved by the OSU Institutional Review Board (#2022B0158).

Eligibility Criteria:

You are invited to participate in this study if you fulfill all of the criteria listed below.

- 1) at least 18 years old;
- 2) passed Soltara's medical intake screening to attend ayahuasca ceremonies;
- 3) are able to read, write, and speak English fluently;
- 4) attended 5-7 nights of retreats experience with 3-4 ayahuasca ceremonies

Duration: If you decide to participate and eligible, you will be asked to complete three electronic surveys. The first survey will take about 5-10 minutes to complete. We will send you a second survey on the last day of your retreat, and third survey one-month post the retreat. The second survey and third survey will take about 30-45 minutes to complete.

Risks and Benefits: There are no direct risks to you by participating in the survey. However, you are reflecting your ayahuasca experience which may involve potential discomfort at answering questions about challenging experiences. Benefits from this study include your scientific contribution for the psychedelic science research. Your responses will help researchers and clinical practitioners gain a deep understanding about roles of resilience in the ayahuasca experiences which may benefit further participants of ayahuasca retreats or inspire clinical trial/treatment approaches' development.

Confidentiality:

(1) We will work to make sure that no one sees your survey responses without approval. But, because we are using the Internet, there is a chance that someone could access your online responses without permission. In some cases, this information could be used to identify you.

(2) Because this survey includes questions that are sensitive in nature (e.g., drug use), the security of these data is protected in the following ways. First, although cannabis use is illegal, this research study *is covered by a Certificate of Confidentiality from the National Institutes of Health*. This means that the researchers *cannot release* or use information, documents, or samples that may identify you in any action or suit *unless you say it is okay*. They also cannot provide them as evidence unless you have agreed. This protection includes federal, state, or local civil, criminal, administrative, legislative, or other proceedings. An example would be a court subpoena. Therefore, if you participate in this study, your data will be protected by this Certificate of Confidentiality and the sensitive information you provide in this study will retain legal protection. Second, all data is collected and stored in Qualtrics, which is FEDRAMP, HITRUST and GDPR certified. These are the 3 highest security ratings in the United States and Europe given when an organization reaches data security levels to handle banking, healthcare and government data. Qualtrics is one of only a handful of companies to meet all 3 security qualifications. Third, confidential data collected as part of this study is stored in the OSU Qualtrics account belonging to the principle investigator and is only available to the PI or other key study personnel at OSU. Fourth, data stored on the OSU Qualtrics server are accessible only by the PI or other IRB approved personnel via the OSU Qualtrics Portal. Thus, data is accessible by a password protected OSU log-in process. Furthermore, once data has been accessed by study personnel at OSU, your identifying information (name, contact info) will be separated from your survey responses (i.e., your data will be de-identified). Once your data is de-identified, they will be stored on OneDrive, a secure OSU cloud-based data storage program. This de-identified data will never be stored with your identifiable information, further protecting your privacy. As another layer of protection of your confidentiality, your responses will be seen and analyzed only by members of the study team or their designee. Additionally, the results of most questions will be presented in aggregate. If you complete the optional open-ended section of the survey, we

may quote from your textual responses. However, if you provide specific identifying information, we will edit your responses to protect your confidentiality.

(3) Although ayahuasca use is illegal in most western countries, this research study *is covered by a Certificate of Confidentiality from the National Institutes of Health* (see <https://grants.nih.gov/policy/humansubjects/coc/what-is.htm>). This means that the researchers *cannot release* or use information, documents, or samples that may identify you in any action or suit *unless you say it is okay*. They also cannot provide them as evidence unless you have agreed. This protection includes federal, state, or local civil, criminal, administrative, legislative, or other proceedings. An example would be a court subpoena. Therefore, if you participate in this study, your data will be protected by this Certificate of Confidentiality and the sensitive information you provide in this study will retain legal protection and will not be disclosed to anyone, including law enforcement, the university, or other agencies.

This page contains important information about this study and what to expect if you decide to participate. If you need further information, please email Yitong Xin at xin.93@osu.edu or project PI, Dr. Alan K. Davis at davis.5996@osu.edu.

Will my de-identified information be used or shared for future research?

No. To protect your confidentiality, your responses will be seen and analyzed only by members of the study team or their designee. Your de-identified information will not be used or shared for future research without your consent. And all the information will be deleted immediately after completion of this study.

Incentives:

For each survey you complete, you will be awarded an electronic gift card to a local or online retail store of your choice. You will receive a \$15 for survey 1, \$20 for survey 2, and \$25 for survey 3, a total of \$60 in compensation for completing a total of three online surveys.

Participant Rights:

You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you choose to participate in the study, you may discontinue participation at any time by clicking the link in the upper right corner of your screen without penalty, loss of benefits, or loss of personal legal rights you may have as a participant in this study. If you exit the survey early, your responses will not be used.

Contacts and Questions:

Please contact the project PI, Dr. Alan K. Davis at davis.5996@osu.edu or team member Yitong Xin, by phone at 614-364-1331 or xin.93@osu.edu with any questions you have about this research study. For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices 1-800-678-6251 or by e-mail at hsconcerns@osu.edu.

What Next?

If you would like to participate, please click “Next” to complete the survey. Otherwise, you may exit this screen.

By clicking 'Begin Survey' below, you affirm that

- you have read the information above
- you fulfill the eligibility criteria
- you voluntarily agree to participate
- you are at least 18 years old

We appreciate your time and contribution to psychedelic research!

[Technical note: Certain browser plugins or extensions could cause display or functionality problems with the survey. If you run into any technical difficulties, please try to disable your plugins and reload the browser. Additionally, we recommend that you take this survey on a laptop, desktop or tablet computer, or that you use your smaller mobile device (such as a phone) in landscape mode to improve functionality of the survey. For further assistance in the event of such difficulties, please email us at xin.93@osu.edu]

Appendix E. Survey Measures

Screening Survey

1. Background Information

Please select your age: (Demo_Age)

<<numbers>>

Please select your biological sex:

- (1) Male
- (2) Female
- (3) Intersex (refers to a person who was born with a reproductive or sexual anatomy that does not fit the typical definitions of female or male.)

Please select your gender:

- (1) Male (identify primarily as a man)
- (2) Female (identify primarily as a woman)
- (3) Gender-fluid
- (4) Transgender (female to male)
- (5) Transgender (male to female)
- (6) Gender-queer
- (7) Other _____

Please select your race:

- (1) White or Caucasian or European American/Canadian
- (2) Black or African or African American, Black Canadian or Black Caribbean
- (3) East Asian, South Asian, Asian American/Canadian
- (4) Native American, American Indian, Indigenous Canadian, or Alaskan Native
- (5) Native Hawaiian or Pacific Islander
- (6) Other (Write In)

Please select your Hispanic ethnicity:

- (1) Hispanic
- (2) Non-Hispanic

In which country do you reside?

- (1) United States
- (2) Canada
- (3) Europe (list of county names for selection)
- (4) Asia (list of county names for selection)
- (5) Other (Write in)

What is the highest level of education you completed?

- (1) Sixth Grade or less

- (2) Grade 7 to 12 (without graduating)
- (3) High School diploma, GED, or equivalent
- (4) Part College
- (5) Graduated 2-year college
- (6) Graduated 3- or 4-year college
- (7) Part graduate/professional school
- (8) Completed graduate/professional school

What is your total annual household income (before taxes)?

- (1) Under \$25,000
- (2) \$25,000-\$34,999
- (3) \$35,000-\$49,999
- (4) \$50,000-\$74,999
- (5) \$75,000-\$99,999
- (6) \$100,000-\$124,999
- (7) \$125,000-\$150,000
- (8) Over \$150,000

What is your occupation:

<Write in>

What is your current employment status?

- (1) Employed Full-Time
- (2) Employed Part-Time
- (3) Employed as a contractor
- (4) Seeking opportunities
- (5) Retired

What religious family do you belong to or identify yourself most close to?

- (1) I am not religious
- (2) Christian (Catholic protestant or any other Christian denominations)
- (3) Judaism
- (4) Islam
- (5) Buddhism
- (6) Hinduism
- (7) Other (please specify)

What is your marital or partnership status?

- (1) Married and living with spouse
- (2) Living with partner
- (3) Divorced or separated
- (4) Widowed
- (5) Never married

Do you read, write, and speak English fluently?

- (1) Yes
- (2) No

Which languages are you capable of speaking fluently? (Check all that apply)

- English
- Spanish
- Mandarin Chinese
- Tagalog
- Vietnamese
- French
- Arabic
- Korean
- Russian
- German
- Other (write in)

2. Lifetime use of psychedelic compounds (Weiss et al., 2021)

- How many times have you used psychedelics in your lifetime? (Never, once, two to four times, five to ten times, greater than ten times)
 - Which psychedelic?
- How many times have you used Ayahuasca in your lifetime? (Never, once, two to four times, five to ten times, greater than ten times)
 - When is the last time using?

3. Other

- **How would you evaluate your overall health? Would you say you are:**

- (1) In good physical health (No illness or disabilities).
- (2) Mildly physically impaired (Minor illness or disabilities)
- (3) Moderately physically impaired (Requires substantial treatment)
- (4) Severely physically impaired (Requires extensive treatment)
- (5) Totally physically impaired (Confined to bed)

- **How often do you get a health checkup?**

- (1) Once in 3 months
- (2) Once in 6 months
- (3) Once a year
- (4) Only when needed
- (5) Never get it done
- (6) Other

- **Have you ever had an alcohol or any types of drug use history?**

(1) Yes

(2) No

If yes, how long has it been since started the using behavior ?

(1) Less than a year

(2) 1-2 years

(3) 3-4 years

(4) 5-6 years

(5) 7-8 years

(6) 9-10 years

(7) More than 10 years

4. Eligibility questions:

- Are you at least 18 years old? (Yes/No)

- Did you pass Soltara's medical intake screening to attend ayahuasca ceremonies? (Yes/No)

- Do you read, write, and speak English fluently? (Yes/No)

- How many nights of Ayahuasca retreat did you register to attend? (5 nights, 7 nights, 9 nights, 12 nights)

- Which location do you plan to attend for your ayahuasca retreat? (Playa Blanca, Costa Rica; Sugar Beach, Costa Rica; Tarapoto, Peru).

5. Contact information

Please provide the following contact information so that researcher can contact you for further participation and monetary compensation. This information will remain completely confidential and will only be used to contact you.

Full name: _____

E-mail address: _____

Alternate e-mail address: _____

Cell-phone Number: _____

We sincerely appreciate your interest in this survey and your willingness to volunteer your time. If you are eligible, you will be contacted by the research team within a week. You may close the window now to exit the survey.

*With gratitude for your interest,
The Ohio State University College of Social Work Research Team*

BASELINE (T1) SURVEY

1. Contact information

Please provide the following contact information so that researcher can contact you for further participation and monetary compensation. This information will remain completely confidential and will only be used to contact you.

Full name: _____
 E-mail address: _____
 Alternate e-mail address: _____
 Cell-phone Number: _____

How many nights of retreats package are you attending? << >>

2. Resilience Scale for Adults (33 items; Friborg et al., 2003)

<i>Personal strength/Perception of self</i>	1	2	3	4	5
When something unforeseen happens	I always find a solution				I often feel bewildered
My personal problems	are unsolvable				I know how to solve
My abilities	I strongly believe in				I am uncertain about
My judgements and decisions	I often doubt				I trust completely
In difficult periods I have a tendency to	view everything gloomy				find something good that help me thrive
Events in my life that I cannot influence	I manage to come to terms with				are a constant source of worry/concern
<i>Personal strength/Perception of future</i>					
My plans for the future are	difficult to accomplish				possible to accomplish
My future goals	I know how to accomplish				I am unsure how to accomplish
I feel that my future looks	very promising				Uncertain
My goals for the future are	unclear				well thought through
<i>Structured style</i>					
I am at my best when I	have a clear goal to strive for				can take one day at a time
When I start on new things/projects	I rarely plan ahead, just get on with it				I prefer to have a thorough plan
I am good at	organizing my time				wasting my time

Rules and regular routines	are absent in my everyday life			simplify my everyday life
<i>Social competence</i>				
I enjoy being	together with other people			by myself
To be flexible in social settings	is not important to me			is really important to me
New friendships are something	I make easily			I have difficulty making
Meeting new people is	difficult for me			something I am good at
When I am with others	I easily laugh			I seldom laugh
For me, thinking of good topics for conversation is	difficult			easy
<i>Family cohesion</i>				
My family's understanding of what is important in life is	quite different than mine			very similar to mine
I feel	very happy with my family			very unhappy with my family
My family is characterized by	disconnection			healthy coherence
In difficult periods my family	keeps a positive outlook on the future			Views the future as gloomy
Facing other people, our family acts	unsupportive of one another			loyal towards one another
In my family we like to	do things on our own			do things together
<i>Social resources</i>				
I can discuss personal issues with	no one			friends/family-members
Those who are good at encouraging me are	some close friends/family members			nowhere
The bonds among my friends is	weak			strong
When a family member experiences a crisis/emergency	I am informed right away			it takes quite a while before I am told
I get support from	friends/family members			No one
When needed, I have	no one who can help me			always someone who can help me
My close friends/family members	appreciate my qualities			dislike my qualities

3. Lifetime use of psychedelic compounds (Weiss et al., 2021)

How many times have you used psychedelics in your lifetime? Which psychedelic?

How many times have you used Ayahuasca in your lifetime? When is the last time using?

Response Scale:

1=Never

2=Once

3=Two to Four Times

4=Five to Ten Times

5=Greater than Ten Times

4. Big Five Inventory-10 (BFI-10; Rammstedt & John, 2007)

Instructions: How well do the following statements describe your personality?

I see myself as someone who ...	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1. ... is reserved	(1)	(2)	(3)	(4)	(5)
2. ... is generally trusting	(1)	(2)	(3)	(4)	(5)
3. ... tends to be lazy	(1)	(2)	(3)	(4)	(5)
4. ... is relaxed, handles stress well	(1)	(2)	(3)	(4)	(5)
5. ... has few artistic interests	(1)	(2)	(3)	(4)	(5)
6. ... is outgoing, sociable	(1)	(2)	(3)	(4)	(5)
7. ... tends to find fault with others	(1)	(2)	(3)	(4)	(5)
8. ... does a thorough job	(1)	(2)	(3)	(4)	(5)
9. ... gets nervous easily	(1)	(2)	(3)	(4)	(5)
10. ... has an active imagination	(1)	(2)	(3)	(4)	(5)

5. Credibility/Expectancy Questionnaire (modified based on Devilly et al., 2000)

1: Not at all

2

3

4

5: somewhat

6

7

8

9: very

- (1) What is the primary goal/expectation for you to have ayahuasca retreats?**
- Spiritual growth
 - Healing from past trauma (write in what trauma)
 - Seeking improvement in mental disorder symptoms (write in what mental disorder)
 - Seeking improvement in substance addiction (write in what substance addiction)
 - Out of curiosity
 - Other (write in)

(2) At this point, how logical does the therapy offered to you seem?

(3) At this point, how successfully do you think this treatment will meet your expectation?

(4) How confident would you be in recommending this intervention to a friend who has similar expectation in life?

(5) By the end of the therapy period, how much improvement in the element you hope to achieve (i.e., mental symptoms, spiritual growth) do you think will occur?
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

For this set, close your eyes for a few moments, and try to identify what you really feel (gut feeling) about the therapy and its likely success. Then answer the following questions.

(6) At this point, how much do you really feel (gut feeling) that this intervention will help you achieve your expectations?

(7) By the end of the therapy period, how much improvement in the element you hope to achieve do you really feel (gut feeling) will occur?
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

6. Intention for attending the ayahuasca retreats

- (1) Strongly agree
- (2) Agree
- (3) neither agree or disagree
- (4) disagree
- (5) strongly disagree

- I have clear treatment intention to attend the ayahuasca retreats.
- I have clear spiritual intention to attend the ayahuasca retreats.
- I have clear recreation intention to attend the ayahuasca retreats.

Thank you for your participation, and your contribution for the psychedelic research is much appreciated! We will contact you on the last day of your retreat with a survey link to fill out the post-retreat survey.

POST-RETREAT (T2) SURVEY

1. Contact information

Please provide any updates to the following contact information so that researcher can contact you for further participation and monetary compensation. This information will remain completely confidential and will only be used to contact you.

Full name: _____

E-mail address: _____

Alternate e-mail address: _____

Cell-phone Number: _____

2. Resilience Scale for Adults (33 items; Friborg et al., 2003)

<i>Personal strength/Perception of self</i>	1	2	3	4	5
When something unforeseen happens	I always find a solution				I often feel bewildered
My personal problems	are unsolvable				I know how to solve
My abilities	I strongly believe in				I am uncertain about
My judgements and decisions	I often doubt				I trust completely
In difficult periods I have a tendency to	view everything gloomy				find something good that help me thrive
Events in my life that I cannot influence	I manage to come to terms with				are a constant source of worry/concern
<i>Personal strength/Perception of future</i>					
My plans for the future are	difficult to accomplish				possible to accomplish
My future goals	I know how to accomplish				I am unsure how to accomplish
I feel that my future looks	very promising				Uncertain
My goals for the future are	unclear				well thought through
<i>Structured style</i>					
I am at my best when I	have a clear goal to strive for				can take one day at a time
When I start on new things/projects	I rarely plan ahead, just get on with it				I prefer to have a thorough plan
I am good at	organizing my time				wasting my time

Rules and regular routines	are absent in my everyday life			simplify my everyday life
<i>Social competence</i>				
I enjoy being	together with other people			by myself
To be flexible in social settings	is not important to me			is really important to me
New friendships are something	I make easily			I have difficulty making
Meeting new people is	difficult for me			something I am good at
When I am with others	I easily laugh			I seldom laugh
For me, thinking of good topics for conversation is	difficult			easy
<i>Family cohesion</i>				
My family's understanding of what is important in life is	quite different than mine			very similar to mine
I feel	very happy with my family			very unhappy with my family
My family is characterized by	disconnection			healthy coherence
In difficult periods my family	keeps a positive outlook on the future			Views the future as gloomy
Facing other people, our family acts	unsupportive of one another			loyal towards one another
In my family we like to	do things on our own			do things together
<i>Social resources</i>				
I can discuss personal issues with	no one			friends/family-members
Those who are good at encouraging me are	some close friends/family members			nowhere
The bonds among my friends is	weak			strong
When a family member experiences a crisis/emergency	I am informed right away			it takes quite a while before I am told
I get support from	friends/family members			No one
When needed, I have	no one who can help me			always someone who can help me
My close friends/family members	appreciate my qualities			dislike my qualities

3. **Acute ayahuasca experience: Mystical Experience Questionnaire** (MEQ; Barrett et al., 2015; MacLean et al, 2011)

Response options:

0 - None; not at all

- 1 - So slight cannot decide
- 2 - Slight
- 3 - Moderate
- 4 - Strong
- 5 - Extreme (more than ever before in my life)

- Loss of your usual sense of time.
- Experience of amazement.
- Sense that the experience cannot be described adequately in words.
- Gain of insightful knowledge experienced at an intuitive level.
- Feeling that you experienced eternity or infinity.
- Experience of oneness or unity with objects and/or persons perceived in your surroundings.
- Loss of your usual sense of space.
- Feelings of tenderness and gentleness.
- Certainty of encounter with ultimate reality (in the sense of being able to "know" and "see" what is really real) at some time during your experience.
- Feeling that you could not do justice to your experience by describing it in words.
- Loss of usual awareness of where you were.
- Feelings of peace and tranquility.
- Sense of being "outside of" time, beyond past and future.
- Freedom from the limitations of your personal self and feeling a unity or bond with what was felt to be greater than your personal self.
- Sense of being at a spiritual height.
- Experience of pure Being and pure awareness (beyond the world of sense impressions).
- Experience of ecstasy.
- Experience of the insight that "all is One."
- Being in a realm with no space boundaries.
- Experience of oneness in relation to an "inner world" within.
- Sense of reverence.
- Experience of timelessness.
- You are convinced now, as you look back on your experience, that in it you encountered ultimate reality (i.e. that you "knew" and "saw" what was really real).
- Feeling that you experienced something profoundly sacred and holy.
- Awareness of the life or living presence in all things.
- Experience of the fusion of your personal self into a larger whole.
- Sense of awe or awesomeness.
- Experience of unity with ultimate reality.
- Feeling that it would be difficult to communicate your own experience to others who have not had similar experiences.
- Feelings of joy.

4. Acute challenging ayahuasca experience: Challenging Experience Questionnaire (CEQ; Barrett et al., 2016)

Response options:

- 0 - None; not at all
- 1 - So slight cannot decide
- 2 - Slight
- 3 - Moderate
- 4 - Strong
- 5 - Extreme (more than ever before in my life)

- Isolation and loneliness
- Sadness
- Feeling my heart beating
- I had the feeling something horrible would happen
- Feeling my body shake/tremble
- Feelings of grief
- Experience of fear
- Fear that I might lose my mind or go insane
- I felt like crying
- Feeling of isolation from people and things
- Feelings of despair
- I had the feeling that people were plotting against me
- I was afraid that the state I was in would last forever
- Anxiousness
- I felt shaky inside
- I had the profound experience of my own death
- I felt my heart beating irregularly or skipping beats
- Pressure or weight in my chest or abdomen
- I experienced a decreased sense of sanity
- I felt as if I was dead or dying
- Panic
- Experience of antagonism toward people around me
- Despair
- I felt isolated from everything and everyone
- Emotional and/or physical suffering
- I felt frightened

5. Acute challenging ayahuasca experience: Ayahuasca Experience Inventory-discomfort subscale (Weiss et al., 2020)

Instructions: Looking back on the entirety of your Experience, please rate the degree to which at any time during that session you experienced the following phenomena. Answer each question according to your feelings, thoughts, and experiences at the time of the ayahuasca ceremony. In making each of your ratings, use the following scale:

1=None; Not at all

2=So slight
cannot decide
3=Slight
4=Moderate
5=Strong (equivalent in degree to any other strong
experience) 6=Extreme (more than any other time in your life
and stronger than 4)

Discomfort Subscale items

1. I felt tormented.
2. I experienced everything as frighteningly distorted.
3. I felt threatened.
4. I felt lost.
5. I felt overwhelmed by the experience.
6. I felt as if dark forces had overtaken me.
7. I felt an unpleasant flow of information that I couldn't control.
8. Time passed slowly in a tormenting way.
9. I felt isolated from everything and everyone.
10. I felt agony.
11. I was afraid that the state I was in would last forever.
12. I experienced my surroundings as strange and weird.
13. I experienced great physical discomfort
14. I felt exhausted.
15. I stayed frozen in a very unnatural position for an extended period of time.

16. Acute challenging ayahuasca experience: Ayahuasca Purging Experience

1=None; Not at all
2=So slight cannot decide
3=Slight
4=Moderate
5=Strong
6=Extreme (one of the most significant purging
memories/experiences for you)

After taking ayahuasca, I had the following purging experience:

- Diarrhea
- Vomiting
- Shivering
- Laughing
- Crying and spontaneous tears
- Yawning
- Fart
- Changes in body temperature

- Mental chatter
- GI discomfort
- Twitching
- Sweating
- Others <<write in>>

17. Acute ayahuasca experience: Emotional Breakthrough Inventory (EBI; Roseman et al., 2019)

Response options:

0 - no, not more than usually

10

20

30

40

50

60

70

80

90

100 - yes, entirely or completely

How much are the following six statements true of your experience:

- 1.) I faced emotionally difficult feelings that I usually push aside.
- 2.) I experienced a resolution of a personal conflict/trauma.
- 3.) I felt able to explore challenging emotions and memories.
- 4.) I had an emotional breakthrough.
- 5.) I was able to get a sense of closure on an emotional problem.
- 6.) I achieved an emotional release followed by a sense of relief.

18. Acute ayahuasca experience: Psychological Insight Questionnaire (PIQ; Davis et al., 2020)

Response Options:

0 - No

1 - So slightly cannot decide

2 - Slightly

3 - Moderately

4 - Strongly

5 - Extremely (more than ever before in my life)

1. Awareness of uncomfortable or painful feelings I previously avoided.
2. Realized the importance of my life.
3. Discovered I could explore uncomfortable or painful feelings I previously avoided.
4. Awareness of information that helped me understand my life.
5. Awareness of dysfunctional patterns in my actions, thoughts, and/or feelings.

6. Discovered a vivid sense of the paradoxes in life.
7. Realized the nature and/or origins of my defenses or other coping strategies.
8. Awareness of my life purpose, goals, and/or priorities.
9. Realized how current feelings or perceptions are related to events from my past.
10. Discovered a clear pattern of avoidance in my life.
11. Discovered new actions that may help me achieve my goals.
12. Gained resolution or clarity about past traumas or hurtful events.
13. Experienced validation of my life, character, values, or beliefs.
14. Gained a deeper understanding of events/memories from my past.
15. Realized I could experience memories previously too difficult to experience.
16. Gained a deeper understanding of previously held beliefs and/or values.
17. Discovered how aspects of my life are affecting my well-being.
18. Realized ways my beliefs may be dysfunctional.
19. Discovered clear similarities between my past and present interpersonal relationships.
20. Discovered new insights about my work or career.
21. Realized how critical or judgmental views I hold towards myself are dysfunctional.
22. Awareness of beneficial patterns in my actions, thoughts, and/or feelings.
23. Realized the point of view or actions of others that had been difficult to understand previously.

19. **Psychospiritual outcomes: 10-item Persisting Effects Questionnaire (PEQ; Griffiths et al., 2006)**

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your current sense of personal well-being or life satisfaction?

- (1) Strong positive change that I consider desirable
- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider undesirable
- (6) Moderate negative change that I consider undesirable
- (7) Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in the sense of your life's purpose?

- (1) Strong positive change that I consider desirable
- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider undesirable
- (6) Moderate negative change that I consider undesirable
- (7) Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in the sense of your life's meaning?

- (1) Strong positive change that I consider desirable
- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider undesirable
- (6) Moderate negative change that I consider undesirable
- (7) Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your social relationships as a whole (e.g., relationships with family members, friends, neighbors, co-workers, strangers, etc.)?

- (1) Strong positive change that I consider desirable
- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider undesirable
- (6) Moderate negative change that I consider undesirable
- (7) Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your attitudes about life?

- (1) Strong positive change that I consider desirable
- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider undesirable
- (6) Moderate negative change that I consider undesirable
- (7) Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your attitudes about self?

- (1) Strong positive change that I consider desirable
- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider undesirable
- (6) Moderate negative change that I consider undesirable
- (7) Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your mood?

- (1) Strong positive change that I consider desirable

- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider undesirable
- (6) Moderate negative change that I consider undesirable
- (7) Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting behavioral changes?

- (1) Strong positive change that I consider desirable
- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider undesirable
- (6) Moderate negative change that I consider undesirable
- (7) Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in how spiritual you are?

- (1) Strong positive change that I consider desirable
- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider undesirable
- (6) Moderate negative change that I consider undesirable
- (7) Strong negative change that I consider undesirable

Did the experience change your attitudes about death?

- (1) Strong positive change that I consider desirable
- (2) Moderate positive change that I consider desirable
- (3) Slight positive change that I consider desirable
- (4) No change
- (5) Slight negative change that I consider detrimental
- (6) Moderate negative change that I consider detrimental
- (7) Strong negative change that I consider detrimental

20. Psychospiritual outcomes: Spirituality index of well-being (SIWB; Daaleman & Frey, 2004)

Instructions: Which response best describes how you feel about each statement?

Statement	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neither agree nor Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
1.) There is not much I can do to help	1	2	3	4	5

myself.					
2.) Often, there is no way I can complete what I have started.	1	2	3	4	5
3.) I can't begin to understand my problems.	1	2	3	4	5
4.) I am overwhelmed when I have personal difficulties and problems.	1	2	3	4	5
5.) I don't know how to begin to solve my problems.	1	2	3	4	5
6.) There is not much I can do to make a difference in my life.	1	2	3	4	5
7.) I haven't found my life's purpose yet.	1	2	3	4	5
8.) I don't know who I am, where I came from, or where I am going.	1	2	3	4	5
9.) I have a lack of purpose in my life.	1	2	3	4	5
10.) In this world, I don't know where I fit in.	1	2	3	4	5
11.) I am far from understanding the meaning of life.	1	2	3	4	5
12.) There is a great void in my life at this time.	1	2	3	4	5

21. Psychospiritual outcomes: satisfaction with life scale (SWLS; Diener et al., 1985)

Response options:

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

- In most ways my life is close to my ideal.
- The conditions of my life are excellent.
- I am satisfied with my life.
- So far I have gotten the important things I want in life.
- If I could live my life over, I would change almost nothing.

22. Psychospiritual outcomes: Meaning in life questionnaire (MLQ; Steger et al., 2006)

Please take a moment to think about what makes your life and existence feel important and significant to you. Please respond to the following statements as truthfully and accurately as you can, and also please remember that these are very subjective questions and that there are no right or wrong answers. Please answer according to the scale below:

Absolutely Untrue 1	Mostly Untrue 2	Somewhat Untrue 3	Can't Say True or False 4	Somewhat True 5	Mostly True 6	Absolutely True 7
----------------------------------	------------------------------	--------------------------------	--	------------------------------	----------------------------	--------------------------------

- 1) I understand my life's meaning.
- 2) I am looking for something that makes my life feel meaningful.
- 3) I am always looking to find my life's purpose.
- 4) My life has a clear sense of purpose.
- 5) I have a good sense of what makes my life meaningful.
- 6) I have discovered a satisfying life purpose.
- 7) I am always searching for something that makes my life feel significant.
- 8) I am seeking a purpose or mission for my life.
- 9) My life has no clear purpose.
- 10) I am searching for meaning in my life.

23. Psychospiritual outcomes: Flourishing Measure (12 items; VanderWeele, 2017)

1. Overall, how satisfied are you with life as a whole these days?
0 = Not Satisfied at All, 10 = Completely Satisfied ____
2. In general, how happy or unhappy do you usually feel?
0 = Extremely Unhappy, 10 = Extremely Happy ____
3. In general, how would you rate your physical health?
0 = Poor, 10 = Excellent ____
4. How would you rate your overall mental health?
0 = Poor, 10 = Excellent ____
5. Overall, to what extent do you feel the things you do in your life are worthwhile?
0 = Not at All Worthwhile, 10 = Completely Worthwhile ____
6. I understand my purpose in life.
0 = Strongly Disagree, 10 = Strongly Agree ____
7. I always act to promote good in all circumstances, even in difficult and challenging situations.
0 = Not True of Me, 10 = Completely True of Me ____
8. I am always able to give up some happiness now for greater happiness later.
0 = Not True of Me, 10 = Completely True of Me ____
9. I am content with my friendships and relationships.
0 = Strongly Disagree, 10 = Strongly Agree ____
10. My relationships are as satisfying as I would want them to be.
0 = Strongly Disagree, 10 = Strongly Agree ____

11. How often do you worry about being able to meet normal monthly living expenses?
0 = Worry All of the Time, 10 = Do Not Ever Worry ____
12. How often do you worry about safety, food, or housing?
0 = Worry All of the Time, 10 = Do Not Ever Worry ____

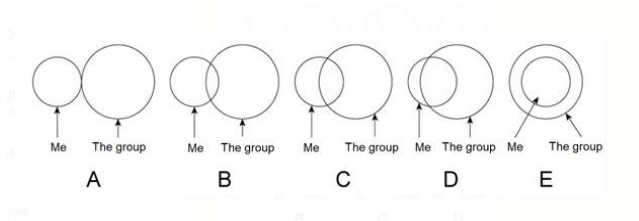
24. **Setting Questionnaire for the Ayahuasca Experience (SQAE; Pontual et al., 2021)**

Response options:

- 5 - Strongly agree
- 4 - Partially agree
- 3 - Neither agree nor disagree
- 2 - Partially disagree
- 1 - Strongly disagree

Social Subscale items

- (S1) The other participants seemed to be doing well.
- (S2) I have characteristics in common with that group of people.
- (S3) I considered myself to be different from the other participants.
- (S4) I felt that I was among peers in that group.
- (S5) Which of the following images best represents how you felt about the group during the session / ceremony?



Leadership Subscale items

- (L1) I entrusted all my concerns to the ritual support group.
- (L2) I felt helpless and that I had to take care of myself.
- (L3) Those with needs were promptly taken care of.
- (L4) The ritual leadership gave me a sense of security.
- (L5) The organizers showed themselves to be inexperienced.
- (L6) I had doubts about the organizers' capacity to deal with possible complications.

Decoration Subscale items

- (D1) For my taste, the decoration was adequate.
- (D2) I would change some object or image of the decoration.
- (D3) Certain components of the ritual didn't align with my personal spirituality.

Comfort Subscale items

- (C1) My physical position was comfortable during the ritual.
- (C2) I wish I had stayed in another position during the ritual.
- (C3) The place where I was sitting / lying bothered me.

(C4) I missed having a support for my back, head or arms.

Infrastructure Subscale items

- (I1) I felt confined.
- (I2) I worried about the air circulation in that place.
- (I3) I found the restroom to be inadequate.
- (I4) There were accessible places for me to take care of my needs.
- (I5) I worried about the lack of emergency exits or other things related to safety.
- (I6) There was a suitable place to throw up.

Instruction Subscale items

- (G1) The ritual took place in the manner expected.
- (G2) From start to finish, the ritual seemed under control.
- (G3) I was previously instructed about the whole ritual.
- (G4) There were times when I felt that there was a lack of instruction.

25. Big Five Inventory-10 (BFI-10; Rammstedt & John, 2007)

Instructions: How well do the following statements describe your personality?

I see myself as someone who ...	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1. ... is reserved	(1)	(2)	(3)	(4)	(5)
2. ... is generally trusting	(1)	(2)	(3)	(4)	(5)
3. ... tends to be lazy	(1)	(2)	(3)	(4)	(5)
4. ... is relaxed, handles stress well	(1)	(2)	(3)	(4)	(5)
5. ... has few artistic interests	(1)	(2)	(3)	(4)	(5)
6. ... is outgoing, sociable	(1)	(2)	(3)	(4)	(5)
7. ... tends to find fault with others	(1)	(2)	(3)	(4)	(5)
8. ... does a thorough job	(1)	(2)	(3)	(4)	(5)
9. ... gets nervous easily	(1)	(2)	(3)	(4)	(5)
10. ... has an active imagination	(1)	(2)	(3)	(4)	(5)

26. Other

- **How do you evaluate your overall ayahuasca experience?**

- (1) Strongly negative experience
- (2) Negative experience

- (3) Neutral
- (4) Positive
- (5) Strongly positive experience

- **Think about your primary reason/expectation to have the ayahuasca retreats experience, do you think your ayahuasca retreats experience met your expectations?**

- (1) Much less than expected
- (2) Less than expected
- (3) Matched expectations
- (4) Exceed my expectations
- (5) Greatly exceed my expectations

- **I would recommend this retreat experience to a friend or family member who experienced similar problems or shares similar expectation.**

- (1) Strongly disagree
- (2) Disagree
- (3) Neutral (maybe or maybe not)
- (4) Agree
- (5) Strongly agree

- **Do you have any future plans on attending ayahuasca retreats?**

- (1) Definitely will plan for next ayahuasca trip
- (2) Mostly like to plan for next ayahuasca trip
- (3) Not sure
- (4) Mostly unlike to plan for next ayahuasca trip
- (5) Definitely will not plan for next ayahuasca trip

Thank you for your participation, and your contribution for the psychedelic research is much appreciated! We will contact you again one month after your retreat with a survey link to fill out the one-month follow-up survey.

ONE-MONTH (T3) SURVEY

1. Contact information

Please provide any updates to the following contact information so that researcher can contact you for further participation and monetary compensation. This information will remain completely confidential and will only be used to contact you.

Full name: _____

E-mail address: _____

Alternate e-mail address: _____

Cell-phone Number: _____

2. Resilience Scale for Adults (33 items; Friborg et al., 2003)

<i>Personal strength/Perception of self</i>	1	2	3	4	5
When something unforeseen happens	I always find a solution				I often feel bewildered
My personal problems	are unsolvable				I know how to solve
My abilities	I strongly believe in				I am uncertain about
My judgements and decisions	I often doubt				I trust completely
In difficult periods I have a tendency to	view everything gloomy				find something good that help me thrive
Events in my life that I cannot influence	I manage to come to terms with				are a constant source of worry/concern
<i>Personal strength/Perception of future</i>					
My plans for the future are	difficult to accomplish				possible to accomplish
My future goals	I know how to accomplish				I am unsure how to accomplish
I feel that my future looks	very promising				Uncertain
My goals for the future are	unclear				well thought through
<i>Structured style</i>					
I am at my best when I	have a clear goal to strive for				can take one day at a time
When I start on new things/projects	I rarely plan ahead, just get on with it				I prefer to have a thorough plan
I am good at	organizing my time				wasting my time

Rules and regular routines	are absent in my everyday life			simplify my everyday life
<i>Social competence</i>				
I enjoy being	together with other people			by myself
To be flexible in social settings	is not important to me			is really important to me
New friendships are something	I make easily			I have difficulty making
Meeting new people is	difficult for me			something I am good at
When I am with others	I easily laugh			I seldom laugh
For me, thinking of good topics for conversation is	difficult			easy
<i>Family cohesion</i>				
My family's understanding of what is important in life is	quite different than mine			very similar to mine
I feel	very happy with my family			very unhappy with my family
My family is characterized by	disconnection			healthy coherence
In difficult periods my family	keeps a positive outlook on the future			Views the future as gloomy
Facing other people, our family acts	unsupportive of one another			loyal towards one another
In my family we like to	do things on our own			do things together
<i>Social resources</i>				
I can discuss personal issues with	no one			friends/family-members
Those who are good at encouraging me are	some close friends/family members			nowhere
The bonds among my friends is	weak			strong
When a family member experiences a crisis/emergency	I am informed right away			it takes quite a while before I am told
I get support from	friends/family members			No one
When needed, I have	no one who can help me			always someone who can help me
My close friends/family members	appreciate my qualities			dislike my qualities

3. **Psychospiritual outcomes: 10-item Persisting Effects Questionnaire (PEQ; Griffiths et al., 2006)**

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your current sense of personal well-being or life satisfaction?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your current sense of personal well-being or life satisfaction?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in the sense of your life's purpose?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in the sense of your life's meaning?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your social relationships as a whole (e.g., relationships with family members, friends, neighbors, co-workers, strangers, etc.)?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your attitudes about life?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your attitudes about self?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in your mood?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting behavioral changes?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Do you believe that the experience and your contemplation of that experience has led to long-term and persisting changes in how spiritual you are?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider undesirable
- Moderate negative change that I consider undesirable
- Strong negative change that I consider undesirable

Did the experience change your attitudes about death?

- Strong positive change that I consider desirable
- Moderate positive change that I consider desirable
- Slight positive change that I consider desirable
- No change
- Slight negative change that I consider detrimental
- Moderate negative change that I consider detrimental
- Strong negative change that I consider detrimental

4. **Psychospiritual outcomes: Spirituality index of well-being** (SIWB; Daaleman & Frey, 2004)

Instructions: Which response best describes how you feel about each statement?

Statement	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neither agree nor Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
1.) There is not much I can do to help myself.	1	2	3	4	5
2.) Often, there is no way I can complete what I have started.	1	2	3	4	5
3.) I can't begin to understand my	1	2	3	4	5

problems.					
4.) I am overwhelmed when I have personal difficulties and problems.	1	2	3	4	5
5.) I don't know how to begin to solve my problems.	1	2	3	4	5
6.) There is not much I can do to make a difference in my life.	1	2	3	4	5
7.) I haven't found my life's purpose yet.	1	2	3	4	5
8.) I don't know who I am, where I came from, or where I am going.	1	2	3	4	5
9.) I have a lack of purpose in my life.	1	2	3	4	5
10.) In this world, I don't know where I fit in.	1	2	3	4	5
11.) I am far from understanding the meaning of life.	1	2	3	4	5
12.) There is a great void in my life at this time.	1	2	3	4	5

5. Psychospiritual outcomes: satisfaction with life scale (SWLS; Diener et al., 1985)

Response options:

7 - Strongly agree

6 - Agree

5 - Slightly agree

4 - Neither agree nor disagree

3 - Slightly disagree

2 - Disagree

1 - Strongly disagree

- In most ways my life is close to my ideal.
- The conditions of my life are excellent.
- I am satisfied with my life.
- So far I have gotten the important things I want in life.
- If I could live my life over, I would change almost nothing.

6. Psychospiritual outcomes: Meaning in life questionnaire (MLQ; Steger et al., 2006)

Please take a moment to think about what makes your life and existence feel important and significant to you. Please respond to the following statements as truthfully and accurately as you can, and also please remember that these are very subjective questions and that there are no right or wrong answers. Please answer according to the scale below:

Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	2	3	4	5	6	7

- I understand my life's meaning.
- I am looking for something that makes my life feel meaningful.
- I am always looking to find my life's purpose.
- My life has a clear sense of purpose.
- I have a good sense of what makes my life meaningful.
- I have discovered a satisfying life purpose.
- I am always searching for something that makes my life feel significant.
- I am seeking a purpose or mission for my life.
- My life has no clear purpose.
- I am searching for meaning in my life.

7. Psychospiritual outcomes: Flourishing Measure (12 items; VanderWeele, 2017)

1. Overall, how satisfied are you with life as a whole these days?
0 = Not Satisfied at All, 10 = Completely Satisfied ____
2. In general, how happy or unhappy do you usually feel?
0 = Extremely Unhappy, 10 = Extremely Happy ____
3. In general, how would you rate your physical health?
0 = Poor, 10 = Excellent ____
4. How would you rate your overall mental health?
0 = Poor, 10 = Excellent ____
5. Overall, to what extent do you feel the things you do in your life are worthwhile?
0 = Not at All Worthwhile, 10 = Completely Worthwhile ____
6. I understand my purpose in life.
0 = Strongly Disagree, 10 = Strongly Agree ____
7. I always act to promote good in all circumstances, even in difficult and challenging situations.
0 = Not True of Me, 10 = Completely True of Me ____
8. I am always able to give up some happiness now for greater happiness later.
0 = Not True of Me, 10 = Completely True of Me ____
9. I am content with my friendships and relationships.
0 = Strongly Disagree, 10 = Strongly Agree ____
10. My relationships are as satisfying as I would want them to be.
0 = Strongly Disagree, 10 = Strongly Agree ____
11. How often do you worry about being able to meet normal monthly living expenses?
0 = Worry All of the Time, 10 = Do Not Ever Worry ____
12. How often do you worry about safety, food, or housing?
0 = Worry All of the Time, 10 = Do Not Ever Worry ____

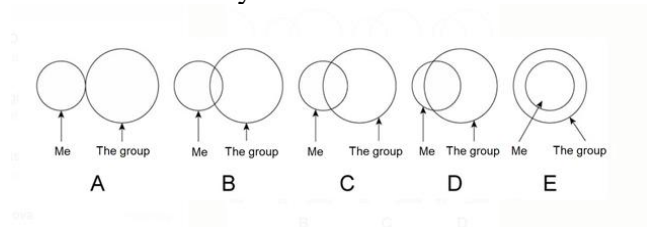
8. Setting Questionnaire for the Ayahuasca Experience (SQAE; Pontual et al., 2021)

Response options:

- 5 - Strongly agree
- 4 - Partially agree
- 3 - Neither agree nor disagree
- 2 - Partially disagree
- 1 - Strongly disagree

Social Subscale items

- (S1) The other participants seemed to be doing well.
- (S2) I have characteristics in common with that group of people.
- (S3) I considered myself to be different from the other participants.
- (S4) I felt that I was among peers in that group.
- (S5) Which of the following images best represents how you felt about the group during the session / ceremony?



Leadership Subscale items

- (L1) I entrusted all my concerns to the ritual support group.
- (L2) I felt helpless and that I had to take care of myself.
- (L3) Those with needs were promptly taken care of.
- (L4) The ritual leadership gave me a sense of security.
- (L5) The organizers showed themselves to be inexperienced.
- (L6) I had doubts about the organizers' capacity to deal with possible complications.

Decoration Subscale items

- (D1) For my taste, the decoration was adequate.
- (D2) I would change some object or image of the decoration.
- (D3) Certain components of the ritual didn't align with my personal spirituality.

Comfort Subscale items

- (C1) My physical position was comfortable during the ritual.
- (C2) I wish I had stayed in another position during the ritual.
- (C3) The place where I was sitting / lying bothered me.
- (C4) I missed having a support for my back, head or arms.

Infrastructure Subscale items

- (I1) I felt confined.
- (I2) I worried about the air circulation in that place.

- (I3) I found the restroom to be inadequate.
- (I4) There were accessible places for me to take care of my needs.
- (I5) I worried about the lack of emergency exits or other things related to safety.
- (I6) There was a suitable place to throw up.

Instruction Subscale items

- (G1) The ritual took place in the manner expected.
- (G2) From start to finish, the ritual seemed under control.
- (G3) I was previously instructed about the whole ritual.
- (G4) There were times when I felt that there was a lack of instruction.

9. Lifetime use of psychedelic compounds (Weiss et al., 2021)

How many times have you used psychedelics in your lifetime? Which psychedelic?
 How many times have you used Ayahuasca in your lifetime? When is the last time using?

Response Scale:

- 1=Never
- 2=Once
- 3=Two to Four Times
- 4=Five to Ten Times
- 5=Greater than Ten Times

10. Big Five Inventory-10 (BFI-10; Rammstedt & John, 2007)

Instructions: How well do the following statements describe your personality?

I see myself as someone who ...	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1. ... is reserved	(1)	(2)	(3)	(4)	(5)
2. ... is generally trusting	(1)	(2)	(3)	(4)	(5)
3. ... tends to be lazy	(1)	(2)	(3)	(4)	(5)
4. ... is relaxed, handles stress well	(1)	(2)	(3)	(4)	(5)
5. ... has few artistic interests	(1)	(2)	(3)	(4)	(5)
6. ... is outgoing, sociable	(1)	(2)	(3)	(4)	(5)
7. ... tends to find fault with others	(1)	(2)	(3)	(4)	(5)
8. ... does a thorough job	(1)	(2)	(3)	(4)	(5)
9. ... gets nervous easily	(1)	(2)	(3)	(4)	(5)
10. ... has an active imagination	(1)	(2)	(3)	(4)	(5)

27. Other

- **How do you evaluate your overall ayahuasca experience after one-month post the retreat?**
 - (1) Strongly negative experience
 - (2) Negative experience
 - (3) Neutral
 - (4) Positive
 - (5) Strongly positive experience

- **Think about your primary reason/expectation to have the ayahuasca retreats experience, do you think your ayahuasca retreats experience met your expectations?**
 - (1) Much less than expected
 - (2) Less than expected
 - (3) Matched expectations
 - (4) Exceed my expectations
 - (5) Greatly exceed my expectations

- **I would recommend this retreat experience to a friend or family member who experienced similar problems.**
 - (1) Strongly disagree
 - (2) Disagree
 - (3) Neutral (maybe or maybe not)
 - (4) Agree
 - (5) Strongly agree

- **Do you have any future plans on attending ayahuasca retreats?**
 - (1) Definitely will plan for next ayahuasca trip
 - (2) Mostly like to plan for next ayahuasca trip
 - (3) Not sure
 - (4) Mostly unlike to plan for next ayahuasca trip
 - (5) Definitely will not plan for next ayahuasca trip

- **Would you be interested to be invited for future study follow-ups (e.g., surveys, interviews) regarding this topic?**
 - (1) Yes
 - (2) No

- **Do you want to receive a copy of the study findings when it is published/available?**
 - (1) Yes
 - (2) No

- **Any comments you have for this study? <<Write in>>**

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Thank you for your participation, and your contribution for the psychedelic research is much appreciated!