ENTHEOGEN-ASSISTED SELF-TRANSCENDENCE & PSYCHOSPIRITUAL DEVELOPMENT: A STUDY OF POSITIVE PSYCHEDELIC DRUG USE

by

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Abstract

This dissertation examined the relationship between psychedelic-facilitated self-transcendent experiences and positive adult development. Although anthropologists note that humans have an extensive history of using these psychoactive substances to induce transformative states for beneficial purposes, only recently have psychologists begun to approach them through an empirical lens. In a similar way, while childhood development has garnered considerable research, adult development has received significantly less attention. Thus, the principal aim of this study was to examine whether psychedelic use predicts self-transcendence and psychospiritual development in contemporary users.

Although psychedelic substances were often socially integrated in previous eras, legal use is a divisive topic in contemporary Western society. The question of whether these drugs hold potential as developmental tools for psychospiritual growth in adulthood is understandably contentious. Thus, the secondary aim of this dissertation was to examine the spectrum of recreational psychedelic use, and thereby determine baseline parameters predictive of deleterious and salubrious use amongst contemporary users.

This dissertation utilized an international sample of drug users and non-drug users drawn from various online communities. Self-report measures from developmental and transpersonal psychology, analyzed with statistical methods, were used to evaluate the questions of interest. Findings revealed that contextual variables, such as lifetime use, frequency, dose size, use in a group (vs. alone), use intention, and post-use integration were critical for predicting use outcomes. Psychedelic use—particularly with entheogenic intentions—was shown to predict an openness to self-transcendent feelings of awe, which, in turn, was shown to predict various indices of positive adult development.

Preface

This dissertation is an original work by Kevin Orest St. Arnaud. The research project, of which this dissertation is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name “Mental Health, Spirituality, and Psychoactive Substance Use”, No. Pro00078484, April 4, 2018.

Dedication

In the woods, we return to reason and faith. There I feel that nothing can befall me in life, — no disgrace, no calamity, (leaving me my eyes,) which nature cannot repair. Standing on the bare ground, — my head bathed by the blithe air, and uplifted into infinite space, — all mean egotism vanishes. I become a transparent eye-ball; I am nothing; I see all; the currents of the Universal Being circulate through me; I am part or parcel of God.

Ralph Waldo Emerson (1903, p. 10)

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"Our normal waking consciousness, rational consciousness as we call it, is but one special type of consciousness, whilst all about it, parted from it by the filmiest of screens, there lie potential forms of consciousness entirely different… We may go through life without suspecting their existence; but apply the requisite stimulus, and at a touch they are there in all their completeness, definite types of mentality which probably somewhere have their field of application and adaptation. No account of the universe in its totality can be final which leaves these other forms of consciousness quite disregarded."

William James (1902, pp. 373-374)

Many processes of emerging interest in positive psychology—which have long been of interest to humanistic and transpersonal psychologists—involve non-ordinary states of consciousness (Leary & Guadagno, 2011). Common examples of non-ordinary states include dreaming, meditative states, and alcohol intoxication (Tart, 1975). However, *self-transcendent* states of consciousness have begun to garner attention in recent years due to growing research demonstrating their link with psychological growth, well-being, prosociality, and spirituality (e.g., Csikszentmihalyi, 2014; Hofmann, Grossman, & Hinton, 2011; Leary & Guadagno, 2011). These experiences, which involve a decreased sense of self-awareness and an enhanced sense of connectedness, exist on a continuum of intensity ranging from mindful awareness to flow states, to profound awe, and mystical experiences (Yaden, 2017).

Recent empirical findings pointing to the beneficial impact of self-transcendent states of consciousness are not altogether surprising given that humans have an extensive

history of modifying consciousness to attain them (Tart, 1975). In fact, many cultures have developed physical, psychological, or pharmacological methods for inducing self-transcendence, typically in the interest of promoting social cohesion, healing, and religious experiences (Ludwig, 1972).

For example, social cohesion is facilitated by a sense of empathy for others and prosociality, both of which are facilitated by a minimal focus on oneself and a sense of connection to others—attributes of self-transcendence (Leary & Guadagno, 2011). Empirically, self-transcendent experiences have indeed been shown to facilitate social cohesion by encouraging prosocial behaviour, other oriented thoughts, and feelings of compassion (Piff et al., 2015; Stellar et al., 2017). In addition, various therapeutic practices have capitalized on the enhanced propensity for emotional catharsis and novel insight engendered by various non-ordinary states (Ludwig, 1972). Again, research has demonstrated that self-transcendent experiences are in fact predictive of psychological healing and well-being (Klein et al., 2016; Noble, 1987). Finally, the most potent self-transcendent states have an awe-inspiring, mystical quality and are believed to underlie human religiosity (see Leary & Guadagno, 2011). Once more, experimental studies have demonstrated that self-transcendent experiences can increase one's sense of spirituality, connection, and unity (Saroglou et al., 2008; Van Cappellen & Saroglou, 2012; Shiota, Keltner, & Mossman, 2007).

Psychedelics and Self-Transcendence

Given the human proclivity for modulating consciousness to obtain these self-transcendent states—and the reliability of pharmacological agents to do so—it is not surprising that we also have an extensive history of using chemical substances toward

this end (Merlin, 2003; Tart, 1975). Of the various psychoactive drugs used for these purposes, *psychedelics* in particular have, and continue to be, very commonly associated with such pursuits (Móró, Simon, Bárd, & Rácz, 2011). In fact, it has been suggested that of the many psychoactive compounds used by our species, psychedelics may have the longest history of use (Nichols, 2016).

Simons and colleagues (1998, 2000) have noted that psychedelic drugs are unique in their ability to provide the user with new perceptions and interpretations of their experience, which can result in growth to one's understanding of self, others, and the world. Accordingly, psychedelics have long been used in traditional and contemporary religious practices and continue to be used as legal sacraments by the Native American Church, Santo Daime, and União do Vegetal (Dobkin de Rios, 1971; Stewart, 1987). Interestingly, it has been argued that the *kykon* potion, which was utilized in the Eleusinian mysteries of ancient Greece, was likely an ergot psychedelic similar to LSD (Hofmann, 2012).

Thus, the use of psychedelics in Western society is not new, but a resurgence, or even reclamation, of an ancient human behaviour (Gowan, 1975). Despite the fact that Western societies have not developed legal or practical frameworks for guiding usage, studies show that many contemporary psychedelic users continue to approach the use of these drugs judiciously and instrumentally, often with self-exploratory, personal growth, or spiritual intentions (Hallock et al., 2013; Lerner & Lyvers, 2006; Lyvers & Meester, 2012; Neitzke-Spruill & Glasser, 2018; Prepeliczay, 2002). Móró and Noreika (2011) have argued that because many contemporary individuals in Western societies use psychedelics with these positive, prosocial intentions, judicious psychedelic use deserves

to be re-legitimized as a socially acceptable practice. They suggest that a comprehensive bio-psycho-socio-spiritual framework could better elucidate the various purposes and outcomes of drug use in modern society (Móró & Noreika, 2011).

Today, individuals who use psychedelics with personal growth, mind-expansive, or spiritual intentions are sometimes known as *psychonauts*—sailors of the soul. Móró et al. (2011) suggest that these intentions be denoted *autognostic*—increasing one's self-knowledge. Similarly, Ruck et al. (1979) proposed that when a drug is used with an explicit spiritual or religious intention, it be referred to as an *entheogen*, meaning "to experience God within." This is analogous to the term used by the ancient Greeks for drugs used for such purposes—*pharmacotheons*, or "divine drugs" (Hofmann, 2012). In other words, although some individuals use psychedelics for enjoyment (e.g., "tripping out," "to party,"), autognostic and entheogenic users often approach their use with the purpose of facilitating personal growth, mind-expansion, or spiritual insight (Móró et al., 2011; Orsolini, Papanti, Francesconi, & Schifano, 2015).

Psychedelics and Psychospiritual Development

Clinical and experimental psychedelic research, which largely began during the 1950s, widely regarded these drugs as both promising therapeutic substances and tools for exploring the inner workings of the mind (Grinspoon & Bakalar, 1979). Around this time, the field of humanistic (and later transpersonal) psychology was beginning to explore self-actualization and self-transcendence, or advanced adult well-being and development. Given their success in aiding psychotherapy and capacity to induce profoundly transformative experiences, there was speculation and preliminary research suggesting that psychedelics might be used to foster growth toward these farther reaches

of human nature (Klavetter & Mogar; 1967; Masters & Houston, 1966; McGlothlin et al., 1967; Savage et al., 1967). For example, Masters and Houston (1966) found that 95 percent of their research participants reported beneficial changes on account of their psychedelic experience, and 40 percent declared themselves profoundly positively transformed. Similar research, which followed up on the lasting effects of a psychedelic drug session which had occurred three years previous, found that 40 to 60 percent of individuals reported lasting personality, attitudinal, and value changes which they attributed to their experience (Ditman, Hayman, & Whittlesey, 1962; Leary, Litwin, & Metzner, 1963; Metzner, 1963).

Interestingly, research participants consistently rated psychedelic experiences with an explicitly religious, spiritual, or numinous (i.e., self-transcendent) quality as the most impactful and transformative (Masters & Houston, 1966). In fact, since the early years of psychedelic research, it has been noted that when dramatic changes occurred following a psychedelic administration, it was almost always associated with a transcendent, mystical type experience (Leary, 1970; Pahnke, 1967; Unger, 1963). These findings are congruent with what many indigenous cultures have asserted for millennia.

However, by the mid-1960s recreational psychedelic use burgeoned in the West, leading to the association of psychedelics with counterculture and antiwar sentiment (Dyck, 2008). These associations, combined with concerns about less-than-rigorous research practices, led to severe legal restrictions, which greatly limited further academic study (Grinspoon & Bakalar, 1979). Consequently, the full nature of both their potential risks and benefits remains unestablished.

Now, after nearly three decades of virtual moratorium on psychedelic research (Johnson, Richards, & Griffiths, 2008), restrictions are loosening, and researchers are returning to the question of what properties these drugs might hold in what has been called a "psychedelic renaissance" (Sessa, 2008). Contemporary studies show that psychedelics users consistently report lasting psychological and spiritual benefits from their use (Carhart-Harris & Nutt, 2010; Lerner & Lyvers, 2006; Lyvers & Meester, 2012; Morgan et al., 2009; Móró et al., 2011; Prepeliczay, 2002; Stasko, Rao, & Pilley, 2012). Importantly, these benefits are frequently associated with the profoundly awe-inspiring, self-transcendent experiences these substances can precipitate, in both experimental and naturalistic settings (e.g., Griffiths et al., 2006; Lyvers & Meester, 2012).

At the same time, there has been a continued growth of interest in the conceptualization and assessment of psychospiritual development in the field of positive adult developmental psychology, with various instruments having been created to measure these constructs (e.g., Levenson et al., 2005; Ryff & Singer, 2006; Wayment et al., 2015). Mounting theoretical and empirical evidence supports the assertion that the use of psychedelic drugs with spiritual, introspective, or personal growth (i.e., entheogenic or autognostic) intentions may be associated with these constructs. Importantly, it has also been argued that one must reflect upon, or *integrate*, a psychedelic experience to derive the largest, and longest lasting, benefits in one's life (Walsh, 2003).

However, despite the promise of these substances for the field of developmental psychology, there has been virtually no empirical research exploring this area. Therefore, this dissertation examines the role of psychedelic substances as developmental tools for enhancing the process of adult psychospiritual development.

Research Questions

In order to undertake this study, a number of questions were explored using validated self-report instruments in a broad assessment of both drug users and non-users drawn from various international, online communities. The research questions asked:

1) Are certain parameters of psychedelic drug use predictive of problematic drug use and psychological distress, while others predictive of psychospiritual development?
2) Is the use of psychedelics with autognostic intentions predictive of psychospiritual development? If so, does post-use integration moderate this relationship?
3) Is the use of psychedelic drugs with entheogenic or autognostic intentions predictive of self-transcendent experiences? Do these self-transcendent experiences predict psychospiritual development? If so, do self-transcendent experiences mediate the relationship between entheogenic/autognostic use and psychospiritual development?

Dissertation Outline

To begin, Chapter I provides an overview of psychoactive drug use and methods of regulation in society. This is followed by an examination of the attributes and applications of the classic psychedelics in Chapter II. Chapter III discusses the pertinent literature on psychospiritual development and the posited associations with psychedelic use. A theoretical overview of self-transcendent states as a mechanism of psychospiritual growth is outlined in Chapter IV. Chapter V presents a theoretical model of the risks of psychedelic use and developmental considerations for their safe application. The research methodology is presented in Chapter VI, followed by the data analysis in Chapter VII, and a discussion of the results in Chapter VII. Finally, the concluding chapter discusses clinical, social, religious, and legal implications of this study.

PART ONE

Chapter I: Towards a Positive Psychology of Psychoactive Drug Use

"[Drugs] are simply one powerful technology among many that modern society must learn to use and regulate wisely"

Bruce Alexander (2010, p. 382)

Before delving into a study of psychedelics as developmental tools for the promotion of self-transcendence and psychospiritual development, the so-called "elephant in the room" must first be addressed. Given their current illegality, and prevailing societal narratives concerning the harms of non-medical drug use in general, it is understandably contentious to suggest that careful psychedelic use may be not only non-harmful, but perhaps beneficial to the user. Accordingly, a brief overview of non-medical psychoactive drug use is first required to provide the necessary contextual grounding for a reasoned discussion of an often maligned and misunderstood human behaviour.

This chapter endeavours to broaden contemporary narratives of drug use by applying the field of positive psychology as an analog. That is, although the harms of drug abuse and addiction must be acknowledged and taken seriously, the potential benefits of judicious drug use need equally be studied to yield a comprehensive understanding of psychoactive substance use and its place in society. If we fear exploring the positive side of drug use, we both lose an opportunity for enhancing well-being and increase the dangers of problematic use (Peele, 1999).

Positive Psychology and Psychoactive Substance Use

Over the last decades of study there have been many advances in our understanding of the dangers associated with the reckless use of psychoactive substances.

Today, we have a rich understanding of drug abuse and dependence, as well as their harmful physical, psychological, and social sequelae. However, despite this burgeoning knowledge, there has been virtually no consideration of the other side of the issue—positive drug use (Askew, 2016; Müller & Schumann, 2011). As a result of this one-sided, pathological emphasis, societal perspectives on substance use have been distorted, which has served to propagate disastrous policies of drug prohibition, impede the development of rational drug laws and education, and facilitate the widespread stigmatization of those who use drugs (see O'Connor & Saunders, 1992; Osborne & Fogel, 2016). Accordingly, an expansion of contemporary perspectives on substance use is warranted to address these biases and further advance public health and safety (Nicholson, White, & Duncan, 1999).

In a similar way, the field of positive psychology, which studies the states, traits, and institutions that enable people to flourish, grew from an imbalance in psychology, which had historically focused on maladaptation and psychopathology (Seligman & Csikszentmihalyi, 2000). As a result, psychologists were limited to a truncated view of human functioning, which emphasized illness and neglected wellness. Although positive psychology fully acknowledges the existence of suffering and dysfunction, its aim is to study the other side of the coin—the ways in which people self-actualize and flourish—thereby addressing the full spectrum of human functioning (Gable & Haidt, 2005).

Conceptualizing and Regulating Psychoactive Drugs

Despite our long history of using psychoactive drugs (Merlin, 2003), human societies continue to struggle with conceptualizing and regulating their use—and by extension, the changes to consciousness they produce. This is to some extent

understandable, given that psychoactive drug use is a very complex phenomenon involving numerous substances and many psychosocial variables. At this time, most Western societies prohibit the great majority of psychoactive drugs, with alcohol and tobacco being two notable exceptions. Courtwright (2005) noted that "in both Western medicine and in Western popular culture, alcohol and tobacco effectively split off from other drugs, to the point that the ordinary understanding of the word 'drugs' came to exclude, rather than include, these substances" (p. 110). However, the conceptual and linguistic delimitation of alcohol and tobacco from illicit substances distorts societal perceptions about the relative harms of "drugs." Indeed, the Institute of Medicine (1996) argues that the delimitation of licit and illicit drugs obfuscates education, abuse prevention, and societal progress ([IOM], 1996).

For example, it is not widely known that the legal frameworks regulating psychoactive substances are not necessarily based upon empirical evidence of harm. Rather, Nutt, King, Saulsbury, and Blakemore (2007) have argued that many legal classification systems are built more upon social, historical, and political foundations rather than an assessment of risks or dangers (see also Nutt, King, & Nichols, 2013). Nutt et al., (2007) thus developed a system to empirically assess the harms of various psychoactive drugs based on criteria established by experts in the fields of psychiatry and addictions. Three factors were outlined, assessing the physical harm to the user, the tendency of the drug to induce dependence and addiction, and the effect of the drug on families, communities, and society. Using these criteria, the expert raters could find no tenable distinction between legal (i.e., alcohol, tobacco, etc.) and illegal (i.e., cannabis, LSD, etc.) classed drugs (Nutt et al., 2007). For example, alcohol and tobacco—the most

widely used legal drugs—were found to have harm ratings comparable with heroin and amphetamines, respectively. In contrast, other illegal drugs, such as LSD, MDMA, and cannabis, were found to be significantly less addictive, and pose significantly less harm to the individual or society, than alcohol or tobacco. Given these findings, Nutt et al. (2007) proposed that whether a drug is legal, or illegal is, from a perspective of harm, essentially arbitrary. The significant problems posed by alcohol and tobacco illustrate this puzzling reality.

With respect to physical harms, tobacco and alcohol account for approximately 90 percent of all drug-related deaths in the UK, with tobacco considered to be the most common cause of drug-related deaths (Nutt et al., 2007). Comparably, alcohol is associated with over 200 medical conditions, and is responsible for thousands of fatal overdoses every year (Nadelmann, 1997; Public Health Agency of Canada [PHAC], 2015). Regarding the development of dependence or addiction, tobacco is thought to be the most problematic commonly used drug (Nutt et al., 2007). Finally, alcohol abuse has a wide range of negative impacts on society and is considered the third highest risk factor involved in the overall global disease burden (Nutt et al., 2007; PHAC, 2015).

The Benefits of Judicious Drug Policy

However, despite these harms, it has been found to be ultimately *less* harmful to the individual and society to legalize and regulate these substances rather than to prohibit them. This is the case as, when alcohol is not legally regulated, there tends to be greater availability, greater use, and more alcohol related problems (PHAC, 2015). For example, with the inability to purchase regulated alcohol during the era of alcohol prohibition in the United States, there was a significant rise in fatalities on account of tainted ethanol

and methanol consumption (Miron & Zwiebel, 1991). It has been argued that by granting alcohol legal status, potential harms can be minimized through regulating the industry, implementing policies on pricing, mandating product standardization, controlling sales and availability, and introducing minimum age laws (PHAC, 2015). By doing so, the risks of alcohol use are reduced, and those who are motivated to use alcohol responsibly are able to safely do so.

Prohibition also perpetuates numerous personal, social, and economic harms (Csete et al., 2016; Miron & Zwiebel, 1995; Nutt, et al., 2013; Nutt et al., 2007; PHAC, 2015). Criminally controlled drug markets generate needless violence, while mandatory sentences for even minor, non-violent drug offences ruin millions of lives (Godlee & Hurley, 2016). Prohibition ends up encouraging indiscriminate consumption, as it negates the distinction between responsible and hazardous use (Harding & Zinberg, 1977; Merkur, 1998). And perhaps most importantly, despite massive economic and personnel costs, the "war on drugs" has simply failed to curb illegal drug use (Jensen, Gerber, & Mosher, 2004). In other words, not only does prohibition lead to widespread social, economic, and health costs, it simply does not work (Csete et al., 2016).

In light of the understanding that it is more harmful to prohibit drugs such as alcohol and tobacco than to legalize and regulate them, the question of whether this logic should extend to some or all illicit substances must be seriously considered (Tupper, 2008). Indeed, one of the central problems facing the establishment of rational drug policy is the fact that nonmedical drug use is increasingly recognized as culturally acceptable by citizens, but not by outdated laws (Roberts, 2012). If the aim of society is to foster public health and safety, then better approaches towards regulating currently

illegal substances should be viewed as an essential undertaking. Admittedly, this will take further research as psychoactive drug use is a very complex phenomenon entailing a variety of substances and numerous intra and interpersonal variables involved in consumption (Móró et al., 2011). However, modern societies have yet to develop legal regulatory frameworks for even those psychoactive drugs *already* established to be much less dangerous than alcohol and tobacco (Gable, 2006). One notable exception is Portugal, which decriminalized all psychoactive substances in 2001. Research conducted nearly a decade later found reductions in problem use, drug use amongst youth, drug-related harms, and crowding of the justice system (Hughes & Stevens, 2010).

The Positive Science of Psychoactive Drug Use

Although it may not be widely recognized, the reality is that if an individual is thoughtful, well-prepared, and aware of the means to minimize the risks, then drug use need not be harmful (Dalgarno & Shewan, 2005). Although the differences between alcohol use and abuse is widely acknowledged, the same nuance tends not to be extended to illicit substances; the terms drug "use" and "abuse" are typically used without distinction (Tupper, 2008). Askew (2016) argues that it is essential to conceptualize all drug use—both legal and illegal—on a spectrum.

According to the Institute of Medicine (1996), *controlled use* involves non-harmful utilization of an illicit or licit drug for nonmedical purposes and is not indicative of a substance use disorder. *Drug abuse* refers to harmful use leading to physical, social, legal, or interpersonal problems, regardless of whether the behaviour meets diagnostic criteria for a substance use disorder. Finally, *dependence* is characterized by compulsive drug seeking and use resulting in impairment and is typically accompanied by tolerance

and withdrawal symptoms upon discontinuation (IOM, 1996). With this distinction in mind, two points on the continuum clearly represent the pathological side of drug misuse—drug abuse and dependence. These forms of use are highly destructive and must be addressed. However, it is crucial to emphasize that the majority of drug users do so in a way that does not harm the individual or society (see Alexander, 2010). In fact, only a minority of drug users constitute either drug abuse or dependence. The vast majority of illicit drug users may be viewed as controlled or non-problematic (United Nations Office on Drugs and Crime [UNODC], 2015).

An Expanded Spectrum of Psychoactive Drug Use

However, there is a growing body of literature suggesting that certain types of drug use may not only be controlled/non-problematic, but even beneficial to the user (e.g., Krebs & Johansen, 2013; Hendricks et al., 2014, 2015; Walsh et al., 2016). In light of these and other findings, the Government of British Columbia (2010) has proposed that the spectrum of drug use be expanded to encompass: *beneficial use* (use having positive health, spiritual, and/or social impacts); *non-problematic use* (recreational, casual, or other use that has negligible health or social effects); *problematic use* (use that begins to have negative health impacts for individuals, family/friends, or society); and *chronic dependence* (use that has become habitual and compulsive despite negative health and social effects). Beneficial drug use thus goes beyond non-problematic use in that it has a demonstrable, positive impact on the user. This drug usage is thus completely opposite from the stereotypical portrayal of drug use as inherently destructive.

Contentious though it may be evidence for positive/beneficial use can be seen with a number of different substances. For example, a comprehensive review conducted

by Peele and Brodsky (2000) outlined a range of beneficial health and social outcomes associated with moderate alcohol consumption. To a greater degree than either abstainers or heavy drinkers, low to moderate alcohol users have been found to have greater psychological, physical, and social well-being; lower stress; lower rates of psychopathology; enhanced sociability and social participation; and less work absence or disability. Peele (1999) noted that heavy drinking worsens psychological and physical health, thus suggesting a negative quadratic relationship between alcohol use and health outcomes.

Like alcohol, numerous studies report a number of health and social benefits associated with judicious cannabis use, including enhanced mood and relaxation, greater appreciation of music, enhanced insight and personal growth, enhanced sensory perception, enhanced concentration, greater creativity, enhanced sexual pleasure, and enhanced socializing (Berke & Hernton, 1974; Chatwin & Porteous, 2013; Green, Kavanagh, & Young, 2003). Users report that cannabis can be used as a tool for reflecting on the world and one's place in it, and to foster experiences of flow (see Hathaway, 1997; Hathaway & Sharpley, 2010).

Clifford et al. (1991) also found a negative quadratic relationship between the use of various drugs (cigarettes, alcohol, cocaine, marijuana, tranquilizers, and amphetamines) and life satisfaction. Their findings indicated that small amounts of drug use may serve to enhance one's life, while both complete abstinence and chronic use may undermine it. Clifford et al. (1991) argued that, "If in fact the greatest degree of self-reported life satisfaction is correlated with low to moderate usage of some drugs, as was indicated by the results obtained from the present investigation, then it would appear

counterproductive to insist that all persons be abstinent." (p. 52). They further contend that a more effective approach to preventing drug misuse and abuse would be to simultaneously focus on the reduction of problematic drug-taking behaviors and encourage the development of responsible drug-use behaviors (Clifford et al., 1991).

Consequently, the "abstinence-only" agenda perpetuated by drug prohibition is not only ineffective at curbing usage, but potentially impeding wellness. Numerous governments have now acknowledged that the war on drugs has caused more harm than good and are calling for the development of more effective strategies for managing drug use (Osborne & Fogel, 2016). Although some authorities have espoused harm reduction policies—which generally aim to reduce the individual and societal harms associated with drug use while allowing usage to continue (Hathaway, 2015; Pryce, 2012)—this approach is entirely remedial and pathologically oriented. Although harm reduction is essential, such policies could be augmented with an understanding of beneficial patterns.

Biopsychosocial Considerations for a Positive Science of Drug Use

Contemporary public health practice is rooted in an understanding of the multifactorial complexity of the determinants of health, including biological, psychological, sociological, and existential dimensions. In much the same way, for a comprehensive science of drug use one must consider the pharmacological profile of a given drug, the intentions one holds for use, and the social context of use (Godlee & Hurley, 2016; Müller & Schumann, 2011).

Biological Parameters Informing Positive Drug Use

The reality is that not all drugs are comparably safe or likely to be salubrious. Drugs vary tremendously in terms of toxicity, tendency to induce dependence, and effects

on cognition (see Gable, 2004; Nutt et al., 2007). If society aims to be evidence-based, particularly in ways that maximize health and safety, then regulatory parameters would ideally be set for each class of drug. Although various drug categories may have positive potential, this dissertation highlights the *classic psychedelics*, as their pharmacological profile renders them amongst the most promising substances lending themselves to positive, nonmedical use. We will explore the classic psychedelics at length in Chapter II.

However, reductionist models that focus only on pharmacology are insufficient to predict the outcomes of substance use (Dalgarno & Shewan, 2005). Accordingly, a better understanding of psychological and social factors associated with beneficial drug use is also required to foster positive outcomes and limit abuse or addiction (Müller & Schumann, 2011).

Psychological Parameters Informing Positive Substance Use

Most would acknowledge that there is a difference between binge drinking to "get drunk," moderate "social" consumption with friends, drinking to "fit in" with a group, religious use, and using alcohol to cope with negative emotions. And in fact, understanding one's psychological intentions for using a substance—which is included as part of "set" (Leary et al., 1963)—can provide great insight into the potential harms or benefits of drug use. Use intentions are believed to be a final, common pathway to either controlled use or abuse (Cox & Klinger, 1988). For example, Cooper (1994) delineated four central intentions for using alcohol: enhancement, coping, conformity, and socialization. Importantly, these intentions largely predict the consequences of use; individuals who use alcohol for coping report more negative consequences (e.g., greater

frequency of use, more problems related to use, dependence) than individuals who report other motives (e.g., Cooper, 1994; Cooper, et al., 1988, 1995; Neighbors et al., 2007).

As with alcohol, motivations and outcomes of those who use illicit drugs show considerable variability, even amongst those with similar sociodemographic characteristics (Harding & Zinberg, 1977; Móró et al., 2011; Simons et al., 1998, 2000). Similarly, one's intention for using a substance is a central factor shaping the nature of a drug experience, and by extension, the outcomes of such an experience (Dalgarno & Shewan, 2005; Móró et al., 2011; Zinberg, 1984). For example, although an individual who takes a psychedelic drug with a spiritual or entheogenic intention may have a transformative, spiritual experience, someone who takes a psychedelic simply to "get high" often will not (Goode, 1972). As a result, a better understanding of drug use intentions will be critical for guiding the assessment of positive drug use and informing effective interventions for those who are struggling with abuse (Milner, 2015).

Social Parameters Informing Positive Substance Use

Understanding the social parameters of drug use—of which "setting" (Leary et al., 1963) may be considered one element—is required for a comprehensive view of drug use and abuse. According to Harding and Zinberg (1977), the availability of positive social contexts and rituals for legal substances grant significant advantages which prohibition does not. As a legal drug, alcohol use is normalized as an acceptable behaviour, and is thus open to public scrutiny. Socially accepted contexts grant users the frameworks to safely use alcohol while simultaneously discouraging harmful use. Importantly, this knowledge is freely available and transmitted through the prevailing culture. Due to social acceptability, problematic users are more likely to seek assistance

without being criminalized. Finally, production and sale are subject to regulation, which informs dosage and limits dangerous use (Zinberg, Jacobson, & Harding, 1975).

Although there are currently no socially sanctioned contexts or rituals available for the use of illicit substances in contemporary Western society, Zinberg (1984) noted that there are nonetheless many controlled users of these drugs. That is, users who maintain regular, non-compulsive use without sustaining physical, psychological, or social impairments. In fact, even relatively frequent drug use can be accommodated into a healthy and functional lifestyle (Askew, 2016). Controlled, illicit drug users differ from "normal" individuals only by virtue of their decision to use an illegal product (Harding & Zinberg, 1977).

As with alcohol, the controlled use of illicit drugs is informed by the rituals and social contexts established by a given drug's particular subculture (Zinberg, 1984). They provide knowledge that is unavailable in mainstream culture—instruction on proper utilization and moderation, and the frameworks for maintaining controlled use. However, because of their unsanctioned nature, individuals must rely on chance association with other controlled users in order to acquire this information. Unfortunately, mainstream culture not only fails to provide the knowledge, rituals, and contexts for controlled use, it actively discriminates against it (Zinberg et al., 1975).

Drug Prohibition and Repression of the Non-Rational

Given that humans have been using psychoactive drugs for thousands of years, it is highly unlikely that their usage will cease anytime soon (Gable, 2006; Merlin, 2003). The fact that individuals will continue to use drugs regardless of their legal status means that prohibition merely dampens society's capacity to inform responsible use (Harding &

Zinberg, 1977). Although current laws intend to protect individuals, they end up promoting indiscriminate consumption as prohibition eliminates consensual distinctions between responsible and dangerous drug use (Merkur, 1998). Consequently, prohibition ends up encouraging unsafe use and harms those who need help (Csete et al., 2016; Godlee & Hurley, 2016; Jensen, Gerber, & Mosher, 2004; Zinberg, 1984).

Nonetheless, the point is not that everyone should use psychoactive substances, but that those who find themselves interested should be afforded both the prerequisite knowledge, guidelines, and liberty to do so (Leary, Metzner, & Alpert, 2007). Unlike many traditional cultures that have established frameworks to inform safe usage, contemporary Western society has failed to develop such guidelines. In a culture so inundated with prescription drugs, alcohol, and tobacco, this is rather perplexing. Only those psychoactive substances bestowed with legal status are said to hold any benefits for health or well-being (Hathaway & Sharpley 2010). While there are socio-political and historical reasons for the current prohibitionist policies (Dyck, 2008; Grinspoon & Bakalar, 1979; Nutt et al., 2013), an important factor may lie in Western cultural attitudes towards non-ordinary states of consciousness (Stolaroff, 2004).

Although most traditional societies have held non-ordinary states in high regard, having devoted much thought to creating safe contexts for inducing them, contemporary Western culture has pathologized, suppressed, and outlawed the means of achieving them (Stolaroff, 2004). Indeed, non-ordinary states are often simply pathologized (Hathaway & Sharpley 2010). Why might this be? Carl Jung (1935/2014) argued that the modern, Western psyche is strained by an overvaluation of rational, waking consciousness, and suggested that this state of imbalance is now being reflected in our distorted and

mechanistic perspectives towards life. Similarly, Carl Rogers (1980) believed that Western culture over values rational, waking consciousness and undervalues the wisdom of the total psyche, thus preventing us from living as unified, whole beings. Pahnke and Richards (1966), too, noted that non-ordinary states are highly undervalued in Western culture, with its focus on rationality, manipulation and control of nature. Albert Hofmann (2012), the Swiss chemist who discovered LSD, similarly contended that Western culture had a one-sided, rational worldview, and believed in the importance of psychedelic states for humanity's reconnection with each other and with nature. Given that various psychoactive substances—and most notably the psychedelics—can evoke the unconscious, (Osmond, 1957; Carhart-Harris et al., 2014), prohibition may at least in part speak to Western culture's repression of the non-rational psyche (cf. Freud, 1930)

Conclusion

Given the failings and high social costs of prohibition, the question of how to conceptualize and regulate the ancient practice of drug use must be addressed. Although positive use should, in principle, apply to any drug (Dalgarno & Shewan, 2005), there is nonetheless too much variability in the pharmacological and phenomenological attributes of psychoactive substances to set broad-stroke regulations. If we aim to be scientific, in particular in such a way that maximizes human well-being, then parameters *should* be set for each individual class of compound.

Due to their long history of use, implicated therapeutic and spiritual import, and unique set of pharmacological and phenomenological characteristics, this dissertation focuses on the classic psychedelics, such as lysergic acid diethylamide, mescaline, and psilocybin. However, as Masters and Houston (1966) pointed out more than 50 years ago,

to be optimistic about psychedelics is one thing; to be messianic is another. Psychedelics are powerful compounds holding very real dangers, and indiscriminate use should not be encouraged. Thus, a greater understanding of the psychedelic drugs, and the contexts of use amongst problematic and beneficial users, may help inform these regulatory frameworks.

Chapter II: Psychedelics

"It does not seem to be an exaggeration to say that psychedelics, used responsibly and with proper caution, would be for psychiatry what the microscope is for biology and medicine or the telescope is for astronomy. These tools make it possible to study important processes that under normal circumstances are not available for direct observation."

Stanislav Grof (1994, p. 12)

The term *psychedelic* derives from the Greek roots psyche (mind or soul) and delos (clear, visible, brought to light), and was first coined by Humphry Osmond in the Canadian province of Saskatchewan during his correspondence with Aldous Huxley in 1956 (Dyck, 2008; Grinspoon & Bakalar, 1979). Psychedelic is usually interpreted to mean mind manifesting or mind revealing and is thought to entail the experience of encountering unconscious depths of the mind (Osmond, 1957). As such, the term psychedelic is not exclusively confined to the use of drugs (Gowan, 1975). Rather, the human mind can attain psychedelic states of consciousness by various means, including fasting, isolation, sensory deprivation, fever, hypnotic trance, repetitive chanting, prolonged wakefulness, hyperventilation, and meditation. However, as with many non-ordinary states, psychoactive drugs are typically the easiest, most reliable, and often safest means to induce a psychedelic state (Grinspoon & Bakalar, 1979).

Classic Psychedelics

The number of drugs that can be considered to hold psychedelic properties is very large and includes a range of substances with varying pharmacological profiles. Many of these drugs occur naturally and are found in plants and animals, while others

have been synthesized artificially. However, the *classic psychedelics* are widely considered to be the prototypical psychedelic compounds (Nichols, 2004, 2016). The classic psychedelics are divided into two main classes: indoleamines (including ergotamines and tryptamines) and phenylalkylamines (including phenethylamines and phenylisopropylamines) (Halberstadt, 2015). Characteristic members of each type include: psilocybin (a tryptamine found in several mushroom species); lysergic acid diethylamide or LSD (an ergotamine originally derived from ergot); mescaline (a phenethylamine found in peyote and other cacti); and 2,5-dimethoxy-4-bromoamphetamine (a synthetic phenylisopropylamine) (Halberstadt, 2015).

A distinguishing feature of the classic psychedelics is that their primary phenomenological effects are exerted via their action as agonists on the serotonin (5-HT) 2A receptor (Halberstadt, 2015; Nichol, 2016; Vollenweider & Kometer, 2010). Thus, the classic psychedelics are sometimes also referred to as *serotonergic psychedelics*. As will be discussed in this dissertation, this is of particular relevance, as research suggests that the serotonergic system is implicated in the mediation of spiritual experiences. For example, Goodman (2002) proposed that mystical experiences share common neural mechanisms related to the serotonergic system, while Borg and colleagues (2003) found a positive correlation between serotonin receptor binding potential and a measure of spirituality.

Certain phenethylamines are sometimes known as *entactogens* or *empathogens,* and include drugs such as methylenedioxymethamphetamine (MDMA), amongst others (Nichols, 1986; 2004). Although MDMA is chemically related to mescaline, its pharmacological properties are less “psychedelic” and more “amphetamine,” and it is

thus not typically considered a classic psychedelic (see Nichols, 2016). Similarly, Salvinorin A, which is derived from Salvia divinorum, is also sometimes labelled a psychedelic due to its powerful effects on consciousness. However, it is a specific, high-affinity κ-opioid agonist (Roth et al., 2002), as opposed to a serotonin agonist, and is thus not typically considered a classic psychedelic.

Cannabis, and its principal psychoactive compound tetrahydrocannabinol (THC), is sometimes considered a "minor" psychedelic. It has received this label due to the findings that, at very high doses, its effects share some resemblance with the classic psychedelics, and it has been used for spiritual and therapeutic purposes by various cultures (Grinspoon & Bakalar, 1979; Tart, 1971). However, unlike the classic psychedelics, cannabis does not appear to function primarily via the serotonergic system; instead, it acts principally via the endocannabinoid system (Marzo & Petrocellis, 2006). Because of this, cannabis is not typically considered a classic psychedelic.

For the remainder of this study, unless explicitly stated otherwise, the use of the generic term psychedelic will refer to the classic, serotonergic psychedelics.

A Note on Terminology

While many researchers feel that the label psychedelic is the most appropriate descriptor for classic substances such as LSD, psilocybin, and mescaline, other terms have been proposed, including: psychotomimetic, hallucinogen, psycholytic (mind-loosening), psychodysleptic (mind-disrupting), phantasticant, and entheogen (Grinspoon & Bakalar, 1979; Ruck et al., 1979).

The term *psychotomimetic*, meaning psychosis-mimicking, was an early term used by researchers who believed that these drugs induced psychotic episodes similar to

that of schizophrenia and related disorders (Grinspoon & Bakalar, 1979). However, psychotomimetic is typically thought to be misleading, as the effects of these drugs are not directly analogous to psychosis (Grinspoon & Bakalar, 1979). In fact, a group of patients with schizophrenia given the psychedelic drug LSD uniformly agreed that the psychedelic state and the state of acute psychosis were dissimilar (Turner, Almudevar, & Merlis, 1959).

Another widely used term, *hallucinogen,* has also been deemed inaccurate, as individuals typically do not describe their psychedelic experiences as hallucinatory in the literal sense. When given a list of 18 descriptors and asked to arrange them in order of accuracy to characterize their experience with LSD, research participants rated the word hallucination as the *least* accurate (Ditman & Bailey, 1967). Classic psychedelics rarely produce sensory experiences that have no basis in reality. Instead, they may produce distortions of sensory input that is actually present. For example, seeing actual lights spreading out or trailing behind the source, or seeing flat surfaces such as walls or floors seeming to oscillate (Goldsmith, 2011).

These drugs have also been referred to as *entheogens*, from the Greek roots *entheos* (god within) and *gen* (becoming), to denote the spiritual or religious nature of experiences often precipitated by these substances (Ruck et al., 1979). Although entheogen is often an appropriate descriptor, these drugs do not *always* precipitate spiritual or religious experiences. Instead, as noted earlier, the word entheogen perhaps more accurately reflects a deliberate, sacramental or spiritual usage of any number of psychoactive drugs, including, but not limited to, those typically deemed psychedelic. In other words, although psychedelics may be, and often are, used *as* entheogens, they may

also be used for other purposes. Because of this, the term entheogen is perhaps better used as an adjective or adverb to describe an approach to drug use, rather than as a noun to describe a drug itself. Although the term psychedelic may have come to bear some negative connotations due to the various excesses of the 1960s, this should not detract from its use. Psychedelic remains perhaps the most appropriate descriptor for these substances.

Psychological Effects of the Classic Psychedelics

The classic psychedelics, like other psychoactive drugs, induce a temporary, non-ordinary state of consciousness (Tart, 1975). These drugs may be thought of acting as a chemical key or psychological amplifier of the inner depths of the mind (Leary, Metzner, & Alpert, 2007). The description offered by Jaffe (1990) is particularly illuminating, "…the feature that distinguishes the psychedelic agents from other classes of drug is their capacity reliably to induce states of altered perception, thought, and feeling that are not experienced otherwise except in dreams or at times of religious exaltation." Consequently, there is no single "psychedelic experience." Instead, there are a range of psychedelic experiences varying in depth and intensity as the boundary between conscious and unconscious layers of the mind become more permeable (Gowan, 1975; Master & Houston, 1966; Richards, 2016).

In such a way, the psychedelic state is thought to involve a deautomatization of schematic filtering of experience, and regression towards a primordial state of consciousness (Prepeliczay, 2002). Carhart-Harris et al. (2014), building on current advances in neuroscience, assert that in this state the conceptual sense of self (or ego) weakens or dissolves entirely, and suggest that this is mediated via reduced activity in

neural regions comprising the default-mode network. They propose that the psychodynamic "unconscious" can be understood as the system underlying a specific mode of cognition—namely, primary cognition (Carhart-Harris & Frison, 2010).

Because psychedelic compounds induct the user into an altered state of consciousness characterized by a greater preponderance of normally unconscious imagery, memories, and affect, the effects of psychedelics are heavily dependent on non-pharmacological factors (Nichols, 2004). In such a way, the phenomenological content of the experience itself depends almost entirely on the set and setting of the user. *Set* includes such factors as the intention, personality, intelligence, and the emotional state of the individual (Grinspoon & Bakalar, 1979). *Setting* includes the physical, such as the weather and the physical surroundings; the social, such as the other individuals present; and the cultural, such as the consensual views of what constitutes reality (Leary, Metzner, & Alpert, 2007).

However, although knowing that someone has taken a psychedelic tells you little about the explicit content of the experience itself (Grinspoon & Bakalar, 1979), the broad types of phenomenological changes that may occur include, but are not limited to: changes in sensory perception and body awareness; changes in the rate and content of thought; changes in mood and affect; increased impressionability; enhanced concentration and memory; regression to primordial/primary process cognition; upsurges of repressed material; enhanced awareness of linguistic nuances and categorizations; feelings of emotional closeness and empathy; enhanced self-awareness and insight; greater concern with existential, philosophical, and religious questions; changes in the

experience of time and space; feelings of ego dissolution; and mystical experiences of unity (Grinspoon & Bakalar, 1979).

Masters and Houston (1966) organized the varieties of psychedelic experiences into four levels based on depth: sensory, recollective-analytic, symbolic, and integral. While not identical to the cartography laid out by Masters and Houston, Stanislav Grof (1994, 2009) has similarly identified four depths of the psychedelic experience: the aesthetic, psychodynamic, perinatal, and transpersonal.

The sensory/aesthetic level includes changes in perception of sensory stimuli, such as sounds, sight, smells, tastes, and touch, as well as closed eye visual imagery (Masters & Houston, 1966). This is the most common and accessible level of psychedelic experience. Colours appear more intense, textures richer, contours sharpened, music more emotionally moving. Other effects include heightened awareness or changes in the appearance and feeling of body parts, vibrations in the field of vision, and greater depth perception. Perceptually, normally unnoticed aspects of the environment capture attention, and people and objects take on a wondrous, fascinating quality, as if seen for the first time (Grinspoon & Bakalar, 1979).

Under certain conditions, doses, or intentions, an individual may experience the recollective-analytical/psychodynamic level (Masters & Houston, 1966). Here, deep self-insight, recovery of forgotten memories, and the awareness of intense emotions are often experienced. Unconscious thoughts and emotions become conscious, so that multiple incompatible feelings and perspectives may be experienced simultaneously. Forgotten memories are often released, leading to sometimes painful self-reflection and insights into oneself, humankind, or existence (Grinspoon & Bakalar, 1979).

At the symbolic/perinatal level, one may experience and live out archetypal motifs described in myths and fairy tales (Masters & Houston, 1966). The individual may feel as if in a waking dream, or as though they are in an archetypal drama. Actions, persons, and the environment itself may take on metaphorical significance and the character of symbols, myths, and allegories (Grinspoon & Bakalar, 1979).

At the deepest, or integral/transpersonal level, the boundary between self and environment may begin to fade, resulting in feelings of oneness with other people, objects, or the universe as a whole (Grinspoon & Bakalar, 1979). Time may seem to slow down or stop entirely, giving rise to the sense of an eternal present. Individuals sometimes experience a mystical state of unity where all contradictions are reconciled. This feeling of unity typically entails dissolution of the ego, which can be a terrifying experience, even for the prepared and willing (Leary, Metzner, & Alpert, 2007). The experience of ego dissolution may be experienced symbolically as a death and rebirth entailing overwhelming feelings of anguish and joy. Individuals typically find that only religious terminology can approximate what is experienced in these intense confrontations with something felt to be eternal, infinite, or sacred (Masters & Houston, 1966).

Safety Profile of the Classic Psychedelics

Potential risks come with the use of all drugs, from caffeine to LSD. While judicious regulatory policy can mitigate these risks, this relies on honest scientific assessment. Returning to Nutt et al.'s (2007) classification system demarking physical harm to the user, the tendency to induce dependence/addiction, and the effect of the drug's use on society, the classic psychedelics have been found to be significantly less

harmful than either alcohol or tobacco (Nutt et al., 2007). In fact, Nutt et al. (2007) noted that the discrepancy between a drug's potential for harm and its legal classification was especially discordant for the classic psychedelics. Similar research in which psychiatric, public health, and addictions experts were asked to rate the harms of numerous drugs (Nutt et al., 2010; Van Amsterdam et al., 2010) also concluded that the classic psychedelics were the *least* harmful of the numerous substances assessed.

Furthermore, Gable (2004) outlined the safety index of multiple drugs, which is the ratio of the lethal dose of a drug divided by the effective dose of that drug. This ratio indicates that the higher the safety index, the safer the drug. Gable (2004) reported the safety index of alcohol to be approximately 10, while, for comparison, the safety index of fluoxetine (Prozac) was rated at approximately 100. In comparison, very conservative estimates of the safety indices for LSD and psilocybin were established at approximately 1000, though Gable (2004) noted they are likely upwards of 10,000.

In fact, there is no evidence for physical harm or lasting physiological effects resulting from LSD, and there are no documented human deaths from an LSD overdose (Passie et al., 2008). In one study of particular note, eight individuals accidentally consumed an immense dose of LSD intranasally (mistaking it for cocaine) and had gastric content levels of 1000–7000 μg *per* 100 mL. They all survived with supportive treatment without residual effects (Klock et al., 1974). This is particularly exceptional, as a dose of 100-300 μg can precipitate profound psychedelic effects (Pahnke, 1967).

Similarly, toxicological and clinical studies of psilocybin suggest that it too has very low toxicity (Nichols, 2004; Passie et al., 2002). During the long history of psilocybin use in the form of mushrooms there has been only one alleged toxic fatality

after ingestion of an extremely high dose (Tylš, Páleníček, & Horáček, 2014). This death is particularly remarkable, and perhaps dubious, in that one would have to eat approximately 19g of *pure* psilocybin or consume their body weight in fresh psilocybin containing mushrooms for it to be fatal (Tylš, et al., 2014). In comparison with LSD and psilocybin, thousands of people die every year from alcohol overdoses (Nadelmann, 1997; PHAC, 2015).

With regards to addictive properties, the National Institute on Drug Abuse (2020) does not consider the classic psychedelics to be addictive as they do not produce compulsive drug-seeking behavior, do not maintain reliable self-administration in laboratory animals, and most users decrease or stop their use over time (Fantegrossi et al., 2004; National Institute on Drug Abuse, 2020). The addictive nature of a psychoactive drug is believed to be mediated via its ability to increase the firing of ventral tegmental area (VTA) dopamine neurons which project to the nucleus accumbens (NAc), increasing dopamine release in the NAc (see Canal & Murnane, 2017). However, nearly all classic psychedelics lack direct dopaminergic pathways that would compel users to continue using these substances (Nichols, 2004). Moreover, converging research indicates that serotonin opposes the effects of dopamine and thus attenuates the addictive potential of a given psychoactive drug. Specifically, Canal and Murnane (2017) have argued that the activation of 5-HT2C receptors by classic psychedelics mediates their anti-addictive properties.

Considering the DSM-5 criteria for a diagnosis of a substance-use disorder (American Psychiatric Association, 2013), addictive drugs can be viewed as those that induce cravings or an impulse to re-dose (see Canal & Murnane, 2017). However,

psychedelic users widely report that these drugs do not produce drug cravings. Moreover, although tolerance to most classic psychedelics is evident with repeated exposure, withdrawal symptoms are generally non-existent, further distinguishing classic psychedelics from typical drugs of abuse (Canal & Murnane, 2017). Ultimately, it has been argued that the classic psychedelics have virtually no potential to cause addiction (Tylš et al., 2014).

Finally, with regards to social harms, the effects of classic psychedelics on public health and public order are believed to be extremely small, as there is minimal criminality related to the use, production, and trafficking of these drugs (Van Amsterdam, Opperhuizen, & Van den Brink, 2011). The classic psychedelics are not regarded to elicit violence (Hoaken & Stewart, 2003), and dangerous behavior leading to suicide or accidental death is extremely rare (European Monitoring Centre for Drugs and Drug Addiction, 2012).

However, despite the overall safety of the classic psychedelics, this is not to say that their use should be encouraged or approached haphazardly. While they may be considered physiologically safe and non-addictive, these drugs have very powerful psychological effects, and their greatest dangers are likewise psychological. Psychedelic experiences can elicit extremely strong feelings of anxiety, fear, panic, paranoia, and confusion (Johnson et al., 2008; McWilliams & Tuttle, 1973), and infrequently these effects may last for a few days after use.

Masters and Houston (1966) pointed out that almost any person taking a psychedelic may experience, under problematic conditions, a transient psychotic-like state. However, they also noted that veridical psychoses rarely (if ever) occur in normal

individuals, particularly under therapeutic conditions. One of the central debates surrounding psychedelics is whether use may *cause* a prolonged psychotic disorder or, conversely, may *precipitate* a psychotic disorder in an individual with pre-existing vulnerabilities. Although more research is needed, findings suggest that psychedelics do not produce psychoses in otherwise healthy individuals but may precipitate these problems in predisposed individuals (Nichols, 2004; Vardy & Kay, 1983).

However, the relationship between psychosis and psychedelics is further complicated in that early research suggested the psychedelics might hold promise for the *treatment* of psychotic disorders (Bender, Cobrinik, Faretra, & Sankar, 1966; Cholden, Kurl, & Savage 1955; Fisher, 1970; Rhead, 1978). Whatever the case, there is certainly an urgent need for more systematic research on the link between psychosis and psychedelic use. Given the state of ambiguity in the literature, use of psychedelics by those who have a psychotic disorder or are at risk of developing one may be considered their primary contraindication (Cohen, 1985; Johnson et al., 2008).

Despite the potential risks, tens of millions of doses of classic psychedelics have been consumed over the last 40 years, and well documented reports of lasting psychiatric complications are exceedingly rare (Strassman, 1984). Studies consistently fail to find a relationship between psychedelic use and lasting mental health problems (Griffiths et al., 2006, 2008, 2011; McWilliams & Tuttle, 1973; Studerus, et al., 2011). For example, Johansen (2013) found that psychedelics use is not associated with visual hallucinations, panic attacks, psychosis, or hallucinogen persisting perceptual disorder (flashbacks). Likewise, recent trials with psilocybin do not report any cases of flashbacks or persistent visual phenomena (Griffiths et al., 2006, 2008, 2011; Studerus et al., 2011), and

interviews with over 500 regular participants in Native American peyote ceremonies have not identified any participants with these symptoms (Halpern et al., 2005).

Consequently, one of the most significant harms associated with psychedelics may be attributed to their illegal status (Nutt et al., 2013). By choosing to procure these substances, one faces the risk of incurring a criminal record and losing their liberty within society. In addition, by keeping a drug illegal one loses the ability to make informed decisions about dosing and substance purity (Zinberg, 1984). One cannot be sure that a purchased substance is in fact LSD and not some other more dangerous chemical.

The Contexts of Controlled Psychedelic Use

Many individuals using psychedelic drugs utilize rituals and social contexts demarcating safe and responsible use which have been developed within the broader psychedelic subculture. For these intentional and controlled psychedelic users, use is typically a well-planned, drug-centered, group activity (Harding & Zinberg, 1977). Use with others, such as a guide to help cope with a "bad trip" or any unforeseen event, is often seen as essential for the safest possible use. Deliberate group planning further establishes the importance of intention and enhances the capacity of the users to anticipate the consequences of the drug experience (though not the content of the experience itself) (Zinberg, 1984). For controlled users, psychedelic use is approached as a challenging encounter that should be confined to a secure setting and approached with an appropriate psychological or spiritual intention.

Conversely, problematic psychedelic users often do not intentionally seek mind expansion or personal growth (Harding & Zinberg, 1977). For problematic psychedelic users, it is the stimulating or merely novel effects of the drug experience that are sought.

Because of this, problematic users may seek increasingly frequent and larger doses. In contrast, controlled users suggest that use should not occur more than once every two weeks, though reported usage rates are even less frequent, with the most common pattern of controlled use being less than once per month (Zinberg et al., 1975).

History and Application of the Classic Psychedelics

Throughout the 1950s and early 1960s psychedelic drugs such as LSD and mescaline were relatively freely available to researchers and clinicians in Europe and North America, and initial studies reported promising findings (Grinspoon & Bakalar, 1979). A substantial portion of this early research was conducted in Weyburn, Saskatchewan by the British psychiatrist, Dr. Humphrey Osmond (along with Dr. Abram Hoffer, Dr. Duncan Blewett, Dr. Neil Agnew, and others) (Dyck, 2008). Osmond, like numerous others, was attracted to Saskatchewan by the post-war, socially progressive, Co-operative Commonwealth Federation (CCF) government led by Tommy Douglas. The innovative research climate fostered by the CCF made 1950s Saskatchewan an attractive destination for those interested in exploring new ideas and led to a culture of scientific freedom and autonomy (Dyck, 2008).

Around this time, one of the most infamous names associated with psychedelics would come to notoriety. Despite Timothy Leary's successful career as an academic psychologist, which culminated in a professorship at Harvard in 1958, he was long known to be an unconventional individual (Grinspoon & Bakalar, 1979). Leary first took psilocybin containing mushrooms in Mexico during the summer of 1960 and began studying it later that year. With his colleague Richard Alpert he conducted a series of experiments with psilocybin (and later LSD), which included taking these substances

himself, as well as giving them to colleagues, friends, graduate students, and others. Regrettably, Leary soon abandoned experimental rigor, detachment, and objectivity in favour of informal, seminar like gatherings. This gained him the attention of the Harvard authorities as well as the Massachusetts Food and Drug Division, leading to his dismissal from Harvard in 1963 (see Grinspoon & Bakalar, 1979).

Unfortunately, due to the widely publicized nature of Leary's (and others') lax scientific methodologies and questionable research ethics, concerns about psychedelic substances began to grow (see Novak, 1997). Furthermore, by the mid-1960s recreational psychedelic use had burgeoned, leading to their association with the growing counterculture movement and anti-war sentiment. Taken together, these factors culminated in the eventual implementation of harsh legal restrictions, which greatly curtailed further study (Dyck, 2008).

More nefariously, the United States military and CIA investigated the properties of psychedelic drugs in highly covert and unethical experiments as agents of warfare (Dyck, 2008; Grinspoon & Bakalar 1979). For example, tests with LSD were conducted on prisoners and military personnel to assess its potential as a "truth serum" for interrogating spies. Regrettably, elements of this research were conducted at Allan Memorial Hospital in Montreal under the supervision of Dr. Ewen Cameron (Collins, 1988; Dyck, 2008). Cameron, who was a respected psychiatrist and former president of both the Canadian and American Psychiatric Associations, received CIA funding as part of the infamous Project MK-ULTRA, a research program investigating various means to control human behavior. Cameron undertook research with various drugs, extensive

electro-shock therapy, sensory deprivation, and chemically induced sleep and coma on patients without their knowledge or consent (Collins, 1988).

On account of the abuses of psychedelic drugs by ostensibly responsible researchers and government agencies, it is unsurprising that psychedelic drugs have a tarnished history. While shameful to acknowledge, this period of research sheds light on contemporary, societal fears of these drugs (Dyck, 2008). However, highlighting both the beneficent and malevolent ends to which these drugs may be applied illustrates that they are merely chemical agents. Like all tools, their properties can be used for good or for ill. The intentions, motivations, and systems of values guiding their use ultimately determine the outcomes. When used with beneficent intentions, early clinical and experimental research strongly indicated that psychedelics held therapeutic properties (Grinspoon & Bakalar, 1979). Hundreds of therapists across the world reported the elimination of psychological problems that had resisted months or years of non-drug therapy with a few psychedelic-assisted psychotherapy sessions (Master & Houston, 1966).

Psychedelic-Assisted Psychotherapy

There are often considered to be two major therapeutic approaches to the use of psychedelics: *psycholytic* and *psychedelic* (Grinspoon & Bakalar, 1979). Psycholytic therapy is usually conceptualized from a psychodynamic perspective, aiming for the enhanced release of unconscious material over the course of psychotherapy. Conversely, psychedelic therapy is usually brief and aimed to induce a transformative spiritual experience in one, or a few, high dose therapy sessions. In both types, psychedelics are thought to augment the therapeutic process by increasing the permeability of mind and

thereby enhancing access to unconscious aspects of awareness (Gowan, 1975; Merkur, 1998).

A combination of these approaches has come to be known as *psychedelytic*, integrating the transformational spiritual experiences of high dose psychedelic sessions and the slower processing of psychodynamic material in low-dose psycholytic sessions. Ultimately, regardless of the approach used, the primary therapeutic effects of psychedelic drugs is not considered to be a direct function of altering biochemical processes (Grinspoon & Bakalar, 1979). Instead, psychedelics are used to facilitate change by inducing a state of consciousness which catalyzes the therapeutic process (Metzner, 1998). In contrast to most psychiatric medications, which are often meant to be taken daily, the psychedelics are intended to be used once or in a few acute administrations to augment therapy (Goldsmith, 2011).

Of the four aforementioned "depths" of psychedelic experience, all aside from the first, or aesthetic/sensory, level are believed to hold direct therapeutic import (Masters & Houston, 1966; Richards, 2009). At the second rung, psychodynamic experiences, such as revisiting unresolved intra and interpersonal conflicts, repressed memories, and emotional catharsis have noted implications for psychological healing and growth.

At the third rung, archetypal experiences, such as a sense of participation in a symbolic or mythological drama portraying one's life, can also be helpful in recontextualizing one's sense of self. Finally, at the fourth rung, mystical experiences, which involve feelings of unity with something felt to be eternal, infinite, or sacred, can have a profound impact on one's sense of connection, meaning, and purpose. However,

although all varieties of psychedelic experience hold therapeutic importance, the mystical form may be especially facilitative of healing and growth (Richards, 2016).

Although differing psychedelic-assisted psychotherapy therapeutic protocols have been developed, general principles have been established to ensure safety and maximize beneficial outcomes. Although the list is by no means exhaustive, a brief overview of some of these principles is as follows:

Before the drug is administered, the participant meets with the session therapists over the course of numerous sessions to establish rapport and trust to prepare for the drug session(s). This touches on the well-established importance of the therapeutic relationship. Following this phase, the individual is administered the drug in a pleasant environment, typically with two therapists present. For most of the session, participants are encouraged to lie down, wear an eye shade, use headphones to listen to instrumental music, and focus their attention on their arising inner experience. As such, significant care is placed on framing the set and setting, as these factors are very influential in shaping the experience.

The therapists are present throughout the session to ensure safety; however, they typically act supportively and non-directively, encouraging participants to be trusting and open to their experience. Thus, communication between the therapists and the participant is often brief; participants are told that they will have ample opportunity following the peak of the drug effects to discuss their experience. Indeed, follow-up integration is often considered as important as the drug session itself for the experience to be most therapeutically impactful (see Griffiths et al., 2006; Griffiths et al., 2016; Grob et al., 2011; Pahnke, 1969; Richards et al., 1977).

The Psychedelic Renaissance

Grinspoon and Bakalar (1979) reported that during the initial period of psychedelic research there were more than 1000 clinical papers written, several dozen books published, and six international conferences discussing over 40,000 patients. However, biased media portrayals of psychedelic use and their association with counterculture and antiwar sentiment led to severe legal restrictions, greatly limiting further study (Dyck, 2008). Ultimately, these legal restrictions were established without a compelling medical or scientific rationale (Nutt et al., 2007, 2010).

However, in recent years there has been a gradual reemergence of research in the field as regulations begin to loosen (Sessa, 2008). Now, with the rapid development of neuroscience and an increased understanding of their pharmacological mechanisms, renewed interest in research with psychedelics is steadily increasing (Vollenweider & Kometer, 2010). Expanding on the early psychedelic literature, contemporary research continues to support the notion that psychedelics warrant serious attention. For example, they have continued to show promise in: palliative care (Gasser et al., 2014; Griffiths et al., 2016; Ross et al., 2016), addictions (Bogenschutz & Johnson, 2016; Bogenschutz & Pommy, 2012; Johnson et al., 2014; Krebs & Johansen, 2012; Ross, 2012; Thomas et al., 2013), pain medicine (Frood, 2006; Grof, 2009; Sewell et al., 2006), psychiatry (Carhart-Harris et al., 2016a; Johnson & Griffiths, 2017; Moreno et al., 2006;), and criminology (Hendricks et al., 2014; Walsh et al., 2016).

The treatment of existential anxiety and depression in individuals with terminal illnesses is among the most promising areas for the therapeutic use of psychedelics. Cancer patients undergoing psychedelic therapy report gaining profound insights and

changed attitudes towards life and death, and the alleviation of depression and anxiety (Gasser et al., 2014; Griffiths et al., 2016; Grof et al., 1973; Pahnke, 1969; Richards et al., 1977; Ross et al., 2016). In a trial among individuals with advanced stage cancer, a single psychedelic experience was associated with long-term reductions in anxiety and depression (Grob et al., 2011); likewise, in a trial among individuals with life-threatening conditions, two sessions with LSD produced lasting reductions in anxiety related to end of life (Gasser et al., 2014).

Recently, Griffiths et al. (2016) studied psilocybin in conjunction with guided psychotherapy for the treatment of depressed mood and anxiety in 51 terminal cancer patients, and found positive changes in attitudes about life, self, mood, relationships, and spirituality, with over 80 percent of patients endorsing moderately or higher increased well-being or life satisfaction.

In another recent study, Ross et al. (2016) found that a single, moderate dose of psilocybin, in conjunction with guided psychotherapy, produced substantial reductions in anxiety and depression in patients with life threatening cancer. Researchers have noted that reduced fear of death is most dramatic if a mystical experience is precipitated. Indeed, patients often report a sense of self-transcendence which diminishes fear and deepens interpersonal relationships, thereby enhancing quality of life for both patients and their families (Pahnke, 1969; Richards et al., 1977).

Research also suggests that psychedelics may augment the treatment of drug and alcohol addiction. A recent meta-analysis of treatment for alcoholism found that a single dose of LSD reduced the probability of alcohol abuse nearly two-fold relative to controls (Krebs & Johansen, 2012). Furthermore, a study of smoking cessation with the aid of

psilocybin produced abstinence rates of 80 percent at long-term follow-up, more than double of the rates seen with approved tobacco dependence interventions (Johnson et al., 2014).

Psychedelics are also showing promising results in the treatment of psychiatric disorders. Moreno et al. (2006) conducted a study of psilocybin with treatment-resistant OCD in which nine subjects were given four, single-dose psilocybin sessions in a standardized setting without psychotherapy. Reduction of OCD symptoms was found in all patients. In an open-label trial, 12 patients with treatment-resistant depression received psilocybin in a supportive setting (Carhart-Harris et al., 2016a). Relative to baseline, depressive symptoms were markedly reduced one week and three months after treatment, while there were also marked and sustained improvements in anxiety and anhedonia.

With regards to the impact of psychedelics on mental health more generally, Krebs and Johansen (2013) used data from 2001 to 2004 from the National Survey on Drug Use and Health, and found that classic psychedelic use was not associated with psychological distress or symptoms of psychiatric disorder. In fact, classic psychedelic use was associated with a *decreased* likelihood of mental health problems (Krebs & Johansen, 2013). Recent population based research has likewise shown that classic psychedelic use is associated with reduced psychological distress and suicidal thoughts and behaviours (Hendricks et al., 2015).

With regards to the impact of psychedelics on interpersonal relations and criminality, the use of psychedelics has been found to be associated with *reduced* likelihood of recidivism among more than 25,000 individuals under community

supervision (Hendricks et al., 2014). Similarly, Walsh et al. (2016) examined the association between partner violence and psychedelic use among 302 inmates and found that psychedelic use predicted fewer arrests for such violence.

Psychedelics and Positive Psychology

There is growing evidence, then, suggesting that psychedelics hold significant potential as therapeutic agents; however, their potential to promote psychospiritual well-being and development is believed to be at least as substantial as their effectiveness as therapeutic tools (Goldsmith, 2011; Merkur, 1998; Roberts, 2012b, 2013). Profoundly beneficial transformations often occur from psychedelic experiences where no psychotherapy was used, and it has thus been argued that they have legitimate uses beyond the explicitly medical context (Masters & Houston, 1966). For example, Walsh (1982) conducted a small qualitative investigation of five individuals judged exemplars of self-actualization who used psychedelics for psychospiritual development. All five individuals contended that when used by mature individuals without significant disturbances, psychedelics could be used to augment advanced growth and well-being.

More recently, Griffiths et al. (2006, 2008, 2011) reported positive changes in personal well-being, behaviour, attitudes, and values from a single psychedelic experience, while MacLean et al. (2011) found substantial changes in the personality domain openness to experience from a single psychedelic experience, amongst healthy volunteers. Importantly, individuals using psychedelics in naturalistic settings frequently report beneficial experiences comparable to experimental settings. For example, a survey of drug users conducted by Cummins and Lyke (2013) found that the majority of psychedelic users reported peak experience during psilocybin use. In a similar study,

Nour, Evans, Nutt, and Carhart-Harris (2016) conducted a survey of individuals who used either psychedelics, cocaine, or alcohol. They found that psychedelic use was associated with mystical experiences, which had a positive and lasting impact on well-being.

In addition to psychological changes and benefits, psychedelics users also display heightened spirituality and spiritual development compared to both non-drug users and non-psychedelic drug users (Barbosa, Giglio, & Dalgalarrondo, 2005; Grob et al., 1996; Lerner & Lyvers, 2006; Móró et al., 2011; Trichter, 2006, 2010; Winkelman, 2005). In fact, one of the most robust research findings is the capacity for psychedelics to foster profoundly beneficial and meaningful spiritual experiences (e.g., Griffiths et al., 2006, 2008, 2011; MacLean et al., 2011; Pahnke, 1967).

However, the contemporary period of renascent research has yet to follow up with the few initial studies conducted in the mid-20th century on the impact of psychedelics on psychospiritual development. Consequently, this study hopes to expand upon the literature by exploring this question. To do so, we now turn to a discussion of how advanced development is conceptualized and its posited relationship with psychedelics.

Chapter III: Psychospiritual Development and the Classic Psychedelics

"It looks as if there were a single ultimate value for mankind, a far goal toward which all men strive. This is called variously by different authors self-actualization, self-realization, integration, psychological health, individuation, autonomy, creativity, productivity, but they all agree that this amounts to realizing the potentialities of the person, that is to say, becoming fully human, everything that the person can become."

Abraham Maslow (1968, p. 145)

When considering developmental psychology, one typically thinks of the growth and change seen in childhood and adolescence. This is understandable given that rapid and pronounced physical and mental changes are extremely evident at this time of life. However, in the last 30 years empirical research on the process of adult development has gradually emerged (Cook-Greuter, 1990, 1994). On the basis of this burgeoning research, two major facets of positive adult development can now be roughly distinguished: *personality adjustment* and *personality growth* (Staudinger & Kessler, 2009; Staudinger & Kunzmann, 2005).

Personality adjustment describes the process of adult development in which one successfully adapts to the outer requirements of society over the lifespan. Ultimately, it considers the degree to which one is able to master the demands of their culture and achieve adaptive functioning in the world via adherence to societal expectations and conventions (Staudinger & Kunzmann, 2005). In such a way, personality adjustment is conceptually related to *subjective,* or *hedonic, well-being*, which asserts that human wellness ultimately consists of life satisfaction, the presence of positive affect, and the

relative absence of negative affect (Keyes et al., 2002; Diener, Emmons, Larsen, & Griffin, 1985).

In comparison, personality growth entails an ongoing process of advances in self-decentration, tolerance for ambiguity and complexity, and a self-transcendent orientation to life concerned with the well-being of others. It involves continuous growth towards the ideal end point of human development—wisdom (Staudinger & Kessler, 2009). Personality growth is conceptually related to *eudaimonic well-being.* Many psychologists have asserted that positive affect and life satisfaction are insufficient criteria to truly assess wellness (Ryan & Deci, 2001). Instead, eudaimonic well-being is expressed through the full realization of one's potential or flourishing; in other words, self-actualization (Waterman, 1993).

The farther reaches of personality growth, wisdom, and eudaimonic well-being also overlap with those domains traditionally conceptualized as spiritual or transpersonal in nature (e.g., Frankl, 1963; Levenson et al., 2005; Maslow, 1971). From the perspective of transpersonal psychology, the path of psychological development eventually dovetails with spiritual development (Roberts, 2013). Similarly, research shows that the manner in which one conceptualizes their spirituality, or system of "faith," follows a developmental arc of increasing complexity, autonomy, and humility. In such a way, spiritual development follows a progression away from egocentric, absolute claims, toward tolerance, openness, and inclusion (Fowler, 1981; Genia, 1991; Streib et al., 2010).

Expanding on the work of Keyes (2007), a truly comprehensive model of psychospiritual development would thus seem to require the presence of personality adjustment, personality growth, and spiritual development, as well as the absence of

psychological distress. In order to assess the relationship between these facets of psychospiritual development and psychedelic drug use, six models and their corresponding self-report instruments were used in this study.

Eudaimonic Well-Being

Carol Ryff developed a complex model of eudaimonic well-being (Ryff, 1985, 1989; Ryff & Keyes 1995) by drawing on key theorists in lifespan development (e.g. Erikson, 1982), existential-humanistic psychology (Frankl 1963; Maslow, 1968; Rogers, 1961) and psychoanalysis (Jung, 1971). She found that these various conceptions of psychological well-being (i.e., Maslow's notion of self-actualization, Jung's concept of individuation, Roger's conceptualization of the fully functioning person, etc.) all emphasized similar attributes, and distilled these criteria into six dimensions. Ryff (1989; Ryff & Keyes 1995) developed the *Scales of Psychological Well-Being* to assess this construct; this measure was used in this study (see Chapter VI).

Self-acceptance entails self-knowledge and an acceptance of one's strengths and weaknesses. For example, Ryff noted that self-insight and positive self-regard were central to Maslow's (1968) model of self-actualization and Roger's (1961) notion of the fully functioning person. In addition, Erikson (1959) emphasized the importance of self-acceptance for psychosocial development, while Jung (1971) noted that accepting and integrating the dark side of one's personality is critical for the process of individuation.

Ryff (1989) also found that *positive interpersonal relationships* were considered central to a positive, well-lived life. For example, Maslow (1968) described self-actualizers as having strong empathy and affection for all human beings, as well as the capacity for profound love, deep friendships, and close identification with others.

Similarly, Erikson (1959) emphasized the importance of close interpersonal relationships and the guidance of future generations in the process of psychosocial development.

Environmental mastery denotes the capacity to choose environments appropriate to one's personality and to contribute meaningfully to society. Ryff (1989) noted that life-span developmental theories, such as Erikson's, emphasized the importance of mastery in one's social environments and the capacity to act meaningfully in the world. Similarly, Maslow (1968) argued for the importance of need gratification (i.e., physical, safety, etc.), which entails success in one's niche, while Jung (1971) emphasized healthy ego development, which also entails the capacity to function meaningfully in the external world.

Autonomy describes independence and the regulation of behaviour from within rather than based on social conventions (Ryff, 1985, 1989). For example, self-actualization entails autonomous functioning and resistance to enculturation (Maslow, 1968), while both the fully functioning person described by Rogers (1961) and the individuated person described by Jung (1971) have an internal locus of evaluation, whereby one does not look to others for approval, but evaluates oneself by an inner moral standard.

Purpose in life encapsulates the sense of meaningfulness to one's goals, pursuits, and activities (Ryff, 1989). This criterion derives heavily from existential perspectives, especially Frankl's (1963) search for meaning. Similarly, Erikson (1982) refers to the changing sources of meaning across the stages of life, such as the pursuit of identity in early adulthood, to generativity in midlife, to self-integrity and self-transcendence in later

life. Likewise, Jung (1971) noted the importance of an evolving orientation to one's Self in the cultivation of meaning over the lifespan.

Lastly, *personal growth* refers to the ongoing pursuit of new challenges and the expansion of one's perspectives (Ryff, 1989). For example, self-actualization, as described by Maslow (1968), is concerned with realization of one's highest potential, while Rogers (1961) described the fully functioning person as one who is open to experience in a process of continual development. Erikson (1982) and Jung (1971) also emphasized the importance of continued growth and development in the confrontation with new challenges across the lifespan.

Eudaimonic Well-Being and Psychedelics

There are numerous indications to suggest that psychedelics may contribute to the development of eudaimonic psychological well-being. For example, Maslow (1968) proposed that psychedelics might be used as tools to foster self-actualization, and early research exploring this hypothesis suggested that they might indeed be capable of facilitating such growth (Klavetter & Mogar, 1967; McGlothlin & Arnold, 1971; Pahnke, 1967; Savage et al., 1967).

Carroll's (2008) doctoral dissertation undertook a qualitative exploration of the effects of long-term psychedelic use and found support for the hypothesis that intentional use of psychedelics can foster eudaimonic well-being. For example, the use of psychedelics was associated with enhanced self-insight and self-acceptance, including formerly rejected parts of the self (Carroll, 2008). In fact, greater self-insight and self-acceptance have long been discussed as potential benefits of psychedelic experiences (Masters & Houston, 1966; Pahnke, 1967).

With regards to positive relations with others, psychedelic users also often report that their use led to greater sensitivity, compassion, empathy, and tolerance for others (Masters & Houston, 1966; McGlothlin, 1962; Pahnke, 1967). Carroll (2008) similarly found that users describe psychedelics as having helped them to be less judgmental and selfish, more loving and accepting of others, and having improved existing interpersonal relationships.

In terms of environmental mastery, psychedelic users have reported benefits to their work and professional lives, such as greater work confidence, efficiency, and motivation; greater professional ambition and commitment; greater ability to handle complex tasks; and an enhanced sense of service to others on account of their use (Carroll, 2008; Master & Houston, 1966; Pahnke, 1967). In terms of autonomy, those who have used psychedelics report living with greater authenticity, self-confidence, and autonomy, and an enhanced sense of inner guidance for making decisions (Carroll, 2008; Pahnke, 1967).

Regarding purpose in life, psychedelic users often report the sense that their drug experiences have motivated them to appreciate more deeply the purpose of their lives and life more broadly (McGlothlin, 1962; Pahnke, 1967). Intentional psychedelic users have reported that their use of psychedelics helped them to discover a very strong sense of meaning and direction in life, and a greater conviction to pursue those activities which hold meaning (Carroll, 2008). Stasko, Rao, and Pilley (2012) also found that psychedelic users reported an enhanced sense of meaning, direction, and purpose in life on account of their use.

Finally, with regards to personal growth, psychedelic users often report having

transformative experiences resulting in greater self-actualization (Carroll, 2008; Masters & Houston, 1966). Indeed, Masters and Houston (1966) proposed that psychedelic experiences might in some way initiate the inner growth process and movement toward self-actualization. Recently, Marko (2011) and Quevedo (2009) demonstrated that ego development (Loevinger, 1976) was associated with the use of psychedelics. Similarly, Prepeliczay (2002) found that the majority of participants reported that their psychedelic experiences were of great importance and had relevance for their individuation process and personality development.

Quiet Ego

The psychological construct of the "ego" can be understood as the organization of one's concepts of self, others, and the world (Wayment et al., 2015). It orchestrates how we perceive inner and outer reality, and coordinates our thoughts, emotions, and behaviours (Cook-Greuter, 2000). Adult developmental psychology has begun to study the maturation of the "ego" which describes the increasing complexity, differentiation, and integration of one's perspective, and includes Loevinger's (1976) theory of ego development and Kegan's (1982) evolving self.

When the ego develops, one's subjective perspective differentiates from the structure of which it was formerly subject, thus re-organizing the structure into an *object* of a new, higher order structure (Kegan, 1982). Thus, with personality growth, or ego development, the ego interprets the self and others in an increasingly more complex manner representing a progressively smaller, decentered, and "quieter" ego (Wayment et al., 2015).

As a measurable construct, the *quiet ego* encompasses four psychosocial characteristics: inclusive identity, perspective taking, detached awareness, and growth. These quiet-ego qualities have long been hallmarks of spiritual and philosophical systems around the world, and now appear in many psychological descriptions of advanced development (Wayment & Bauer, 2018; Leary, Brown, & Diebels, 2016). For example, these characteristics figure prominently in descriptions of the integrated stage of ego development (Loevinger, 1976), advanced wisdom (Ardelt, 2019), self-transcendence (Levenson et al., 2005; Maslow, 1971), and various virtues and character strengths in positive psychology (Peterson & Seligman 2004; see Wayment et al., 2015). Wayment et al. (2015) developed the *Quiet Ego Scale* to assess this construct; this measure was used in this study (see Chapter VI).

Inclusive identity refers to an ability to see oneself as interconnected with other people and the natural world; this increases the likelihood of cooperation and decreases the likelihood of self-protective stances towards others (Wayment et al., 2015). One may feel not only interconnected with other people, but also other species or nature, in the perception of being part of a universal whole (e.g., humanity, nature, the cosmos). This may involve a sense of oneness, which has been shown to be associated with various parameters of well-being (Diebels & Leary, 2019). For example, the perception that one is connected to aspects of a larger whole is related to humility, forgiveness, compassion, positive social relationships, and concerns for the environment (see Leary et al., 2016).

Perspective taking involves the capacity to shift attention from oneself to reflect on other people's perspectives, which provides a basis for empathy and compassion (Wayment et al., 2015). Perspective-taking, or decentering from the ego, is an essential

mechanism in Piaget's model of growth, Loevinger's model of ego development, and other forms of psychosocial maturity (e.g., Jung, 1971; Kegan 1982).

Detached awareness is the ability to focus on the immediate moment without predetermined expectations or frameworks that prejudge the persons or situation (Wayment et al., 2015). It involves present-focused awareness, which is similar to some descriptions of mindfulness, and affords non-defensiveness towards experience.

Growth refers to the pursuit of long-term psychological growth and development, and the motivation to take an open stance to experience that facilitates an expanded sense of self (Wayment & Bauer, 2018; Wayment et al. 2015). Concern for development predicts the subsequent attainment of personal growth as reflected in increases over time in measures of ego development and eudaimonic well-being (Ryff & Singer 2006).

Quiet Ego and Psychedelics

There is a growing body of research which suggests that the use of psychedelic compounds, particular when employed for autognostic or entheogenic purposes, may be related to a quiet ego. For example, hypo-egoic states, such as those precipitated by psychedelics, are often associated with changes in beliefs about the meanings of life, greater selflessness, and a sense of the oneness of all things, features which reflect a quiet ego (Leary & Guadagno, 2011). Moreover, through self-examination the ego quiets, which allows a glimpse into reality beyond the self and consequently results in greater maturity (Ardelt, 2019; Wayment & Bauer, 2018). Psychedelic substances are notorious for inducing profound states in which one becomes highly self-reflective (Buckman, 1967), which has been suggested to contribute to their therapeutic properties (Carroll,

2008; Ditman & Bailey, 1967; Grinspoon & Bakalar, 1979; Masters & Houston, 1966; McGlothlin, 1962; Pahnke, 1967).

Indeed, regarding the first quality of the quiet ego, *detached awareness*, which is similar to some descriptions of mindfulness, Carroll (2008) found that long-term psychedelic users often reported increased present focus. Furthermore, research suggests that exposure to psychedelic experiences shares similar features with mindfulness practice, and studies have shown that psychedelic use may increase trait mindfulness (Soler et al., 2016; Thomas et al., 2013). Psychedelics may thus help to foster self-awareness leading to non-defensiveness towards present experience, and a greater capacity for mindful, or detached awareness.

The second facet of the quiet ego, an *inclusive identity,* refers to the degree to which one identifies with others or views the self as the same as others. Yaden et al. (2016) found that people who have had psychedelic induced mystical experiences tended to use more inclusive language (i.e., "everything," "oneness"). Similarly, Carroll (2008) found that long term psychedelic users reported a greater sense of the interconnected nature of life and had allowed them to see themselves as a part of a larger whole, increasing feelings of oneness with nature and other people. Stasko, Rao, and Pilley (2012) also found that psychedelic users reported an enhanced feeling of connectedness with other people.

The third facet of the quiet ego, *perspective taking*, provides a basis for empathy and compassion. For example, Lerner and Lyvers (2006) found that those who used psychedelics scored higher on measures of concern for others and empathy in comparison to non-drug users. Research has documented that individuals are able to view problems in

new ways while on psychedelics, and perhaps this persists (Roberts, 1983). This ability to see things from new or broader perspectives has been noted by several other studies as well (McGlothlin et al., 1967). Similarly, Carroll (2008) found that long-term psychedelic users expressed increases in empathy, concern, and compassion for others, with a decrease in selfish tendencies. Many participants described feeling that they had gained the ability to view issues from multiple perspectives or were more flexible in their thinking.

The fourth facet of the quiet ego, *growth*, involves the desire to continue to stretch and develop one's potential. This facet overlaps with Ryff's (1989) personal growth dimension, and, as noted, is one of the most essential and enduring aspects associated with the deliberate use of psychedelic substances. For example, Carroll (2008) found that some long-term psychedelic users specifically used psychedelics to accelerate their growth. These users described how their psychedelic use catalyzed their process of maturation. For these individuals, regular use of psychedelics constituted an intentional practice that they used to deliberately challenge the way they viewed self, others, and the world around them.

Self-Transcendence

Self-transcendence is widely seen as a key feature of advanced psychospiritual development in the works of numerous theorists, including Jung (1971), Erikson (1982), Maslow (1971), Frankl (1963), and Wilber (2006). After conducting an analysis of the common elements of wisdom across Eastern and Western cultures, Curnow (1999) proposed that self-transcendence may be viewed as the core attribute. Levenson et al. (2005) argued that self-transcendence is at the core of wisdom, while Staudinger and

Kessler (2009) deemed self-transcendence to be a core measure of personality growth. Contemporary researchers have validated this assertion, with numerous studies showing the centrality of self-transcendence in advanced development (Beaumont, 2009; Curnow, 1999; Glück et al., 2013; Levenson et al., 2005; Labouvie-Vief, 2003; Mickler & Staudinger 2008; Orwoll & Perlmutter 1990; Reed, 1991).

Reed (1991) defined self-transcendence as a characteristic of developmental maturity, irrespective of chronological age, in which one experiences an expansion of self-boundaries and an orientation toward broadened life perspectives and activities. This involves reaching outward beyond self concerns. Self-transcendent individuals feel that the boundaries between themselves and others are permeable, feel related to past and future generations, humanity, and nature, and accept others as they are (Koller, Levenson, & Glück, 2017).

Frankl (1963) described self-transcendence as the cornerstone of psychospiritual growth and felt that the more we are able to transcend our individual self the more mature and fully human we become. Jung (1971) viewed self-transcendence as part of the process of individuation, involving a shift in values and orientation precipitated by the ego's encounter with the transpersonal Self (Orwoll & Perlmutter, 1990). Similarly, for Alfred Adler (1959) social interest was essential for advanced psychospiritual development. In essence, social interest involves self-transcendence in identification with others and the betterment of society.

Although it is not widely known, in his late work, Maslow (1971) identified individuals who had gone beyond self-actualization to an even higher, transpersonal level of development, where the self is transcended (Koltko-Rivera, 2006). At this level, one

has a motivation for self-transcendence and seeks connection with something felt to be eternal, perhaps through mystical experiences. Maslow defined self-transcendence as, "...the very highest and most inclusive or holistic levels of human consciousness, behaving and relating, as ends rather than means, to oneself, to significant others, to human beings in general, to other species, to nature, and to the cosmos" (1971, p. 269).

Self-transcending individuals come to identify with a perspective greater than their individual self, strive to further a cause beyond the self, and seek experiences of communion beyond the boundaries of the self through peak experiences (Koltko-Rivera, 2006). Maslow (1971) found that compared to self-actualizers, self-transcenders were more apt to perceive the sacred in the mundane, view life through a cosmic perspective, and be driven by mystery, awe, and the Being-values, such as unity, truth, and beauty.

More recently, Levenson (Levenson et al., 2005; Koller et al., 2017) developed a model of self-transcendence as wisdom and personality growth, including five measurable dimensions: self-knowledge and integration; non-attachment; peace of mind; presence in the here-and-now and growth; and self-transcendence. Levenson (Levenson et al., 2005; Koller et al., 2017) developed the *Adult Self-Transcendence Inventory* to measure this construct; this measure was used in this study (see Chapter VI).

Self-knowledge and integration refers to knowledge about, and acceptance of, all aspects of one's own self, including undesirable qualities. This entails awareness of the different and sometimes contradictory facets of one's self, and an ability to accept these sides of one's personality and integrate them into one's life (Koller et al., 2017).

Non-attachment describes awareness of the fundamental independence of one's conscious awareness from both internal experiences and external possessions or

evaluations. Non-attached individuals' self-esteem is not dependent on how others think about them and they do not depend on external sources for self-enhancement (Koller et al., 2017). They are autonomous in living the life that is right for them and accepting others to do the same.

Peace of mind entails serenity and emotion regulation. It involves the ability to remain tranquil in situations where others would get angry or upset, and acceptance of the fundamental impermanence of things (Koller et al., 2017). In other words, equanimity.

Presence in the here-and-now and growth describes the ability to live mindfully in the moment without clinging to experience. It involves an awareness that things are always changing, and that change facilitates growth. As such, there is an orientation toward learning, growth through loss, and acceptance of finitude (Koller et al., 2017).

Self-transcendence entails a permeability of boundaries between self and other. It involves the feeling of being part of something larger than one's self, such as past and future generations of life and nature. With this comes a greater acceptance of others as they are (Koller et al., 2017).

Self-Transcendence and Psychedelics

Recently, Bouso et al. (2015) compared 22 long-term ayahuasca users with 22 non-users, matched for age, sex, years of education, and verbal and fluid intelligence. They found that the ayahuasca users had higher scores on the self-transcendence subscale of the Temperament and Character Inventory (Cloninger et al., 1993), which is similar though conceptually distinct from self-transcendence as wisdom or personality growth (e.g., Levenson et al., 2005). Similarly, Carroll (2008) found that long-term psychedelic

users reported that their use strengthened their spirituality and increased self-transcendent feelings of being part of a larger, interconnected whole.

Maslow (1964) proposed that peak experiences often lead an individual to transcend the self and noted that psychedelics could induce such experiences. Because the most profound psychedelic experiences are often characterized by feelings of self-transcendence (Grinspoon & Bakalar, 1979; Masters & Houston, 1966; Pahnke, 1967), it is plausible that individuals who use these drugs may show higher levels of self-transcendence. Support for this hypothesis derives from the work of Griffiths et al. (2006), who found that individuals given psilocybin showed heightened spiritual transcendence as compared to a control group given methylphenidate. Furthermore, psychedelic users often report changes in their values (Carroll, 2008; Masters & Houston, 1966; Pahnke, 1967) in the direction of altruism, characteristic of self-transcendence (Schwartz, 1992).

Research also suggests that exposure to psychedelic experiences shares similar features with mindfulness practice, and studies have shown that psychedelic use may increase trait mindfulness (Soler et al., 2016; Thomas et al., 2013). Given that the facets of self-transcendence, particularly non-attachment, peace of mind, and presence in the here-and-now, are associated with mindfulness, it is plausible that self-transcendence may be associated with psychedelic use.

Spiritual-Religious Development

Some psychologists have long considered spirituality to be an important facet of human functioning (James, 1902; Jung, 1971; Frankl, 1963; Maslow, 1964; Wilber, 2006). Research has supported this notion, as positive relationships between spirituality

and mental and physical health have consistently been shown (see Fiorito & Ryan, 2007; Joshanloo, 2011; Van Dierendonck & Mohan, 2006). On account of the growing interest in the clinical and developmental relevance of spirituality, there is increasing overlap between the psychology of religion and the study of positive psychology (Hood, 2016).

Shafranske and Gorsuch (1984) view spirituality as a sense of belongingness and openness to the infinite, while de Jager Meezenbroek and colleagues (2012) define spirituality as "one's striving for an experience of connection with oneself, connectedness with others and nature, and connectedness with the transcendent" (p. 338). Similarly, Corbett (2012) argues that spirituality is synonymous with a sense of awe and wonder at the mystery of the universe and contends that by deliberately paying attention to this mystery one is "being spiritual" (p. 208).

Spirituality is also related to the term *transcendence*, which is defined as a sense of "connection to something higher—the belief that there is meaning or purpose larger than ourselves" (Peterson & Seligman, 2004, p. 48). It involves feelings of awe and gratitude, reminds us of how small we are, and gives us a sense of significance and meaning via our inclusion in something larger (Byock, 2002).

While some may bristle at the metaphysical or supernatural connotations of the terms spiritual and transcendence, Maslow (1964) emphasized that they can have naturalistic meanings and are not contingent upon supernatural beliefs or organized religions for their expression. That is, transcendence can be *vertical* (and hence religious) or *horizontal* (and hence secular). This form of horizontal transcendence need not involve any ontological claims about God but may include a sense of union with humankind, oneness with the cosmos, or a sense of oneness with nature (Elkins et al., 1988).

The distinction between vertical and horizontal transcendence is meant to emphasize that spirituality can be experienced by people who are not religiously affiliated, many of whom identify with atheism, agnosticism, or humanism (Hood, 2016). Spirituality is noted as an important facet of many people's lives, including those who are not religious (Garssen, Visser, & de Jager Meezenbroek, 2016). Not only are spirituality and religiosity not synonymous, but they are also entirely independent (Saucier & Skrzypińska, 2006).

Theologians and psychologists have strived to distinguish mature forms of religion or spirituality from less mature forms (Allport, 1963; Fowler, 1981), and broadly recognizable patterns of spiritual-religious development have been identified (Genia, 1991). For example, Fowler (1981) introduced a model of spiritual-religious development rooted in six stages of meaning-making, or patterns of faith. These stages of development are akin to the models of Kohlberg and Loevinger. Fowler (1981) conceptualized *faith* as a human universal, distinct from any particular tradition or belief system. Instead, faith is characterized by meaning-making, interpretations of experiences, and values in relation to one's conceptualization of the *ultimate* (Tillich, 1952), which can be theologically or naturalistically defined (e.g., God or the universe, etc.).

Ultimately, the central notion underlying spiritual-religious development is that one's ultimate sense of meaning-making, or "faith," advances in complexity, autonomy, and humility, following a progression away from egocentric, absolute claims, toward tolerance, openness, and inclusion (Fowler, 1981; Genia, 1991; Streib et al., 2010). As a measurable construct, spiritual-religious development assesses the developmental progression of these underlying belief styles/schemas.

According to Streib and colleagues' (2010) model, the first measurable stage or schema, *Truth of Texts and Teachings*, captures an absolutist, fundamentalist orientation wherein preoccupation with the truth of one's belief system is central. This schema is characteristic of Fowlers' (1981) stage three, synthetic-conventional. The next stage or schema, *Fairness, Tolerance & Rational Choice*, captures a belief system in which fairness and tolerance stands in the foreground. This schema is characteristic of Fowler's (1981) stage four individuative-reflective. The final stage or schema, *Xenosophia*, captures a system of belief characterized by the appreciation and interest in that which is unknown or different. This stage involves a greater willingness for inter-belief dialog and shared learning (Streib et al., 2010), and is characteristic of Fowler's (1981) stage five conjunctive. Based on the assumption that the decline of fundamentalism and the growth of tolerance and openness toward other beliefs constitutes progression, movement through these styles/schemas may be conceptualized as developmental (Streib et al., 2010). Streib and colleagues (2010) developed the *Religious Schema Scale* to measure religious/spiritual development; this scale was used in this study (see Chapter VI).

Spiritual-Religious Development and Psychedelics

It has long been noted that psychedelic experiences are associated with spirituality. For example, in an early study of 194 research participants given LSD in a non-religious setting, 48 percent reported changes in their sense of values and increased interest in spiritual matters (McGlothlin, 1962). Recent studies have similarly found that psychedelics users show heightened spirituality compared to non-users (Bogenschutz & Pommy, 2012; Griffiths et al., 2006, 2008, 2011; Lerner & Lyvers, 2006).

Recently, Winkelman (2005) found that ayahuasca users reported that their experiences facilitated their spiritual development, while Trichter (2006, 2010) found that participants of an ayahuasca ceremony felt that their experiences led to a greater sense of spiritual well-being. Moreover, Móró et al. (2011) found that those who used psychedelics with autognostic intentions demonstrated heightened levels of intrinsic spirituality, which is a marker of mature spirituality (Allport, 1963; Genia, 1991). Of the big-five personality traits, only openness to experience has been shown to have a strong correlation with a measure of spiritual-religious development, the *Religious Schema Scale* (Streib et al., 2010). Moreover, mystical experiences have been shown to be strongly related to holding a xenosophia (i.e., mature) schema (Streib, Hood, & Klein, 2016). Given the strong relationship between both openness to experience and mysticism and the use of psychedelics (see Chapter VI), it is plausible that use of these substances may promote the development of more mature forms of religiousness/spirituality.

Subjective Well-Being and Psychedelics

Subjective well-being is believed to consist of an emotional component and a cognitive component. The emotional component involves the presence of positive affect as well as the infrequency of negative affect. The cognitive component involves a sense of overall satisfaction with one's life. Diener, Emmons, Larsen, and Griffin (1985) developed the *Satisfaction with Life Scale* to measure this construct; this scale was used in this study (see Chapter VI).

Regarding the relationship between subjective well-being and psychedelics, Griffiths et al. (2006, 2008, 2011) have found positive changes in subjective well-being and life-satisfaction from a single psychedelic experience. Similarly, in a recent cross-

sectional survey of psychedelic and other drug users, Nour et al. (2016) found that psychedelic experiences were correlated with increased subjective well-being. Finally, Rudd, Vohs, and Aaker (2012) found that experimentally elicited experiences of awe led to a greater sense of life satisfaction. Given that psychedelic experiences are often typified by feelings of awe (Leary, 1970), it is plausible to suggest that they may contribute to subjective well-being.

Psychological Distress and Psychedelics

The aforementioned constructs of personality adjustment/subjective well-being and personality growth/eudaimonic well-being can be broadly considered under the rubric of mental health. However, it also must be emphasized that mental health is *not* the opposite of mental illness. Indeed, these are two distinct, though related, factors (see Keyes, 2002, 2007). In general, psychopathology can be broadly indexed by assessing non-specific psychological distress. The *K-6* is a widely used measure of psychological distress indicative of nonspecific mental disorder (Kessler et al., 2002, 2003); this scale was used in this study (see Chapter VI).

Psychedelics are now showing promising results in the treatment of psychiatric disorders in experimental clinical settings *without the presence* of psychotherapy (e.g., Carhart-Harris et al., 2016a; Moreno et al., 2006). As noted at the epidemiological level, Krebs and Johansen (2013), using cross-sectional data from 2001 to 2004 from the National Survey on Drug Use and Health, found that classic psychedelic use amongst the population was associated with a *decreased* likelihood of symptoms of psychological distress. Other epidemiological research has likewise shown that classic psychedelic use

is associated with *reduced* psychological distress, suicidal thoughts, and behaviours (Hendricks et al., 2015).

Taken together, it is possible that psychedelics—when used with autognostic or entheogenic intentions—may contribute to psychospiritual well-being and development. Although preliminary evidence points in this direction, further research is needed.

Potential Mechanism of Psychedelic-Assisted Psychospiritual Growth

How is one to conceptualize the beneficial impact of psychedelic substances? In a synthesis of the literature, Swanson (2018) reviewed the major psychedelic theories from the 19th, 20th, and 21st centuries, and presented four areas on which they all converge: 1) psychedelics produce their effects by *inhibiting* the neuropsychological mechanisms which constrain consciousness; 2) too much or too little constraint can contribute to psychopathology; 3) psychedelic effects appear similar to psychotic symptoms because both involve inhibited constraints; and 4) psychedelic drugs are therapeutically useful because they inhibit these constraints.

Accordingly, some researchers have suggested that psychedelics may augment the process of growth by enhancing access to unconscious aspects of the self (Gowan, 1975; Merkur, 1998). That is, in the psychedelic state more ego-alien imagery, memories, and emotions arise in awareness, and new insights are more likely (Carhart-Harris et al., 2014; Grinspoon & Bakalar, 1979). Although intellectual/conceptual learning occurs best in rational, waking consciousness (Fromm, 1977), emotional/experiential learning is facilitated when the ego is open and receptive to novel experience. Importantly, Bohart (1993) has argued that emotional experiencing is the basis of therapeutic growth, while Martin (2011) has similarly proposed that all growth resulting in meaningful change of

one's schemas requires emotional experiencing. In fact, emotional processing is widely seen as a critical aspect of change across all therapeutic schools (Whelton, 2004).

Nonetheless, enduring change also requires cognitive reflection and the construction of new meaning (Whelton, 2004). In other words, an individual must actively reflect on and integrate new experiences into one's self-structure for enduring change (Fromm, 1977). Thus, although some individuals may benefit from releasing and experiencing unconscious memories and emotions by using psychedelics, some degree of post-drug cognitive reflection is likely necessary to gain the most benefit from these experiences. This is ostensibly the basis for the great emphasis placed on psychotherapeutic integration sessions following the drug session(s).

In a similar way, psychedelics may foster growth by foisting the individual into an encounter with the unknown, which Jung (1971) considered analogous to the unconscious. When the constraints that normally filter experience are inhibited by psychedelics, one's perception of the world can appear fresh, novel, strange, or even alien (Korngold, 1963). Streib and Klein (2018) have argued that development is facilitated by these uncanny experiences, as they may foment a crisis of certainty in which the usual sense of understanding collapses. Such a crisis is created when an experience of the unknown is too disorienting to simply be assimilated, thus inviting questioning and a revision of one's structures of meaning, or schemas. In such cases, the individual comes to a forced recognition that his or her past understanding is not the absolute truth, thus leading to the potential for growth (Streib & Klein, 2018).

The transformative impact of psychedelic experiences can also be understood from James' (1902) notion of conversion experiences, in which a person becomes more

integrated, or healed, via a transformative spiritual experience. In this case, inhibition of the normal restraints on consciousness is believed to allow for a *regression in the service of the ego*, leading to a profound spiritual or mystical state (Prince & Savage, 1966). Indeed, the spiritual conversion experience likely involves a primordial state of consciousness, which facilitates re-organization of the personality into a more cohesive level of integration (Allison, 1968). As noted, many researchers have demonstrated that the positive impact of psychedelics is largely related to their ability to induce transformative spiritual experiences, even in experimental settings (Griffiths et al., 2006, 2008, 2011; MacLean et al., 2011; Pahnke, 1969; Savage et al., 1967).

For example, in his famous "Good Friday Experiment," Walter Pahnke (1967) administered psilocybin to one group of divinity students, and niacin (vitamin B3) to a control group (also divinity students), before both groups attended a religious service in a small chapel. Those in the psilocybin group had very high rates of mystical experiences compared with the controls and felt that the experience led to a greater sense of meaning in life, more depth and authenticity, and positive changes in their values and philosophies of life (Pahnke, 1967). A long-term follow-up interviewed many of these participants and found lasting benefits attributable to the experience more than 25 years later (Doblin, 1991).

Pahnke's study is not isolated, however. In a summary of five early studies, Masters and Houston (1966) found that up to 75 percent of experimental psychedelic research participants reported having religious experiences under supportive conditions. However, if the setting provided religious stimuli, upwards of 90 percent of subjects reported such experiences. Importantly, participants consistently rated these religious

mystical experiences as the most transformative and beneficial (Masters & Houston, 1966).

With the re-emergence of psychedelic research in recent years, double-blind studies conducted by Griffiths et al. (2006, 2008, 2011) have further confirmed that a single administration of psilocybin can induce mystical experiences with lasting benefits. Psychedelic naive participants received psilocybin in the experimental group or methylphenidate in the control group. Those in the psilocybin group showed changes including more positive attitudes about life and one's self, positive changes in mood, altruistic/positive social effects, positive behaviour changes, and increases in spiritual transcendence, as compared to the control group. In addition, 79 percent of those in the psilocybin group rated the experience as having increased their current sense of personal well-being, while 71 percent rated the experience in the top five most spiritually significant experiences of their lives. The beneficial changes were independently verified by individuals from the participants' lives. In a follow up study, Griffiths et al. (2008) found that the benefits had persisted for at least 14 months following the psychedelic experience.

On account of these findings, some researchers and theorists have argued that the classic psychedelics may be conceptualized as "spiritual medicines," as it has become clear that many of their therapeutic effects derive not from their biochemical modulation per se, but rather, by inducing therapeutic mystical experiences (Goldsmith, 2011, p. xix). It must be noted that this applies to non-religiously affiliated individuals, who report feelings of connection to nature or the universe.

Given the importance of these self-transcendent mystical experiences to psychospiritual health and development, a more thorough exploration of the reasons underlying their transformative potential is required. We thus now turn to a discussion of self-transcendent experiences and related constructs in order to better appreciate their risks and benefits.

Chapter IV: Self-Transcendence and Psychospiritual Development

"You are quite right, the main interest of my work is not concerned with the treatment of neuroses but rather with the approach to the numinous. But the fact is that the approach to the numinous is the real therapy and inasmuch as you attain to the numinous experience you are released from the curse of pathology."

Carl Gustav Jung (1973, 1:377)

Although they have been long acknowledged for their value by many indigenous cultures, *self-transcendent* (Yaden et al. 2017), or *hypo-egoic* (Leary & Guadagno, 2011), states have historically been deemed indicators of mental illness by mainstream Western psychology and psychiatry (Roberts, 2012a). However, on account of growing research indicating that such experiences are in fact associated with various benefits (e.g., Noble, 1987; Van Dierendonck & Mohan, 2006), contemporary scholars of transpersonal psychology and the psychology of religion are reconsidering their value (Hood, 2016).

According to Yaden et al. (2017), self-transcendent states entail two major features: 1) ego-loss, and 2) connectedness. The first facet describes the subjective sense of ego-dissolution, involving a decrease in self-awareness, self-differentiation, and self-centeredness. The second facet involves a sense of unity, connectedness, or oneness, and involves the expansion of one's self to include the broader context of which one is a part, such as the task one is engaged in, other people, nature, God, or the universe (Yaden et al., 2017).

Self-transcendent states are believed to exist on a spectrum of intensity described as the unitary continuum (Newberg & d'Aquili, 2000). At the low end are positioned states such as mindful awareness (Vago & Silbersweig, 2012) and flow

(Csikszentmihalyi, 2014). In the midrange fall the self-transcendent emotions, such as awe (Demoulin, Saroglou, & Van Pachterbeke, 2008; Van Cappellen & Saroglou, 2012), and at the far end of the continuum lies the most pronounced form of self-transcendent state, the mystical experience (Yaden et al., 2017). Mystical experiences have also been referred to as peak experiences, conversion states, cosmic consciousness, and numinous experiences (Roberts, 2012b).

Encountering the Numinous: Mystical Experiences

The German theologian Rudolf Otto (1923) coined the term *numinous* to describe the feeling of unspeakable awe and wonder in one's encounter with the sacred or holy. Otto defined the numinous as a *mysterium tremendum et fascinans* (a terrible and fascinating mystery). Mysterium describes how the experience vastly exceeds what is currently known, evoking a sense of incomprehension and awe. Tremendum characterizes the fear that often accompanies facing something overwhelmingly vast or incomprehensible, while fascinans describes the captivating quality of the unknown, despite its potentially fearful quality (Schlamm, 2007).

It has been argued that the cornerstone of human religion/spirituality derives from the numinous, or mystical, experience (Maslow, 1964). Mystical experiences are common in religious traditions across cultures and throughout history, and while they may occur spontaneously, humans have used a variety of means, such as meditation, prayer, fasting, experiences in nature, dance, and psychoactive substances to induce them (Hood, 2016; Metzner, 1998, 2004; Wasson, 1980).

Whether spontaneous or produced through technological means, the essential features of the mystical experience are phenomenologically indistinguishable.

Descriptions across sources reveal common features, suggesting a core experience that cuts across religions and cultures (Stace, 1960). These central features include: a sense of unity; transcendence of time and space deeply felt positive mood; a sense of sacredness and awe; gnosis; paradoxicality; ineffability; transiency; and persisting positive changes (Pahnke, 1967). In this most pronounced form of self-transcendent experience there is typically complete dissolution of the boundaries of the personal self, leaving the person feeling a sense of total oneness and inclusion within the broader ontological context of which they are a part (Grinspoon & Bakalar, 1979; Pahnke, 1969).

Self-Transcendence and Psychospiritual Development

Carl Jung believed that numinous experiences were crucial for the process of individuation, which was his term for psychospiritual development (Stein, 2006). For Jung (1971), the treatment of psychopathology and the process of individuation were one and the same, entailing the integration of conscious and unconscious aspects of one's total personality, or Self. In a numinous experience the conscious ego encounters unconscious (i.e., unknown) dimensions of the Self in an overwhelming and humbling encounter. This interaction leads to further expansion of consciousness and a greater sense of perspective towards, and decentering from, one's ego, essential for psychospiritual maturity (Stein, 2006).

Similarly, Abraham Maslow (1964, 1968, 1971) was interested in the function of mystical experiences, which he classified under the broader rubric of "peak" experiences. Maslow described peak experiences as acute identity experiences and temporary moments of self-transcendence, characterized by awe, joy, and gratitude. He found that peak experiences were common in many self-actualizing and all self-transcending

individuals and noted that these individuals often attested to their therapeutic effects. For example, even a single peak experience was reported to be able to eliminate psychological symptoms, such as chronic anxiety or suicidality. Noting that individuals who had peak experiences became more integrated, self-accepting, and altruistic, Maslow came to believe—like Jung—that peak experiences might foster the process of psychospiritual development.

Maslow (1964, 1968) was also aware of the early research indicating that psychedelics could induce peak experiences and proposed that they might have some use as tools to promote self-actualization. Klavetter and Mogar (1967) tested this hypothesis by administering research participants LSD and mescaline, measuring the magnitude of the participants' peak experiences, and correlating this with a measure of self-actualization. Those who experienced high magnitude peak experiences evaluated their experience as highly beneficial and meaningful, and showed greater levels of self-actualization compared to those who did not have such an experience.

In a study conducted by Richards et al. (1977), those participants who had a psychedelic induced peak experience demonstrated statistically significant increases on a measure of self-actualization from pre to posttest, while those who did not have a peak experience did not show significant changes. Hood (1977) also explored the relationship between self-actualization and mystical experiences, and found that amongst his research participants, high scores on a measure of self-actualization were associated with mystical experiences facilitated using psychedelics.

Lawrence Kohlberg (1973) also believed that mystical experiences were important for advanced growth. In his original theory, Kohlberg outlined the progression

of moral development through six stages, from pre-conventional, to conventional, to postconventional. However, in his late work, Kohlberg proposed a seventh, "cosmic" stage, and suggested that having a mystical experience could help to inform this broader perspective toward the self and one's place in the universe (Kohlberg & Power, 1981; Kohlberg & Ryncarz, 1990).

Dale (2014) notes that mystical experiences were also an important part of the life and work of Jean Piaget, who suggested that these states could foster the process of advanced cognitive development by serving as a catalyst to experiencing higher stages of perception. Carl Rogers (1980), too, asserted the importance of the "mystical, spiritual dimension" (1980, p. 130) in the fully functioning person. Citing the LSD studies conducted by Grof (1975) and Lilly (1973), Rogers expressed interest in the role for psychedelics to promote mystical experiences.

Taken together, it is clear that a better understanding of self-transcendent states will hold great significance for advancing our psychological well-being and spiritual development. Importantly, whether termed a numinous, mystical, or peak experience, a central feature cutting across all conceptualizations of this highly potent form of self-transcendent experience is a profound feeling of awe, in either its ecstatic or terrifying form (Casement & Tacey, 2006; Grotstein, 2006). We thus now turn to a review of awe and its role in psychospiritual growth.

Awe: The Prototypical Self-Transcendent Emotion

Contemporary psychologists define awe as a feeling of wonder when facing something vast and beyond understanding or comprehension (Keltner & Haidt, 2003). It is considered to be the prototypical *self-transcendent* emotion, involving a deep,

experiential awareness of one's smallness, and a concomitant sense of connection with a perspective greater than one's self (Haidt, 2006; Maslow, 1964; Van Cappellen & Saroglou, 2012). As with other positive emotions, awe is believed to "broaden and build" one's mindset (Stellar et al., 2017). Accordingly, feelings of awe can expand an individual's thought and action potential, thus fostering the emergence of creative thoughts, behaviours, and attitudes, and the expansion of an individual's schemas (see Fredrickson, 2001).

Perhaps unsurprisingly, self-transcendent feelings of awe are thought to be a defining feature of spirituality (Batson & Stocks, 2004; Corbett, 2012; Demoulin, Saroglou, & Van Pachterbeke, 2008). Indeed, even experimentally inducing awe has been found to increase participants' self-ratings of spirituality (Saroglou et al., 2008; Van Cappellen & Saroglou, 2012; Van Cappellen et al., 2013). Given this association, Corbett (2012) suggests that spirituality is in fact synonymous with awe. Because awe is commonly experienced in a psychedelic state (Korngold, 1963; Leary, 1970; Masters & Houston, 1966; Pahnke, 1967), this may in part explain the heightened levels of spirituality found in psychedelic users (e.g., Lerners & Lyvers, 2006; Móró et al., 2011).

Bonner and Friedman (2011) have proposed that the central features of awe include: openness, profoundness, heightened perception, connectedness, vastness, numinousness, fear, existential awareness, acceptance, here-and-now presence, and ineffable wonder. In order to experience awe, one must first be open to experience—open to being challenged by the unknown and mysterious. When experienced, awe has a profound quality in which one's perception of the world is made more real or vivid. It challenges one's sense of being a separate self, generating expansive feelings of

connection, unity, and being part of a vast and greater whole (Bonner & Friedman, 2011; Shiota et al., 2007).

Individuals, religious and secular alike, typically experience this encounter with something so overwhelmingly vast to be a sacred or numinous presence, evoking fascination and fear, as one is humbled and "shrinks" before its incomprehensibility (Campos et al., 2013; Rudd, Vohs, & Aaker, 2012). This diminution, shrinking, or negation of the self (Piff et al., 2015) may evoke greater existential awareness and self-reflection, which can lead to acceptance of limitations, such as mortality, in awareness of one's smallness and singular insignificance (Bonner & Friedman, 2011). Time is suspended and one is drawn in fascination into the here-and-now, leaving a feeling of wonder and joy (Haidt, 2006; Schneider, 2004, 2009). Indeed, it has been suggested that the awe's beneficial effects may be due this dissolution of the self, otherwise known as hypo-egoicism (Leary et al., 2011; Piff et al., 2015). This small self/unitive experience/ego dissolution/hypo-egoicism may mediate the relationship between awe and self-insight, positive mood, gratitude, well-being, life satisfaction, humility, prosocial motivations, and mindfulness (see Hendricks, 2018 for references).

As previously noted, Newberg and d'Aquili (2000) have suggested that self-transcendent experiences, such as awe, exist on a spectrum of intensity. In a similar manner, it has also been proposed that experiences of awe themselves may exist on a spectrum of intensity (Silvia, Fayn, Nusbaum, & Beaty, 2015), with the most profound moments of awe either precipitating, or being in some way synonymous with, mystical or peak experiences (see Mitchell & Williams, 1996; White, 1987). Thus, while "normal"

feelings of awe may characterize the center of the self-transcendence continuum, heightened awe may be concomitant, or analogous with mystical experiences.

Awe and Psychospiritual Development

Keltner and Haidt (2003) proposed that in order to feel awe, an experience must entail two essential features: perceived vastness and the need for accommodation, which are roughly analogous to novelty and comprehensibility, respectively (Campos et al., 2013). Vastness (extreme novelty) refers to anything experienced as much greater than the self or one's current capacity to grasp or understand. This may be something experienced as physically vast, conceptually complex, overwhelmingly novel, or infinite. What is crucial is that the experience dramatically challenges one's usual frame of reference and understanding (Shiota et al., 2007). Accommodation (comprehensibility) refers to the process where the mental frameworks that map one's understanding of reality must grow or change in order to incorporate an experience or idea that cannot be assimilated into one's current cognitive structures (Keltner & Haidt, 2003). In other words, "awe involves a challenge to or negation of mental structures when they fail to make sense of an experience of something vast" (Keltner & Haidt, 2003, p. 304).

Most experiences we encounter in daily life can easily be assimilated into existing schemas, thus preserving existing mental frameworks, resulting in no change in personality (Block, 1982). Typically, when an individual has new thoughts or experiences that do not fit their existing maps of reality, they screen them out by selective inattention or defense mechanisms. However, when an individual has an extraordinarily vast, novel, or complex experience that breaches the limits of understanding, he or she enters a state of disequilibrium and tension, and cannot make sense of, or assimilate, the experience.

This tension is typically marked by curiosity, surprise, anxiety, or fear (Kreibig et al., 2007), which are often associated with awe.

Importantly, psychospiritual development is promoted when new experiences challenge one's established schemas or frames of reference. When the meaning-making structure (the ego, or self-schema) cannot readily assimilate an experience, the structure itself must be modified to integrate with the new information (accommodation). This facilitates vertical development, or the establishment of a broader perspective in which previously discordant ideas or perspectives are integrated in a broader whole (Cook-Greuter, 2000; Jung, 1971; Kegan, 1982).

This process of accommodation and vertical development is perhaps analogous to *second-order change* in psychotherapy (Hanna, Giordano, Dupuy, & Puhakka, 1995; Hanna & Ritchie, 1995). Second-order change, which is subjectively experienced as *transcendence,* is defined as, "moving beyond or stepping outside of a set of perceived restrictions, confines, or limitations—largely in terms of systems of meaning" (Hanna, et al., 1995, p. 146). Transcendence involves breaking away from old modes of being and experiencing oneself in a new ways, and underlies the process of growth (Tien, 1991).

Murray (2002) noted that second-order change, or transcendence, is facilitated by Self-exposure—the cathartic, though painful, reexperiencing of warded off aspects of one's Self. Dissolving the protective defences of one's ego structure allows for a new understanding and relationship with the core of one's being, leading to a restructuring of the personality and concomitant feelings of unity, wholeness, and completion. According to Murray (2002), second-order change is simultaneously therapeutic *and* developmental, analogous to the process of growth studied by Loevinger (1976) and Kegan (1982). Thus,

when a profoundly vast, novel, or complex experience challenges one's self, this may result in accommodation and the subsequent restructuring into a more integrated whole—second order change and personality growth (Cook-Greuter, 1994; Labouvie-Vief, Grühn, & Studer, 2010). Thus, psychedelics may facilitate psychological healing and development, at least in part, by inducing experiences of awe (e.g., Hendricks, 2018).

However, Keltner and Haidt (2003) emphasized that awe involves a *need* for accommodation, which may *or* may not be met. They propose that this explains how awe can have a terrifying or enlightening quality. Sundararajan (2002) incorporated two additional elements into Keltner and Haidt's (2003) model to conceptualize this terrifying aspect of awe—*negativity* and *self-reflexivity.* Negativity describes the insufficiency of one's schemas to conceptualize an experience, while self-reflexivity involves the deep contemplation of one's core existential situation that occurs when negativity (insufficiency of comprehension) is attuned to one's very sense of self. To the extent that self-reflexive negativity forces us to examine our self and question our basic assumptions, it requires radical accommodation (Sundararajan, 2002).

In other words, the response to overwhelming vastness is often experienced as profound, and sometimes painful, self-dissolution (Sundararajan, 2002). Awe and trauma are thus similar in that they both involve an encounter with something that far exceeds the capacity of the self to comprehend and integrate (Sundararajan, 2002). As Bonner and Friedman (2011) noted, when deeply awe struck, the insufficiency of current maps of meaning can threaten one's very sense of self, which has the potential to lead to progressive self-transcendence *or* traumatic self-annihilation (we will return to this issue in Chapter V).

In such a way, accommodative challenge, and the concomitant degree of stress of an experience, are two key features of growth inducing experiences (Manners & Durkin, 2000). To grow, one's expectations must be challenged by new experiences to liberate and transcend the structures within which one is accustomed. It is the extent to which an individual responds to a challenging experience with openness and self-reflection that is critical, as it is through reflection that more complex ways of thinking become part of one's self (Block, 1982; Lilgendahl, Helson, & John, 2013; Loevinger, 1976; Manners & Durkin, 2000).

The motivation for self-reflection—the exploration of novel self-perceptions—is a characteristic of those with high levels of the personality trait openness to experience (McCrae & Costa, 1997; Staudinger & Glück, 2011). This may explain why Bonner and Friedman (2011) found openness to be a *precondition* for experiencing awe. One must be open to change—open to reflection and revising one's perspectives on the self, others, or the world—in order to be awed (Schneider, 2004, 2009).

Openness to Experience

The Five-Factor model is the most widely used taxonomy of personality traits in psychology (John, Naumann, & Soto, 2008). Within this model, openness to experience subsumes personality characteristics relating to curiosity, imagination, creativity, artistic and aesthetic interests, emotional and fantasy richness, rebelliousness, and unconventionality. McCrae and Costa (1997) argue that openness to experience captures "the breadth, depth, and permeability of consciousness, and ... the recurrent need to enlarge and examine experience" (p. 826). Those high in openness tend to seek out

challenging experiences, are often self-reflective about these experiences, and remain open to reconsidering their perspectives and values.

McCrae and Costa (1997) note that openness to experience can be defined by permeability of consciousness, such that closed individuals have a greater boundary between conscious and unconscious aspects of the mind. Enhanced access to primary process cognition can be adaptive in that conventional associations and conceptualization can be suspended, opening the mind to greater novelty.

McCrae and Costa (1997) further contend that openness is thus closely related to *regression in service of the ego*. In fact, openness to experience is rooted in Kris' (1952) and Fitzgerald's (1966) work on regression in service of the ego. Kris (1952) argued that creative individuals can intentionally loosen the boundaries that separate waking, rational cognition from the primary, pre-conceptual cognition seen in dreams, psychosis, and other altered states of consciousness, including the psychedelic state. This intentional regression to primary cognition is adaptive in that it serves creativity. Fitzgerald (1966) similarly views regression as a loosening of fixed interpretations and the filtering of experience, so that one is able to approach experience from novel perspectives.

Openness is also related to Tellegen and Atkinson's (1974) concept of *absorption*, which may be interpreted as the capacity for absorbed and self-altering attention (Glisky et al., 1991; McCrae & Costa, 1997). Tellegen (1981) proposed that high trait-absorption is associated with an experiential set (image oriented and affectively toned), whereas low-absorption is associated with an instrumental set (reality oriented and rational).

Openness is likewise related to Hartmann's (1991) notion of thick-thin boundaries (McCrae & Costa, 1997). Hartmann suggested that thin boundaries (high openness) entail

more primary process cognition in awareness and noted that individuals with thin boundaries are less restricted, more open to growth, and childlike. Hartmann (1991) found that many older individuals tend to have thicker boundaries and are thus more inflexible and closed to new experiences. This corresponds with empirical research demonstrating that openness to experience tends to decline with age (Costa et al., 2000). However, Hartmann (1991) suggested that individuals who continue to grow as they age are able to maintain permeable, thinner boundaries.

Openness to Experience and Psychedelics

Hartmann (1991) proposed that classic psychedelics, such as LSD, put the user into a state of temporarily thinned boundaries. In contemporary terminology, this might be conceptualized as a temporary increase in openness. Recently, empirical support has been found for this hypothesis. For example, Carhart-Harris et al. (2016b) gave 20 participants intravenous LSD on one occasion and intravenous saline placebo on another. They found significant increases on a measure of openness to experience two weeks after the LSD session, but not after the placebo. In another study, Lebedev et al. (2016) gave 19 participants intravenous LSD on one occasion and saline placebo on another. They found significant increases on a measure of openness to experience two weeks after the LSD session, but not after placebo. Those who experienced the greatest increases in openness also experienced the greatest degree of ego-dissolution.

Similarly, MacLean et al. (2011) found that a single dose of psilocybin was associated with increases in openness to experience in psychedelic-naive participants, with changes persisting for at least one year. Participants showing large increases in

openness experienced a mystical state, while those who did not show substantial changes in openness did not have a mystical experience.

In a study by Erritzoe et al. (2018), 20 patients with depression received 10 mg psilocybin in a first session, and 25 mg in the second. Two therapists adopted a non-directive approach, encouraging patients' uninterrupted introspection. Openness scores significantly increased after the second session. Importantly, this increase did *not* correlate with treatment outcomes, as openness changed equally for improved and unimproved patients. Erritzoe et al. (2018) proposed that increased openness might be specific to the effects of the psychedelic itself rather than an effect of the psychotherapy.

Regarding non-experimental research, Carroll's (2008) study of long-term psychedelic users found that they reported the development of a more open-minded outlook toward life. Long-term users described being more open to trying new things, greater openness to different ideas about life, spirituality, and the universe, and greater appreciation of nature, patterns, and music. These descriptions directly correspond with qualities of openness to experiences as outlined by McCrae and Costa (1997). When these experimental and qualitative research findings are taken as a whole, there is a strong argument that psychedelic substances have the potential to increase openness to experience, at least temporarily.

Openness to Experience and Self-Transcendence

As noted, Bonner and Friedman (2011) contend that one must be open to experience awe. Similarly, McCrae (2009) proposed that openness to experience effectively denotes an openness to awe, mystical experiences, and self-transcendence. In other words, openness to experience may determine one's threshold for experiencing

awe, with higher openness denoting a lower threshold to be awed (Silvia et al., 2015). Substantial research has demonstrated that openness to experience is indeed positively predictive of peak experiences (Mathes et al., 1982), feelings of awe and awe-proneness (McCrae & Costa, 1997; McCrae, 2007; Shiota, Keltner, & John, 2006; Silvia & Nusbaum, 2011), and self-transcendence (Levenson et al., 2005; McCrae, 2009; McCullough et al., 2004; Shiota et al., 2006).

Tellegen and Atkinson (1974) have similarly concluded that absorption, which is strongly correlated with openness, is a central trait underlying aesthetic, peak, and mystical experiences, regression in the service of the ego, and many drug induced states. This has received support from the work of Van Elk et al. (2016), who demonstrated that individuals high on trait absorption reported greater feelings of awe than those low in absorption. Similarly, Spanos and Moretti (1988) found that absorption is strongly correlated with mystical experiences.

These findings also correspond with the work of Wild, Kuiken, and Schopflocher (1995), who proposed that a common feature underlying peak experiences is a capacity for experiential involvement, which entails two features: 1) experiential, as opposed to instrumental, functioning, and 2) meaningful identification and elaboration of stimuli. This, in turn, shows striking correspondence with the work of Kast (1967), who noted that in the psychedelic state explicit goals and purposeful activity lose importance as one is highly engaged with present experience (corresponding with an increase in experiential functioning), and the impact of sensory input is increased as stimuli increase in significance and meaning (corresponding with meaningful identification and elaboration of stimuli).

Openness to Experience and Psychospiritual Development

Maslow (1968) noted that self-transcending individuals reported more frequent peak experiences and a pronounced childlike sense of awe toward existence when compared to non-self-transcending individuals. He proposed that both characteristics were due to their enhanced openness to experience and access to primary process cognition. In a similar manner, Jung (1971) argued that permeability of consciousness and an openness toward unconscious processes was necessary for the process of individuation. Likewise, Rogers' (1961) theory of the fully functioning person was largely rooted in growing openness to one's inner feelings and experience, which may be considered an aspect of the broader dimension of openness to experience (McCrae & Costa, 1997). Altogether, numerous theorists have proposed that openness to experience provides a necessary, though not sufficient, basis for advanced personality growth (Loevinger, 1976; McCrae & Costa, 1997; Staudinger & Glück, 2011).

Furthermore, empirical research has demonstrated that openness is amongst the most important predictors of eudaimonic well-being, as well as moral, spiritual, and personality growth (Levenson et al., 2005; McCrae & Costa, 1980; Keyes, Shmotkin, & Ryff, 2002; Schmutte & Ryff, 1997; Staudinger & Bowen, 2010). For example, openness to experience shows strong correlations with the personal growth dimension of Ryff's psychological well-being scale (Schmutte & Ryff, 1997), the Washington University Sentence Completion Test measure of ego development (Hogansen & Lanning, 2001; Kurtz & Tiegreen, 2005; McCrae & Costa, 1980), the quiet ego scale (Wayment et al., 2015), and measures of self-transcendence, wisdom, and personality growth (Levenson et al., 2005; Staudinger & Glück, 2011).

In summary, convergent lines of research give a strong basis to the contention that psychedelics may be conceptualized as tools for putting one in a state of increased openness to experience and, in particular, openness to awe and mystical states. Importantly, Bonner and Friedman (2016) have suggested that any means that increases openness can potentiate experiences of awe which, if attended to, may foster an individual's psychospiritual well-being and growth.

Novelty-Seeking and Psychedelics

Because psychedelic experiences can be profoundly disequilibrating to one's sense of stability, deliberate pursuit of these states may indicate an intentional desire of the user to grow by stretching his or her self-boundaries (Gowan, 1975). This point is of critical importance, as the typical reasons assumed for drug use, such as "to feel good and escape from life's troubles," cannot explain the deliberate use of psychedelics (Móró et al., 2011). Because of this, the use of psychedelics has little in common with other psychoactive drugs, such as alcohol or heroin (Metzner, 2005). Typically, one does not use a psychedelic to escape from life, but rather, to encounter existence in its overwhelming intensity.

Various psychological characteristics may incline people to seek out novel experiences and to feel confident in their ability to respond to them; however, primary amongst these is openness to experience. *Curiosity* is a facet of openness to experience (John & Srivastava, 1999). Highly curious (open) individuals intentionally seek novelty knowing it may involve anxiety and the revision of their previous perspectives (McCrae & Costa, 1997). Novelty seeking, which is related to curiosity (Kashdan et al., 2004), can be defined as, "...the need for varied, novel, and complex sensations and experiences and

the willingness to take physical and social risks for the sake of such experience" (Zuckerman, 1979, p. 10).

Pearson (1970) described four types of that novelty seeking: external sensation seeking—the tendency to enjoy active, physical participation in "thrilling" activities; internal sensation seeking—the tendency to enjoy the experience of unusual dreams, fantasies, or internal feelings; external cognitive seeking—the tendency to enjoy finding out facts, how things work, and how to do new things in the world; and internal cognitive seeking—the tendency to enjoy thinking about internal processes and developing explanatory principles and conceptual frameworks. Furthermore, numerous studies have shown that the use of psychedelics is associated with novelty seeking—particularly internal sensation seeking (Brill, Crumpton, & Grayson, 1971; Eisenman, Grossman, & Goldstein, 1980; McGlothlin & Arnold, 1971; Segal & Merenda, 1975; Segal & Rose, 1972; Zuckerman, 1972).

Thus, some psychedelics users are likely to use these compounds to intentionally modulate consciousness to induce states of profound novelty or complexity in which one's schemas must accommodate to the new perception of reality (cf. Müller & Schumann, 2011). In this sense, psychedelic *awe-seeking* may represent a particular subtype of internal novelty seeking. Strong correlations between awe and openness to experience further link awe with this deliberate tendency to push one's boundaries (Shiota et al., 2006; Shiota et al., 2007).

Awe-Seeking and Psychospiritual Development

Awe-seeking is likely to be conducive to psychospiritual development, as deliberately challenging and accommodating one's schemas is required for advanced

growth (Langer et al., 1990; Staudinger & Kessler, 2009). However, a critical aspect of seeking awe is that a person must feel as though he or she has the capacity to effectively cope with uncertainty (Kashdan et al., 2009). Therefore, the pursuit of awe reflects not only a desire to intentionally expand one's self boundaries, but also a willingness to engage the anxiety and tension that arises when encountering something new and unexpected (Kashdan et al., 2009). Indeed, awe-prone individuals have a low need for cognitive closure, suggesting that they are comfortable challenging and revising their mental structures (Shiota et al., 2007). Conversely, a more defensive approach to discordant, challenging experiences involves gating thoughts, feelings, or impulses that may cause anxiety (Brown & Ryan, 2003; Langer et. al, 1990). This involves the maintenance of categories that prevent, or filter out, new learning and growth. Because of the intense potential for anxiety with experiences of awe, individuals with low tolerance for uncertainty using a defensive approach may avoid or be blocked from awe (Bonner & Friedman, 2011).

The relationship between awe-seeking and growth further relates to the work of Helson and Srivastava (2001), who distinguish three pathways of positive adult development: the pathway of security and a life in accord with social norms and conventions (*conservers*), the pathway of social recognition and achievement (*achievers*), and the pathway of seeking personality growth and independence from social norms (*seekers*). Helson and Srivastava (2001) note that conservers tend to avoid anxiety and find security, while seekers tend to pursue new perspectives and experiences at the cost of anxiety. Seekers use a strategy called *deviation amplification through exploration*. This involves intentionally seeking to grow by pursuing and accepting disequilibration,

which allows for new schemas to develop through accommodation and equilibrium. It involves the search for greater self-objectivity, flexibility, tolerance for ambiguity, and the exploration of complex emotions.

Helson and Srivastava (2001) note that seeking is associated with openness to experience and, compared to both the conserving and achieving orientations, is most strongly associated with personality growth. Seeking involves a mindful orientation—an open, receptive, and accepting attitude towards experience—which enhances one's capacity to cope and adjust to the uncertainty of novel or discordant experiences (Bishop et al., 2004; Lau et al., 2006). Thus, many seekers are likely to be awe-seekers, as well. For these individuals, the intentional use of psychedelics to foster novelty, awe, and accommodation may be conceptualized as a form developmental practice, with the user deliberately inducing and exposing him or herself to a highly novel and challenging experience to practice surrendering (accommodating) to experience.

This shows important parallels with mindfulness practice. Indeed, research suggests that this openness or deliberate exposure in psychedelic experiences shares similarities with mindfulness practice. For example, studies show that psychedelic use may increase trait mindfulness (Soler et al., 2016; Thomas et al., 2013). Furthermore, research has shown that meditation practice is strongly predictive of self-transcendence, the quiet-ego, and other models of psychospiritual development (Levenson et al., 2005; Wayment et al., 2011).

This open, mindful, awe-seeking approach may help explain why certain individuals are more likely than others to experience fear of losing control, going insane, or extreme panic when resisting a psychedelic experience (Grinspoon & Bakalar, 1979).

Accommodation is a more likely response among individuals high in openness to experience, while assimilation is a more likely response among those who are lower on openness (Manners & Durkin, 2000). When assimilation fails, these individuals may thus be more prone to experience a sense of losing control, as they struggle with surrendering to accommodation. In other words, an open, non-judgmental, seeking stance toward experience may entail a greater capacity to intentionally *surrender to awe* and the discordance of the psychedelic state. This willing to surrender is critical for a positive experience (cf. Gowan, 1975; Leary, Metzner, & Alpert, 2007).

However, beyond this intentional desire or openness is the importance of *capacity.* One must have the ego-strength necessary to surrender to one's experience—to willingly, though painfully, disintegrate and accommodate one's self-structure. As is often said in transpersonal psychology, one must first have a self before it can be transcended (e.g., Cook-Greuter, 2000; Irwin, 2002; Vaughan, 2000). This is a key factor distinguishing awe and psychospiritual growth from terror, trauma, and psychosis, a topic to which we now turn.

Chapter V: Self-Transcendence or Psychosis? Developmental Considerations for the Safe Use of Psychedelic Substances

The only part of you that burns in hell is the part of you that won't let go... Your memories, your attachments - they burn them all away. But they are not punishing you, they're freeing your soul... If you're frightened of dying and you're holding on, you'll see devils tearing your life away. But, if you've made your peace, then the devils are really angels, freeing you from the Earth.

Lyne (1990)

Although profound feelings of awe can foster accommodation and the potential for second-order change and psychospiritual growth, it must also be stated that such experiences can be extremely challenging (Langer et al., 1990). As a result, psychedelic experiences may just as easily be terrifying as enlightening, and very often they are both (Grinspoon & Bakalar, 1979). Those wishing to use psychedelics must appreciate that the terms awesome and awful in their truest sense derive from the *awe-full* quality of facing the wholly other, or numinous (Gowan, 1975; Ostow, 2006; Otto, 1923). In fact, the word awe was originally used to express fear and dread (Halstead & Halstead, 2004).

When an experience is so vast, novel, or complex that assimilation fails, an individual *needs* to accommodate the experience; failure to accommodate can lead to anxiety, terror, the sense of "going crazy," and even the possibility of trauma or reactive psychosis (Dabrowski, 1964; Sundararajan, 2002). Conversely, successful accommodation may lead to second-order change. Therefore, the question as to what tips the balance between accommodation and psychospiritual growth on the one hand, or failed assimilation and trauma—or potentially even psychosis—on the other, is critical.

This chapter hopes to provide a theoretical framework, taking into account developmental psychopathology and transpersonal psychology, to help to make this distinction.

Positive Disintegration and Stress-Related Growth

Psychospiritual growth can be fostered by experiences that "force" us to grow by challenging us to reorganize—but not completely destroy—our assumptions about life, values, and sense of purpose (Staudinger & Glück, 2011). In fact, Dabrowski (1964, 1967) suggested that growth cannot take place without anxiety or crisis and labelled this process of beneficial disequilibrium *positive disintegration.* Contemporary research has demonstrated that stressful and even traumatic experiences can indeed potentiate psychological and spiritual development (e.g., Park, Cohen, & Murch, 1996; Tedeschi, Park, & Calhoun, 1998).

The notion of positive disintegration, or stress-related growth, has resonance in the work of Jung (1971), who noted that individuation entails suffering as the ego submits itself to the dictates of the Self, while Maslow (1968) suggested that although adjustment limits tension it halts growth toward self-actualization. Ebersole (1970) found that *nadir experiences* (very stressful events), seem to produce at least as potent effects on one's growth as do peak experiences. Similarly, Rogers (1961) believed that self-actualization was a difficult process involving a continuous stretching of one's limits.

Dabrowski, Kawczak, & Piechowski (1970) noted that intense existential awareness is often associated with positive disintegration and argued that it is especially important for catalyzing growth. Other theorists have similarly found that crises evoking existential awareness are particularly apt at stimulating development as they induce deep self-reflection and new insights about self, others, and the world (Grant, Franklin, &

Langford, 2002; Kohlberg & Ryncarz, 1990; Langer et al., 1990; Levinson, 1990). For example, Pascual-Leone (1990a) asserted that existential limit situations (e.g., aging, illness, death, etc.) require self-reflection and growth in response, while Yalom (1980) similarly contended that "boundary" situations, experiences that foist us into a confrontation with existence, can foment a substantial shift in one's outlook. Likewise, Reed (2009) argued that psychospiritual growth is prompted by crises such as loss, illness, aging, end of life, and other experiences that engender existential awareness.

Psychedelics and Existential Awareness

Incidentally, many researchers have noted that psychedelic experiences often foster a state of existential awareness (Buckman, 1967; Leary, 1970; Pahnke, 1967; Savage et al., 1967). This is perhaps unsurprising, given that existential awareness is a central element of experiences of awe (Bonner & Friedman, 2011). Indeed, awe temporarily diminishes self-coherence and prompts a search for meaning, thus opening a gateway to existential boundary experiences that can foment growth and transformation (Bonner & Friedman, 2016). Intense awe disrupts our deepest assumptions, and in turn compels us to reevaluate our values, goals, and strivings (Perlin & Li, 2020). In other words, awe removes us from our habituation to everyday life and foists us into an overwhelming re-encounter with the mystery of existence itself.

Tupper (2002, 2003) argued that because psychedelics can stimulate profound awe and existential awareness, they might be used as cognitive tools to foster existential education. He has proposed that Gardner's (1999) theory of existential intelligence might be a useful guide to approach the utility of psychedelics. Gardner defined existential intelligence as the tendency, "to be concerned with 'ultimate' issues of life, … to engage

in transcendental concerns … [and] the capacity to locate oneself with respect to the furthest reaches of the cosmos—the infinite no less than the infinitesimal—and the related capacity to locate oneself with respect to the most existential features of the human condition—the significance of life, the meaning of death, the ultimate fate of the physical and the psychological worlds, such profound experiences as love of another human being or total immersion in a work of art" (Gardner, 1999, p. 60).

Gardner (1999) proposed that existential intelligence involves actively grappling with the human existential condition *without* assuming any truth claims. The substantial divergence with which individuals hold their beliefs with unquestioning certitude or are open to reconsideration therefore touches upon one's capacity for psychospiritual maturity (Van Pachterbeke, Keller, & Saroglou, 2011). In other words, the humility to revisit and change one's deepest beliefs requires the self-integration, flexibility, and maturity characteristic of personality growth. This is evidenced by the increased tolerance for ambiguity, empathy, and altruistic behaviour found amongst those with high levels of existential thinking (Staudinger & Kunzmann, 2005; Van Pachterbeke et al., 2011).

In support of Tupper's contention that psychedelics may be used to promote awe and thereby facilitate existential intelligence, Bonner (2015) demonstrated that two measures of awe were strongly correlated with existential thinking. It is plausible, then, that intentionally using psychedelics could help to foster development by opening an individual to awe and existential awareness. However, because existential awareness and deep self-reflection is often painful, one must be prepared for some modicum of distress when taking a psychedelic substance. Thus, as Grinspoon and Bakalar (1979) have

pointed out, when considering the outcome of a psychedelic experience, the question is not whether you suffered, but whether the suffering was worthwhile.

Psychedelics and Positive Disintegration

It should be noted that dread, and even seemingly psychotic reactions, arising from an existentially disequilibrating psychedelic experience are not necessarily pathological (Dabrowski, 1967; Gowan, 1975). In fact, research suggests that individuals may grow from both ecstatic experiences and horrifying disintegrations alike. The benefits of disintegrating and existentially challenging psychedelic experiences was first noted by McGlothlin and Arnold (1971) in their study of LSD users. Of the 24 percent of study participants who reported having a "bad trip," 50 percent felt the experience was beneficial. Research participants reported that the experience forced them to encounter a conflict they were avoiding and that they subsequently grew by facing the issue.

More recently, in a study exploring nearly 2000 psilocybin users' most difficult psychedelic experiences, Carbonaro et al. (2016) found that 84 percent of respondents reported having benefited from the experience, with 76 percent reporting increased well-being attributable to the experience. Moreover, 60 percent of respondents considered their experience to be among the top 10 most personally meaningful experiences of their lives. The difficulty of the experience was significantly correlated with enduring personal meaning, spiritual significance, and increased life satisfaction (Carbonaro et al., 2016). Barrett et al. (2016) also found that challenging psychedelic experiences associated with feelings of loss of sanity and death were related to a sense of meaningfulness and spiritual significance, while profound fear was related to a sense of well-being.

What is particularly interesting in Carbonaro et al.'s (2016) study is that 21 percent of participants' reports of their single most challenging psychedelic experience also fulfilled the criteria for a complete mystical experience. This shows correspondence with Dabrowski (1967), who found that mystical experiences often occur through disintegration, and Maslow (1968), who noted that mystical experiences were often reported as somehow akin to a "beautiful death." This also corresponds with Otto's (1923) assertion that numinous encounters involving a tremendous, self-annihilating fear are at the core of mysticism.

Positive Disintegration or Trauma?

Fingarette (1963) pointed out that it is the response to self-disintegration that is critical. If the threat to the self is bearable and the individual can willingly surrender to the unknown, self-challenging anxiety can facilitate the process of psychospiritual development. However, when the process goes further toward massive disintegration, there can be traumatic anxiety (Fingarette, 1963). As such, although disintegration may be experienced as beneficial for the prepared individual, it may be traumatic or even lead to a psychotic reaction, for the unprepared or unstable (Gowan, 1975).

Sundararajan (2002) has proposed that one of the key differences between whether an experience will be traumatic or growth-inducing is the intentional desire and capacity of the individual to surrender to the experience, to deliberately and receptively allow one's self to be dissolved and expand into something experienced as much greater. In other words, a desire and explicit pursuit of self-transcendence. As noted, "surrendering" control to what arises in the psychedelic state is crucial for a positive experience (Gowan, 1975; Leary et al., 2007).

How can we distinguish those who may benefit and those who may be harmed by an experience of ego-dissolution, beyond the intention to surrender? In the interest of developing frameworks for the use and regulation of psychedelics compounds, this question is paramount.

Openness to Experience and Latent Inhibition

The degree of novelty in any experience is a function of the discrepancy between an individual's past and present experience (Pearson, 1970). Consequently, while novelty is often used to mean something new, it can also be applied to something familiar that is seen from a new perspective (DeYoung, Peterson, & Higgins, 2005). It has been found that differences in response to novelty correspond with *latent inhibition*, a cognitive process wherein habituated stimuli are gated from entering awareness (DeYoung et al., 2005; Peterson & Carson, 2000). Latent inhibition serves to automate processing, such that conscious attention is not distracted by non-essential stimuli (Fromm, 1977).

There is a substantial, negative correlation between openness to experience and latent inhibition (Peterson & Carson, 2000; Peterson, Smith, & Carson, 2002). That is, openness is associated with a *reduction* in latent inhibition, and thus a greater tendency to perceive novelty (Peterson & Carson, 2000; Peterson et al., 2002). The connection between openness and latent inhibition lends further support to the assertion that psychedelic drugs produce a state of temporarily increased openness to experience. For example, research has found that 5-HT2A receptor agonists reduce latent inhibition (Cassaday, Hodes, & Gray, 1993; Hitchcock, Lister, Fischer, & Wettstein, 1997), while 5-HT2A serotonin receptor antagonists increase latent inhibition (Alves & Silva, 2001; Hitchcock, Lister, & Wettstein, 1997; McDonald et al., 2003). Given that the classic

psychedelics are potent 5-HT2A receptor agonists, Jakab and Goldman-Rakic (1998) have suggested that these drugs may produce (at least some of) their effects by temporarily reducing latent inhibition (and thereby temporarily increasing openness). Similarly, research has demonstrated that 5-HT2A receptor binding affinity is associated with absorption, which, as previously noted, is strongly correlated with openness to experience (Ott, Reuter, Hennig, & Vailt, 2005).

Although latent inhibition is important for conserving attentional resources by gating non-consequential, habituated stimuli, it also renders the individual less aware of filtered stimuli that might be used to revise perspectives or behaviour. In other words, lowered latent inhibition reduces the screening of stimuli, which can lead to experiencing situations with a sense of freshness (Nelson & Rawlings, 2010). Reducing latent inhibition may thus have adaptive consequences by allowing greater access to unfiltered stimuli, leading to greater flexibility and creativity in processing information (DeYoung et al., 2005). Research has demonstrated that openness and reduced latent inhibition are indeed correlated with creativity (Carson et al., 2003; McCrae, 1987, 1994). Analogously, absorption also correlates with measures of creativity (Lynn & Rhue, 1986; Manmiller, Kumar, & Pekala, 2005), and gifted adolescents show substantially higher levels of absorption relative to normal adolescents (Kerr & McKay, 2013).

Reducing latent inhibition may be conceptualized similarly to de-habituation or *deautomatization*. Deautomatization occurs when the schemas that filter experience are loosened, bringing the individual into a fresh encounter with experience (Fromm, 1977). With reduced latent inhibition as with deautomatization there is a reduction in the tendency to pre-categorize experience, and a propensity to perceive new meanings and

associations (Peterson & Carson, 2000). This sheds light on the finding that in the psychedelic state experience takes on a feeling of childlike novelty (Grinspoon & Bakalar, 1979). Deikman (1972) has also suggested that deautomatization shifts perception toward a childlike state of primordial cognition. This skew to pre-rational, pre-categorical perception may even de-differentiate the self-environment divide, dissolving the separate self, which can evoke a unitive, mystical experience (Deikman, 1972).

Psychedelic or Psychotomimetic?

However, despite the benefits of openness and reduced latent inhibition, it must also be fully appreciated that high openness and low latent inhibition are not strictly positive (McCrae & Costa, 1997). In fact, schizophrenia and schizotypy are also associated with heightened openness (Miller & Tal, 2007; Ross, Lutz, & Bailley, 2002) and reduced latent inhibition (Gray et al., 1995; Lubow et al., 1992; Weiner, 2003). Piedmont et al. (2009, 2012) explored the impact of maladaptively high openness, and found that extreme scores were correlated with disorganized, psychotic-like symptoms. Analogously, extremely high levels of absorption have been linked to psychotic symptoms in patients with schizophrenia (Perona-Garcelán et al., 2012; Rosen et al., 2017) and psychotic-like experiences in nonclinical populations (Glicksohn & Barrett, 2003; Humpston et al., 2016; Perona-Garcelán et al., 2013). Taken together, these findings suggest that psychosis may be characterized by a state of heightened openness to experience and an attenuated capacity to filter stimuli (Nelson & Rawlings, 2010).

Importantly, Carhart-Harris et al. (2014) have demonstrated that the psychedelic state is in many ways neurologically similar to acute psychotic states. This suggests that, at least to a certain degree, the notion of psychedelics as psychotomimetic agents bears

reconsideration. Recall Swanson's (2018) review, which noted that psychedelics produce their effects by inhibiting the neuropsychological constraints on consciousness. Psychedelic effects appear similar to psychotic symptoms because both entail this disinhibited, permeable mode of consciousness. Crucially, this effect has both therapeutic and developmental significance.

However, as noted, high openness and low latent inhibition are not only correlated with psychosis, but also with creativity, awe, mystical experiences, and personality growth. This, then, creates something of a paradox. Some researchers have suggested that cognitive development may moderate the expression of psychosis in high functioning individuals (e.g., Claridge, 1997; Eysenck, 1995; Berenbaum & Fujita, 1994). For example, Carson, Peterson, and Higgins (2003) found that high cognitive ability, in tandem with high openness and reduced latent inhibition, was related to superior outcomes on tasks of creativity. Similarly, Meyersburg, Carson, Mathis, and McNally (2014) showed that among participants with high cognitive ability, low latent inhibition predicted elevated scores on measures of creativity.

In comparison, low cognitive ability paired with high openness and low latent inhibition appears to be deleterious. For example, psychotic disorganization and schizophrenia are negatively correlated with cognitive ability (Allen, Coyne, & David, 1986; Aylward, Walker, & Bettes, 1984; Elvevag & Goldberg, 2000; Fagerlund, Pagsberg, & Hemmingsen, 2006; Khandaker, Barnett, White, & Jones, 2011; Kirrane & Siever, 2000). Similarly, individuals with schizophrenia show significant impairment on measures of cognitive development (Christ, 1977; Kilburg & Siegel, 1973; Lim, 1988; Rosenthal, Massie, Wulff, 1980; Torres et al., 2007). Thus, although heightened openness

and lowered latent inhibition in the presence of a certain threshold of cognitive development may be advantageous, in their absence these factors may predisposes to psychosis (Peterson & Carson, 2000).

Adult Developmental Psychology and the Safe Use of Psychedelics

Given the literature outlined above, the same act of intentional regression, or opening to the unconscious, with the use of psychedelic drugs may be at once beneficial for some and hazardous for others. In fact, the relationship between lower cognitive development and schizophrenia may help explain the noted contraindication for using psychedelics amongst this population (Cohen, 1985; Johnson et al., 2008). Because cognitive development is a necessary (though insufficient) precondition for advanced psychospiritual development (Cohn & Westenberg, 2004), we must consider the developmental stage of an individual to assess whether plunging into the unconscious with the aid of psychedelics may be harmful or beneficial.

In early phases of development, the reality-oriented ego has not yet been differentiated from the non-rational processes of the unconscious (Cook-Greuter, 2000). Freud (1962) argued that healthy development thus involves the ego slowly differentiating from the unconscious as one moves toward late adolescence. Adolescence is a particularly sensitive period, as self-consciousness is emerging, yet the ego-structure is not yet stable (Harter, 2016). Therefore, individuals in early, preconventional stages of ego-development are most likely to be harmed by openings to the unconscious with the use of psychedelics. This cautions against the use of psychedelics by individuals with tenuous ego-structures, such those on the schizophrenia spectrum, individuals with borderline personality, as well as children and adolescents. Children and adolescents are

still in the process of differentiating a healthy ego structure and developing secondary process cognition to cope with the demands of the outer world. One must have a stable ego-structure before undertaking explorations into the unconscious, as encountering these non-rational processes can be highly destabilizing (Jung, 1971; Wilber, 1980).

However, although it is important for the rational ego to fully develop in adolescence, as one moves into adulthood this one-sided differentiation may develop into rigid conventionality, intellectualization, and rationalization (Labouvie-Vief, 1990; Pascual-Leone, 1990b). In other words, once an individual reaches conventional stages of development, the ego naturally becomes over differentiated, cut off from the creative well-spring of the unconscious (Cook-Greuter, 2000). Advanced development requires the rigid boundaries of the self-structure to be loosened through an opening to, and subsequent re-integration with, these unconscious processes (Cook-Greuter, 2000; Labouvie-Vief 1990; Kramer, 1990).

The ideal trajectory of ego development across the lifespan, then, first involves increasing differentiation of the rational ego and establishment of a conventional view of reality from birth to early adulthood—the *outward arc* (Vaughan, 2000). This is where personality development ends for many individuals. If development proceeds further, one moves into a deliberate deconstruction of ego boundaries and re-integration with the unconscious—the *inward arc* (Cook-Greuter, 2000; Vaughan, 2000). As such, the goal of advanced development is somewhat the opposite of early development, as one must seek to re-access non-rational internal processes (Cook-Greuter, 1990; Orwoll & Perlmutter, 1990; Wilber, 1980). Integrating these discordant and bewildering thoughts, emotions,

images, and impulses, yet maintaining an integrated self-structure, is the task of postconventional development (Sinnott, 1998, 2009).

Taken together, it may be argued that an individual should not undertake the intentional loosening or fragmenting of their ego-structure with the use of psychedelics before obtaining a certain degree of ego development. Perhaps only individuals who have reached advanced conventional stages of development are now ready to venture further with the aid of psychedelics (cf. Irwin, 2002). Interestingly, a similar caution can be applied to intensive meditation, as this practice can induce psychotic reactions (Dyga & Stupak, 2015; Lustyk et al., 2009). Psychoanalytic theorists view deep meditative states as similar to psychedelic states—regressions, or openings, to the unconscious (Shafii, 1973). Analogous to psychedelics, intensive meditation practice appears to increase trait openness (Valentine & Sweet, 1999), and is also associated with decreased activity in the default-mode network (Brewer et al., 2011). Moreover, Epstein & Lieff (1981) note that psychosis is most likely to occur in meditators with tenuous ego-structures.

Developmental Forcing: Psychosis or Spiritual Emergency?

From the preceding section it may be argued that individuals who have not yet developed a stable, conventional ego structure who use a psychedelic, or engage in extensive mediation practice, may be engaging in *developmental forcing*—the process of catalyzing a developmental shift prematurely (Gowan, 1974; Irwin, 2002). In such cases, the disintegration of the ego may lead to a loss of control, paranoia, projection, and even a reactive psychosis. As mentioned in Chapter II, this is the most serious potential risk of using a psychedelic substance and must be taken seriously.

However, in other cases, known as *developmental escalation*, this rupturing of ego—though still potentially terrifying—may "jerk" the individual into a higher-order self-organization (Gowan, 1974). This ego-disintegration, though painful, disorienting, and even *seemingly* psychotic, may, then, accompany advanced development. As Nelson and Sass (2008) have pointed out, while disruption in one's sense of self via a psychedelic can precipitate a mystical experience in some individuals, it may be experienced as alienation from the self and the world in those prone to psychosis. The key is differentiating developmental forcing, which may lead to a psychotic reaction and poor clinical outcomes, from developmental escalation, which may lead to a painful *spiritual emergency* or transpersonal crisis (Grof & Grof, 1989) though, ultimately, psychospiritual development. Or, as Naranjo and Ornstein (1971, pp. 107-108) bluntly put it, "We may be justified in considering many cases of schizophrenia as the outcome of spontaneous plunging of an immature person into the realm of that kind of experience which, when properly assimilated, distinguishes the genius from the average man."

As we move forward into a future of psychedelic-assisted psychotherapy and the decriminalization of recreational use, it will be critical to assess a given individual's developmental status to determine how he or she may react to a potentially destabilizing psychedelic encounter. Further information on making this distinction on the basis of developmental psychopathology has been discussed elsewhere (see St. Arnaud & Cormier, 2017).

PART TWO

Chapter VI: Research Methodology

"I believe that the next great frontier of learning, the area in which we will be exploring exciting new possibilities, is a region scarcely mentioned by hard-headed researchers. It is the area of the intuitive, the psychic, the vast inner space that looks before us. I hope that innovative education moves forward the learnings in this primarily noncognitive realm, the area that currently seems illogical and irrational."

Carl Rogers (1980, p. 312)

At this point, we review the empirical study conducted for this dissertation. The preceding chapters established the theoretical framework and rationale for the following research questions and hypotheses, which can be summarized as follows.

Literature Review Summary and Study Rationale

When considered as a whole, the central aim of this dissertation was to explore beneficial psychedelic drug use in recreational, or non-clinical, contexts. In particular, it aimed to examine whether the use of psychedelics can facilitate greater psychospiritual well-being and development amongst recreational users. In order to do so, it first aimed at establishing which contextual variables are central to understanding and predicting both positive *and* negative use outcomes. To date, very little research has been done in this area. Nonetheless, the preceding literature review highlighted previous research suggesting that life-time psychedelic use is associated with greater life-satisfaction and lower rates of psychological distress (e.g., Krebs & Johansen, 2013; Nour et al., 2016). In addition, positive psychedelic use is associated with group planning, explicit autognostic use intentions, and relatively infrequent use (e.g., Móró et al., 2011; Zinberg, 1984). Conversely, previous research also suggests that problematic psychedelic use is

associated with a high frequency of use, ingestion of large doses, and use with the intention of coping, self-medicating, or to experience the stimulating or novel sensations of the drug (e.g., Zinberg et al., 1975). Moreover, Peele and Brodsky (2000) and Clifford et al. (1991) reported a curvilinear relationship between psychoactive drug use and well-being, though these studies did not assess psychedelic users. Taken together, contextual variables have either never been studied nor assessed in large scale, quantitative studies of psychedelic users. Thus, in order to better conceptualize the parameters of safe and beneficial usage, we must start somewhere—this dissertation aimed to contribute to these foundations. As a result, by requisite some of the following analyses are exploratory.

Second, the preceding review outlined the theoretical pathways through which psychedelics may facilitate positive well-being and development. To summarize, psychedelic substances appear to induce a state of increased openness to experience (e.g., Carhart-Harris et al., 2016b; Jakab & Goldman-Rakic, 1998) which, in turn, promotes self-transcendent experiences (McCrae, 2009; Shiota et al., 2006) and personality growth (e.g., Levenson et al., 2005; Staudinger & Glück, 2011). In addition, use of psychedelics does promote self-transcendent experiences (Griffiths et al., 2006; MacLean et al., 2011) which have various associations with subjective and eudaimonic well-being (Bonner & Friedman, 2016; Hendricks, 2018; Klein et al., 2016; Maslow, 1964).

However, the link between the use of psychedelics, openness to experience, self-transcendent experiences, and psychospiritual development has not been previously studied as a unified model. In particular, the association between psychedelic-assisted self-transcendence and personality growth has received virtually no attention (e.g., Klavetter & Mogar, 1967). In other words, although experimental (e.g., Griffiths et al.,

2006) and survey (e.g., Nour et al., 2016) research suggests that psychedelic use may contribute to subjective well-being, the question of whether these drugs may foster advanced growth/eudaimonic well-being, and the pathways through which this occurs, requires study. Examining whether psychedelic use predicts self-transcendence and, through it, personality growth, was thus a central goal of this study. Further to this aim, although post-use integration has often been discussed as necessary to maximize the benefits of a psychedelic experience (e.g., Griffiths et al., 2006; Walsh, 2003), this assertion has not been empirically verified. As such, the role of deliberate post-use integration in relation to psychospiritual development was examined in this study.

Research Questions and Hypotheses

Question 1

Which parameters of psychedelic drug use, including: life-time use, frequency, dosage, intentions for use, use in a group or alone, and post-use integration, are predictive of problematic drug use and psychological distress? Conversely, which of these parameters are predictive of personality adjustment and growth?

Hypothesis 1A. Life-time psychedelic use will show a negative quadratic relationship with personality adjustment and growth, and a positive quadratic relationship with psychological distress. Life-time psychedelic use will show a positive linear relationship with problem drug usage.

Hypothesis 1B. Frequency of psychedelic use will show a negative quadratic relationship with personality adjustment and growth, and a positive quadratic relationship with psychological distress. Frequency of psychedelic use will show a positive linear relationship with problem drug usage.

Hypothesis 1C. Psychedelic dose size will show a negative quadratic relationship with personality adjustment and growth, and a positive quadratic relationship with psychological distress. Psychedelic dose size will show a positive linear relationship with problem drug usage.

Hypothesis 1D. Psychedelic use in a group context will positively predict personality adjustment and growth, and negatively predict problematic drug usage and psychological distress.

Hypothesis 1E. Post-psychedelic use integration will positively predict personality adjustment and growth, and negatively predict problematic drug usage and psychological distress.

Hypothesis 1F. Psychedelic use with autognostic intentions will positively predict personality adjustment and growth, and negatively predict problematic drug usage and psychological distress.

Hypothesis 1G. Psychedelic use with a coping/avoidance intention will negatively predict personality adjustment and growth, and positively predict problematic drug usage psychological distress.

Question 2

Does post-use integration of drug experiences moderate the relationship between autognostic drug use and: personality adjustment, personality growth, psychological distress, spiritual-religious development?

Hypothesis 2A. Psychedelic use with autognostic intentions will positively predict personality growth, and this relationship will be positively moderated by drug use integration.

Hypothesis 2B. Psychedelic use with autognostic intentions will positively predict personality adjustment, and this relationship will be positively moderated by drug use integration.

Hypothesis 2C. Psychedelic use with autognostic intentions will negatively predict psychological distress, and this relationship will be positively moderated by drug use integration.

Hypothesis 2D. Psychedelic use with autognostic intentions will positively predict spiritual-religious development, and this relationship will be positively moderated by drug use integration.

Question 3

Is autognostic psychedelic use predictive of: personality growth, personality adjustment, psychological distress, and spiritual development? Is autognostic psychedelic use predictive of openness to experience, awe, and mystical experiences? Are openness to experience, awe, and mystical experiences predictive of: personality adjustment, personality growth, psychological distress, and spiritual development? Do openness to experience, awe, and mystical experiences mediate this relationship?

Hypothesis 3A. Autognostic psychedelic use will positively predict openness to experience, awe-proneness, mystical-peak experiences, and personality growth. In turn, openness to experience will positively predict awe-proneness, mystical experiences, and personality growth. Further, awe-proneness will positively predict mystical experiences and personality growth. Finally, mystical experiences will positively predict personality growth.

Hypothesis 3B. Autognostic psychedelic use will positively predict openness to experience, awe-proneness, mystical-peak experiences, and personality adjustment. In turn, openness to experience will positively predict awe-proneness, mystical experiences, and personality adjustment. Further, awe-proneness will positively predict mystical experiences and personality adjustment. Finally, mystical experiences will positively predict personality adjustment.

Hypothesis 3C. Autognostic psychedelic use will positively predict openness to experience, awe-proneness, mystical-peak experiences, and negatively predict psychological distress. In turn, openness to experience will positively predict awe-proneness and mystical experiences, and negatively predict psychological distress. Further, awe-proneness will positively predict mystical experiences and negatively predict psychological distress. Finally, mystical experiences will negatively predict psychological distress.

Hypothesis 3D. Autognostic psychedelic use will positively predict openness to experience, awe-proneness, mystical-peak experiences, and spiritual development. In turn, openness to experience will positively predict awe-proneness, mystical experiences, and spiritual development. Further, awe-proneness will positively predict mystical experiences and spiritual development. Finally, mystical experiences will positively predict spiritual development.

Research Methods and Design

This study used a cross-sectional survey design and a convenience sample derived from international, online communities of both drug users and non-drug users. This design was chosen for a number of reasons. First, given the illegality of psychedelic

drugs, and the regulatory difficulties surrounding experimental research, surveys are one of the primary means for examining illicit substance use (Hendricks et al., 2015). Although determining the causal impact of a given substance is best determined by double-blind, randomized experiments, ethical considerations rule it out in the study of the long-term effects of naturalistic drug use. This leaves epidemiological studies as the most powerful tool available for examining these types of questions (Peele & Brodsky, 2000). In other words, although a longitudinal, randomly assigned, experiment would offer greater control and be an ideal way to most rigorously establish causality, it would also be highly unethical and likely unfeasible.

Online surveys are also used due to their ability to access niche drug using populations while maximizing anonymity (Móró et al., 2011). Although online questionnaires have been shown to be virtually equivalent to traditional pen and paper based formats (Kongsved et al., 2007), one of the primary disadvantages—multiple submissions—was controlled for in this study. Research suggests that compared to traditional recruitment, online methods tend to result in samples that are of greater diversity and more representative of the overall population (Gosling & Mason, 2015). The limitations of nonprobability samples were, nonetheless, still present in this study. Despite these limitations, this methodology has been used in recent studies exploring the relationships between various psychosocial constructs and drug use (e.g., Carbonaro et al., 2016; Lyvers & Meester, 2012; Móró et al., 2011; Nour et al., 2016).

Population and Sampling

Ideally a probability sample of drug users and nonusers would have been utilized, as this would make population-based inferences possible (Kerlinger & Lee, 2000).

However, while such methods can be effective for studying the use of legal substances, such as tobacco and alcohol, they are ineffective at assessing rare, covert, and stigmatized forms of drug use (Taylor & Griffiths, 2005). Due to the illegal and stigmatized nature of illicit substance use, studying these behaviours requires accessing hidden populations, which severely limits the feasibility of using a probability sample (Barratt, Ferris, & Lenton, 2015; Hendricks & Blanken, 1992). There is a strong impetus for illicit drug users to hide their behaviour, rendering an accurate random sample of the overall drug using population nearly impossible (Faugier & Sargeant, 1997).

The construction of a sampling frame is also dependent on having, or being able to construct, a list covering all members of a target population, which simply do not exist when it comes to illicit drug use (Taylor & Griffiths, 2005). Low prevalence rates of illicit drug use within general population sampling frames also means that a given sample will include very few users. For example, if only one percent of the population are regular psychedelic users, then it would require a probability sample of roughly 20,000 people to produce a sample of 100 regular psychedelic users, assuming a 50 percent response rate (Barratt et al., 2015). In other words, even if a random sample of the illicit drug using population were possible, an extremely large sample would be needed to achieve sufficient data to conduct inferential statistics. This limitation particularly applies to the extremely small subset of the population who use psychedelics with autognostic and entheogenic intentions.

In attempting to study populations for whom adequate sampling is not tenable, convenience, snowball, or purposive sampling methodologies are often the only feasible options (Faugier & Sargeant, 1997). Given these limitations, the practice of using these

sampling methods is commonly used in contemporary psychedelic research (e.g., Barrett et al., 2016; Carbonaro et al., 2016; Lerners & Lyvers, 2006; Lyvers & Meester, 2012; Móró et al., 2011; Nour, et al., 2016). Despite these limitations, many studies have provided useful data even when inferences to the larger population cannot be shown, as analysis of within sample differences nonetheless provides useful insight (Taylor & Griffiths, 2005).

Sample Size

When conducting online research with nonprobability samples, it is recommended to obtain the largest sample size possible (Alreck & Settle, 1995; Hill, 1998). For this study, a total of 684 surveys were sufficiently completed to be used in the data analysis.

Participant Recruitment

Participants were recruited primarily via internet advertisements. Links to the survey were posted on websites that are frequented by individuals interested in psychedelics and other psychoactive drugs (e.g. MAPS, The Psychedelic Society, Erowid, Bluelight, Reddit, Facebook). The link was also posted on general forums and message boards to recruit as broad of a sample of both drug users and non-users as possible.

The link directed participants to a webpage describing the aims and basic information about study. Participants were told the study would examine, "Mental health, spirituality, and psychoactive drug use." The nature of this recruitment procedure limits one from knowing the exact number of invitees and, by extension, response rate. Although the lack of data regarding the precise number of invitees is a drawback of this

sampling method, this issue is present in any sampling method that recruits participants through advertising, online or otherwise.

Internet Sampling

Using the internet to collect data has been a contentious issue. However, it provides a number of advantages over traditional means of data collection, including: reduced use of physical materials, unmatched anonymity of participants, automatic checks for item completion, adaptive form testing, large sample sizes, the ability to survey across geographical boundaries, higher response rates than conventional surveys, and better overall generalizability (Gosling & Mason, 2015; Miller & Sønderlund, 2010).

Furthermore, many niche populations, which are hard to reach with traditional methods, can be sampled easily (i.e., those engaging in illegal or socially stigmatized behaviour), making it ideal for this study (Gosling & Mason, 2015). Miller and Sønderlund (2010) conducted a comprehensive review of 46, internet-based, drug studies, and showed that the internet provides unmatched opportunities for research in the drug-use field.

One critique of internet samples is that they are selective and not diverse. However, traditional psychological research also typically suffers from this weakness with its use of student samples (Gosling & Mason, 2015). To empirically assess the notion that internet samples are not diverse, Gosling et al. (2004) examined one year of studies published in the *Journal of Personality and Social Psychology.* The characteristics of these studies, which used conventional research samples, were compared with the characteristics of an internet sample. The comparison revealed that the internet sample was more diverse and more representative of the U.S. population with

respect to gender, socioeconomic status, geographic region, and age than any of the conventional samples used in these reputable, published studies (Gosling et al., 2004).

A growing body of research also suggests that findings obtained using convenience internet samples are consistent with findings obtained using traditional sampling methods used in the social sciences (Gosling et al., 2004). Data gathered via the internet are also typically of equal or even higher quality than that gathered via traditional means (Gosling et al., 2004). Nonetheless, threats to the validity of data collected via the internet remain. Researchers cannot supervise participants to confirm identity, nor monitor alertness and attentiveness.

There are also ethical issues that must be considered. For example, it is possible for participants to misrepresent their identity in ethically problematic ways (e.g., minors representing themselves as adults). Conversely, internet research can provide favorable ethical conditions. For example, participants taking an online study can simply close the browser window if they wish to discontinue, making participation even less subtly coercive than traditional formats. Internet research also facilitates a greater degree of anonymity than in-person studies, which can increase self-disclosure and honesty (Gosling & Mason, 2015; Miller, & Sønderlund, 2010). Ultimately, while there are weaknesses in using an internet sample, it also has numerous advantages.

Survey Administration

The survey was designed to take approximately 20 to 30 minutes to complete, and participants were asked to complete the survey in one sitting. The survey was administered using *REDCap*, an online survey and data-collection software tool designed with security and privacy features allowing for ethical research. It is compliant with

Canadian legislation such as the HIA, FOIP, and TCPS2, as well as U.S. privacy requirements such as HIPAA. Hosting was done at the University of Alberta, which follows Canadian research standards. Participants were required to fulfill the following inclusion criteria: (1) be at least 18 years old; (2) read fluently in English; (3) have not previously completed the survey (See Appendix A).

Ethics and Informed Consent

To make an informed decision about participating in the research, participants were briefed on (a) the general nature of the study; (b) the University of Alberta Research Ethics Office approval of the research; (c) how the data was to be used; (d) the average length of time needed to complete the survey; and (e) the risks and benefits involved in participating.

Participants were informed that the study was to examine the relationship between mental health, spirituality, and psychoactive drug use. They were also informed that the survey was approved by the Research Ethics Office of the University of Alberta, and that data would remain strictly confidential, hosted on Canadian servers, and presented as summary statistics. They were informed that they could withdraw from the survey at any time without penalty, and that if they did not complete the survey their responses would not be used.

By asking participants to reflect on themselves, there is the potential for emotional discomfort. Participants were informed that there would be a small chance of emotional unease and that they could discontinue the survey at any time without penalty. They were also told that their results would make a meaningful contribution to psychology and public health. Participants were not required to provide any identifying

information and were informed that all information would be used for research purposes only. No solicitation data collection occurred before obtaining approval from the REO. Participants were not compensated for their participation.

Survey Materials and Instruments

The survey assessed participants' demographics, drug use patterns, personality, psychological distress, personality adjustment, personality growth, spirituality, and self-transcendent experiences (See Appendix B).

Demographics

Age, gender, ethnicity, education level, health, financial status, religious affiliation, religious/spiritual orientation, continent of residence, and meditation practice were assessed.

Drug Use Patterns

The 12 drug categories assessed were derived from the World Health Organization's (WHO) ASSIST Version 3.0 drug abuse measure (WHO, 2020). These substances included: alcohol, tobacco, cannabis, MDMA, amphetamines, cocaine, opiates (e.g., heroin, codeine, oxycodone), classic psychedelics, (LSD, psilocybin mushrooms, mescaline, ayahuasca), inhalants, sedatives and hypnotics (e.g., benzodiazepines, barbiturates, etc.), dissociatives (e.g., PCP, ketamine), and atypical psychedelics (e.g., ibogaine, salvia divinorum). Participants were informed that they were only to report on their use of these substances for *non-medical* purposes and were asked the following questions about their use of each drug.

Life-Time Use. (0 = *Never*, 1 = *Once*, 2 = *2-5 times*, 3 = *6-9 times*, 4 = *10-19 times*, 5 = *20-49 times*, 6 = *50-99 times*, and 7 = *More than 100 times*).

Frequency of Use. (0 = *I no longer use this drug*, 1 = *Less than once per year*, 2 = *1-2 times per year*, 3 = *3-4 times per year*, 4 = *1-2 times per month*, 5 = 1-*2 times per week*, 6 = *3-4 times per week*, and 7 = *Once or more per day*).

Dosage. (1 = *Very small*, 2 = *Small*, 3 = *Moderate*, 4 = *Large* and 5 = *Very large*).

Use Alone or With a Group. (1 = *Always or almost always alone*, 2 = *Usually alone*, 3 = *Half of the time alone, half of the time in a group*, 4 = *Usually in a group*, and 5 = *Always or almost always in a group*).

Drug Use Integration. Participants were also asked about their post-drug use integration. Three questions were summed to comprise a *drug use integration scale* for the purpose of this study. Each item had the same responses (1 = *Never or almost never*, 2 = *Some of the time*, 3 = *Half of the time*, 4 = *Most of the time*, 5 = *Always or almost always*). Participants were asked to consider how their drug experiences influence their day-to-day life and functioning: The three items included: "1) Overall, I try to reflect on my drug experiences; 2) Overall, I try to integrate new perspectives gained through my drug experiences into my day-to-day life; 3) Overall, I try to learn from my drug experiences." The internal consistency $\alpha = 0.88$.

Drug Use Motivations. Participants were asked about their motivations, or intentions, for using each of the 12 drug categories. To do so, a *drug use motivations scale* was developed based on a review of the drug use motivations/intentions identified in the literature (see Berman, Palmstierna, Källmén, & Bergman, 2007; Hallock et al. 2013; Lee, Neighbors, Hendershot, & Grossbard, 2009; Lyvers, & Meester, 2012; Milner, 2015; Móró et al., 2011; Newcomb, Chou, Bentler, & Huba, 1988; Simons et al., 1998).

Based on a synthesis of these sources, 12 intentions were distilled for use in this study: 1) boredom; 2) spiritual/religious (entheogenic) purposes; 3) to enhance socializing; 4) to enjoy the sensation, feeling, or effects; 5) to understand things differently or mind-expansion; 6) to enhance creativity or performance; 7) conformity/to fit in with a group; 8) curiosity/experimentation; 9) coping/relieve negative emotions; 10) introspection/personal growth/self-realization; 11) relaxation; 12) to party or get "messed up." Of these, entheogenic, mind-expansive, and introspective were considered *autognostic use intentions* based on previous work (see Móró et al., 2011). Participants were asked to rate how frequently their use of each drug was motivated by each of the intentions listed. Responses included (1 = *Never or almost never*, 2 = *Some of the time*, 3 = *Half of the time*, 4 = *Most of the time*, 5 = *Always or almost always*).

Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST). The ASSIST is a scale that measures problem or hazardous substance use in adults. For this study, the psychedelic subscale of the ASSIST 3.0 was used to assess for problematic psychedelic use. The ASSIST was developed for the World Health Organization (WHO, 2020) and includes eight items about lifetime use, frequency of use, injection use, and use problems over the past three months. For example, "During the past three months, how often have you failed to do what was normally expected of you because of your use of classic psychedelics?" Responses on a five-point scale range from 1 = *Never* to 5 = *Daily*. To score the ASSIST, six of the eight items are summed for the scale score. The internal consistency of these six items in this study was $\alpha = 0.54$.

Personality

Big Five Inventory - Short Form (BFI-S). The BFI-S is a 15-item version of original BFI 44 (John & Srivastava, 1998). The BFI-S (Hahn, Gottschling, & Spinath, 2012) assesses the five-factor personality model with three items per trait. Given that openness to experience is an important variable in the analysis, the full, 10-item openness to experience scale of the BFI-44 was used. Items use a seven-point scale ranging from a seven-point scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. All questions begin with the stem, "I see myself as someone who…" An example item is, "likes to reflect, play with ideas." The BFI subscales have shown strong convergence with longer measures, such as the NEO, as well as divergent validity (Hahn et al., 2012). In this study the internal consistencies were: Conscientiousness, $\alpha = 0.64$; Agreeableness, $\alpha = 0.58$; Extraversion, $\alpha = 0.81$; Openness, $\alpha = 0.78$; Neuroticism, $\alpha = 0.83$.

Psychological Distress

K-6. The K-6 is a widely used, six-item scale that screens for the presence of psychological distress indicative of nonspecific psychological disorder (Kessler et al., 2002, 2003). The K-6 has very good concordance with independent clinical ratings of mental disorder (Kessler et al., 2002, 2003). This scale consists of six questions that ask subjects to rate how often they felt certain negative symptoms over the past month. For example, one item asks, "In the past month, how often have you felt so depressed that nothing could cheer you up?" The K-6 had an internal consistency of $\alpha = 0.88$.

Personality Adjustment and Personality Growth

Satisfaction with Life Scale (SWLS). The five-item SWLS is a commonly used, valid, and reliable measure of subjective well-being (Diener et al., 1985). The SWLS has

been widely used in positive psychology and has been shown to be an effective instrument in diverse populations. The SWLS also has been shown to load onto a composite factor of personality adjustment (Wink & Staudinger, 2016). Respondents are asked to indicate the extent of their agreement with each item using a seven-point scale ranging from a seven-point scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. For example, one item reads, "In most ways my life is close to my ideal." The SWLS had an internal consistency of $\alpha = 0.90$.

Scales of Psychological Well-Being (PWB). The 18-item PWB was used to measure eudaimonic well-being. It was developed by Ryff and Keyes (1995) to assess six dimensions: 1) self-acceptance, 2) environmental mastery, 3) positive relationships, 4) personal growth, 5) autonomy, and 6) purpose in life. The PWB is a commonly used instrument in positive psychology and has been extensively used in a variety of samples and settings. The PWB shows strong correlations (Ryff, 1989) with other measures of positive functioning (i.e., affect balance, self-esteem, internal locus of control), as well as negative correlations with measures of maladjustment (i.e., depression). Research has shown that the first three scales load onto a composite factor of personality adjustment. Similarly, the fourth through sixth scales load onto a composite factor of personality growth (Wink & Staudinger, 2016). Respondents indicate the extent of their agreement or disagreement with each item using a seven-point scale ranging from a seven-point scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. An example item is, "In many ways, I feel disappointed about my achievements in life." The internal consistency of the PWB was $\alpha = 0.87$.

Quiet Ego Scale (QES). The 14-item QES was used as a measure of personality growth, as it ties together principles of advanced development found in the world's wisdom traditions and adult developmental psychology (Wayment et al., 2015). The QES is strongly correlated with measures of mindfulness, self-compassion, authenticity, ecological concern, affect regulation, life-satisfaction, self-transcendence, flexible and open-minded thinking, and prosocial attitudes (Wayment et al., 2015). The QES includes four subscales: 1) detached awareness; 2) inclusive identity; 3) perspective taking; and 4) personal growth. Respondents indicate their agreement or disagreement with each item using a seven-point scale ranging from a seven-point scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. The internal consistency was $\alpha = 0.81$.

Adult Self-Transcendence Inventory (ASTI). The 24-item ASTI was used as a measure of personality growth (Koller et al., 2017). The ASTI measures a developmental process reflecting "a decreasing reliance on externals for definition of self, increasing interiority and spirituality, and a greater sense of connectedness with past and future generations" (Levenson et al., 2005, p. 127). Glück et al. (2013) found that the ASTI had a very high amount of shared variance with three other measures of wisdom/personality growth. The ASTI consists of five subscales: 1) self-knowledge and self-integration; 2) peace of mind; 3) non-attachment; 4) presence in the here-and-now and growth; and 5) self-transcendence. Respondents are asked to indicate the extent of their agreement with each item using a seven-point scale ranging from a seven-point scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. An example is, "I feel that my individual life is a part of a greater whole." The internal consistency of the ASTI was $\alpha = 0.89$.

Personality Adjustment Scale. Previous research has shown that personality adjustment can be broadly assessed as a composite of: satisfaction with life and three dimensions of eudaimonic well-being—environmental mastery, positive relations with others, and self-acceptance (Mickler & Staudinger, 2008; Staudinger & Kunzmann, 2005; Staudinger & Glück, 2011; Wink & Staudinger, 2016). Thus, a personality adjustment scale was created by combining all items from the *satisfaction with life scale (SWLS),* as well as all items from the environmental mastery, positive relations with others, and self-acceptance subscales of the *scales of psychological well-being (SPWB)*. The internal consistency of this 14-item scale was $\alpha = 0.92$.

Personality Growth Scale. Research has shown that personality growth can be assessed as a composite of advanced growth/wisdom measures and three eudaimonic well-being dimensions—personal growth, purpose in life, and autonomy (Mickler & Staudinger, 2008; Staudinger & Kunzmann, 2005; Staudinger & Glück, 2011; Wink & Staudinger, 2016). Consistent with previous research, a personality growth scale was created in this study by combining all items from the *quiet ego scale (QES)*, the *adult self-transcendence inventory (ASTI),* and the personal growth, purpose in life, and autonomy subscales of the *scales of psychological well-being (SPWB)*. The internal consistency of this 44-item scale was $\alpha = 0.92$.

Spirituality

Religious Schema Scale (RSS). The RSS was used to assess spiritual-religious development (Streib et al., 2010). The RSS has three, five-item subscales, each of which measures a different level of spiritual development: 1) truth of text and teachings (ttt); 2) fairness, tolerance, and rational choice (ftr); and (3) xenosophia (xenos). Because this

study was concerned with advanced development, only the xenos subscale was used. The xenos subscale shows strong correlations with the personality domain openness to experience, as well as the personal growth and purpose in life subscales from Ryff's *scales of psychological well-being*. The xenos subscale is also negatively correlated with religious fundamentalism and right-wing authoritarianism (Streib et al., 2010). Respondents are asked to indicate the extent of their agreement with each item using a seven-point scale ranging from a seven-point scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree.* An example item is, "The truth I see in other worldviews leads me to reexamine my current views." Internal consistency of the xenos subscale was $\alpha = 0.64$.

Spirituality Index. A single item was used to measure spirituality: "Spirituality is important in my life" using a seven-point scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. Although only one item, this index has been found to predict spirituality-related constructs in a way that is equivalent to multi-item measures of spirituality, both related to distinct from religiosity (e.g., Saroglou & Munoz-Garcia, 2008; Saroglou et al., 2005; Van Cappellen et al., 2013).

Self-Transcendent Experiences

Mysticism Scale (MS-SF). Hood's Mysticism Scale - Short Form (Anthony, Hermans, & Sterkens, 2010) was used to assess whether participants have had mystical experiences. Hood's Mysticism scale is the most widely used instrument to assess mystical experiences and is commonly used in the psychology of religion and transpersonal psychology (Hood, Morris, Watson, 1993). The Short-Form uses 12-items drawn from Hood's 32-item full version, chosen based on inter-item correlations in Hood's (1975) initial study as well as Anthony et al.'s (2010) pilot studies. Each item is

rated on a five-point scale, from 1 = *Definitely not* to 5 = *Definitely yes*. An example item is, "I have had an experience which I knew to be sacred." Internal consistency for the scale in this study was $\alpha = 0.90$.

Dispositional Positive Emotions-Awe Subscale (DPES-AWE). Shiota and colleagues (2006) developed the 38-item dispositional positive emotion scale (DPES) to measure one's tendency to experience joy, contentment, compassion, pride, amusement, love, and awe. In this study, the six-item DPES-AWE subscale was used to assess the degree to which participants routinely experience awe. The DPES-AWE has been used in many studies in positive psychology. Research shows it to be reliable and valid; the DPES-AWE is correlated with openness to experience, humility, and prosocial behaviour (Dixson et al., 2018; Piff et al. 2015; Shiota et al., 2006). This subscale uses a seven-point scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. An example of an item is, "I feel wonder every day." The internal consistency of the awe scale was $\alpha = 0.80$.

Other

Marlowe-Crowne Social Desirability Scale (MCSDS-SF): A limitation of self-report research is the potential for social desirability, or "faking good." As such, the Marlowe-Crowne Social Desirability Scale - Short Form (Vésteinsdóttir, Reips, Joinson, & Thorsdottir, 2017) was used to control biased responses. Research suggests the MCSDS outperforms the similar BIDR for detecting "faking good" response sets (Lambert et al., 2016). The MCSDS-SF contains 10 true/false items, with responses in the keyed direction coded as one and responses in the opposite direction as zero. The maximum score is 10 and the minimum zero, with higher scores indicating more biased responses. The scale was found to have an internal consistency of $\alpha = 0.60$.

Data Analysis Procedures

This study used inferential statistical methods, including bivariate Pearson correlations, hierarchical regression analyses, moderation, and mediation analyses. A significance level of .01 is used in all analyses. However, given the emerging discussion concerning the limitations of null hypothesis significance testing (see Gliner, Leech, & Morgan, 2002), effect size estimates were also utilized.

Statistical Methods

Moderation analysis is used to help determine if the effect of variable X on variable Y depends on variable M. In such a case, M is said to be a *moderator* of X's effect on Y. Moderation helps to establish the conditions for which the effect of X on Y is large versus small, present versus absent, positive versus negative, etc. (Hayes, 2018).

Mediation analysis is used to determine if variable X transmits its effect on variable Y through variable M (Hayes, 2018). There are two pathways by which variable X may influence variable Y. The *direct effect* leads from X to Y without passing through M. The *indirect effect* passes from X to M, and from M to Y. In such cases, M is said to be a *mediator*. Hayes (2018) argues that one can conduct mediation even if causality cannot be established due to the limits of a given research design.

Effect Size

Effect sizes can be an important complement to null hypothesis significance testing (e.g., p-values), in that they offer a measure of practical significance in terms of the magnitude of the effect. Various measures of effect size have been developed. Pearson's correlation, denoted *r,* is widely used as an effect size estimate, with 0.1, 0.3, and 0.5 denoting small, medium, and large effects, respectively (Cohen, 1988). Similarly,

the coefficient of determination, denoted R^2, is a measure of the proportion of variance in the dependent variable explained by the independent variables. In terms of R^2, 0.02, 0.13, and 0.26 represent small, medium, and large effects, respectively (Cohen, 1988). Similarly, Cohen's f^2 represents the ratio of the variance in the dependent variable explained by the independent variables over the variance in the dependent variable unexplained by the variables in the model ($R^2/1\text{-}R^2$). For Cohen's f^2, 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively (Cohen, 1988).

Cohen's f^2 is appropriate for calculating the effect size of the overall, or global, effect of a given pathway model. However, some research questions require calculating the effect size for different variables and pathways within the same model (the local effects). Selya et al. (2012) thus developed a means for measuring local effects by adjusting Cohen's f^2 formula to:

$$f^2 = \mathrm{R}^2\mathrm{AB} - R^2\mathrm{A} / 1 - R^2\mathrm{AB}.$$

Where B is a given variable of interest, A is the set of all other variables, R^2AB is the proportion of variance accounted for by A and B together, and R^2A is the proportion of variance accounted for by A. Thus, the numerator reflects the proportion of variance uniquely accounted for by B, over and above that of all the other variables.

Multiplicity Control

It has been noted that as the number of statistical tests being conducted increases (multiplicity), so too does the probability of making a Type I error (false positive). Researchers have attempted to control for this by using multiplicity control procedures (MCPs) (Smith & Cribbie, 2013). However, the use of MCPs is controversial. For example, Hunter, Farmus, Beribisky, and Cribbie (in press) argue that MCPs should not

be routinely used. They note various limitations with the practice, and suggest that these methods are at best unnecessary, and at worst unacceptably conservative. They also contend that there is no logical basis for the decision to link the significance level to the number of tests conducted within a study. For example, they argue that conducting all (e.g., T = 6) pairwise comparisons within one study is no different than conducting six studies each testing T = 1 of these pairwise comparison. They question why there should be a penalty for conducting all the tests together, given that the theoretical likelihood of a Type I error for each test should be equivalent in both designs. In other words, whether a researcher conducts one test in one study (and therefore does not have to control for multiplicity) or six tests in one study, the number of tests conducted should not impact the conclusion for *each* test (Cribbie, 2017). In addition, Hunter et al. (in press) argue that MCPs are subject to the same binary decision-making issues as NHST, which, as noted, has been criticized (Crabbie, 2017).

Ultimately, due to the problematic assumptions underlying MCPs and the subjective nature of decision making using these methods, Hunter et al. (in press) contend that replication provides a superior answer to the problem of false positives. Thus, due to the limitations of MCP, and the largely exploratory nature of this study, the decision was made to risk Type I errors in the interest of reducing Type II errors. Accordingly, further replication will be necessary to establish the veracity of the following research findings.

Predictor and Control Variables

The main predictor variables of interest in this study were: life-time psychedelic use, frequency of psychedelic use, typical psychedelic dosage, intentions for use, use in a group or alone, and post-psychedelic integration. Openness to experience, awe, and

mystical experience were examined as mediating variables, while post-psychedelic integration was examined as a moderating variable. Age, education, financial stability, spirituality, meditation, and social desirability were examined as covariates.

Age

Measures of personality growth tend to decrease with age (Staudinger & Bowen, 2010), while the personality growth dimensions of eudaimonic well-being (e.g., personal growth and purpose in life) also show negative age differences (Ryff & Keyes, 1995).

Education and Financial Stability

Measures of eudaimonic well-being show positive correlations with financial stability and education (Ryff, 1989). Similarly, favourable socioeconomic conditions and educational opportunities may be related to personality growth (Glück et al., 2013).

Spirituality

Spirituality is strongly predictive of subjective and eudaimonic well-being (see Fiorito & Ryan, 2007; Joshanloo, 2011; Van Dierendonck, 2004).

Meditation

Compared to non-meditators, meditators have more frequent experiences of mystical states and score higher on self-actualization measures (Alexander et al., 1987). Longitudinal experiments also show that meditation facilitating transcendent states can facilitate personality growth (Alexander et al., 1991).

Chapter VII: Data Analysis and Results

"Science is not only compatible with spirituality; it is a profound source of spirituality. When we recognize our place in an immensity of light years and in the passage of ages, when we grasp the intricacy, beauty and subtlety of life, then that soaring feeling, that sense of elation and humility combined, is surely spiritual… The notion that science and spirituality are somehow mutually exclusive does a disservice to both."

Carl Sagan (1996, p. 29)

To complete the data analysis, the dataset was downloaded from the REDcap servers, and analyses were performed using SPSS (Statistical Package for the Social Sciences). Prior to conducting data analyses, data screening was completed to identify any missing or incomplete data and outliers. Participants who did not complete all sections of the survey had their data removed from the sample.

Data from participants who completed the survey but left some items blank were analyzed to determine if the data were missing at random or non-random. Based on the analysis, Little's test was not statistically significant, and it was determined that the missing data were missing completely at random (MCAR). Furthermore, because less than one percent of the data were missing, expectation maximization was used to impute the remaining data (Gold & Bentler, 2000; Schlomer, Bauman, & Card, 2010).

Sample Characteristics

A total of 1,216 individuals began the survey, of which 684 surveys were completed and able to be used in the analysis. The vast majority of incomplete surveys completed less than 10 percent of the survey questions. Information was gathered on age,

gender, ethnicity, continent of residence, education, physical health, financial stability, religious affiliation, and religious-spiritual orientation. These data are summarized in Table 1, Appendix C.

The median age of participants was “25-34” years, with a range of “18-24” to “75-84” years. In total, 88.2 percent of the sample was aged 18-44. A total of 38.2 percent of the sample identified as female, 57.5 percent identified as male, and 3.7 percent identified as other. Most of the sample identified as white-Caucasian (82.7%). Participants ranged from six of the seven continents (aside from Antarctica), with the majority (77.5%) located in North America.

The sample ranged in level of education from less than a high-school diploma to a doctoral degree; the median level of education was a two-year diploma/associate degree. In total, 81 percent of the sample had at least some college education. The median rated level of physical health was “healthy,” while the median level of financial stability was “average.” Overall, 67 percent of the sample did not identify with any religion, with Christianity being the most identified with religion at 14.2 percent of the sample. Finally, 59 percent identified as “spiritual but not religious.”

Assessing Self-Transcendence and Psychospiritual Development by Drug Type

Before beginning the analyses of the research hypotheses, it was important to establish if the classic psychedelics were indeed set apart from other substances in their capacity to facilitate self-transcendence and psychospiritual development, as suggested by previous research (e.g., Lerner & Lyvers 2006; Nour et al., 2016). In other words, do the classic psychedelics show a different or stronger pattern of associations with these

dimensions when compared to other psychoactive drug types? Examination of correlational date (Table 2, Appendix D) revealed the following.

Life-Time Drug Use and Self-Transcendence

Examination of the Pearson's correlation coefficients of the life-time use of various drug categories with measures of self-transcendence (awe and mystical experiences) revealed the following associations and effect sizes according to Cohen's (1988) estimates.

Awe showed statistically significant correlations with the life-time use of: cannabis ($r = .22$, $p < .01$), classic psychedelics ($r = .27$, $p < .01$), sedatives ($r = -.11$, $p < .01$), and atypical psychedelics ($r = .14$, $p < .01$). The atypical psychedelics and sedatives correlation coefficients constitute a small effect size, while the cannabis correlation coefficient constitutes a small-medium effect size. Finally, the classic psychedelics correlation coefficient constitutes a medium effect size.

Mystical experiences showed statistically significant correlations with the life-time use of: tobacco ($r = .21$, $p < .01$), alcohol ($r = .16$, $p < .01$), cannabis ($r = .37$, $p < .01$), cocaine ($r = .20$, $p < .01$), MDMA ($r = .27$, $p < .01$), amphetamines ($r = .19$, $p < .01$), classic psychedelics ($r = .50$, $p < .01$), opiates ($r = 016$, $p < .01$), inhalants ($r = .15$, $p < .01$), sedatives ($r = .12$, $p < .01$), dissociatives ($r = .24$, $p < .01$), and atypical psychedelics ($r = .29$, $p < .01$).

The sedatives correlation coefficient constitutes a small effect size, while the tobacco, alcohol, cocaine, amphetamines, opiates, inhalants, and dissociatives correlation coefficients constitute a small-medium effect size. The MDMA and atypical psychedelic coefficients constitute a medium effect size, while the cannabis correlation coefficient

constitutes a medium-large effect size. Finally, the classic psychedelics correlation coefficient constitutes a large effect size.

Life-Time Drug Use and Psychospiritual Development

Examination of the Pearson's correlation coefficients of the life-time use of various drug categories with measures of psychospiritual development (psychological distress, personality adjustment, personality growth, and spiritual-religious development), revealed the following associations and effect sizes according to Cohen's (1988) estimates.

Psychological distress showed statistically significant correlations with the life-time use of: MDMA (r = -.11 p < .01), classic psychedelics (r = -.16, p < .01), opiates (r = .12, p < .01), and sedatives (r = .21, p < .01). The MDMA and opiates correlation coefficients constitute a small effect size. The sedatives and classic psychedelics correlation coefficients constitute a small-medium effect size.

Personality adjustment showed statistically significant correlations with the life-time use of: cannabis (r = .12, p < .01), MDMA (r = .11, p < .01), amphetamines (r = -.11, p < .01), classic psychedelics (r = .17, p < .01), opiates (r = -.15, p < .01), and sedatives (r = -.22, p < .01). The cannabis, MDMA, and amphetamines correlation coefficients constitute a small effect size. The classic psychedelics, opiates, and sedatives correlation coefficients constitute a small-medium effect size.

Personality growth showed statistically significant correlations with the life-time use of: tobacco (r = .10, p < .01), cannabis (r = .25, p < .01), MDMA (r = .12, p < .01), classic psychedelics (r = .31, p < .01), sedatives (r = -.13, p < .01), and atypical psychedelics (r = .15, p < .01). The tobacco, MDMA, and sedatives correlation

coefficients constitute a small effect size. The atypical psychedelics correlation coefficient constitutes a small-medium effect size. The cannabis and classic psychedelic correlation coefficients constitute a medium effect size.

Spiritual-religious development (xenosophia) showed statistically significant correlations with the life-time use of: tobacco ($r = .13$, $p < .01$), alcohol ($r = .10$, $p < .01$), cannabis ($r = .17$, $p < .01$), and classic psychedelics ($r = .19$, $p < .01$). The tobacco and alcohol correlation coefficients constitute a small effect size, while the cannabis and classic psychedelic correlation coefficients constitute a small-medium effect size.

Similar to previous research, the classic psychedelics demonstrated the largest effect sizes across each dependent variable of interest. Although causality cannot be established, they may thus be tentatively regarded as the most *potentially* salubrious of the 12 drug categories studied. This preliminary analysis further justified the following analyses, which focused exclusively on the classic psychedelics.

Assessing Positive and Negative Patterns of Psychedelic Drug Use

For the first series of research questions, hierarchical regression analyses were conducted to test the hypotheses exploring which parameters of classic psychedelic drug use were associated with positive and negative outcomes. In total, 17 regressions were conducted for *each* of the four dependent variables of interest, for a total of 68 regressions. The four dependent variables of interest were: K-6 psychological distress, ASSIST psychedelic drug problems, personality adjustment, and personality growth (see Tables 3-7, Appendix E).

The following procedure describes how the 17 regression equations were conducted for each of the four dependent variables (again, for a total of 68 regressions).

In Step 1, the dependent variable of interest was regressed on age, education, financial stability, and social desirability bias. These variables were adjusted for on account of their known associations with drug use behaviours, mental health outcomes, and measures of psychological well-being and development (Erskine et al., 2007; Redonnet et al., 2012; Ross & Mirowsky, 1984; Schulte & Hser, 2013; Welte & Russell, 1993).

In the first regression, life-time usage of psychedelics was entered in Step 2, and life-time usage of psychedelics squared was entered in Step 3. In the second regression, frequency of use was entered in Step 2, and frequency of use squared was entered in Step 3. For the first and second regressions, the entire sample (n = 684) of both psychedelic users *and* non-psychedelic users was used. This is because both life-time psychedelic use and frequency of psychedelic use includes *never* using these substances. Thus, it is important to include non-users in an examination of how life-time use and frequency of use are associated with psychological distress, personality adjustment, and personality growth. However, this does not include the fourth dependent variable, ASSIST problematic psychedelic use. Given that only individuals who use a drug can have problems with that drug, only psychedelic users were included (n = 511) in the first and second regressions on the ASSIST.

In the third through 17th regressions, only data drawn from the sample of those individuals who use psychedelics (n = 511) were used for all four dependent variables. This is because the independent variables used in the third through 17th regressions are only applicable to psychedelic users (i.e., dose of use, use in a group or alone, intention for use). In the third regression, typical dosage was entered in Step 2, and dosage squared was entered in Step 3.

The decision to assess for a quadratic relationship with life-time use, frequency of use, and dosage was made based on Peele and Brodsky's (2000) suggestion that standard practice should be to test quadratic models to assess outcomes associated with low, moderate, and heavy levels of drug use.

In the fourth and fifth regressions, use in group (vs. alone) and drug use integration were entered in Step Two, respectively. In the sixth through 17th regressions, each of the 12 intentions for using psychedelics were entered in Step 2.

For each of the 68 regression equations (17 regressions each for all four dependent variables) linearity was assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was independence of residuals, as assessed by a Durbin-Watson statistic, and homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1, and assumption of normality was met, as assessed by a Q-Q Plot. All coefficients reported in the body of this document are standardized (β). Unstandardized coefficients (B) can be found in the appendices. Correlation data for the following 68 regression analyses can be seen in Table 3, Appendix E.

Research Question 1A: Psychedelics and Psychological Distress

This research question sought to explore which parameters of classic psychedelic drug use are predictive of K-6 psychological distress. In order to undertake these tasks, a total of 17 hierarchical multiple regressions were run (See Table 4, Appendix E).

Life-Time Use and Frequency of Use

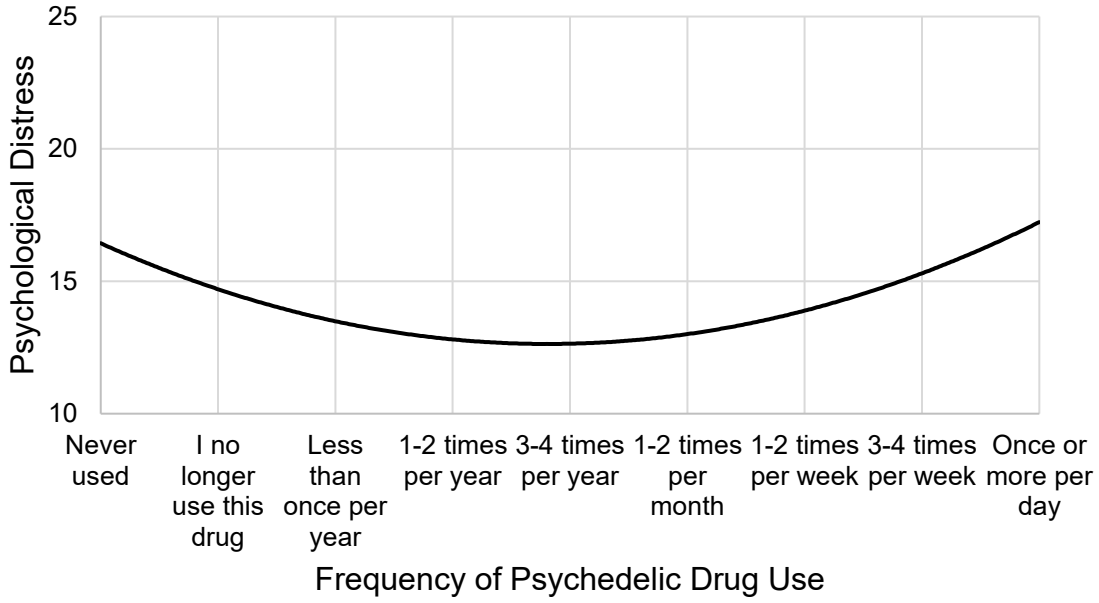
Step 1 of the regression equation included age, education, financial stability, and social desirability bias, and predicted K-6 psychological distress, $R^2 = 015$, $F(4, 679) = 28.76$, $p < .01$. Education ($\beta = -.11$, $p < .01$), financial stability ($\beta = -.28$, $p < .01$), and social desirability ($\beta = -.13$, $p < .01$) contributed to the prediction of K-6 scores. The following regression models used this block in Step 1.

Life-Time Psychedelic Use. The addition of life-time psychedelic use to the prediction of K-6 psychological distress (Step 2) led to a statistically significant increase in variance explained, $R^2 = .17$, $\Delta F(1, 678) = 17.84$, $p < .01$. Life-time psychedelic use was a statistically significant *negative* predictor of K-6 psychological distress scores ($\beta = -.15$, $p < .01$). The further addition of life-time psychedelic use squared (to assess for a quadratic relationship) to the prediction of K-6 psychological distress (Step 3) did not lead to a statistically significant increase in variance explained, though it moved in that direction $R^2 = .17$, $\Delta F(1, 677) = 3.64$, $p = 0.06$.

Frequency of Psychedelic Use. The addition of frequency of psychedelic use to the prediction of K-6 psychological distress (Step 2) led to a statistically significant increase in variance explained, $R^2 = .16$, $\Delta F(1, 678) = 15.38$, $p < .01$. Frequency of psychedelic use was a statistically significant *negative* predictor of K-6 psychological distress ($\beta = -.14$, $p < .01$). The further addition of frequency of psychedelic use squared (to assess for a quadratic relationship) to the prediction of K-6 psychological distress (Step 3) led to a statistically significant increase in variance explained, $R^2 = .18$, $\Delta F(1, 677) = 9.17$, $p < .01$. Frequency of psychedelic use squared was a statistically significant *positive* predictor of K-6 psychological distress ($\beta = .22$, $p < .01$). See Figure 1.

Figure 1

Frequency of Psychedelic Use and Psychological Distress



Note. Figure 1 shows a positive quadratic equation. Increased frequency of psychedelic use is associated with *lower* psychological distress, peaking at roughly 3-4 times per year. Beyond this point, increased frequency is associated with *higher* psychological distress.

Psychedelic Dosage, Use in Group, Integration, and Intentions

Psychedelic Dosage. The addition of dosage to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .21$, $\Delta F(1, 505) = 2.56$, $p = .11$. The further addition of psychedelic dosage squared (to assess for a quadratic relationship) to the prediction of K-6 psychological distress (Step 3) did not lead to a statistically significant increase in variance explained, $R^2 = .16$, $\Delta F(1, 504) = 0.01$, $p = .94$.

Use in a Group (vs. Alone). The addition of use in a group to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $\Delta F(1, 505) = 1.61$, $p = .21$.

Post-Psychedelic Integration. The addition of drug use integration to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $\Delta F(1, 505) = 1.16$, $p = .28$.

Boredom. The addition of boredom use intention to the prediction of K-6 psychological distress (Step 2) led to a statistically significant increase in variance explained, $R^2 = .17$, $\Delta F(1, 505) = 13.92$, $p < .01$. Boredom was a statistically significant positive predictor of K-6 psychological distress scores ($\beta = .15$, $p < .01$).

Socializing. The addition of socializing use intention to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $\Delta F(1, 505) = 0.61$, $p = 0.43$.

Sensation. The addition of sensation use intention to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $\Delta F(1, 505) = 0.29$, $p = .59$.

Mind Expansion. The addition of mind expansion use intention to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $\Delta F(1, 505) = 0.23$, $p = .64$.

Creativity. The addition of creativity use intention to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $\Delta F(1, 505) = 0.12$, $p = .73$.

Fit in With the Group. The addition of fit in with a group use intention to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $\Delta F(1, 505) = 0.08$, $p = .78$.

Curiosity. The addition of curiosity use intention to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $\Delta F(1, 505) = 1.06$, $p = .30$.

Forget My Worries/Relieve Negative Emotions. The addition of alleviate negative feelings/emotions use intention to the prediction of K-6 psychological distress (Step 2) led to a statistically significant increase in variance explained, $R^2 = .21$, $\Delta F(1, 505) = 38.16$, $p < .01$ To forget my worries was a statistically significant positive predictor of K-6 psychological distress scores ($\beta = 0.25$, $p < .01$).

Introspection. The addition of introspection use intention to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $F\Delta(1, 505) = 0.04$, $p = .84$.

Relaxation. The addition of relaxation use intention to the prediction of K-6 psychological distress (Step 2) led to a statistically significant increase in variance explained, $R^2 = 0.16$, $\Delta F(1, 505) = 7.76$, $p < .01$. Relaxation was a statistically significant predictor of K-6 psychological distress scores ($\beta = 0.11$, $p < 0.01$).

Partying. The addition of partying use intention to the prediction of K-6 psychological distress (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .15$, $\Delta F(1, 505) = 0.54$, $p = .74$.

Spiritual-Religious (Entheogenic) Purposes. The addition of spiritual/religious use intention to the prediction of K-6 psychological distress (Step 2) led to a statistically significant increase in variance explained, $R^2 = .17$, $\Delta F(1, 505) = 8.94$, $p < .01$. Spiritual/religious use was a statistically significant negative predictor of K-6 psychological distress scores ($\beta = -.12$, $p < 0.01$).

Summary

When examining the relative importance, or effect size, of each predictor variable in contributing to K-6 psychological distress scores, an interesting pattern emerged. In total, Step 1, which included age, education, financial stability, and social desirability accounted for roughly 15% of the variance in K-6 scores. When considering the remaining statistically significant predictor variables added in Step 2, they each contributed 1% to 6% more variance explained. Spiritual/religious use intentions and life-time use contributed roughly 2% more variance explained, up to roughly 17% total variance, but as *negative* predictors of psychological distress. Conversely, using psychedelics to forget one's worries was the most substantial overall (positive) predictor of K-6 scores, adding 6% more variance explained, bringing the total in Step 2 to 21%.

Research Question 1B: Psychedelics and Problematic Use

This research question explored which parameters of psychedelic drug use are predictive of ASSIST problematic psychedelic use scores. Step 1 of the regression equation included age, education, financial stability, and social desirability bias, and did not significantly predict ASSIST scores, $R^2 = .02$, $F(4, 506) = 3.09$, $p = .02$. The following regression models used these variables in Step 1 (See Table 5, Appendix E).

Life-Time Use and Frequency of Use

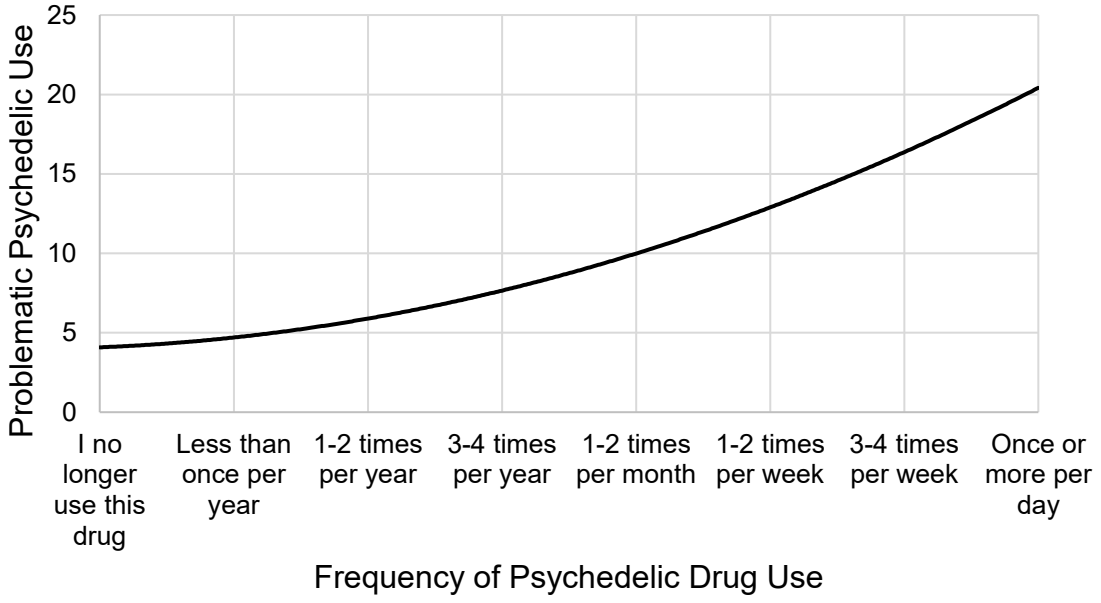
Life-Time Psychedelic Use. The addition of life-time psychedelic use to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .07$ $\Delta F(1, 505) = 27.09$, $p < .01$. Life-time psychedelic use was a statistically significant predictor of ASSIST scores ($\beta = .23$, $p < .01$). The addition of life-time psychedelic use squared (to assess a quadratic relationship)

to the prediction of problematic psychedelic use (Step 3) did not lead to a statistically significant increase in variance explained, $R^2 = .08$, $\Delta F(1, 504) = 2.34$, $p = .13$.

Frequency of Psychedelic Use. The addition of frequency of psychedelic use to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .37$, $\Delta F(1, 505) = 275.35$, $p < .01$. Frequency of psychedelic use was a statistically significant predictor of ASSIST scores ($\beta = .60$, $p < .01$). The further addition of frequency of psychedelic use squared (to assess for a quadratic relationship) to the prediction of ASSIST problematic psychedelic use (Step 3) led to a statistically significant increase in variance explained, $R^2 = .38$, $\Delta F(1, 504) = 12.60$, $p < .01$. Frequency of psychedelic use squared was a statistically significant predictor of ASSIST scores ($\beta = .36$, $p < .01$).

Figure 2

Frequency of Psychedelic Use and Problematic Psychedelic Drug Use



Psychedelic Dosage, Use in Group, Integration, and Intentions

Psychedelic Dosage. The addition of dosage to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .07$, $\Delta F(1, 505) = 24.54$, $p < .01$. Dosage was a statistically significant predictor of ASSIST problematic psychedelic use ($\beta = .22$, $p < .01$). The further addition of psychedelic dosage squared (to assess for a quadratic relationship) to the prediction of ASSIST problematic psychedelic use (Step 3) did not lead to a statistically significant increase in variance explained, $R^2 = .07$, $\Delta F(1, 504) = 1.26$ $p = .26$.

Use in a Group (vs. Alone). The addition of use in a group to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .05$, $\Delta F(1, 505) = 11.77$, $p < .01$. Use in a group was a statistically significant *negative* predictor of ASSIST scores ($\beta = -.15$, $p < .01$)

Post-Psychedelic Integration. The addition of drug use integration to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .04$, $\Delta F(1, 505) = 8.12$, $p < .01$. Integration was a statistically significant predictor of ASSIST scores ($\beta = .13$, $p < .01$).

Boredom. The addition of boredom use intention to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .05$, $\Delta F(1, 505) = 13.90$, $p < .01$. Boredom was a statistically significant predictor of ASSIST scores ($\beta = .16$, $p < .01$).

Socializing. The addition of socializing use intention to the prediction of ASSIST problematic psychedelic use (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .03$, $\Delta F(1, 505) = 4.37$, $p = .05$.

Sensation. The addition of sensation use intention to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .04$ $\Delta F(1, 505) = 7.41$, $p < .01$. Sensation was a statistically significant predictor of ASSIST scores ($\beta = .12$, $p < .01$).

Mind Expansion. The addition of mind expansion use intention to the prediction of ASSIST problematic psychedelic use (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .03$, $\Delta F(1, 505) = 2.88$, $p = .09$.

Creativity. The addition of creativity use intention to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .05$, $\Delta F(1, 505) = 12.09$, $p < .01$. Creativity was a statistically significant predictor of ASSIST scores ($\beta = .15$, $p < .01$).

Fit in With the Group. The addition of fit in with a group use intention to the prediction of ASSIST problematic psychedelic use (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .03$, $\Delta F(1, 505) = 2.12$, $p = .15$.

Curiosity. The addition of curiosity use intention to the prediction of ASSIST problematic psychedelic use (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .02$, $\Delta F(1, 505) = 0.03$, $p = .86$.

Forget My Worries/Relieve Negative Emotions. The addition of forget my worries use intention to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .04$, $\Delta F(1, 505) = 7.15$, $p < .01$. To forget my worries was a statistically significant predictor of ASSIST scores ($\beta = .12$ $p < .01$).

Introspection. The addition of introspection use intention to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .04$, $\Delta F(1, 505) = 7.65$, $p < .01$. Introspection was a statistically significant predictor of ASSIST scores ($\beta = .12$, $p < .01$).

Relaxation. The addition of relaxation use intention to the prediction of ASSIST problematic psychedelic use (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .03$, $\Delta F(1, 505) = 3.01$, $p = .08$.

Partying. The addition of partying use intention to the prediction of ASSIST psychedelic drug abuse (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .03$, $\Delta F(1, 505) = 1.86$, $p = .17$.

Spiritual-Religious (Entheogenic) Purposes. The addition of spiritual/religious use intention to the prediction of ASSIST problematic psychedelic use (Step 2) led to a statistically significant increase in variance explained, $R^2 = .05$, $\Delta F(1, 505) = 13.43$, $p < .01$. Spiritual/religious use was a statistically significant predictor of ASSIST scores ($\beta = .12$, $p < .01$).

Summary

When examining the relative importance, or effect size, of the predictor variables in contributing to problematic psychedelic use, an interesting pattern emerged. In total, Step 1, which included age, education, financial stability, and social desirability accounted for roughly 2% of the variance in ASSIST scores, a small and not statistically significant amount. When considering the remaining statistically significant predictor variables added in Step 2, they each contributed roughly 2% to 5% more variance explained, which is not very substantial. However, the one exception to this is frequency

of psychedelic use, which, when added in Step 2 increased the total variance explained from 2% in Step 1 to 37%. Thus, frequency of use is far and away the most meaningful predictor of ASSIST problematic psychedelic use scores.

Research Question 1C: Psychedelics and Personality Adjustment

This research question sought to explore which parameters of psychedelic drug use are predictive of personality adjustment scores (See Table 6, Appendix E).

Life-Time Use and Frequency of Use

The first-step of the regression equation included age, education, financial stability, and social desirability bias, and predicted personality adjustment, $R^2 = .24$, $F(4, 679) = 52.52$, $p < .01$. Education ($\beta = .13$, $p < .01$), financial stability ($\beta = .38$, $p < .01$), and social desirability ($\beta = .19$, $p < .01$) contributed to the prediction of personality adjustment scores. The following regression models used these variables in Step 1.

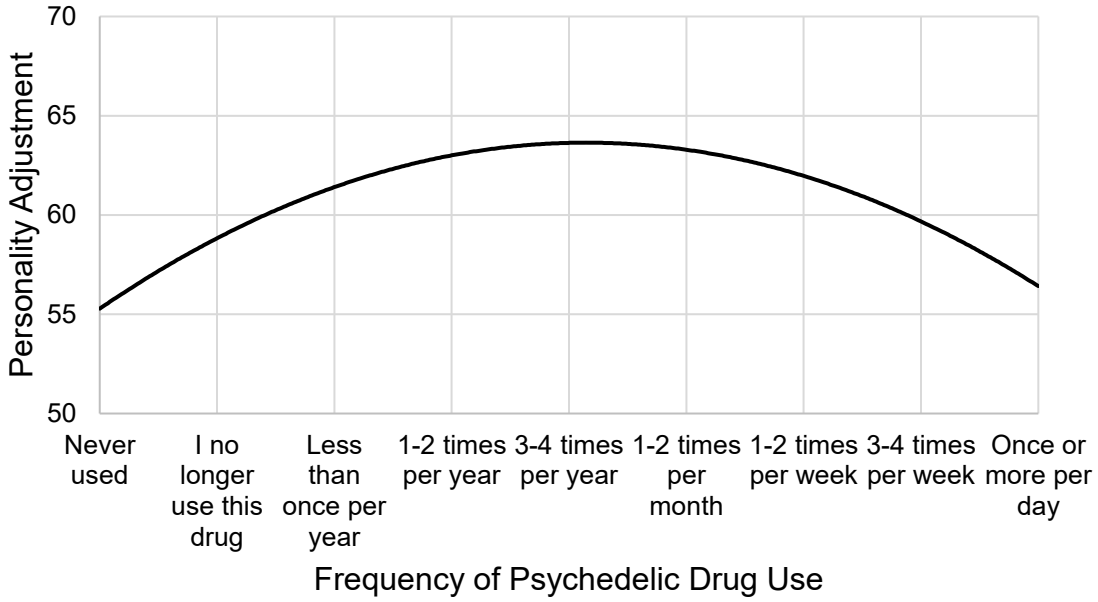
Life-Time Psychedelic Use. The addition of life-time psychedelic use to the prediction of personality adjustment (Step 2) led to a statistically significant increase in variance explained, $R^2 = .27$ $\Delta F(1, 678) = 26.45$, $p < .01$. Life-time psychedelic use was a statistically significant predictor of personality adjustment ($\beta = .17$, $p < .01$). The further addition of life-time psychedelic use squared (to assess for a quadratic relationship) to the prediction of personality adjustment (Step 3) did not lead to a statistically significant increase in variance explained, $R^2 = .27$, $\Delta F(1, 677) = 0.45$, $p = .51$.

Frequency of Psychedelic Use. The addition of frequency of psychedelic use to the prediction of personality adjustment scores (Step 2) led to a statistically significant increase in variance explained, $R^2 = .26$, $\Delta F(1, 678) = 17.10$, $p < .01$. Frequency of psychedelic use was a statistically significant predictor of personality adjustment scores

(β = .14 $p < .01$). The further addition of frequency of psychedelic use squared (to assess for a quadratic relationship) to the prediction of personality adjustment (Step 3) led to a statistically significant increase in variance explained, $R^2 = .27$, $\Delta F(1, 677) = 9.57$, $p < .01$. Frequency of psychedelic use squared was a statistically significant negative predictor of personality adjustment scores (β = -.21, $p < .01$).

Figure 3

Frequency of Psychedelic Use and Personality Adjustment



Note. Figure 3 shows a negative quadratic equation. Increased frequency of psychedelic use is associated with *higher* personality adjustment, peaking at roughly 3-4 times per year. Beyond this point, increased frequency is associated with *lower* adjustment.

Psychedelic Dosage, Use in Group, Integration, and Intentions

Psychedelic Dosage. The addition of dosage to the prediction of personality adjustment (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .24$, $\Delta F(1, 505) = 0.84$. $p = .36$. The further addition of psychedelic dosage squared (to assess for a quadratic relationship) to the prediction of personality

adjustment (Step 3) did not lead to a statistically significant increase in variance explained, $R^2 = .24$, $\Delta F(1, 504) = 0.56$, $p = .46$.

Use in a Group (vs. Alone). The addition of use in a group to the prediction of personality adjustment (Step 2) led to a statistically significant increase in variance explained, $R^2 = .26$, $\Delta F(1, 505) = 13.70$, $p < .01$. Use in a group was a statistically significant predictor of personality adjustment ($\beta = .14$, $p < .01$).

Post-Psychedelic Integration. The addition of drug use integration (amongst psychedelic users) to the prediction of personality adjustment (Step 2) led to a statistically significant increase in variance explained, $R^2 = .27$, $\Delta F(1, 505) = 25.20$, $p < .01$. Drug use integration was a statistically significant predictor of personality adjustment ($\beta = .19$, $p < .01$).

Boredom. The addition of boredom use intention to the prediction of personality adjustment (Step 2) led to a statistically significant increase in variance explained, $R^2 = .26$, $\Delta F(1, 505) = 18.22$, $p < .01$. Boredom was a statistically significant predictor of personality adjustment scores ($\beta = -.17$, $p < .01$).

Socializing. The addition of socializing use intention to the prediction of personality adjustment (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = 0.24$, $\Delta F(1, 505) = 4.59$, $p = .03$).

Sensation. The addition of sensation use intention to the prediction of personality adjustment (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .25$, $\Delta F(1, 505) = 5.56$, $p = .02$.

Mind Expansion. The addition of mind expansion use intention to the prediction of personality adjustment (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = 0.24$, $\Delta F(1, 505) = 3.15$, $p = .08$.

Creativity. The addition of creativity use intention to the prediction of personality adjustment (Step 2) led to a statistically significant increase in variance explained, $R^2 = 0.26$, $\Delta F(1, 505) = 12.75$, $p < .01$. Creativity was a statistically significant predictor of personality adjustment scores ($\beta = .14$, $p < .01$).

Fit in With the Group. The addition of fit in with a group use intention to the prediction of personality adjustment (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .24$, $\Delta F(1, 505) = 0.00$, $p = .99$.

Curiosity. The addition of curiosity use intention to the prediction of personality adjustment (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .24$, $\Delta F(1, 505) = 0.25$, $p = .62$.

Forget My Worries/Relieve Negative Emotions. The addition of forget my worries use intention to the prediction of personality adjustment (Step 2) led to a statistically significant increase in variance explained, $R^2 = .27$, $\Delta F(1, 505) = 20.70$, $p < .01$. Forget my worries was a statistically significant predictor of personality adjustment scores ($\beta = -.17$, $p < .01$).

Introspection. The addition of introspection use intention to the prediction of personality adjustment (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .24$, $\Delta F(1, 505) = 4.04$, $p = .05$.

Relaxation. The addition of relaxation use intention to the prediction of personality adjustment (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .24$, $\Delta F(1, 505) = 1.82$, $p = .18$.

Partying. The addition of partying use intention to the prediction of personality adjustment (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .24$, $\Delta F(1, 505) = 0.11$, $p = .74$

Spiritual-Religious (Entheogenic) Purposes. The addition of entheogenic use to the prediction of personality adjustment (Step 2) led to a statistically significant increase in variance explained, $R^2 = .26$, $\Delta F(1, 505) = 12.53$, $p < .01$. Spiritual/religious use was a statistically significant predictor of personality adjustment scores ($\beta = .14$, $p < .01$).

Summary

When examining the effect size of the predictor variables in contributing to personality adjustment, certain patterns emerged. In total, Step 1, including age, education, financial stability, and social desirability accounted for 24% of the variance in adjustment. When considering the remaining statistically significant predictor variables added in Step 2, they each contributed roughly 2% to 3% more variance explained.

Research Question 1D: Psychedelics and Personality Growth

This research question sought to explore which parameters of psychedelic drug use are predictive of personality growth scores (See Table 7, Appendix E).

Life-Time Use and Frequency of Use

The first-step of the regression equation included age, education, financial stability, and social desirability bias, and predicted personality growth, $R^2 = .16$, $F(4, 679) = 32.96$, $p < .01$. Financial stability ($\beta = .15$, $p < .01$) and social desirability ($\beta = .33$,

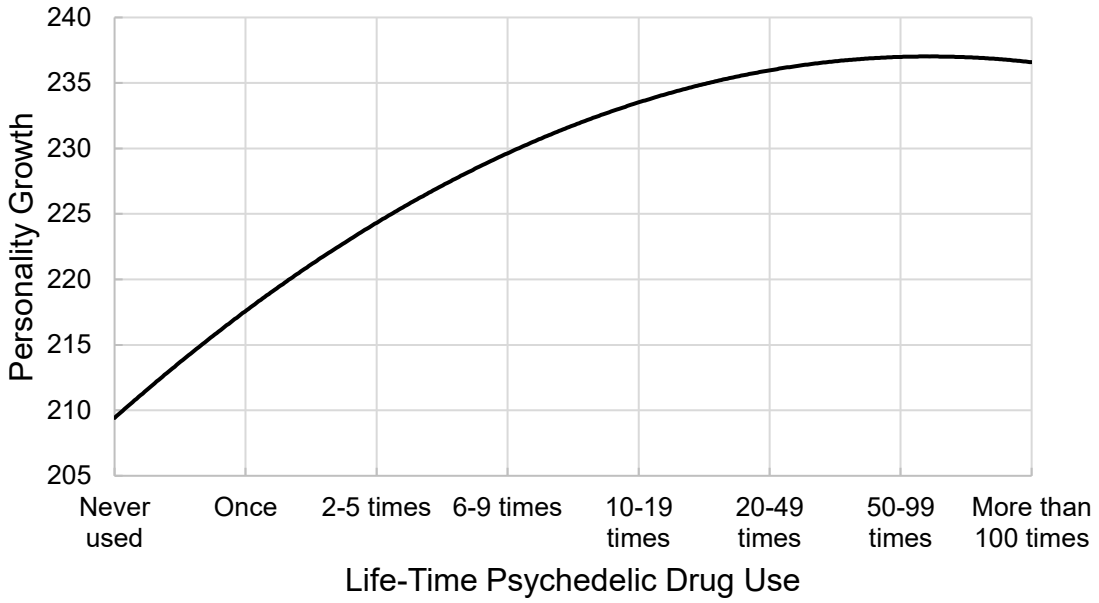
$p < .01$) contributed to the prediction of personality growth. The following regression models used this block of variables in Step 1.

Life-Time Psychedelic Use. The addition of life-time psychedelic use to the prediction of personality growth (Step 2) led to a statistically significant increase in variance explained, $R^2 = .25$ $\Delta F(1, 678) = 75.74$, $p < 0.01$. Life-time psychedelic use was a statistically significant predictor of personality growth ($\beta = .29$ $p < .01$).

The addition of life-time use squared (to assess a quadratic relationship) to the prediction of personality growth (Step 3) led to a statistically significant increase in variance explained, $R^2 = .25$, $\Delta F(1, 677) = 6.25$, $p < .01$. Life-time use squared was a statistically significant predictor of personality growth ($\beta = -.27$, $p < .01$). See Figure 4.

Figure 4

Life-Time Psychedelic Use and Personality Growth

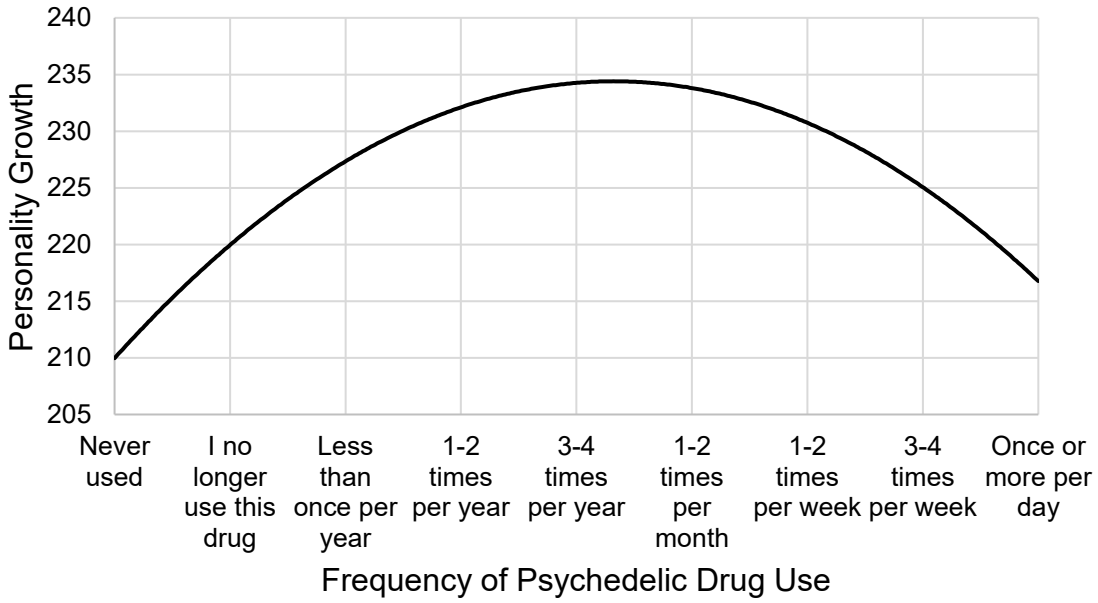


Note. Figure 4 shows a negative quadratic equation. Increased life-time psychedelic use is associated with *higher* personality growth, peaking at roughly 50-100 times. Beyond this point, increased life-time use is associated with *lower personality* growth.

Frequency of Psychedelic Use. The addition of frequency of psychedelic use to the prediction of personality growth scores (Step 2) led to a statistically significant increase in variance explained, $R^2 = .22$, $\Delta F(1, 678) = 51.77$, $p < .01$. Frequency of psychedelic use was a statistically significant predictor of personality growth scores ($\beta = .25$, $p < .01$). The further addition of frequency of psychedelic use squared (to assess for a quadratic relationship) to the prediction of personality growth (Step 3) led to a statistically significant increase in variance explained, $R^2 = .24$, $\Delta F(1, 677) = 16.10$, $p < .01$. Frequency of psychedelic use squared was a statistically significant predictor of personality growth ($\beta = -.27$, $p < .01$). See Figure 5.

Figure 5

Frequency of Psychedelic Use and Personality Growth



Note. Figure 5 shows a negative quadratic equation. Increased frequency of psychedelic use is associated with *higher* personality growth, peaking at roughly 3-4 times per year. Beyond this point, increased frequency of use is associated with *lower* growth.

Psychedelic Dosage, Use in Group, Integration, and Intentions

Psychedelic Dosage. The addition of dosage to the prediction of personality growth (Step 2) led to a statistically significant increase in variance explained, $R^2 = .18$, $\Delta F(1, 505) = 12.27$, $p < .01$. Dosage was a statistically significant predictor of personality growth scores ($\beta = .14$, $p < .01$). The further addition of psychedelic dosage squared (to assess for a quadratic relationship) to the prediction of personality growth (Step 3) did not lead to a statistically significant increase in variance explained, $R^2 = .18$, $\Delta F(1, 504) = 1.23$, $p = .27$

Use in a Group (vs. Alone). The addition of use in a group to the prediction of personality growth (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .16$, $\Delta F(1, 505) = 0.51$, $p = .48$.

Post-Psychedelic Integration. The addition of drug use integration to the prediction of personality growth (Step 2) led to a statistically significant increase in variance explained, $R^2 = .30$, $\Delta F(1, 505) = 99.87$, $p < .01$. Drug use integration was a statistically significant predictor of personality growth ($\beta = .38$, $p < .01$).

Boredom. The addition of boredom use intention to the prediction of personality growth (Step 2) led to a statistically significant increase in variance explained, $R^2 = .18$, $\Delta F(1, 505) = 9.01$, $p < .01$. Boredom was a statistically significant predictor of personality growth scores ($\beta = -.12$ $p < .01$).

Socializing. The addition of socializing use intention to the prediction of personality growth (Step 2) led to a statistically significant increase in variance explained, $R^2 = .17$, $\Delta F(1, 505) = 7.32$, $p < .01$). Socializing was a statistically significant predictor of personality growth scores ($\beta = .11$, $p < .01$).

Sensation. The addition of sensation use intention to the prediction of personality growth (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .17$, $\Delta F(1, 505) = 4.25$, $p = .04$.

Mind Expansion. The addition of mind expansion use intention to the prediction of personality growth (Step 2) led to a statistically significant increase in variance explained, $R^2 = .21$, $\Delta F(1, 505) = 28.46$, $p < .01$. Mind expansion was a statistically significant predictor of personality growth scores ($\beta = .21$, $p < .01$).

Creativity. The addition of creativity use intention to the prediction of personality growth (Step 2) led to a statistically significant increase in variance explained, $R^2 = 0.22$, $\Delta F(1, 505) = 39.06$, $p < .01$. Creativity was a statistically significant predictor of personality growth scores ($\beta = .25$, $p < .01$).

Fit in With the Group. The addition of fit in with a group use intention to the prediction of personality growth (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .16$, $\Delta F(1, 505) = 0.15$, $p = .70$.

Curiosity. The addition of curiosity use intention to the prediction of personality growth (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .16$, $\Delta F(1, 505) = 0.12$, $p = .73$.

Forget My Worries/Relieve Negative Emotions. The addition of forget my worries to the prediction of personality growth (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .17$, $\Delta F(1, 505) = 5.94$, $p = .02$.

Introspection. The addition of introspection use intention to the prediction of personality growth (Step 2) led to a statistically significant increase in variance

explained, $R^2 = 0.21$, $\Delta F(1, 505) = 33.23$, $p < .01$. Introspection was a statistically significant predictor of personality growth scores ($\beta = .23$, $p < .01$).

Relaxation. The addition of relaxation use intention to the prediction of personality growth (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .16$, $\Delta F(1, 505) = 0.91$, $p = .34$.

Partying. The addition of partying use intention to the prediction of personality growth (Step 2) did not lead to a statistically significant increase in variance explained, $R^2 = .16$, $\Delta F(1, 505) = 0.50$, $p = .48$.

Spiritual-Religious (Entheogenic). The addition of entheogenic intentions to the prediction of personality growth (Step 2) led to a statistically significant increase in variance explained, $R^2 = .27$, $\Delta F(1, 505) = 72.64$, $p < .01$. Spiritual/religious use was a statistically significant predictor of personality growth scores ($\beta = .33$, $p < .01$).

Summary

When examining the relative importance, or effect size, of the given predictor variables in contributing to personality growth scores, certain patterns appear. In total, Step 1, including age, education, financial stability, and social desirability account for 16% of the variance in personality growth. The remaining statistically significant predictor variables added in Step 2, contribute 2% to 14% additional variance. Of these, post-use integration and entheogenic psychedelic use contribute the most additional variance, at an 14% and 11%, respectively.

Assessing Autognostic Classic Psychedelic Use

Based on previous research (Móró et al., 2011) three intentions for using a classic psychedelic were defined as autognostic: mind-expansion, introspection, and spiritual-

religious (entheogenic). Bivariate correlations revealed (Table 3, Appendix E) that these three intentions are indeed strongly correlated. Entheogenic classic psychedelic use showed correlations with mind-expansive and introspective psychedelic use of $r = .42$, $p < .01$ and $r = .49$, $p < .01$, respectively. However, introspective and mind-expansive use were even more strongly correlated with each other ($r = .77$, $p < .01$). This suggests that these three intentions should not be viewed as a single (autognostic) construct.

Furthermore, examination of the hierarchical regressions and correlations (Tables 3-7) revealed that of the three autognostic use intentions, entheogenic use was most strongly predictive of each dependent variables of interest. For example, of the three autognostic uses, only entheogenic use was statistically significantly *negatively* predictive of K-6 psychological distress. In addition, only entheogenic use was statistically significantly predictive of personality adjustment. Regarding personality growth, mind-expansion, introspection, and entheogenic use were all statistically significant predictors, though entheogenic use shows the largest effect size. Mind-expansion, introspection, and entheogenic use were also significant predictors of spiritual-religious development ($r = .17$, $p < .01$; $r = .20$, $p < .01$; $r = .31$, $p < .01$), respectively. Finally, only introspective and entheogenic use were predictive of ASSIST problematic psychedelic use. Thus, based on both these empirical findings and the historic relevance of religiously motivated drug use, entheogenic psychedelic use, rather than autognostic use as a composite variable, was used in the moderation and mediation analyses.

Assessing Entheogenic Drug Use by Drug Type

Before undertaking the analyses of research questions two and three, it was also important to determine if entheogenic drug use differed across the 12 drug categories (see

Table 8, Appendix F). It was found that tobacco, alcohol, cocaine, amphetamines, opiates, inhalants, and sedatives had a mean entheogenic use rate of ~1, corresponding with "never or almost never." Cannabis, MDMA, and the dissociatives had a mean entheogenic use rate of ~2, corresponding with "some of the time." Finally, the classic psychedelics and the atypical psychedelics had a mean entheogenic use rate of ~3, corresponding with "Half of the time."

Entheogenic Drug Use and Self-Transcendence

Examination of the correlation coefficients of the 12 drug types (see Table 8, Appendix F) when used with entheogenic intentions, and measures of self-transcendence (awe and mystical experiences), revealed the following associations and effect sizes according to Cohen's (1988) estimates.

Awe showed statistically significant correlations with the entheogenic use of: cannabis ($r = .24$, $p < .01$), MDMA ($r = .18$, $p < .01$), classic psychedelics ($r = .29$, $p < .01$), and sedatives ($r = -.17$, $p < .01$). The cannabis, MDMA, and sedatives correlation coefficients constitute a small-medium effect size. The classic psychedelics correlation coefficient constitutes a medium effect size.

Mystical experiences showed statistically significant correlations with the entheogenic use of: tobacco ($r = .15$, $p < .01$), cannabis ($r = .33$, $p < .01$), MDMA ($r = .26$, $p < .01$), classic psychedelics ($r = .39$, $p < .01$), dissociatives ($r = .18$, $p < .01$), and atypical psychedelics ($r = .25$, $p < .01$). The tobacco and dissociatives correlation coefficients constitute a small-medium effect size, while the cannabis, MDMA, and atypical psychedelics correlation coefficients constitute a medium effect size. The classic psychedelics correlation coefficient constitutes a medium-large effect size.

Entheogenic Drug Use and Psychospiritual Development

Examination of the Pearson's correlation coefficients of the various forms of entheogenic drug use and measures of psychospiritual development (psychological distress, personality adjustment, personality growth, spiritual-religious development), revealed the following associations and effect sizes according to Cohen's (1988) estimates.

Psychological distress showed statistically significant correlations with the entheogenic use of: classic psychedelics ($r = -.17$, $p < .01$). The classic psychedelic correlation coefficient constitutes a small-medium effect size.

Personality adjustment showed statistically significant correlations with the entheogenic use of: cannabis ($r = .12$, $p < .01$) and classic psychedelics ($r = .19$, $p < .01$). The cannabis correlation coefficient constitutes a small effect size, while the classic psychedelics correlation coefficient constitutes a small-medium effect size.

Personality growth showed statistically significant correlations with the entheogenic use of: cannabis ($r = .28$, $p < .01$), MDMA ($r = .19$, $p < .01$), and classic psychedelics ($r = .37$, $p < .01$). The MDMA correlation coefficient constitutes a small-medium effect size. The cannabis correlation coefficient constitutes a medium effect size, and the classic psychedelics correlation coefficient constitutes a medium-large effect size.

Spiritual-religious development showed statistically significant correlations with the entheogenic use of: cannabis ($r = .22$, $p < .01$), classic psychedelics ($r = .30$, $p < .01$), inhalants ($r = .19$, $p < .01$), dissociatives ($r = .19$, $p < .01$), and atypical psychedelics ($r = .29$, $p < 0.01$). The cannabis, inhalants, and dissociatives correlation coefficients

constitute a small-medium effect size. The classic and atypical psychedelic correlation coefficients constitute a medium effect size.

Based on this analysis and a comparison of the relative effect sizes of each substance with each measure of interest, we can reasonably conclude that the *entheogenic* use of the *classic psychedelics* shows the largest overall associations with self-transcendence and psychospiritual development. This further supported the decision to utilize the entheogenic use of the classic psychedelics as the predictor variable in the following analyses as opposed to focusing on another drug category or use intention.

Assessing Post-Psychedelic Use Integration and Psychospiritual Development

For the second set of research questions, moderation analysis (Model 1) in Hayes' PROCESS macro for SPSS was used (2018). As is suggested for moderation analysis, tests for multicollinearity between entheogenic psychedelic drug use, drug use integration, and their interaction term were first conducted (Irwin & McClelland, 2001). Due to the high degree of multicollinearity, these variables were mean-centered, as this process can clarify regression coefficients (Iacobucci et al., 2017). Coefficients for the following are unstandardized (B) as the PROCESS macro does not provide standardized coefficients for moderation models.

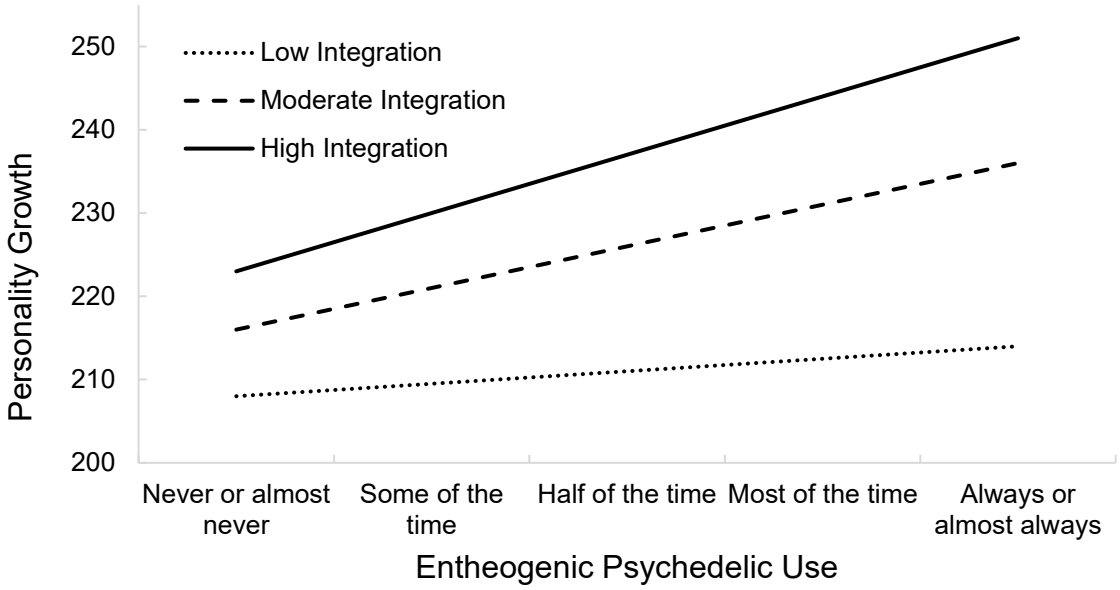
Research Question 2A: Post-Use Integration and Personality Growth

This research question sought to determine if drug use integration functions as a moderator of the relationship between spiritual-religious psychedelic use and personality growth. (See Table 9, Appendix G). The results from the PROCESS output showed a statistically significant total model with all three predictors, $F(3, 644) = 70.94$, $p < .01$, $R^2 = .25$. In other words, the three predictors together explain 25% of the variance in

personality growth. Entheogenic psychedelic drug use (B = 4.29, $p < .01$), drug use integration (B = 3.27, $p < .01$), and their interaction (B = 0.80, $p < .01$) predicted personality growth. Examination of the interaction plot showed a moderation effect of drug use integration on personality growth, as shown in Figure 6.

Figure 6

Entheogenic Psychedelic Use and Personality Growth Moderated by Drug Integration



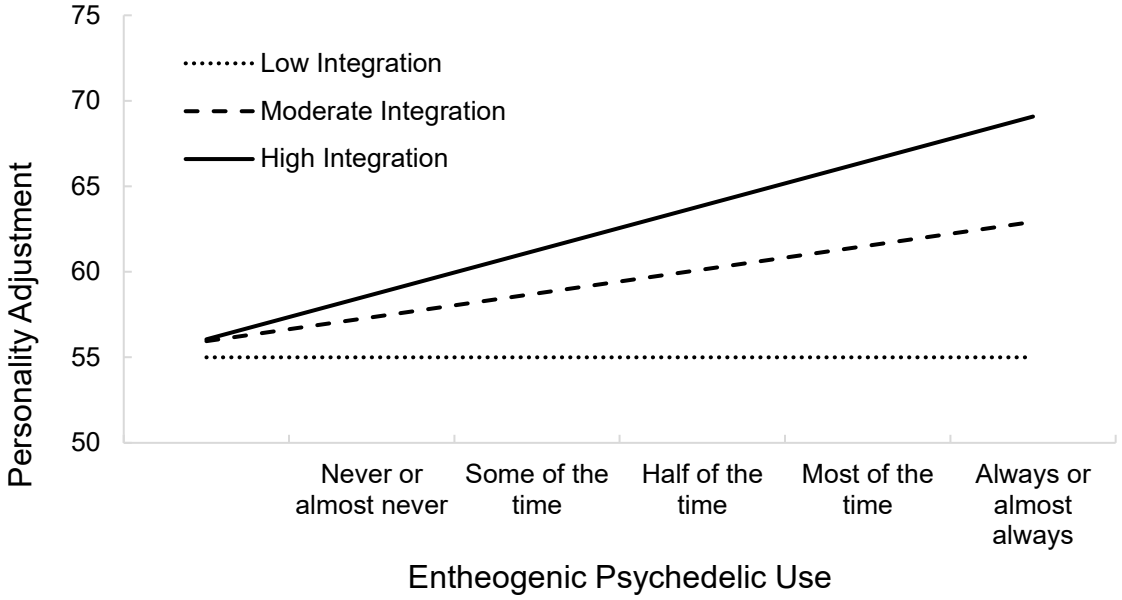
Research Question 2B: Post-Use Integration and Personality Adjustment

This research question sought to determine if drug use integration functions as a moderator of the relationship between spiritual-religious psychedelic use and personality adjustment (See Table 10, Appendix G). The results from the PROCESS output showed a statistically significant total model with all three predictors, $F(3, 644) = 18.52$, $p < .01$, $R^2 = .08$. In other words, the three predictors together explain eight percent of the variance in personality adjustment. Spiritual-religious psychedelic drug use (B = 1.24, $p < .01$), drug use integration (B = 1.07, $p < .01$), and their interaction (B = .39, $p < 0.01$) predicted

personality adjustment. Examination of the interaction plot showed a moderation effect of drug use integration on personality adjustment, shown in Figure 7.

Figure 7

Entheogenic Psychedelic Use and Personality Adjustment Moderated by Drug Integration



Research Question 2C: Post-Use Integration and Psychological Distress

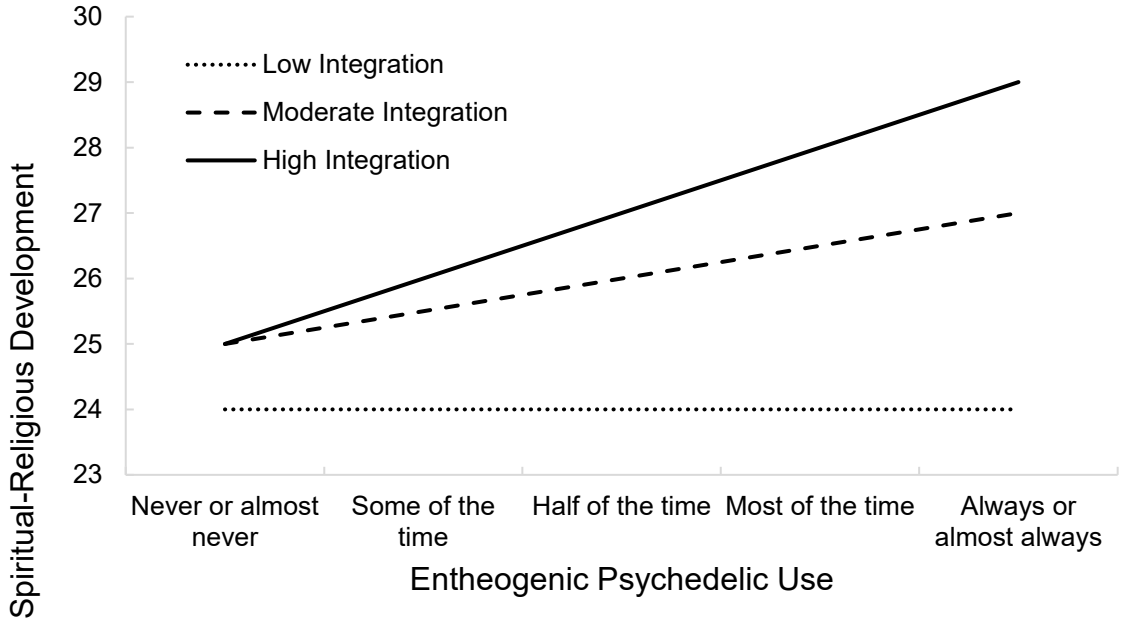
This research question sought to determine if drug use integration functions as a moderator of the relationship between spiritual-religious psychedelic use and psychological distress (See Table 11, Appendix G). The results from the PROCESS output showed a statistically significant total model with all three predictors, $F(3, 644) = 11.02$, $p < .01$, $R^2 = .05$. In other words, the three predictors together explain five percent of the variance in psychopathology scores. However, only spiritual-religious psychedelic use (B = -0.61, $p < .01$) predicted psychopathology. Drug use integration (B = -0.01, $p = .86$) and the interaction term (B = -0.03, $p = .47$) did not.

Research Question 2D: Post-Use Integration and Spiritual-Religious Development

This research question sought to determine if drug use integration functions as a moderator of the relationship between spiritual-religious psychedelic use and spiritual-religious development (xenosophia) (See Table 12, Appendix G). The results from the PROCESS output showed a statistically significant total model with all three predictors, $F(3, 644) = 35.55$, $p < .01$, $R^2 = .14$. In other words, the three predictors together explain 14 percent of the variance in spiritual-religious development. Entheogenic psychedelic use (B = 0.45, $p < .01$), drug use integration (B = 0.41, $p < .01$), and their interaction (B = 0.09, $p < .01$) predicted spiritual-religious development. The interaction plot suggests a moderation effect of drug use integration on spiritual-religious development, as shown in Figure 8.

Figure 8

Entheogenic Psychedelic Use and Spiritual-Religious Development Moderated by Integration



Assessing Entheogen-Assisted Self-Transcendence and Psychospiritual Development

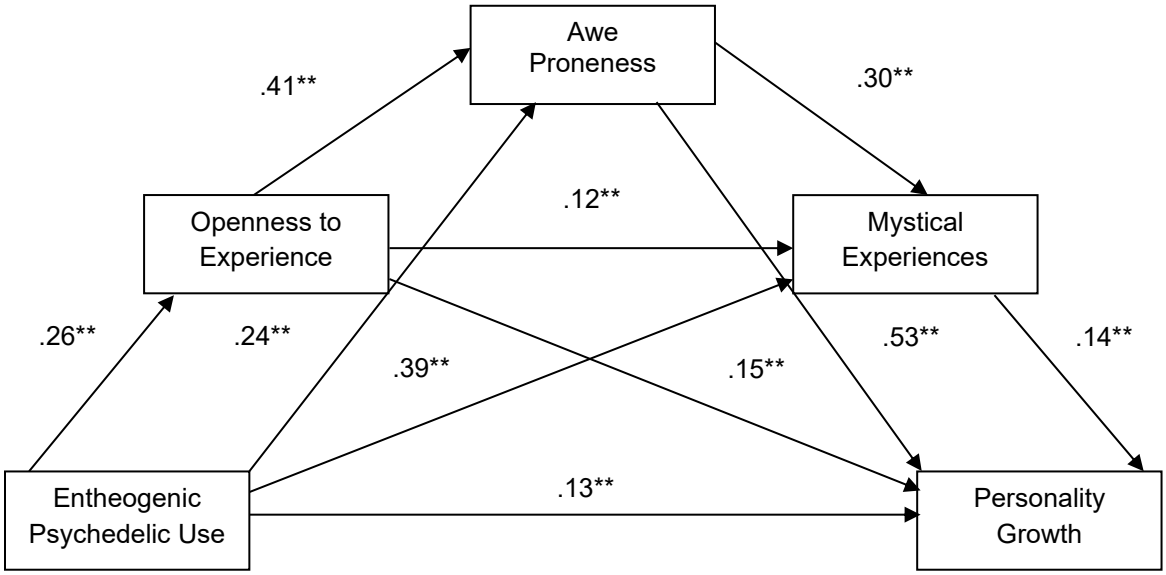
For the third set of research questions, mediation analysis, using Hayes' (2018) PROCESS macro for IBM's SPSS, was used to test the paths via Model 6 (see Table 13, Appendix H for correlational data). Coefficients for the following are standardized (β)

Research Question 3A: Entheogenic Psychedelic Use and Personality Growth

This research question sought to determine if the entheogenic classic psychedelic use is predictive of personality growth. It further asked whether openness to experience, awe-proneness, and mystical experiences mediate the relationship. The results show a statistically significant total model with all four predictors, $R^2 = .57$, $F(4, 679) = 222.19$, $p < .01$. In other words, the four predictors explain 57% of the variance in personality growth. Cohen's f^2 (total model) = 1.32, which, using Cohen's (1988) effect sizes, is a very large effect. Figure 9 shows the pathways and standardized coefficients (β).

Figure 9

Pathways of Entheogenic Psychedelic Use on Personality Growth



Note: ** $p < .001$, * $p < .01$

The direct effect of entheogenic psychedelic drug use on personality growth, as well as all the indirect effects, were statistically significant ($p < .01$). In addition, the bootstrap confidence intervals for the direct and indirect effects did not contain zero. This indicates that entheogenic psychedelic use predicts personality growth, while openness to experience, awe-proneness, and mystical experiences separately, and together, mediate the relationship between entheogenic psychedelic use and personality growth (see Tables 14 and 15, Appendix H).

The effect sizes of each pathway were calculated as per Selya et al. (2012). The Cohen's f^2 (local effect openness to experience) is .04, a small effect size. Cohen's f^2 (local effect mystical experiences) is .03, a small effect size. Cohen's f^2 (local effect awe) is .42, a large effect size. Cohen's f^2 (local effect of entheogenic psychedelic use) is .03, a small effect size. This model was run a second time, adjusting for age, education, financial stability, spirituality, meditation practice, and social desirability bias. In the second model each pathway coefficient maintained statistical significance even after adjusting for these variables (see Tables 19 and 20, Appendix I).

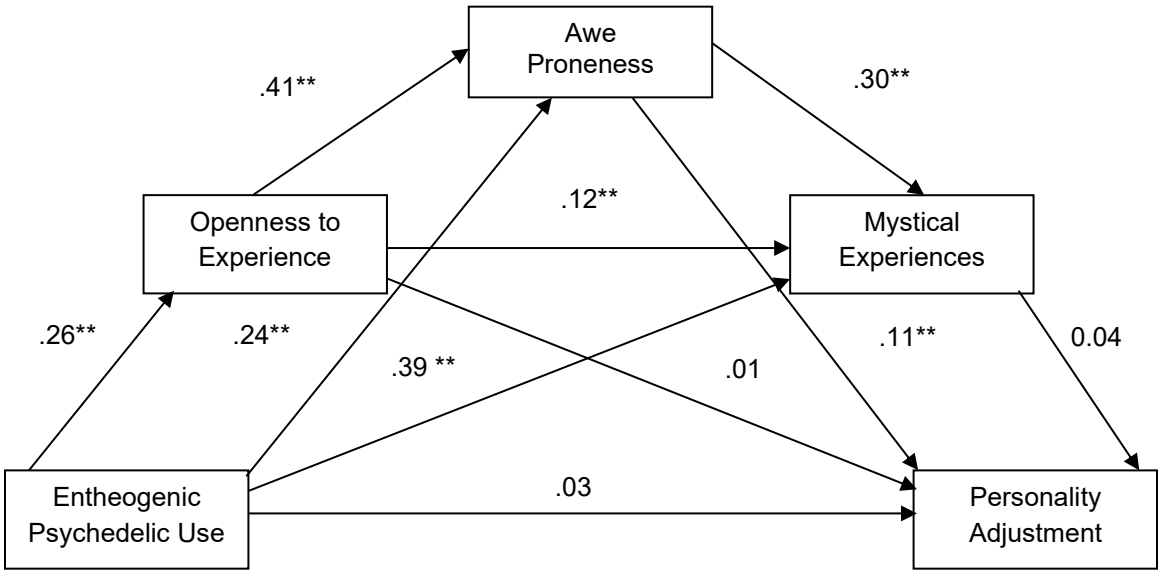
Research Question 3B: Entheogenic Psychedelic Use and Personality Adjustment

This question sought to determine if entheogenic psychedelic use is predictive of personality adjustment. Furthermore, it asked whether openness to experience, awe-proneness, and mystical experiences, separately and together, mediate this relationship. The results shows a statistically significant total model with all four predictors, $R^2 = .28$, $F(4, 679) = 65.61$, $p < .01$. In other words, the four predictors together explain 28% of the variance in personality adjustment. Cohen's f^2 (total model) is 0.39, which, using

Cohen's (1988) benchmarks, is a large effect size. Figure 10 shows the pathways and standardized coefficients (β).

Figure 10

Pathways of Entheogenic Psychedelic Use on Personality Adjustment



Note: ** $p < .001$, * $p < .01$

The direct effect of entheogenic psychedelic drug use on personality adjustment, as well as the indirect effects through openness to experience and mystical experiences, were not significant ($p > .05$). However, the indirect effect through awe-proneness to personality adjustment was statistically significant. The bootstrap confidence intervals for this indirect effect did not contain zero. This shows that entheogenic use predicts personality adjustment through awe-proneness (see Tables 14 and 16, Appendix H).

The effect sizes of the indirect pathways were calculated as per Selya et al. (2012). Cohen's f^2 (local effect of openness to experience) is 0.0004, a negligible effect size. Cohen's f^2 (local effect of mystical experiences) is 0.001, a negligible effect size. Cohen's f^2 (local effect of awe) is 0.22, a medium to large effect size. Cohen's f^2 (local

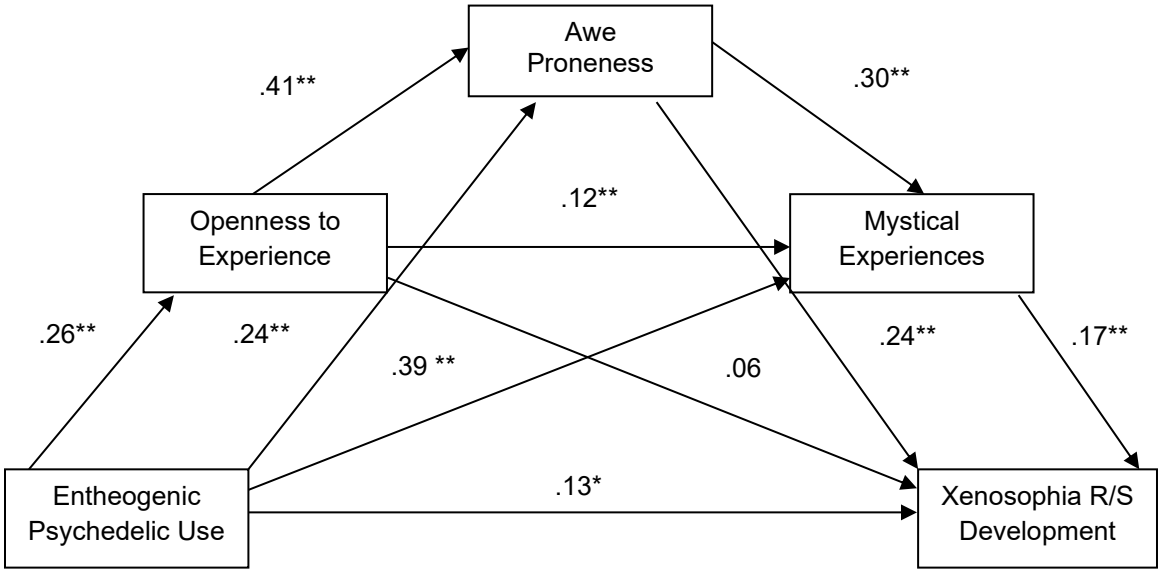
effect of entheogenic psychedelic use) is 0.001, a negligible effect size. This model was run a second time, adjusting for age, education, financial stability, spirituality, meditation practice, and social desirability bias. In this model, the same pathway coefficients maintained significance (see Tables 19 and 21, Appendix I).

Research Question 3C: Entheogenic Psychedelic Use and Xenosophia

This question sought to determine if entheogenic psychedelic use is predictive of spiritual-religious development (xenosophia). Furthermore, it asked whether openness to experience, awe-proneness, and mystical experiences mediate this relationship. The PROCESS output (Model 6) shows a statistically significant total model with all four predictors, $R^2 = .22$, $F(4, 679) = 47.93$, $p < .01$. The four predictors explain 22% of the variance in xenosophia. Cohen's f^2 (global effect, or total model) is 0.28, a medium-large effect size. Figure 11 shows the pathways and standardized coefficients (β).

Figure 11

Pathways of Entheogenic Psychedelic Use on Spiritual-Religious Development



Note: ** $p < .001$, * $p < .01$

The direct effect of entheogenic psychedelic drug use on spiritual-religious development, as well as the indirect effects through awe-proneness and mystical experiences, were statistically significant. However, the indirect effect through openness to experience was not statistically significant. This indicates that entheogenic psychedelic use predicts spiritual-religious development through awe-proneness and mystical experiences (see Tables 14 and 17, Appendix H).

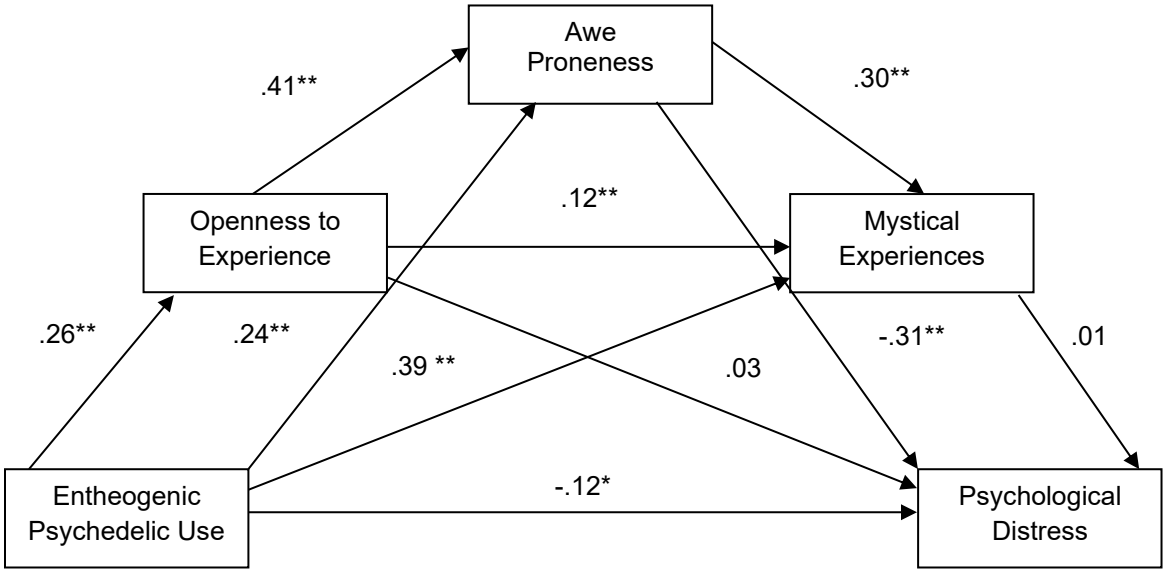
The effect sizes of the indirect pathways were calculated as per Selya et a. (2012). Cohen's f^2 (local effect, openness to experience) is 0.003, a negligible effect. Cohen's f^2 (local effect, mystical experiences) is 0.02, a small effect. Cohen's f^2 (local effect, awe) is 0.05, a small effect size. Cohen's f^2 (local effect, entheogenenic psychedelic use) is 0.02, a small effect size. This model was run a second time, adjusting for age, education, financial stability, spirituality, meditation practice, and social desirability bias. In the second model the indirect pathway coefficients through awe-proneness and mystical experiences maintained statistical significance; however, the direct effect did not maintain statistical significance (see Tables 19 and 22, Appendix I).

Research Question 3D: Entheogenic Psychedelic Use and Psychological Distress

This research question sought to determine if entheogenic psychedelic use is *negatively* predictive of psychological distress. Furthermore, it asked whether openness, awe-proneness, and mystical experiences mediate this relationship. Results show a statistically significant model, $R^2 = .12$ $F(4, 679) = 23.62$, $p < .01$. With the four predictors together explaining 12% of the variance in distress. Cohen's f^2 (global effect) = 0.14, a medium effect. Figure 12 shows the pathways and unstandardized coefficients.

Figure 12

Pathways of Entheogenic Psychedelic Use on Psychological Distress



Note: ** $p < .001$, * $p < .01$

The direct effect of entheogenic psychedelic drug use on psychological distress as well as the indirect effect through awe-proneness were statistically significant. However, the indirect effect through openness and the indirect effect through mystical experiences were not statistically significant (see Table 14, Appendix H).

The effect sizes of the indirect pathways were calculated as per Selya et al. (2012). Cohen's f^2 (local effect of openness to experience) is 0.0005, a negligible effect. Cohen's f^2 (local effect of mystical experiences) is zero, no effect. Cohen's f^2 (local effect of awe) is 0.07, a small effect. Cohen's f^2 (local effect of spiritual psychedelic use) is 0.01, a very small effect (see Table 18, Appendix H). This model was run a second time, adjusting for age, education, financial stability, spirituality, meditation practice, and social desirability bias. The indirect pathway through awe-proneness maintained statistical significance while the direct effect did not (see Tables 19 and 23, Appendix I).

Chapter VIII: Discussion

Now I am certainly aware... that the compelling need for honesty is one of the motives which leads psychologists to seek quantitative measures… I am also aware that research in our day has to be carefully set up so that the results are teachable and can be built upon by others. The compelling drive to get at the truth is what improves us all as psychologists, and is part and parcel of intellectual integrity. But I do urge that we not let the drive for honesty put blinders on us and cut off our range of vision so that we miss the very thing we set out to understand - namely, the living human being.

Rollo May (1967, p. 14)

This dissertation sought to explore the relationship between the use of the classic psychedelic substances and various indices of self-transcendence and psychospiritual development. In particular, it examined three overarching research questions, each with a number of sub-questions. The first set of questions pertained to which parameters of classic psychedelic drug use are associated with positive outcomes, and which are associated with negative outcomes. The second set of questions pertained to whether post-use psychedelic integration moderates the relationship between entheogenic psychedelic use and psychospiritual development. The final set of questions pertained to the pathways mediating entheogenic psychedelic use and psychospiritual development.

Self-Transcendence and Psychospiritual Development by Drug Category

An exploratory approach was taken with regards to the evaluative comparison of each of the 12 drug categories surveyed in this study. A number of interesting associations were found when evaluating how the life-time use of each of the 12 studied substances were related to self-transcendence and psychospiritual development.

Comparisons of the effect sizes of each drug category revealed that of all substances, the life-time use of the classic psychedelics was consistently and most strongly associated with awe, mystical experiences, personality adjustment, personality growth, spiritual-religious development, and (inversely) psychological distress. This suggests that there is something important about the classic psychedelics as a substance—or the type of person who chooses to use them—in relation to positive outcomes. This finding corresponds with previous research (e.g., Lerner & Lyvers, 2006; Nour et al. 2016).

The life-time use of cannabis also deserves mention, as it was the second most salubrious of the substances. Similar to the classic psychedelics, life-time cannabis use consistently showed associations of small-medium to medium size with awe, mystical experiences, personality adjustment, personality growth, spiritual-religious development, and (inversely) psychological distress. This fits with the work of Hathaway (1997), who found that cannabis was routinely used as a tool to look at the world, and one's place in it, through a different lens. For example, in a qualitative study of over 100 cannabis users, Hathaway and Sharpley (2010) found that users often reported experiences of self-transcendent flow. Moreover, like the classic psychedelics, cannabis can induce childlike openness, a sense of awe, and—at very high doses—individuals may experience a sense of self-transcendent merger with other people or the world around them (Tart, 1971).

Conversely, the life-time use of opiates was associated with psychological distress and negatively associated with personality adjustment. Similarly, the life-time use of sedatives was associated with psychological distress and negatively associated with awe, personality adjustment, and personality growth. Accordingly, the life-time (non-medical) use of sedatives appears to be the most problematic of the 12 substances. This also

suggests that there is something special about opiates and sedatives—or the type or contexts of persons who use them for non-medical purposes—in relation to negative outcomes. Nonetheless, causation cannot be determined with these analyses.

Positive and Negative Patterns of Psychedelic Drug Use

After establishing the foremost positive *potential* of the classic psychedelics in the exploratory analyses, the first series of research questions analyzed which parameters of their use would predict both negative and positive outcomes. Ultimately, the aim of this research question was to establish foundational estimates under which classic psychedelic use is beneficial, neutral, or harmful. A number of hypotheses were proposed, each of which were assessed with hierarchical regression analyses. Before discussing the outcomes, an examination of the first step of these regressions is required.

Socioeconomics and Psychospiritual Development

For two of the four outcome variables of interest (psychological distress and personality adjustment), education, financial stability, and social desirability bias were significant predictors, whereas these variables did not predict ASSIST problematic psychedelic use. Financial stability and social desirability bias were also significant predictors of personality growth, while education was not.

Taken together, these findings have important implications. As has long been discussed in the public and mental health literature, one must always consider the socio-economic context in which an individual finds him or herself in order to understand their level of well-being and development. This speaks to the social facet of a bio-psycho-social-spiritual model of wellness. Favourable social conditions opportunities are important steppingstones for advanced functioning and are noted predictors of adult

development (Glück et al., 2013). Deci and Ryan (2000) have also argued that meeting the *deficiency* needs originally outlined by Maslow (1968) (e.g., food and water, safety, love, self-esteem) is a necessary precondition for advanced psychological well-being and the pursuit of *being* needs. Usually only the resources left over after achieving a certain threshold of adjustment can be devoted to advanced development. As Maslow (1971) suggested, an individual is not typically motivated by being needs, such as self-transcendence, if their deficiency needs, such as financial stability and the potential to pursue an education, are not adequately met. Therefore, socioeconomic realities must be considered when assessing one's level of, and potential for, psychospiritual development.

Question 1

Question 1 sought to explore which parameters of classic psychedelic drug use, including: life-time use, frequency, dosage, intentions for use, use alone or in a group, and post-use integration, were predictive of problematic drug use and psychological distress, and, conversely, which of these parameters were predictive of personality adjustment and growth.

Hypothesis 1A: Life-Time Psychedelic Use

Life-time psychedelic use will show a negative quadratic relationship with personality adjustment and growth, and a positive quadratic relationship with psychological distress. Life-time psychedelic use will show a positive linear relationship with problem drug usage.

Life-Time Use and Psychological Distress. Life-time psychedelic use was shown to *negatively* predict psychological distress, while the quadratic relationship failed to achieve statistical significance. This finding corresponds with previous literature (e.g.,

Krebs & Johansen, 2013) which also found the use of psychedelics to be associated with a *decreased* likelihood of psychiatric symptoms of distress. The finding that the quadratic relationship was not statistically significant suggests that there does not strongly appear to be an upper threshold where a certain degree of psychedelic use inherently becomes predictive of psychological distress.

Life-Time Use and Problematic Psychedelic Use. Life-time psychedelic use was shown to *positively* predict problematic psychedelic use, while the quadratic relationship failed to achieve statistical significance. Consequently, the more prominence that psychedelic use has in one's life, regardless of intention, the more likely that one will experience problems associated with its use (e.g., trying and failing to control, cut down, or stop using; failing to do what is normally expected because of use; health, social, legal, or financial problems).

Life-Time Use and Personality Adjustment. Life-time psychedelic use was shown to *positively* predict personality adjustment, while the quadratic relationship failed to achieve statistical significance. These findings correspond with previous literature showing that the use of psychedelics in naturalistic samples is associated with subjective well-being and satisfaction with life (e.g., Carhart-Harris & Nutt, 2010; Lerner & Lyvers, 2006). The finding that the quadratic relationship was not statistically significant suggests that there is not an upper threshold where a certain degree of psychedelic use adversely impacts personality adjustment.

Life-Time Use and Personality Growth. Life-time psychedelic use was shown to *positively* predict personality growth, while the negative quadratic relationship was also statistically significant. This finding suggests that life-time psychedelic use is

linearly predictive of personality growth up until a given threshold. At this threshold, further usage appears to negatively predict personality growth. An inspection of the curve suggests that this maximum point is somewhere beyond roughly 100 uses.

Perhaps this speaks to Alan Watts' (1970) famous caution about the use of psychedelic substances:

> Psychedelic experience is only a glimpse of genuine mystical insight, but a glimpse which can be matured and deepened by the various ways of meditation in which drugs are no longer necessary or useful. When you get the message, hang up the phone. For psychedelic drugs are simply instruments, like microscopes, telescopes, and telephones. The biologist does not sit with eye permanently glued to the microscope, he goes away and works on what he has seen. (p. 26)

Nonetheless, life-time psychedelic use *positively* predicted growth scores, accounting for 24.7% of the variance in Step 2, while the addition of life-time psychedelic use squared in Step 3 only contributed 0.7% additional variance, bringing the total to 25.4% variance explained. This suggests a minor negative quadratic effect. Ultimately, more research is needed, as the resolution of this metric extends only to 100 or more uses. Future studies should utilize scales with greater upper end measurement resolution, for example, 100-150 uses, 151-250 use, etc.

Hypothesis 1B: Frequency of Psychedelic Use

Frequency of psychedelic use will show a negative quadratic relationship with personality adjustment and growth, and a positive quadratic relationship with psychological distress. Frequency of psychedelic use will show a positive linear relationship with problem use.

Frequency of Use and Psychological Distress. Frequency of psychedelic use was shown to *negatively* predict psychological distress, while the positive quadratic relationship is also statistically significant. These findings suggest that frequency of use is linearly (and negatively) associated with psychological distress up until a threshold. The positive quadratic function indicates that beyond this point, frequency of use *positively* predicts psychological distress. An inspection of the curve suggests that this threshold point is roughly 3-4 times per year.

Frequency of Use and Problematic Psychedelic Use. Frequency of psychedelic use was shown to *positively* predict psychedelic abuse, while the quadratic relationship was also statistically significant. Frequency of using psychedelics is thus linearly associated with psychedelic abuse. However, an inspection of the curve suggests a *positive* quadratic equation, such that with increased frequency the relationship with psychedelic abuse does not stay linear but takes on a curvilinear quality. In other words, greater frequencies of use become even more strongly predictive of psychedelic abuse. However, although frequency of psychedelic use (Step 2) accounted for 37% of the variance in ASSIST scores, frequency of psychedelic use squared only added 1% more variance explained, such that the quadratic effect is of minor importance.

Frequency of Use and Personality Adjustment. Frequency of psychedelic use was shown to *positively* predict personality adjustment, while the *negative* quadratic relationship was also statistically significant. These findings suggest that the frequency of psychedelic use is linearly predictive of personality adjustment up until a given threshold. At this point, greater frequency of use appears to *negatively* predict adjustment. An

inspection of the curve suggests that this maximum point occurs at roughly 3-4 times per year.

Frequency of Use and Personality Growth. Frequency of psychedelic use was shown to positively predict personality growth, while the *negative* quadratic relationship is also statistically significant. These findings suggest that frequency of psychedelic use is linearly associated with personality growth up until a given threshold. At this point, greater frequency of use appears to negatively predict personality growth. As inspection of the curve suggests that this maximum point occurs at roughly 3-4 times per year.

Hypothesis 1C: Psychedelic Dosage

Psychedelic dose size will show a negative quadratic relationship with personality adjustment and growth, and a positive quadratic relationship with psychological distress. Psychedelic dose size will show a positive linear relationship with problem drug usage.

Regarding negative outcomes, neither psychedelic dosage nor the quadratic relationship were shown to be associated with psychological distress. These findings are not congruent with Zinberg (1984) who proposed that larger doses are more likely to be associated with problem outcomes. However, psychedelic dosage did positively predict problematic use, while the quadratic relationship was not statistically significant. This suggests that psychedelic dosage is linearly associated with problematic psychedelic use, which does correspond with Zinberg's (1984) proposal that larger doses are more likely to become problematic.

Regarding positive outcomes, neither psychedelic dosage nor the quadratic relationship were shown to be associated with personality adjustment. Finally, psychedelic dosage was shown to positively predict personality growth, while the

quadratic relationship was not statistically significant. This finding is congruent with Nour et al. (2016) who found that psychedelic dosage was linearly associated with self-transcendent experiences, and the strength of these experiences predicted well-being. Thus, larger doses of psychedelics may be more likely to induce self-transcendent experiences, and these experiences, as described below, are indeed predictive of personal growth.

Hypothesis 1D: Psychedelic Use in a Group (vs. Alone)

Psychedelic use in a group context will positively predict personality adjustment and growth, and negatively predict problematic drug usage and psychological distress.

Regarding negative outcomes, psychedelic use in a group (vs. alone) was not shown to be associated with psychological distress but is negatively associated with psychedelic abuse. In other words, whether one uses psychedelics alone or in a group setting does not appear to have any bearing on psychopathology but does appear to be associated with a *lower* likelihood of problematic use. This corresponds with Zinberg (1984) who suggested that controlled psychedelic use is often a planned, group activity.

Regarding positive outcomes, psychedelic use in a group (vs. alone) is *positively* associated with personality adjustment but is not associated with growth. In other words, using psychedelics in a group setting appears to be associated with a greater likelihood of adjustment, but appears to have no bearing on personality growth. This may be the case because a large part of adjustment is related to the quality of one's relationships, which may benefit from exploring altered states together in a group context.

Hypothesis 1E: Post-Psychedelic Integration

Post-psychedelic use integration will positively predict personality adjustment and growth, and negatively predict problematic drug usage and psychological distress.

Post-use psychedelic integration was not shown to be associated with psychological distress, but is positively associated with problematic use, adjustment, and growth. This is an interesting finding. Although it was anticipated that psychedelic drug use integration would be predictive of adjustment and growth, it was not expected that integration would not predict psychological distress, nor was it predicted that integration would predict psychedelic abuse. Nonetheless, integration only contributes 1.5% additional variance to scores on the ASSIST, bringing the total from 2.4% in Step 1 to to 3.9% in Step 2. Thus, it is a minor effect.

Hypothesis 1F: Autognostic Psychedelic Use Intentions

Psychedelic use with autognostic intentions will positively predict personality adjustment and growth, and negatively predict problematic drug usage and psychological distress.

Of the three forms of autognostic psychedelic use, only spiritual/religious (entheogenic) use was shown to be *negatively* predictive of psychological distress, while mind-expansive and introspective use show no association. Comparably, entheogenic use and introspective psychedelic are weakly, but positively, predictive of problematic use, while mind-expansive use shows no association. Entheogenic use and introspective use are weakly but positively predictive of personality adjustment. However, all three forms of autognostic psychedelic use are moderately associated with personality growth, with entheogenic use showing the strongest association. This finding corresponds with

previous research (e.g., Móró et al., 2011). The finding that entheogenic and introspective forms of psychedelic use are weakly associated with problems opens further questions. Nonetheless, entheogenic use only contributes 2.5% variance to scores on the ASSIST, bringing the total from 2.4% in Step 1 to 4.9% in Step 2. Thus, it is a minor association.

Hypothesis 1G: Coping/Self-Medication Psychedelic Use Intentions

Psychedelic use with a coping/avoidance intention will negatively predict personality adjustment and growth, and positively predict problematic drug usage psychological distress.

Regarding negative outcomes, using psychedelics with the intention of forgetting one's worries/relieving negative emotions was shown to be positively predictive of both psychological distress and psychedelic abuse. Regarding positive outcomes, using psychedelics with the intention of relieving negative emotions was shown to be *negatively* predictive of personality adjustment and growth. Taken together, these findings are similar to studies of both cannabis and alcohol users, which have found that using these drugs to cope with distress is associated with negative outcomes (e.g., Cooper et al., 1994, 1995; Neighbors et al., 2007; Simons et al., 1998).

Hypothesis 1 Summary

One of the central findings of this study is that using psychedelic drugs in and of itself is neither negative, neutral, or beneficial. Rather, the parameters of use ultimately determine the outcomes. With regards to life-time use, the results of this study suggest that using psychedelics to excess may, under some contexts, become detrimental. The linear relationship between life-time use and abuse, and the negative quadratic relationship between life-time use and growth, suggest that while use of psychedelics

appears to have benefits, excessive use—particularly beyond a certain upper threshold of roughly 50-100 uses—may become detrimental for some users.

In a similar way concerning frequency of use, using psychedelics roughly 3-4 times per year is associated with the overall most positive outcomes. However, frequency of use showed a negative quadratic relationship with various outcomes; in fact, heavy frequency of use is the contextual variable most predictive of negative outcomes. These findings correspond with Peele and Brodsky (2000) and Clifford et al. (1991) in that there appears to be a curvilinear relationship between drug use and well-being. In other words, while limited psychedelic use may positively contribute to one's well-being and growth, both complete abstinence *and* extensive use may limit it.

The size of psychedelic dose one takes does not appear to have any bearing on psychopathology or adjustment. Paradoxically, larger doses are associated with both higher abuse potential and greater growth, which speaks to the seeker orientation in adulthood and the risks of the *Puer* archetype (see conclusion). Using psychedelics in a group (rather than alone) appears to be associated with a lower risk of abuse and greater personality adjustment, though it is not associated with psychopathology or personality growth. Use in a group may protect against problem use if the user's social network is composed of others in the drug use community who can help group members moderate and control use, as shown by Zinberg (1984).

Reflecting upon and actively integrating one's psychedelic use is positively associated with adjustment and growth as well as with problematic use. However, it is not associated with psychological distress, which suggests something in terms of a "hygienic" effect as opposed to a "remediation" effect. Integration is the independent

variable most strongly associated with personality adjustment and growth in this study, which speaks to its importance for deriving benefits from psychedelic use.

Autognostic use intentions (entheogenic, introspective-personal growth, and mind-expansive) were shown to be most strongly predictive of the positive indices. Entheogenic use in particular showed the largest associations with adjustment and growth of the 12 use intentions studied. In addition, entheogenic use was the *only* intention of the 12 that was negatively associated with psychological distress. However, entheogenic and introspective psychedelic use were also weakly associated with problem use. And finally, the use of psychedelics to cope with or relieve negative emotions positively predicts distress and problem use, and negatively predicts adjustment and growth. It is the use intention most strongly predictive of negative outcomes.

The primary conclusion to be drawn from this series of analyses is that we cannot make blanket statements about the outcomes of psychedelic drug use. We must know why or for what purpose an individual uses the substance, how frequent, the size of the dose, whether that use is alone or with others, whether or not they reflect upon their drug experiences, and roughly how many times they have used the substance in order to predict whether use is likely to be associated with positive or negative consequences. As a result, we should be neither cavalier nor close-minded about these substances. Use can be destructive or beneficial. Knowledge of these contextual variables is crucial to determining which outcome is most likely.

A Continuum of Psychedelic Use Intentions

An exploratory stance was taken towards the use intentions for which no hypotheses were presented a priori. It is hoped that these data can provide a foundation

for future replication studies. Of these intentions, using psychedelic out of boredom appears to be the second most deleterious, as, like coping, it was positively associated with psychopathology and problematic use, and negatively associated with adjustment and growth. Similarly, using psychedelics to relax was predictive of psychopathology, while using psychedelics to enjoy the sensation was predictive of problematic use.

Using psychedelics for socializing, to fit in with a group, out of curiosity, or for partying were not associated with any of the four outcome measures. This finding is interesting, as it suggests that some of the most classically "recreational" forms of psychedelic use are neutral and have no relationship with one's functioning in the world.

Finally, using psychedelic for creativity was associated with problematic use, adjustment, and growth, but not associated with psychopathology. The strength of the associations for creativity are similar to introspection and mind-expansion, thus suggesting that creativity should be considered amongst the most salubrious intentions. Taken together, if a continuum of psychedelic use intentions were created in terms of overall negative and positive predictive outcomes, it might be described as follows:

Positive Psychedelic Use Intentions

1. Entheogenic
2. Mind-expansion; Introspection; Creativity/Performance

Neutral Psychedelic Use Intentions

3. Socialization; Fitting in with a group; Curiosity; Partying

Adverse Psychedelic Use Intentions

4. Relaxation; Sensation
5. Coping with negative emotions; Boredom

This continuum is, of course, tentative and does not mean to imply causality. In other words, using a psychedelic to enhance creativity cannot be said to cause personality growth, and nor does using a psychedelic to cope with negative emotions be said to cause psychological distress. To make such statements would requires experimental research. However, this continuum does help us to establish whether or not a given individual's use may be a cause for concern. Thus, knowing that someone has taken a psychedelic substance is not enough to make a determination of likely outcomes. We must critically ask why, or for what purpose, they took the drug.

The ASSIST and Problematic Psychedelic Drug Use

Given the interesting correlation between ASSIST problematic use and various positive outcome variables—as well as the paradoxical finding that the ASSIST was *not* correlated with K-6 psychopathology, but was correlated with adjustment, growth, and xenosophia—greater consideration of the ASSIST is in order. To do so, an examination of the correlations of each of the six ASSIST scale items (not including the first or the eighth ASSIST items, as these two items are not included in scoring) with personality growth and adjustment, as well as the other drug use parameters, was conducted.

The second ASSIST item asks about one's frequency of use in the past three months. This item alone correlated with personality adjustment and growth. In fact, the majority of the other items were *negatively* correlated with adjustment and growth, just as one would expect (e.g., tried and failed to control, stop, or cut down using psychedelics; use of psychedelics led to health, social, legal, or financial problems). This may raise questions about the criterion validity of the ASSIST, as one of the scaled items does not concern problem use per se, but rather is an indicator of frequency use in the last 3

months. When comparing each ASSIST item with the various psychedelic use parameters, a similar pattern emerged. For example, post-use integration, mind-expansion, entheogenic use, and introspective use were only weakly associated with the first two items of the ASSIST scale: item 2) *frequency of use in the past three months*, and item 3) *a strong urge or desire to use psychedelics.* This suggests that assessing frequency of use in the last 3 months linearly is problematic. A more accurate conceptualization of frequency, as suggested by this study, is that beyond a certain point (roughly 3-4 times per year), greater frequency of use moves from potentially helpful to potentially harmful.

However, the associations with item 3 suggest that caution is in order. All three autognostic forms of drug use and post-use integration are correlated, albeit weakly, with 3) *a strong urge or desire to use*. Thus, we must be careful to note that although psychedelics may be used in a beneficial manner, one must always remain cautious of the potential to develop a compulsive relationship with them, regardless of why they are being used or if their use is being integrated. Any behaviour, when taken to excess, can become problematic, even when that behaviour is ostensibly for beneficial purposes.

Entheogenic Drug Use by Drug Type

When considering how each of the 12 substances were associated with entheogenic use intentions, it was found that both the classic psychedelics and the atypical psychedelics had a mean entheogenic use rating of ~3, corresponding with "Half the time." Cannabis, MDMA, and the dissociatives had a mean entheogenic use rate of ~2, corresponding with "some of the time." These findings corresponds with Móró et al. (2011), who noted that the psychedelic drugs are commonly associated with self-

exploratory and spiritual pursuits, as well as with Simons and colleagues (1998, 2000) who noted that psychedelic drugs are unique in their ability to facilitate new perceptions and interpretations of experience. So, although cannabis, MDMA, and dissociatives see occasional use as entheogens, both classic and atypical psychedelics see relatively frequent use in pursuit of the sacred or numinous.

Comparisons of the effect size of each drug type, when used entheogenically, revealed that the classic psychedelics showed the largest overall associations with self-transcendence and psychospiritual development. However, entheogenic use of cannabis, MDMA, and the atypical psychedelics at times showed modest effect sizes. Thus, psychedelic substances—broadly defined to include the classic and atypical psychedelics, MDMA, and cannabis—certainly have potential as entheogens (Ott, 1995; Tart, 1971). Indeed, cannabis, is sometimes considered a "minor" psychedelic. It has received this label due to the findings that, at very high doses, its effects share some resemblance with the classic psychedelics, and it has been used for spiritual and therapeutic purposes by various cultures (Grinspoon & Bakalar, 1979; Tart, 1971). However, given the nature of this study, it cannot be causally determined if the substance *itself*, or the *type* of person who chooses to use that substance, or the *entheogenic purpose*, is the critical factor. It is likely that an interaction of the personality, intention, context, and pharmacology contribute to outcomes, though further research is needed to tease apart these variables.

Post-Psychedelic Use Integration and Psychospiritual Development

The second series of research questions involved an exploration of the role of post-drug use integration on psychospiritual development. Several hypotheses were proposed, each of which were assessed with moderation analyses (Hayes, 2018).

Question 2

Question 2 sought to determine if post-use integration of classic psychedelic experiences moderates the relationship between autognostic psychedelic use and: personality adjustment, personality growth, psychological distress, and spiritual-religious development. However, of the three a priori established autognostic use intentions, entheogenic use was ultimately selected for use in these models. This decision was made based on the theoretical and anthropological significance of spiritual/religious psychoactive drug use in general. Further, this study found entheogenic classic psychedelic use to be the most salubrious of the three autognostic use intentions in the preliminary analyses.

Hypothesis 2A: Personality Growth

Entheogenic classic psychedelic use, drug-use integration, and their interaction term were all predictive of personality growth. As such, as either entheogenic psychedelic drug use or drug use integration increase, so too does personality growth. Given the moderation effect, drug use integration amplifies the impact of entheogenic psychedelic use, meaning that at low levels of integration, entheogenic use is less strongly predictive of personality growth, while with higher levels of drug use integration, entheogenic psychedelic use becomes more strongly predictive of personality growth.

Hypothesis 2B: Personality Adjustment

Entheogenic psychedelic use, drug use integration, and their interaction term were all shown to be predictive of personality adjustment. As both entheogenic psychedelic use and drug use integration increase, so too does personality adjustment. Further, drug use integration amplifies the impact of entheogenic psychedelic use, meaning that at low

levels of drug use integration, entheogenic psychedelic use is less strongly predictive of personality adjustment, while with higher levels of drug use integration, entheogenic psychedelic drug use becomes more strongly predictive of personality adjustment.

Hypothesis 2C: Psychological Distress

Only entheogenic psychedelic use was shown to be negatively predictive of psychological distress, while drug use integration and the interaction term are not. In other words, as entheogenic psychedelic use increases, psychological distress decreases. However, drug use integration does not amplify this relationship, meaning that regardless of one's level of drug use integration, entheogenic psychedelic use maintains a linear (negative) relationship with psychological distress.

Hypothesis 2D: Spiritual-Religious Development

Entheogenic psychedelic use, drug-use integration, and their interaction term were all shown to be predictive of spiritual-religious development. As both entheogenic psychedelic drug use and drug use integration increase, so too does spiritual-religious development. Drug use integration amplifies the impact of entheogenic drug use, meaning that at low levels of drug use integration, entheogenic psychedelic use is less strongly predictive of spiritual-religious development, while with higher levels of drug use integration, entheogenic psychedelic drug use becomes more strongly predictive of spiritual-religious development.

Hypothesis 2 Summary

Overall, these findings point to the importance of deliberately reflecting and acting upon one's drug experiences in order to gain maximum benefit. Although this has long been discussed in the psychedelic literature (e.g., Richards, 2016; Walsh, 2003), this

study provides empirical support for the argument that although use in and of itself may engender benefits, one must actively reflect, process, and act upon drug induced insights in order for use to have the most meaningful impact in one's life. As an analogy, consider the act of attending school. If one does not attend class with the *intention* of learning and does not engage with homework afterward (*integration*), then the learning gains are smaller than if one had gone to school with the intention of learning *and* completed the homework. You might gain something from mindlessly going to school and never doing your homework, but you are likely to gain a great deal more if you go in with the intention of learning and work on your homework after class has been dismissed.

Entheogen-Assisted Self-Transcendence and Psychospiritual Development

As noted, the third series of research questions involved an exploration of the mediational pathways by which classic psychedelic drug use predicts psychospiritual development. A number of hypotheses were proposed, each of which were assessed with mediation analyses.

Question 3

Question 3 sought to determine whether entheogenic psychedelic use would be predictive of openness to experience, awe-proneness, and mystical-peak experiences. In turn, openness to experience was expected to be predictive of awe-proneness and mystical experiences, while awe-proneness, in turn, was expected to be predictive of mystical experiences. Finally, entheogenic psychedelic use directly, and openness, awe-proneness, and mystical experiences indirectly, were expected to be predictive of each of the four dependent variables: personality growth, personality adjustment; psychological distress, and xenosophia.

As with question two, of the three a priori established autognostic use intentions, entheogenic use was selected for use in these models rather than mind-expansion or introspective use for two reasons. First, the long standing theoretical and anthropological significance of spiritual/religious psychoactive drug use render it important to consider in contemporary society. Second, entheogenic psychedelic use was found to be overall the most hygienic of the 12 intentions which were examined in this study.

Entheogenic psychedelic use was found to be predictive of openness to experience, awe-proneness, and mystical experiences. This supports the findings of previous research indicating that psychedelic use is strongly associated with openness to experience, awe, and mystical states (e.g., Carhart-Harris et al., 2016b; Jakab & Goldman-Rakic, 1998; Griffiths et al., 2006; Leary, 1970). Moreover, as seen in previous studies, openness to experience was predictive of both awe-proneness and mystical experiences, further supporting the assertion that openness to experience promotes an openness to self-transcendent states (e.g., Bonner & Friedman, 2011; McCrae, 2007). In addition, this study supports the argument that awe-proneness—a proclivity to experience states of awe, wonder, and beauty in day to day life—is predictive of having a mystical experience (Silvia et al., 2015). The relationship between these variables and each of the dependent variables of interest are discussed below.

Hypothesis 3A: Personality Growth

Entheogenic psychedelic use was found to directly predict personality growth, while openness to experience, awe-proneness, and mystical experiences also indirectly mediated this relationship. The finding that the direct effect is statistically significant suggests that other mechanisms beyond openness, awe, and mystical experiences

contribute to the impact of entheogenic psychedelic use on personality growth. These mechanisms may include cathartic, emotional processing, or greater self-insight, as has been suggested by previous researchers (e.g., Carhart-Harris et al., 2014; Fromm, 1977; Grinspoon & Bakalar, 1979). However, when comparing the relative effect sizes (Cohen's *f*), awe-proneness is clearly most prominent. Although entheogenic psychedelic use in and of itself, openness to experience, and mystical experiences are important, experiencing awe is the central predictor of personality growth in this model.

Hypothesis 3B: Personality Adjustment

Entheogenic psychedelic use was *not* shown to be directly predictive of personality adjustment, while openness to experience and mystical experiences were not indirect mediators of this relationship. However, awe-proneness appears to indirectly mediate the relationship between entheogenic psychedelic use and personality adjustment, which supports previous theoretical research suggesting a beneficial relationship between awe and well-being (e.g., Bonner & Friedman, 2011; Hendricks, 2018). The beneficial impact of entheogenic psychedelic use on psychological adjustment may thus be largely derived from experiences of awe, wonder, and beauty.

Hypothesis 3C: Psychological Distress

Entheogenic psychedelic use was shown to directly (and negatively) predict psychological distress. This finding corresponds with previous research, which has also found psychedelic use to be associated with lower rates of psychopathology (e.g., Hendricks et al., 2015; Krebs & Johansen, 2013). Awe-proneness further mediates this relationship, supporting previous research showing a beneficial relationship between awe and mental health (e.g., Bonner & Friedman, 2011; Maslow, 1964; Schneider, 2009).

However, neither openness to experience nor mystical experiences were important predictors of psychopathology. When comparing the relative effect sizes (Cohen's *f*) of each path variable's contribution to psychopathology, awe-proneness is most prominent. Although entheogenic psychedelic use in and of itself is important, awe-proneness is once more the central (negative) predictor of psychopathology.

Hypothesis 3D: Spiritual-Religious Development

Entheogenic psychedelic use was shown to predict spiritual-religious development, while awe-proneness and mystical experiences mediate this relationship. These findings correspond with previous research indicating that mystical states and entheogenic psychedelic use may be associated with mature religiosity/spirituality (e.g., Móró et al., 2011; Streib et al., 2016). This study adds to this body of research by showing that awe is also a strong predictor of development. However, the finding that openness to experience was not a predictor of spiritual-religious development in the total model does not correspond with previous research (Streib et al., 2010). This may be because awe and mystical experiences were included in this model, such that any "openness to self-transcendence" may have been partialled out. Furthermore, when comparing the relative effect sizes (Cohen's *f*) of each variable's contribution to spiritual-religious development, awe-proneness was most prominent. Although entheogenic psychedelic use in and of itself and mystical experiences are important, awe-proneness is a central predictor of spiritual-religious development.

Hypothesis 3 Summary

When examining the four hypotheses as a whole, a strong pattern emerges. As predicted, in all four models, entheogenic psychedelic use predicts openness to

experience, awe-proneness, and mystical experiences. In other words, when used with entheogenic intentions, psychedelics can be considered tools for facilitating openness and self-transcendence. However, across these four models, entheogenic psychedelic use, openness, awe-proneness, and mystical experiences displayed varying relationships with the dependent variables of interest. When examining the effect sizes of these path variables, awe-proneness stands out as the most important variable in each model. Further, awe-proneness maintains statistical significance even after adjusting for the influence of age, education, financial stability, meditation practice, spirituality, and social desirability bias.

Together, these findings support the notion that, when employed with entheogenic intentions, psychedelics can reasonably be considered tools for facilitating both a proneness to, and greater frequency of, self-transcendent experiences of awe, which in turn are associated with psychological and spiritual well-being and development. Given that a truly comprehensive model of mental health requires the presence of personality adjustment and personality growth, as well as the absence of psychopathology, entheogen-assisted awe-proneness may constitute one means to facilitate flourishing.

Importantly, one of the principal aims of this study was to determine if psychedelics could be used not only to foster subjective well-being/adjustment, but also to promote eudaimonic well-being/personality growth. Supporting previous research this study suggests that psychedelics can indeed enhance mental adjustment/subjective well-being, primarily via promoting experiences of awe in day-to-day life. Importantly, not only do psychedelics have an important role to play for mental health, but also in fostering adult development toward the farther reaches of human nature. That is,

entheogenic psychedelic use is associated with a cluster of personal growth traits, including purpose in life, personal growth, autonomy, an inclusive sense of identity, perspective taking, detached awareness and non-attachment, self-knowledge, equanimity, here-and-now presence, and self-transcendence.

As noted, experiencing awe is the chief variable of importance in this mediational model. However, awe-proneness, as assessed by the DPES-AWE, is a measure of trait, not state. In other words, this scale measures one's proclivity for experiencing awe, wonder, and beauty. Thus, this study shows that although psychedelics can induce pronounced moments of self-transcendence—mystical experiences—the greatest benefits derive from a greater frequency of awe in day-to-day life. It supports the contention that we should be fostering a greater openness to wonder, awe, and beauty in our lives (Schneider, 2009), not just aiming for profound self-transcendent states while under the influence of a psychedelic.

As noted, awe is the apprehension of profound novelty or vastness and the need for accommodation (Keltner & Haidt, 2003). It logically follows that awe would foster growth, given that accommodation requires schematic expansion in order to incorporate an experience that cannot be assimilated into one's current mental structures (Keltner & Haidt, 2003). In other words, "awe involves a challenge to or negation of mental structures when they fail to make sense of an experience of something vast" (Keltner & Haidt, 2003, p. 304). Thus, awe facilitates an openness to growth and change. It entails a sense of humility and the willingness to surrender to mystery; to see that the mundane is indeed the sublime. The careful use of psychedelic substances may support one's endeavour to foster this greater sense of awe, wonder, and marvel in life.

In a similar way, given the connection between the entheogenic psychedelic use and awe, mystical experiences, spirituality ($r = 0.48$, $p < 0.01$), and spiritual-development, these substances certainly have implications for transpersonal psychology, theology, and spirituality. This theme is explored further in the conclusion chapter of this dissertation. Ultimately, these findings point to what many indigenous cultures have noted for millennia (Ludwig, 1972); when carefully used these substances can contribute to personal, social, and spiritual well-being.

Meditation and Psychospiritual Development

It is important to briefly note the role of meditation as another "tool" or technology in the interest of psychospiritual development. Akin to previous studies (e.g., Alexander et al., 1991; Levenson et al., 2005), this research has further demonstrated that meditation is positively associated with personality adjustment ($r = .24$, $p < .01$), personality growth ($r = .38$, $p < .01$), and spiritual-religious development ($r = .37$, $p < .01$), as well as negatively associated with psychological distress ($r = -.22$, $p < .01$; see Appendix H). Furthermore, in the expanded models, which included control variables (see Appendix I), meditation practice maintained statistical significance as a predictor of spiritual-religious development ($\beta = .15$, $p < .01$), even after accounting for the other variables in the path models. This suggests that meditation practice, like autognostic or entheogenic psychedelic use, may be a tool to aid adult development.

Limitations

Due to the fact that a random, probability sample was not used, the results of this study cannot be assumed to be representative of the broader population. As such, generalization to other populations cannot be made. Furthermore, models such as the

ones developed here using a cross-sectional sample are limited by measures that capture individuals at one particular point in time. In addition, this study used self-report inventories which can lead to biased responding, particularly in the direction of making one's self appear more favourable. Although this study attempted to statistically control for the presence of this bias by using the Marlowe-Crowne inventory, self-report bias nonetheless remains a limitation of this study. There were also a sizable number of individuals who did not complete the survey after beginning. It is possible that the experiences of these individuals were in some manner systematically different from those individuals who did complete the questionnaire. Finally, as noted in Chapter VI, Type I errors (false positives) are always a concern in scientific research, and this problem is exacerbated when conducting multiple tests. Given that many statistical tests were conducted in this study, it is possible several findings reported to be statistically significant are in fact spurious. Ultimately, as is always the case with science, replication studies are needed to confirm the veracity of the findings in this dissertation.

Even if we are to accept the legitimacy of the study findings, the question of directional causality cannot be established. That is, although autognostic (and particularly entheogenic) psychedelic drug use may contribute to psychospiritual development, it is also possible that individuals with high levels of psychospiritual development choose to use psychedelic drugs for these purposes. For example, Lerner and Lyvers (2006) found that psychedelic users reported greater spirituality and concern for others than non-psychedelic drug users and speculated that an interaction of personality factors and the drug effects may have contributed to group differences. Likewise, Cummins and Lyke (2013) also noted that with cross-sectional research, it is impossible to determine whether

personality characteristics, or psychedelic use, leads to psychedelic users being more prone to mystical experiences and their attendant benefits. Even in experimental studies, Griffiths et al. (2006) and MacLean et al. (2011) noted that the religious/spiritual interest and activities of participants may have increased the likelihood that their psychedelic experience would have spiritual significance and personal meaning.

Thus, no causation can be drawn from this study. Whether individuals who show high levels of psychospiritual development are drawn to autognostic psychedelic drug use, or conversely, autognostic psychedelic drug use promotes psychospiritual development cannot be determined. Or perhaps more likely, personality and drug use interact. Regardless of causality, associations between autognostic psychedelic use and psychospiritual development open the door to larger questions about our society's stance toward these drugs. For example, what if we assume that causality is, in fact, in the other direction—that the more developed a person the more likely they are to use psychedelic drugs as entheogens. These are allegedly dangerous, non-useful, hallucinogenic substances. Why, then, would the most developed amongst us be using them? What does this say about the validity of their prohibition?

PART THREE

Conclusion: Entheogens, Awe, and the Recovery of Religion

One cannot help but be in awe when [contemplating] the mysteries of eternity, of life, of the marvelous structure of reality. It is enough if one tries merely to comprehend a little of this mystery every day.

Albert Einstein (1955, p. 64)

One of the central findings of this study is that when psychedelic substances are used with certain intentions—particularly those that are entheogenic—they can be thought of as tools to help facilitate an openness to self-transcendence and, with it, the process of psychospiritual development. By expanding the theoretical and empirical importance of experiencing awe, this study sheds additional light on *one* potential mechanisms by which positive adult development may be fostered.

Psychedelics as Tools for Facilitating Awe and Psychospiritual Development

Based upon both the theoretical and empirical research conclusions of this dissertation, the transformative impact of psychedelics may be conceptualized as follows. When taken, psychedelics usher the user into a state of increased openness to experience, in which the boundaries between normally conscious and unconscious processes are rendered more permeable. This corresponds with decreased latent inhibition and enhanced novelty perception. That is, one's mental frameworks, which normally filter one's perception of reality, are deautomatized, bringing the individual into a fresh experience of reality. Experience takes on a pristine and wondrous immediacy, pulling the individual into a state of fascinated absorption, in which self-awareness diminishes and consciousness begins to merge with the experience at hand.

In this receptive, childlike state one may be overwhelmed by feelings of awe and potentially fear, as the sheer novelty, complexity, and wonder of the experience cannot be merely assimilated to extant schemas. This awe-full encounter with what is experienced as new, vast, overwhelming, or mysterious may promote humility as one's very self-schema is diminished. This phenomenological self-shrinking, small-self, or hypo-egoicism exists on a spectrum, with the farthest reaches of self-negation being equivalent to ego-death. To the degree that the self-structure falters it must accommodate, and thereby one's self-schema must expand to incorporate the experience. With this accommodative stretching growth occurs—the former self-structure is weakened allowing for self-transcendence. At the most extreme level of self-negation, the self dissolves entirely, and one experiences a sense of total self-dissolution and unity—the mystical experience. Such experiences may at times be so transformative as to be deemed conversion states, leading to pronounced changes in one's orientation, values, attitudes, existential perceptions, and personality. In this process, second-order change, or what Jung would call the transcendent function, may occur, as formerly antagonistic self-positions are reconciled in the creation of a new, more inclusive self-structure.

However, it must be emphasized that an awe-full or self-transcendent experience is no guarantee of a psychospiritual growth. As Maslow (1971) noted, the temporary experience of self-transcendence is one thing; having one's life become truly centered at the developmental level of self-transcendence is another altogether (Koltko-Rivera, 2006). Similarly, Huston Smith (1964) famously argued that "drugs appear to induce religious experiences; it is less evident that they can produce religious lives" (p. 529). Just because you have taken a psychedelic drug does not mean you will experience a shift

in attitude or perspective. And further, even if you have had an impactful experience with a psychedelic, it does not automatically mean that new insights and perspectives will *necessarily* lead to lasting changes in your behaviour, attitude, or functioning in life. The greatest challenge is to transform such impactful experiences into lasting change (Walsh, 2003). Indeed, Jung argued that while numinous experiences are significant in themselves, their true function lies in giving the individual something to reflect upon and apply in his or her life (Stein, 2006). In other words, psychedelic induced spiritual experiences, even repeated, are not the basis of development; insights need to be integrated and put into action (Strassman, 2012). As Carroll (2008) noted in his research of long-time psychedelic users, it was the deliberate and considered use of these substances over time that contributed to growth, not their simple use in and of itself.

A crucial point regarding the utility of psychedelics as developmental tools, then, is the intention of the user. As this study has demonstrated, psychedelic use in and of itself is neither a negative or positive predictor of well-being nor development. Although certain changes in neuropsychological functioning may be reliably induced by these substances, the interpretation, meaning, and outcome of any resultant experience is heavily contingent on the set and setting. One must also consider the importance of successfully integrating such experiences into everyday life. Enduring change requires deliberate reflection upon the memories, thoughts, and emotions evoked in non-ordinary states for the construction of new meaning to persist in one's day-to-day life (Fromm, 1977; cf. Whelton, 2004). And, because development is a lifelong process, psychedelics cannot simply be thought of as shortcuts to wisdom. Instead, they offer an opportunity—

to challenge one's beliefs, one's perspectives, and one's values as one develops through the various tasks and stages of life.

Taken together, this means that deliberate attention must be paid to the set and setting of one's psychedelic usage to have any conception of use outcomes. In other words: *who* is using the substance? *Where*? With *whom*, for *what* reason, and to what extent did they strive to reflect on, or *integrate*, their experience into daily life?

Clinical Implications of Psychedelics for Psychospiritual Development

Although advanced psychospiritual development appears to be beneficial for all individuals, it might be particularly important as one approaches the end of life (Wayment et al., 2015). With increasing age one typically faces mounting losses, such as friends, family, jobs, bodily functioning, and so on (Marcia, 2010). For many, awareness of the end of life can provoke existential suffering akin to anticipatory grief in the face of the ultimate loss—one's death. This form of distress is common for many individuals approaching the end of life, particularly for those in which death is developmentally off-time (Weenolsen, 1988).

However, inasmuch as an individual is able to transcend a loss, a crisis can be an opportunity for growth. Reed (2009) found that the developmental process of self-transcendence mediates between an existential crisis—whether the normative loss involved in a life transition or the traumatic loss of some aspect of one's life or self—and well-being. Similarly, Tornstam (1989) has argued that advanced levels of psychospiritual development serve to buffer against existential suffering, in that it entails a shift to a cosmic and spiritual perspective in which:

> An impression of being One all together becomes dominant. As a consequence, the degree of self-centeredness will diminish. To a certain extent, the enclosed self is disaggregated and substituted with a cosmic self. Individuals no longer look upon themselves as especially important. They may perceive themselves as part of a cosmic flow of energy, in which the flow of energy, and not its parts is the important thing. This also involves a redefinition of the perception of life and death. It is not the individual but rather the total flow of life that is important. It is only logical then that the fear of death will decrease while feelings of affinity with past, present and future generations will be enhanced. (Tornstam, 1989, p. 60)

By transcending one's separate, personal self, one comes to experience a sense of identification and oneness with that which endures beyond death, whether that be conceptualized as nature, the cosmos, God, or some other transcendent reality. As such, Tomer and Eliason (2008) proposed that the ideal therapeutic approach to existential suffering associated with the crisis of death is a direct experience of self-transcendence—a state of mystical consciousness. Through the experienced loss of bodily and egoic aspects of identity, though retention of conscious awareness in the mystical state (Pahnke, 1969), the individual directly experiences him or herself as part of something more enduring that will continue beyond his or her death (Hood & Morris, 1983). In other words, in the mystical state it is possible to experience non-separation and oneness with the fundamental ground of being, regardless of how it is interpreted (Levenson et al., 2001). Cassell (1982) noted that:

> "When experienced, transcendence locates the person in a far larger landscape. The sufferer is not isolated by pain but is brought closer to a transpersonal source of meaning and to the human community that shares those meanings. Such an experience need not involve religion in any formal sense; however, in its transpersonal dimension, it is deeply spiritual." (p. 644)

Thus, the ultimate fear is not of death itself, but of the sense of meaninglessness it engenders (Weenolsen, 1988). However, one need no longer remain concerned with meaninglessness after having directly experienced oneself as a part of a vaster and more enduring reality. This is what Lifton (1976) described as experiential transcendence in the service of symbolic immortality. This sense of immortality requires neither the denial of death nor the belief in a personal afterlife, but rather the maintenance of a sense of connection and continuity with a source of meaning that transcends death. This, in turn, serves to buffer against death anxiety, hopelessness, and meaninglessness. Crucially, numerous studies have shown that advanced psychospiritual development is a central predictor of well-being at the end of life, even after controlling for other pertinent variables (for reviews see Coward & Reed, 1996; Reed, 2009).

Societal Implications of Psychospiritual Development

What are the benefits of cultivating psychospiritual development for society at large? It is probably safe to say that the conflicts in this world—geopolitically, interculturally, interpersonally, intrapersonally—do not stem from too much mindfulness, too much perspective-taking, too much identification with nature or the cosmos, or too much concern for human wellness and flourishing. Rather, it is probably safe to say that conflicts often start and are perpetuated from a lack of such things (Wayment et al.,

2015). Indeed, advanced psychospiritual development is associated with a greater concern for ethics, morality, the environment, and the well-being of present and future generations (Wayment & Bauer, 2018).

As the self develops in the direction of psychospiritual maturity, one's understanding of self, others, and the world expands to incorporate an increasingly wider range, from one's local groups (like family and neighborhood), to social institutions and organizations (like specific political and religious groups) to humanity, life, and the cosmos (Erikson 1982; Loevinger 1976). In addition, there is also the noted association between an ever more inclusive identity and concern for the natural environment, which is increasingly relevant in our time of climate crisis. Fostering psychospiritual development would be advantageous for a more just, caring, and environmentally conscious future society (Wayment et al., 2015).

Entheogenic Drug Use and the Recovery of Religion

The fact that psychedelics, particularly when used as entheogens, can promote awesome, self-transcendent states has implications for the development of religion in the 21st century. William James (1902) noted the difference between primary, or direct religious experience, and secondary religion, based upon accounts of such experiences. In other words, directly experienced, numinous states function as the bedrock of many (if not all) of the world's great religious traditions (Roberts, 2013). Jung (1971) argued that our species has a religious instinct, a need for self-transcendent meaning in life. However, he contended that modern humans have become detached from traditional, secondary religious structures, as these symbols and rituals no longer provided a sense of connection

with the original source of self-transcendence. As a result, the modern condition is beset with a distinct existential malaise and the search for primary religious experience.

While everyone technically has the capacity to directly experience self-transcendence, it is not easily achieved (Sterling, 2012). As a result, historically many technologies have been developed to aid this process: prayer, fasting, self-flagellation, chanting, drumming, dance, breathing techniques, meditation—and use of psychoactive substances. However, as the most reliable means of altering consciousness, entheogens have the greatest capacity to democratize access to primary religious experience (Roberts, 2013). For example, when asked about how their experiences with psilocybin impacted their lives, one volunteer in Griffith's and colleagues (2008) research study remarked, "The complete and utter loss of self… The sense of unity was awesome… I now truly do believe in God as an ultimate reality" (p. 629). At the 14-month follow up to this study, 33 percent of volunteers rated their psilocybin experience as being the single most spiritually significant experience in their life. Why, then, should these substances be prohibited in contemporary society? As Emerson (1903, p. 3) opined, "The foregoing generations beheld God and nature face to face; we, through their eyes. Why should not we also enjoy an original relation to the universe?"

It is undeniable that when used for spiritual or religious purposes psychedelics truly qualify as *sacraments*—that "through which the holy makes its presence felt" (Dourley, 1981, p. 31). They are equally worthy of the term used by the ancient Greeks—*pharmacotheon*, or "divine drugs" (Hofmann, 2012). If a sacrament or pharmacotheon is that through which the holy is felt, and if the holy is synonymous with the numinous, then entheogenic drug use can be understood as the pursuit of awe. Corbett (2012) argues that

spirituality is in fact synonymous with awe, and contends that any practice which quiets the ego, expands its awareness, and makes it conscious of a much larger, interconnected reality (ie., the experience of awe) can be deemed a spiritual pursuit. Entheogenic drug use may thus be defined as *intentionally using a psychoactive agent to engender awe*. This awe-full spiritual quest involves encountering the mystery of being, contemplating infinity, and pushing oneself to the boundaries of comprehension. Entheogens, then, provide a means for "modern man in search of a soul" to recover religion.

Ride the Lightning

It is important to reiterate, as mentioned in Chapters IV and V, that the approach to awe is a razor's edge. In fact, Gowan (1974) compares the numinous to a bolt of lightning. It is dangerous, yet it holds the potential to our psychospiritual growth. We must be reminded that the spiritual quest, with the aid of entheogens or otherwise, involves a sincere commitment—it is not an easy pursuit (Corbett, 2012). Connecting with the numinous is a humbling and often painful process, as awe-full experiences can eviscerate the ego. Thus, although these humbling Self encounters are useful for advancing psychospiritual development, they can nonetheless be highly challenging.

Conversely, there is also the danger of the shadow side of spirituality, which may involve ego-inflation, a sense of feeling spirituality superior, or spiritual bypassing. The ego secretly wants to enhance itself and being on a spiritual path often can make an individual feel superior to those who are not (Corbett, 2012). This danger is perhaps likely to be exacerbated with the use of entheogens, as the direct perception of the numinous can, as Jung (1971) noted, lead to archetypal inflation of the ego. With

deliberate entheogenic psychedelic use, one must seek to cautiously ride the lightning—to neither be entirely obliterated nor inflated by it.

We must also touch again upon the potential pitfalls of drug use in the sense of abuse. As noted in Chapter VIII, although the association was small, introspective and entheogenic psychedelic use were correlated with a strong desire or urge to use psychedelics in this study. Perhaps this is not entirely surprising, as it has been argued that spiritual seeking with psychedelics is the realm of the *puer aeternus*—the eternal child (Hillman, 2005). And, as Grof (2000) pointed out, "Among archetypes that show important connection with addiction, that of puer aeternus with its varieties of Icarus and Dionysus, seems to play an important role" (p. 112). Although these substances may function as tools for psychospiritual development, one must be careful to maintain a judicious, controlled relationship with them.

Legal Implications

This study has important legal implications. First, it adds further empirical support to the notion that the war on drugs is both immoral and foolish. It has demonstrated that by prohibiting psychedelic substances, society is effectively curtailing access to an important tool for psychological and spiritual well-being and development. Not only, then, does prohibition of psychedelic substances lead to the senseless criminalization of otherwise law-abiding citizens, but it actively stymies the flourishing of citizenry. Second, this study answers Albert Hofmann's (2012) question—*is it religiously defensible to use drugs to gain self-transcendent insights?*—in the affirmative. The entheogenic use of psychedelic substances was found to not only be strongly associated with spirituality ($r = .48$, $p < .01$), but also with mature spiritual-religious

beliefs, or xenosophia. Clearly, a segment of psychedelic drug users are doing so as part of their idiosyncratic religious/spiritual practice, and yet, most Western countries deem this behaviour criminal. Although the Canadian Charter of Rights and Freedoms (and the U.S. Constitution) assert that we are free to follow the religion of our choice, the war on drugs has curtailed this freedom (Roberts, 2012a; Stolaroff, 2004). Just as the Quakers in seventeenth century England were under threat of prison for their religious practices, so too are entheogenic drug users in the 21st century being persecuted and at times even jailed, with no recognition of the religious nature of their activities (Sterling, 2012). Drug laws must change to respect the use of psychoactive drugs as part of religious practice, regardless of the nature of the belief system or its cultural lineage.

Conclusion

This dissertation sought to explore the connection between the judicious use of psychedelic substances, self-transcendent experiences, and psychospiritual development. In so doing, it further delineated negative from positive patterns of psychedelic drug use. Critically, psychedelic use in and of itself is neither harmful nor beneficial. Rather, the parameters of use determine the outcomes. Life-time use, frequency of use, dosage size, use in a group vs. alone, intentions for use, and post-use integration have all been shown to be essential variables for consideration when determining the benefits or harms associated with use. We must, therefore, approach these drugs with reason, neither cavalier nor puritanical.

Ultimately, the central aim of this study was not to further examine and explore all the ways in which psychoactive substances can be used in a destructive manner, as this is well trodden territory. This is not, of course, to say that psychoactive substances

should be approached from a Pollyanna perspective, discounting, denying, or refuting the very real harms of use. Indeed, it is critical to reiterate that use of psychedelics is not strictly beneficial. As this study has demonstrated, when used with great frequency, in very large doses, and to cope with negative feelings or out of boredom, use of these substances negatively predicts well-being and development, and positively predicts psychological distress. Conversely, when used with judicious, autognostic intentions, psychedelic substances may facilitate a greater openness to self-transcendent awe and the promotion of psychospiritual development. As such, psychedelic drug use is a very complex phenomena that should not be taken lightly. These are very powerful substances that must be treated with caution; use should never be approached haphazardly. Like any tool, they can be used either to the detriment or benefit of the user.

However, given that the farther reaches of human nature can evidently be fostered, or at very least awakened, in the awe-full states of consciousness engendered by these drugs, our society must develop ways of safely using them (Roberts, 2012a). We must begin to re-evaluate the role for psychedelics in psychology, education, theology, and society at large. The point, of course, is not that everyone needs to use psychedelics, but that those adults who find themselves compelled to undertake this exploration be permitted the autonomy to do so (Leary, Metzner, & Alpert, 2007). As Alexander (2010) noted, "[drugs] are simply one powerful technology among many that modern society must learn to use and regulate wisely" (p. 382). To do so, our societies will require a thorough cartography of both drug abuse and positive use. It is my hope that this dissertation has contributed to the further development of such a cartography.

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Appendix A

Mental Health, Spirituality, and Psychoactive Substance Use

Welcome and thank you for taking the time to check out this study. This online survey is part of a research project exploring the relationships between mental health, spirituality, and the non-medical use of various psychoactive substances.

Psychoactive substances are chemicals that affect mental processes (e.g. thinking, mood, perception). This includes a very wide range of substances, some of which may be legal, such as alcohol and tobacco, others of which may be illegal, such as heroin and LSD.

Even if you do not use any psychoactive substances for non-medical purposes (including alcohol or tobacco) you are still eligible and encouraged to complete the questionnaire.

This anonymous, online survey uses validated, self-report scales to assess:

- Demographic and personality information (e.g., age, gender, education, etc.).
- Mental Health (e.g., feelings about one's self and one's functioning in life, etc.).
- Spirituality (e.g., religious/spiritual beliefs, spiritual experiences, etc.).
- Use (or non-use) of psychoactive substances (e.g., alcohol, tobacco, cannabis, opioids, psychedelics, etc.).
- Non-medical reasons for using those substances (e.g., relaxation, curiosity, personal growth, entheogenic purposes, etc.).

You may complete this questionnaire on any device connected to the internet (e.g., desktop computer, laptop computer, tablet, smartphone). However, it is highly recommended that you use a desktop, laptop, or large tablet for ease of viewing and completing the survey items.

You must be at least 18 years old and capable of fluently reading and writing English in order to participate in this study. The survey is designed to take about 20 to 25 minutes to complete in one sitting. However, you may save your responses and return to the survey at a later time to finish. If you choose to do so, you will receive a unique ID code that will allow you to regain access to your survey.

Participation in this study is completely voluntary, confidential, and anonymous. Even if you begin the survey you can change your mind at any time and withdraw without penalty by simply closing your internet window or browser. You may also decline to answer a particular question by leaving it blank or selecting "prefer not to answer."

Because the survey is entirely anonymous and you are not linked to your data, it is not possible to withdraw your data once you have submitted your responses.

The data collected from this survey is encrypted and stored on secure servers located at the University of Alberta, Canada. Your responses cannot be tracked through your IP

address or any other means, and you do not require an email address to participate. Only the research team will have access to the data, which is protected with two-factor authentication. However, the Research Ethics Committee at the University of Alberta maintains the right to review research data should they deem it necessary.

The survey software, REDCap, was initially developed by researchers at Vanderbilt University, and is now used in over 100 countries. REDCap is compliant with Canadian legislation such as the HIA, FOIP, and TCPS2 as well as U.S. privacy requirements such as HIPAA. All data sent from your web browser to the REDCap server is encrypted with SSL. Data is encrypted and will be stored for a minimum of 5 years following completion of the research project. This data may be used in future studies, which also must be approved by the Research Ethics Board.

Although you will not receive payment, your participation in this study is highly valued. Modern society requires a comprehensive understanding of psychoactive substance use in order to foster public health and well-being. By taking this survey, you will be helping to expand our scientific understanding of this nuanced behaviour and advancing the evidence-based discussion on the role of psychoactive substances in society.

It is very unlikely that you will experience any harms from taking this survey. However, you may experience some discomfort from being asked to reflect on yourself and your life in order to complete the survey questions. Only complete the questions that you feel comfortable answering.

If you find yourself in crisis, you may access crisis-line support in your country by visiting: http://www.yourlifecounts.org/need-help/crisis-lines

This study has been reviewed and approved by the Research Ethics Board at the University of Alberta. If you have questions about your rights or how research should be conducted, you can call 1-780-492-2615. This office is independent of the researcher.

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The results of this study may be published in academic journals or presented at academic conferences, and will contribute to the completion of a doctoral dissertation.
I have read and understand all of the above information and would like to take the survey.
1) I am at least 18 years old.
2) I have not already taken this survey.
3) I am able to fluently read and write in English

Appendix B

Complete the survey items listed below as honestly as you can. Respond to the items as you see yourself now, not as you wish to be in the future. Keep in mind that there are no right or wrong answers, your responses are completely anonymous, and all data is confidential. You may decline to answer a particular question by leaving it blank or selecting "prefer not to answer." Thank you very much for your time and participation. It is greatly appreciated.

Your age:	18-24 25-34 35-44 45-54 55-64 65-74 75-84 85+ Prefer not to answer
Your gender:	Male Female Transgender Other Prefer not to answer
Your ethnicity:	Arabic Black / African East Asian Hispanic / Latino Native / Aboriginal South Asian White / Caucasian Other Prefer not to answer
Please describe your ethnicity:	_____
Your highest level of schooling completed:	Less than a high school diploma High school diploma or equivalent Some college, no degree Associate degree / Two-year diploma Bachelor's degree (e.g. BA) Master's degree (e.g. MA) Professional degree (e.g. MD) Doctorate (e.g. PhD) Prefer not to answer

Your region/continent of residence:	Africa Asia Australia/Oceania Europe North America South America Prefer not to answer
How would you describe your overall physical health?	Very unhealthy Unhealthy Average Healthy Very Healthy
How would you describe your overall financial stability/security?	Very poor Poor Average Secure Very secure
How would you describe your religious affiliation?	Christian Islamic Jewish Hindu Buddhist Other None/No religious affiliation
Please describe your religious affiliation:	_____
How would you describe your religious/spiritual orientation?	Religious but not spiritual Equally religious and spiritual Spiritual but not religious Neither spiritual nor religious
How often do you engage in a formal meditation practice?	Never 1-2 times per year 1-2 times per month Weekly Daily

Here are a number of characteristics that may or may not apply to you. Please read the statements listed below and indicate the extent to which you agree with each statement, using the following scale:

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

Please respond to the items as you see yourself now, not as you wish to be in the future. *I see myself as someone who...*

Does a thorough job.
Is ingenious, a deep thinker.
Is talkative.
Is sometimes somewhat rude to others.
Has few artistic interests.
Worries a lot.
Has a forgiving nature.
Is curious about many different things.
Tends to be lazy.
Is outgoing, sociable.
Has an active imagination
Values artistic, aesthetic experiences.
Gets nervous easily.
Is inventive.
Does things effectively and efficiently.
Is reserved.
Is considerate and kind to others.
Likes to reflect, play with ideas.
Is relaxed, handles stress well.
Prefers work that is routine.
Is sophisticated in art, music, or literature.
Is original, comes up with new ideas.

The following questions ask about how you have been feeling during the past month (30 days). Please indicate how often you had each feeling using the following scale:

1. None of the time
2. A little of the time
3. Some of the time
4. Most of the time
5. All of the time

During the past month, how often did you feel...

Nervous
Hopeless
Restless or fidgety
So depressed that nothing could cheer you up
That everything was an effort
Worthless

The following set of questions deals with how you feel about yourself and your life. Please select the response that best describes your present agreement or disagreement with each statement using the following scale:

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

In most ways my life is close to my ideal.
Overall, 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.

The following set of questions deals with how you feel about yourself and your life. Please select the response that best describes your present agreement or disagreement with each statement using the following scale:

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

I think it is important to have new experiences that challenge how you think about yourself and the world.
I find myself doing things without paying much attention.
I feel a sense of connection with all living things.
Before criticizing somebody, I try to imagine how I would feel if I were in their place.
For me, life has been a continuous process of learning, changing, and growth.
I do jobs or tasks automatically, without being aware of what I'm doing.
I feel a sense of connection with people I don't know.
When I'm upset at someone, I usually try to put myself in his or her shoes for a while.
I have the sense that I have developed a lot as a person over time.
I rush through activities without being really attentive to them.
I sometimes find it difficult to see things from another person's point of view.
I feel a sense of connection with people of other races/ethnicities.
I try to look at everybody's side of a disagreement before I make a decision.
When I think about it, I haven't really improved much as a person over the years.
I see beauty all around me.
I often engage in quiet contemplation.
I feel that my individual life is a part of a greater whole.
I don't worry about other people's opinions of me.
I feel a sense of belonging with both earlier and future generations.
My peace of mind is not easily upset.
My sense of well-being does not depend on a busy social life.
I often feel awe.
I often look for patterns in the objects around me.
I have many opportunities to see the beauty of nature.
I feel part of something greater than myself.
My happiness is not dependent on other people and things.
I do not become angry easily.
I have a good sense of humour about myself.
I find much joy in life.
Material possessions don't mean much to me.

Please select the response that best describes your present agreement or disagreement with each statement using the following scale:

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

The texts and stories of my religion/spirituality are absolutely true and must not be changed.
When I make a decision, I look at all sides of the issue and come up with the best decision possible.
We can learn from each other what ultimate truth each religion/spirituality contains.
When people want to know how the world came to be, they need to hear a creation story.
Although every person deserves respect and fairness, arguments need to be voiced rationally.
We need to look beyond denominational and religious/spiritual differences to find the ultimate reality.
When I have to make a decision, I take care that my plans are acceptable by my religious/spiritual teachings.
We should resolve differences in how people appear to each other through fair and just discussion.
When I make a decision, I am open to contradicting proposals from diverse sources and philosophical standpoints.
The stories and teachings of my religion/spirituality give meaning to the experiences of my life and reveal the unchangeable truth about God or the Divine.
Regardless of how people appear to each other, we are all human.
Stories and representations from any religion/spirituality can unite me with ultimate reality.
The teachings of my religion/spirituality offer answers to any question in my life, if I am ready to listen.
It is important to understand others through a sympathetic understanding of their culture and religion/spirituality.
The truth I see in other world views leads me to re-examine my current views.

The following set of questions deals with how you feel about yourself and your life. Please select the response that best describes your present agreement or disagreement with each statement using the following scale:

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

I feel compassionate even toward people who have been unkind to me.
I am not often fearful.
I can learn a lot from others.
I often have a sense of oneness with nature.
I am able to accept my mortality.
I often "lose myself" in what I am doing.
I feel wonder almost every day.
I seek out experiences that challenge my understanding of the world.
I feel that I know myself.
Whatever I do to others, I do to myself.
I am able to integrate the different aspects of my life.
I can accept the impermanence of things.
I have grown as a result of losses I have suffered.
I am accepting of myself, including my faults.
Spirituality is important in my life.

The following statements refer to a number of experiences that you may or may not have had. Please note that the items may be considered as applying to one experience or as applying to different experiences. Please respond on the following scale:

1. Definitely not
2. Probably not
3. Unsure
4. Probably yes
5. Definitely yes

Have you ever had anexperience that left you with a feeling of wonder?
Have you ever had an experience in which you lost all sense of time and space?
Have you ever had an experience in which everything seemed to be alive?
Have you ever had an experience that you knew to be sacred?
Have you ever had an experience in which everything seemed to disappear from your mind until you were conscious only of a void (emptiness)?
Have you ever had an experience in which your self seemed to merge into something greater?
Have you ever had an experience in which a new view of reality was revealed to you?
Have you ever had an experience that cannot be expressed in words?
Have you ever had an experience in which you felt that everything was part of the same whole?
Have you ever had an experience in which you felt a sense of profound joy?
Have you ever had an experience in which something greater than yourself seemed to absorb you?
Have you ever had an experience in which you realized the oneness of yourself with all things?

Please read each item and decide whether it is true or false for you:

1. True
2. False

I have never intensely disliked anyone.
I sometimes feel resentful when I don't get my way.
No matter who I'm talking to, I'm always a good listener.
There have been occasions when I took advantage of someone.
I'm always willing to admit it when I make a mistake.
I sometimes try to get even, rather than forgive and forget.
There have been occasions when I felt like smashing things.
There have been times when I was quite jealous of the good fortune of others.
I have never felt that I was punished without cause.
I have never deliberately said something that hurt someone's feelings.

The following set of questions deals with how you feel about yourself and your life. Please select the response that best describes your present agreement or disagreement with each statement using the following scale:

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

I tend to be influenced by people with strong opinions.
In general, I feel I am in charge of the situation in which I live.
In many ways, I feel disappointed about my achievements in life.
I think it is important to have new experiences that challenge how you think about yourself and the world.
Maintaining close relationships has been difficult and frustrating for me.
I have a sense of direction and purpose in life.
When I look at the story of my life, I am pleased with how things have turned out.
I sometimes feel as if I've done all there is to do in life.
I have confidence in my own opinions, even if they are contrary to the general consensus.
I have not experienced many warm and trusting relationships with others.
The demands of everyday life often get me down.
For me, life has been a continuous process of learning, changing, and growth.
People would describe me as a giving person, willing to share my time with others.
I gave up trying to make big improvements or changes in my life a long time ago.
Some people wander aimlessly through life, but I am not one of them.
I like most aspects of my personality.
I judge myself by what I think is important, not by what others think.
I am quite good at managing the responsibilities of my daily life.

The following questions ask about your use of tobacco, alcohol, and other psychoactive substances across your lifetime and in the past three months.

Some of the substances listed may be prescribed by a doctor (e.g., amphetamines, sedatives, pain medications). For this survey, do not report your use of medications as prescribed by your doctor for medical purposes. However, if you have taken medications for reasons other than as prescribed by your doctor (non medical purposes), please report this use.

Have you ever used tobacco, alcohol, or any other psychoactive substance (e.g., cannabis, LSD, etc.) for non-medical purposes?
1. No
2. Yes

Have you ever used any drug by injection? (Non Medical Use Only)
1. No, never
2. Yes, in the past 3 months
3. Yes, but not in the past 3 months

In your life, how many times have you used the following substances? (Non Medical Use Only):

1. Never used
2. Only once
3. 2-5 times
4. 6-9 times
5. 10-19 times
6. 20-49 times
7. 50-99 times
8. 100 times or more

Tobacco products (e.g., cigarettes, chewing tobacco, cigars, etc.)
Alcohol (e.g., beer, wine, spirits, etc.)
Cannabis (e.g, marijuana, pot, hash, etc.)
Cocaine (e.g., coke, crack-cocaine, etc.)
MDMA (ecstasy)
Amphetamines (e.g., methamphetamine, speed, diet pills etc.)
Classic Psychedelics (e.g., LSD, mescaline, psilocybin, DMT, ayahuasca, etc.)
Opiates (e.g., heroin, morphine, codeine, methadone, etc.)
Inhalants (e.g., nitrous, "poppers," glue, petrol, paint thinner, etc.)
Sedatives and Hypnotics (e.g., Valium, Serepax, Rohypnol, other benzodiazepines, barbiturates, GHB, etc.)
Dissociatives (e.g., ketamine, PCP, DXM, etc.)
Atypical Psychedelics (e.g., ibogaine, salvia divinorum, amanita muscaria, etc.)

For each drug category listed, please select your typical frequency of use (Non Medical Use Only):

1. I no longer use this drug
2. Less than once per year
3. 1-2 times per year
4. 3-4 times per year
5. 1-2 times per month
6. 1-2 times per week
7. 3-4 times per week
8. Once or more per day

Tobacco products (e.g., cigarettes, chewing tobacco, cigars, etc.)
Alcohol (e.g., beer, wine, spirits, etc.)
Cannabis (e.g, marijuana, pot, hash, etc.)
Cocaine (e.g., coke, crack-cocaine, etc.)
MDMA (ecstasy)
Amphetamines (e.g., methamphetamine, speed, diet pills etc.)
Classic Psychedelics (e.g., LSD, mescaline, psilocybin, DMT, ayahuasca, etc.)
Opiates (e.g., heroin, morphine, codeine, methadone, etc.)
Inhalants (e.g., nitrous, "poppers," glue, petrol, paint thinner, etc.)
Sedatives and Hypnotics (e.g., Valium, Serepax, Rohypnol, other benzodiazepines, barbiturates, GHB, etc.)
Dissociatives (e.g., ketamine, PCP, DXM, etc.)
Atypical Psychedelics (e.g., ibogaine, salvia divinorum, amanita muscaria, etc.)

For each drug category listed, please select the typical dosage that you use or used (Non Medical Use Only):

1. Very small
2. Small
3. Moderate
4. Large
5. Very large

Tobacco products (e.g., cigarettes, chewing tobacco, cigars, etc.)
Alcohol (e.g., beer, wine, spirits, etc.)
Cannabis (e.g, marijuana, pot, hash, etc.)
Cocaine (e.g., coke, crack-cocaine, etc.)
MDMA (ecstasy)
Amphetamines (e.g., methamphetamine, speed, diet pills etc.)
Classic Psychedelics (e.g., LSD, mescaline, psilocybin, DMT, ayahuasca, etc.)
Opiates (e.g., heroin, morphine, codeine, methadone, etc.)
Inhalants (e.g., nitrous, "poppers," glue, petrol, paint thinner, etc.)
Sedatives and Hypnotics (e.g., Valium, Serepax, Rohypnol, other benzodiazepines, barbiturates, GHB, etc.)
Dissociatives (e.g., ketamine, PCP, DXM, etc.)
Atypical Psychedelics (e.g., ibogaine, salvia divinorum, amanita muscaria, etc.)

For each drug category listed, please select how often you use, or used, it alone or with a group of people (at least one other person) (Non Medical Use Only):

1. Always or almost always alone
2. Usually alone
3. Half of the time alone, half of the time with a group
4. Usually with a group
5. Always or almost always with a group

Tobacco products (e.g., cigarettes, chewing tobacco, cigars, etc.)
Alcohol (e.g., beer, wine, spirits, etc.)
Cannabis (e.g, marijuana, pot, hash, etc.)
Cocaine (e.g., coke, crack-cocaine, etc.)
MDMA (ecstasy)
Amphetamines (e.g., methamphetamine, speed, diet pills etc.)
Classic Psychedelics (e.g., LSD, mescaline, psilocybin, DMT, ayahuasca, etc.)
Opiates (e.g., heroin, morphine, codeine, methadone, etc.)
Inhalants (e.g., nitrous, "poppers," glue, petrol, paint thinner, etc.)
Sedatives and Hypnotics (e.g., Valium, Serepax, Rohypnol, other benzodiazepines, barbiturates, GHB, etc.)
Dissociatives (e.g., ketamine, PCP, DXM, etc.)
Atypical Psychedelics (e.g., ibogaine, salvia divinorum, amanita muscaria, etc.)

The following questions ask about how your drug experiences influence your day to day life and functioning (Non Medical Use Only):

1. Never or almost never
2. Some of the time
3. Half of the time
4. Most of the time
5. Always or almost always

Overall, I try to reflect on my drug experiences.
Overall, I try to integrate new perspectives gained through my drug experiences into my day-to-day life.
Overall, I try to learn from my drug experiences.

Listed below are various reasons why people might use psychoactive substances (Non Medical Purposes):

Boredom.
For spiritual or religious purposes.
To enhance socializing.
To enjoy the sensation, feeling, or effects of it.
To understand things differently or expand my perspective; mind-expansion.
To enhance creativity or performance (e.g., work, art, school, sports, etc.).
Because my friends were doing it; to fit in with a group.
Curiosity or experimentation.
To forget my worries or relieve negative emotions (e.g., hopelessness, anxiety, etc.).
For introspection, personal growth, or self-realization.
To relax.
To party or get "messed up."

Please select how frequently your use of each of the following drug categories is, or was, motivated by each of the reasons listed above by using the following scale:

1. Never or almost never
2. Some of the time
3. Half of the time
4. Most of the time
5. Always or almost always

Tobacco products (e.g., cigarettes, chewing tobacco, cigars, etc.)
Alcohol (e.g., beer, wine, spirits, etc.)
Cannabis (e.g, marijuana, pot, hash, etc.)
Cocaine (e.g., coke, crack-cocaine, etc.)
MDMA (ecstasy)
Amphetamines (e.g., methamphetamine, speed, diet pills etc.)
Classic Psychedelics (e.g., LSD, mescaline, psilocybin, DMT, ayahuasca, etc.)
Opiates (e.g., heroin, morphine, codeine, methadone, etc.)
Inhalants (e.g., nitrous, "poppers," glue, petrol, paint thinner, etc.)
Sedatives and Hypnotics (e.g., Valium, Serepax, Rohypnol, other benzodiazepines, barbiturates, GHB, etc.)
Dissociatives (e.g., ketamine, PCP, DXM, etc.)
Atypical Psychedelics (e.g., ibogaine, salvia divinorum, amanita muscaria, etc.)

For the next four questions use the following scale and list of drug categories (Non Medical Only):

1. Never
2. Once or twice
3. Monthly
4. Weekly
5. Daily or almost daily

In the past three months (90 days), how often have you used the following substances?

During the past three months (90 days), how often have you had a strong desire or urge to use the following substances?

During the past three months (90 days), how often has your use of the following substances led to health, social, legal, or financial problems?

During the past three months (90 days), how often have you failed to do what was normally expected of you because of your use of the following substances?

Tobacco products (e.g., cigarettes, chewing tobacco, cigars, etc.)
Alcohol (e.g., beer, wine, spirits, etc.)
Cannabis (e.g, marijuana, pot, hash, etc.)
Cocaine (e.g., coke, crack-cocaine, etc.)
MDMA (ecstasy)
Amphetamines (e.g., methamphetamine, speed, diet pills etc.)
Classic Psychedelics (e.g., LSD, mescaline, psilocybin, DMT, ayahuasca, etc.)
Opiates (e.g., heroin, morphine, codeine, methadone, etc.)
Inhalants (e.g., nitrous, "poppers," glue, petrol, paint thinner, etc.)
Sedatives and Hypnotics (e.g., Valium, Serepax, Rohypnol, other benzodiazepines, barbiturates, GHB, etc.)
Dissociatives (e.g., ketamine, PCP, DXM, etc.)
Atypical Psychedelics (e.g., ibogaine, salvia divinorum, amanita muscaria, etc.)

For the next two questions use the following scale and list of drug categories (Non Medical Only):

1. No, never
2. Yes, but not in the past 3 months
3. Yes, in the past 3 months

Has a friend or relative or anyone else ever expressed concern about your use of any of the following substances?

Have you ever tried and failed to control, cut down, or stop using any of the following substances?

Tobacco products (e.g., cigarettes, chewing tobacco, cigars, etc.)
Alcohol (e.g., beer, wine, spirits, etc.)
Cannabis (e.g, marijuana, pot, hash, etc.)
Cocaine (e.g., coke, crack-cocaine, etc.)
MDMA (ecstasy)
Amphetamines (e.g., methamphetamine, speed, diet pills etc.)
Classic Psychedelics (e.g., LSD, mescaline, psilocybin, DMT, ayahuasca, etc.)
Opiates (e.g., heroin, morphine, codeine, methadone, etc.)
Inhalants (e.g., nitrous, "poppers," glue, petrol, paint thinner, etc.)
Sedatives and Hypnotics (e.g., Valium, Serepax, Rohypnol, other benzodiazepines, barbiturates, GHB, etc.)
Dissociatives (e.g., ketamine, PCP, DXM, etc.)
Atypical Psychedelics (e.g., ibogaine, salvia divinorum, amanita muscaria, etc.)

Appendix C

Table 1

Participant Characteristics

Characteristic	*n*	*%*
Age Range		
18-24	270	39.5
25-34	247	36.1
35-44	86	12.6
45-54	34	5.0
55-64	25	3.7
65-74	15	2.2
75-84	3	0.4
Prefer not to say	4	0.6
Gender		
Female	261	38.2
Male	394	57.5
Other	25	3.7
Prefer not to say	4	0.6
Ethnicity		
Arabic	3	0.4
Black	10	1.5
East Asian	11	1.6
Hispanic-Latino	38	5.6
Native-Aboriginal	7	1.0
South Asian	15	2.2
White-Caucasian	566	82.7
Other	22	3.2
Prefer not to say	12	1.8
Education		
Less than high school diploma	18	2.6
High school or equivalent	103	15.1
Some college	206	30.1
Associate degree/two-year diploma	57	8.3
Bachelor’s degree	195	28.5
Master’s degree	63	9.2
Professional degree	19	2.8
Doctorate	13	1.9
Prefer not to say	8	1.2

Characteristic	*n*	*%*
Location		
Africa	3	0.4
Asia	9	1.3
Australia/Oceania	20	2.9
Europe	109	15.9
North America	530	77.5
South America	10	1.4
Prefer not to say	3	0.4
Physical Health		
Very unhealthy	13	1.9
Unhealthy	70	10.2
Average	246	36
Healthy	273	39.9
Very healthy	82	12
Financial Stability		
Very poor	28	4.1
Poor	141	20.6
Average	260	38
Secure	207	30.3
Very secure	48	7.0
Religious Affiliation		
Christian	97	14.2
Islamic	9	1.3
Jewish	10	1.5
Hindu	5	0.7
Buddhist	33	4.8
Other	69	10
No religious affiliation	461	67.4
Religious and/or Spiritual		
Religious but not spiritual	6	0.9
Both religious and spiritual	81	11.8
Spiritual but not religious	402	58.7
Neither spiritual nor religious	194	28.3

Appendix D

le 2

riate Correlations for Life-Time Drug Use, Self-Transcendence, and Psychospiritual Development

able	*M*	*SD*	1	2	3	4	5	6	7	8
sychological Distress	14.65	5.35	—							
ersonality Adjustment	60.68	17.71	-0.70**	—						
ersonality Growth	225.29	32.57	-0.50**	0.71**	—					
piritual-Religious Development	25.67	5.17	-0.14**	0.29**	0.47**	—				
we-Proneness	31.64	6.75	-0.33**	0.53**	0.71**	0.40**	—			
lysticism	48.76	10.52	-0.19**	0.30**	0.52**	0.38**	0.49**	—		
ife-Time Tobacco Use	4.63	2.82	0.04	0.00	0.10**	0.13**	0.02	0.21**	—	
ife-Time Alcohol Use	5.84	2.02	-0.06	0.10*	0.09*	0.10**	0.04	0.16**	0.49**	—
ife-Time Cannabis Use	5.40	2.38	-0.10*	0.12**	0.25**	0.17**	0.22**	0.37**	0.53**	0.53**
Life-Time Cocaine Use	1.72	2.32	0.05	-0.01	0.05	0.02	0.01	0.20**	0.40**	0.32**
Life-Time MDMA Use	1.78	2.13	-0.11**	0.11**	0.12**	0.06	0.08*	0.27**	0.35**	0.34**
Life-Time Amphetamines Use	1.97	2.53	0.14**	-0.11**	-0.02	0.02	-0.03	0.19**	0.33**	0.27**
Life-Time Classic Psychedelic Use	2.94	2.28	-0.16**	0.17**	0.31**	0.19**	0.27**	0.50**	0.37**	0.32**
Life-Time Opiate Use	1.54	2.33	0.12**	-0.15**	-0.01	0.04	-0.04	0.16**	0.33**	0.23**
Life-Time Inhalant Use	1.10	1.85	0.06	-0.09*	-0.06	-0.02	-0.08	0.15**	0.28**	0.25**
Life-Time Sedative Use	1.63	2.32	0.21**	-0.22**	-0.13**	0.01	-0.11**	0.12**	0.30**	0.23**
Life-Time Dissociative Use	1.09	1.79	0.04	-0.04	0.03	0.02	0.04	0.24**	0.25**	0.20**
Life-Time Atypical Psychedelic Use	0.69	1.29	-0.08*	0.08	0.15**	0.07	0.14**	0.29**	0.22**	0.14**

< 0.05. **$p < 0.01$. $n = 684$

Table 2 Continued

Bivariate Correlations for Life-Time Drug Use, Self-Transcendence, and Psychospiritual Development

Variable	9	10	11	12	13	14	15	16	17	18
9. Life-Time Cannabis Use	—									
10. Life-Time Cocaine Use	0.37**	—								
11. Life-Time MDMA Use	0.41**	0.61**	—							
12. Life-Time Amphetamines Use	0.29**	0.53**	0.37**	—						
13. Life-Time Classic Psychedelic Use	0.56**	0.45**	0.57**	0.36**	—					
14. Life-Time Opiate Use	0.27**	0.50**	0.29**	0.57**	0.31**	—				
15. Life-Time Inhalant Use	0.26**	0.42**	0.43**	0.31**	0.34**	0.32**	—			
16. Life-Time Sedative Use	0.24**	0.44**	0.30**	0.53**	0.25**	0.69**	0.38**	—		
17. Life-Time Dissociative Use	0.26**	0.44**	0.49**	0.47**	0.46**	0.44**	0.47**	0.46**	—	
18. Life-Time Atypical Psychedelic Use	0.28**	0.27**	0.33**	0.27**	0.46**	0.26**	0.27**	0.20**	0.39**	—

*$p < 0.05$. **$p < 0.01$. $n = 684$

Appendix E

Table 3

Bivariate Correlations for Variables Used in Regression Analyses

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Age	2.09	1.34	—									
2. Education	3.91	1.59	.31**	—								
3. Financial Stability	3.15	0.97	0.04	0.22**	—							
4. Social Desirability	3.59	2.01	0.05	0.08*	0.12**	—						
5. Life Time Use	2.94	2.28	0.11**	0.03	-0.04	0.07	—					
6. Frequency of Use	1.48	1.88	-0.07	-0.02	0.05	0.12**	.72**	—				
7. Typical Dosage	3.01	1.00	-0.13**	-0.08	0.01	-0.04	.36**	.34**	—			
8. Use in a Group	3.53	1.34	-0.03	0.07	0.06	-0.10*	-.15**	-.22**	-.14**	—		
9. Drug Use Integration	12.59	2.76	-0.09*	0.04	0.10*	0.11*	.15**	.29**	.23**	-0.09	—	
10. Boredom	1.39	0.82	-0.06	-0.10*	-0.06	-0.11*	.16**	0.05	.09*	-0.04	-0.14**	—
11. Socializing	1.66	1.05	0.07	0.05	-0.09*	-0.11*	.19**	0.06	0.03	0.19**	0.00	0.16**
12. Sensation	3.83	1.42	-0.12**	-0.04	0.01	0.07	.15**	.13**	.15**	0.12**	0.06	0.17**
13. Mind Expansion	4.50	0.98	-0.09*	0.06	0.04	0.05	.22**	.24**	.29**	-0.06	0.37**	0.02
14. Creativity-Performance	2.89	1.62	0.01	-0.06	-0.01	0.01	.28**	.20**	.20**	-0.11**	0.18**	0.11*
15. Fit in With a Group	1.45	0.90	0.09	0.03	-0.03	-0.10*	0.02	-.19**	-.09*	0.20**	-0.10*	0.26**
16. Curiosity-Experimentation	3.75	1.40	-0.12**	-0.10*	0.08	-0.05	-.19**	-0.06	0.03	0.00	0.01	0.12*
17. Forget my Worries	1.68	1.19	0.03	-0.04	-0.09	-0.05	0.07	0.08	-0.01	-0.05	-0.01	0.27**
18. Introspection-Growth	4.29	1.19	-0.08	0.02	0.05	0.09	.16**	.26**	.28**	-0.14**	0.44**	-0.02
19. Relaxation	1.67	1.17	0.02	-0.03	0.04	-0.01	.12**	.12**	.09*	0.01	0.03	0.22**
20. Party-Get Messed up	1.63	1.10	0.14**	0.06	-0.02	-0.10*	.16**	-0.08	-0.04	0.17**	-0.17**	0.27**
21. Spiritual-Religious	3.23	1.55	0.06	0.08	0.09	0.08	.20**	.25**	.30**	-0.16**	0.36**	-0.09
22. Personality Adjustment	60.68	17.71	0.04	0.22**	0.43**	0.25**	.17**	.18**	0.03	0.15**	0.25**	-0.21**
23. Personality Growth	225.29	32.57	0.07	0.14**	0.21**	0.36**	.31**	0.29**	.12**	0.01	0.42**	-0.17**
24. Psychological Distress	14.65	5.35	-0.12**	-0.20**	-0.32**	-0.18**	-0.16**	-0.16**	-0.05	-0.06	-0.08	0.19**
25. Problematic Psychedelic Use	5.34	4.77	-0.08*	-0.08*	0.01	0.05	0.58**	.79**	0.23**	-0.15**	0.14**	0.17**

*$p < 0.05$. **$p < 0.01$.

Table 3 Continued

Bivariate Correlations For Variables Used in Hierarchical Regressions

Variable	12	13	14	15	16	17	18	19	20	21	22	23
12. Sensation	—											
13. Mind Expansion	.26**	—										
14. Creativity-Performance	.30**	.36**	—									
15. Fit in With a Group	0.08	-0.06	0.07	—								
16. Curiosity-Experimentation	.19**	.11*	0.13**	0.11*	—							
17. Forget my Worries	.19**	.12**	0.19**	0.18**	-0.02	—						
18. Introspection-Growth	.14**	.77**	0.34**	-0.13**	0.16**	0.10*	—					
19. Relaxation	.27**	.10*	0.24**	0.13**	0.03	0.44**	0.08	—				
20. Party-Get Messed up	.21**	-.13**	0.02	0.48**	0.01	0.19**	-0.25**	0.20**	—			
21. Spiritual-Religious	0.08	.42**	0.25**	-0.14**	0.03	0.04	0.49**	0.12**	-0.18**	—		
22. Personality Adjustment	.12*	.10*	0.13**	-0.03	0.04	-0.22**	0.11**	-0.04	-0.04	0.19**	—	
23. Personality Growth	.10*	.24**	0.24**	-0.05	0.00	-0.13**	0.26**	0.04	-0.06	0.37**	0.71**	—
24. Psychological Distress	-0.02	-0.04	-0.01	0.03	-0.05	0.28**	-0.03	0.10*	0.03	-0.17**	-0.70**	-0.50**
25. Problematic Psychedelic Use	.14**	0.08	0.15**	-0.08	0.03	0.11*	0.13**	0.08	0.04	0.15**	0.08*	0.17**

*$p < 0.05$. **$p < 0.01$.

Table 4

Regression Analysis for Psychedelics and Psychological Distress

Step	Predictor	B	*β*	*SE*	95% CI		*p*	*R2*	*R2Δ*	*F*	*FΔ*	*p*
					LL	*UL*						
1								0.15	—	28.76	—	0.01
	Intercept	22.83		0.79	212.27	24.38	0.00					
	Age	-0.28	-0.07	0.15	-0.58	0.01	0.06					
	Education	-0.35	-0.11	0.13	-0.60	-0.10	0.01					
	Financial Stability	-1.56	-0.28	0.20	-1.96	-1.16	0.00					
	Social Desirability	-0.36	-0.13	0.10	-0.55	-0.17	0.00					
2-i								0.17	0.02	27.14	17.84	0.01
	Life-Time Psychedelic Use (i)	-0.35	-0.15	0.08	-0.51	-0.19	0.00					
3-i								0.17	0.00	23.31	3.64	0.01
	Life-Time Psychedelic Use Squared (i)	0.08	0.21	0.04	0.00	0.16	0.06					
2-ii								0.16	0.02	26.57	15.38	0.01
	Frequency Psychedelic Use (ii)	-0.40	-0.14	0.10	-0.59	-0.20	0.00					
3-ii								0.18	0.01	23.94	9.17	0.01
	Frequency Psychedelic Use Squared (ii)	0.18	0.22	0.06	0.06	0.30	0.00					
2-iii								0.16	0.00	18.62	2.58	0.01
	Dose Size (iii)	-0.33	-0.07	0.21	-0.74	0.08	0.11					
3-iii								0.16	0.00	15.49	0.01	0.01
	Dose Size Squared (iii)	0.01	0.01	0.16	-0.29	0.32	0.94					
2-iv								0.15	0.00	18.39	1.61	0.01
	Use in a Group (iv)	-0.20	-0.05	0.16	-0.51	0.11	0.21					
2-v								0.15	0.00	18.29	1.16	0.01
	Integration (v)	-0.08	-0.05	0.08	-0.23	0.07	0.28					
2-vi								0.17	0.02	21.29	13.92	0.01
	Boredom (vi)	0.94	0.15	0.25	0.45	1.44	0.00					

Table 4 Continued

R*egression Analysis for Psychedelics and Psychological Distress*

Step	Predictor	B	*β*	*SE*	95% CI		*p*	*R2*	*R2Δ*	*F*	*FΔ*	*p*
					LL	*UL*						
2-vii								0.15	0.00	18.16	0.61	0.01
	Socializing (vii)	0.16	0.03	0.20	-0.24	0.55	0.43					
2-viii								0.15	0.00	18.08	0.29	0.01
	Sensation (viii)	-0.08	-0.02	0.15	-0.37	0.21	0.59					
2-ix								0.15	0.00	21.79	0.23	0.01
	Mind Expansion (ix)	-0.10	-0.02	0.21	-0.52	0.32	0.64					
2-x								0.15	0.00	18.04	0.12	0.01
	Creativity-Performance (x)	-0.04	-0.01	0.13	-0.30	0.21	0.73					
2-xi								0.15	0.00	18.03	0.08	0.01
	Fit in With a Group (xi)	0.06	0.01	0.23	-0.39	0.52	0.78					
2-xii								0.15	0.00	18.26	1.06	0.01
	Curiosity (xii)	-0.15	-0.04	0.15	-0.45	0.14	0.30					
2-xiii								0.21	0.06	27.01	38.16	0.01
	Forget My Worries (xiii)	1.04	0.25	0.17	0.71	1.37	0.00					
2-xiv								0.15	0.00	18.02	0.04	0.01
	Introspection (xiv)	-0.04	-0.01	0.18	-0.38	0.31	0.84					
2-xv								0.16	0.01	19.84	7.76	0.01
	Relaxation (xv)	0.49	0.11	0.18	0.14	0.83	0.01					
2-xvi								0.15	0.00	18.14	0.54	0.01
	Party (xvi)	0.14	0.03	0.19	-0.24	0.52	0.74					
2-xvii								0.17	0.02	20.12	8.94	0.01
	Spiritual-Religious (xvii)	-0.40	-0.12	0.13	-0.66	-0.14	0.00					

Table 5

Regression Analysis for Psychedelics and Problematic Use

Step	Predictor	B	*β*	*SE*	95% CI		*p*	*R2*	*R2Δ*	*F*	*FΔ*	*p*
					LL	*UL*						
1.00								0.02	—	3.09	—	0.02
	Intercept	8.03		0.78	6.50	9.57	0.00					
	Age	-0.38	-0.12	0.16	-0.69	-0.08	0.01					
	Education	-0.18	-0.07	0.13	-0.43	0.07	0.16					
	Financial Stability	0.14	0.03	0.20	-0.25	0.54	0.48					
	Social Desirability	0.04	0.02	0.09	-0.15	0.22	0.69					
2-i								0.07	0.05	8.02	27.09	0.00
	Life-Time Psychedelic Use (i)	0.55	0.23	0.11	0.34	0.76	0.00					
3-i								0.08	0.00	7.09	2.34	0.13
	Life-Time Psychedelic Use Squared (i)	-0.09	-0.31	0.06	-0.21	0.03	0.13					
2-ii								0.37	0.34	58.88	275.35	0.00
	Frequency Psychedelic Use (ii)	1.82	0.60	0.11	1.61	2.04	0.00					
3-ii								0.38	0.02	52.29	12.60	0.00
	Frequency Psychedelic Use Squared (ii)	0.22	0.36	0.06	0.10	0.35	0.00					
2-iii								0.07	0.05	7.49	24.54	0.00
	Dose Size (iii)	0.91	0.22	0.18	0.55	1.26	0.00					
3-iii								0.07	0.00	6.46	1.26	0.00
	Dose Size - Squared (iii)	-0.15	-0.22	0.14	-0.42	0.11	0.26					
2-iv								0.05	0.02	4.88	11.77	0.00
	Use in a Group (iv)	-0.48	-0.15	0.14	-0.75	-0.20	0.00					
2-v								0.04	0.02	4.14	8.18	0.00
	Integration (v)	0.19	0.13	0.07	0.06	0.33	0.00					
2-vi								0.05	0.03	5.31	13.90	0.00
	Boredom (vi)	0.84	0.16	0.23	0.40	1.29	0.00					

Table 5 Continued

Regression Analysis for Psychedelics and Problematic Use

Step	Predictor	B	*β*	*SE*	95% CI		*p*	*R2*	*R2Δ*	*F*	*FΔ*	*p*
					LL	*UL*						
2-vii								0.03	0.01	3.36	4.37	0.01
	Socializing (vii)	0.37	0.09	0.18	0.02	0.72	0.04					
2-viii								0.04	0.01	3.98	7.41	0.00
	Sensation (viii)	0.36	0.12	0.13	0.10	0.61	0.01					
2-ix								0.03	0.01	3.06	2.88	0.01
	Mind Expansion (ix)	0.32	0.08	0.19	-0.05	0.70	0.09					
2-x								0.05	0.02	4.94	12.09	0.00
	Creativity-Performance (x)	0.39	0.15	0.11	0.17	0.62	0.00					
2-xi								0.03	0.00	2.90	2.12	0.01
	Fit in With a Group (xi)	-0.30	-0.07	0.21	-0.71	0.11	0.15					
2-xii								0.02	0.00	2.47	0.03	0.03
	Curiosity (xii)	0.02	0.01	0.13	-0.24	0.29	0.86					
2-xiii								0.04	0.01	3.93	7.15	0.00
	Forget My Worries (xiii)	0.42	0.12	0.16	0.11	0.72	0.01					
2-xiv								0.04	0.02	4.03	7.65	0.00
	Introspection (xiv)	0.43	0.12	0.16	0.14	0.74	0.01					
2-xv								0.03	0.01	3.08	3.01	0.01
	Relaxation (xv)	0.27	0.08	0.16	-0.04	0.58	0.08					
2-xvi								0.03	0.00	2.85	1.86	0.02
	Party (xvi)	0.23	0.06	0.17	-0.10	0.57	0.17					
2-xvii								0.05	0.03	5.22	13.43	0.00
	Spiritual-Religious (xvii)	0.44	0.12	0.12	0.20	0.67	0.00					

Table 6

Hierarchical Regression Analysis for Psychedelics and Personality Adjustment

Step	Predictor	B	*β*	*SE*	95% CI		*p*	*R2*	*R2Δ*	*F*	*FΔ*	*p*
					LL	*UL*						
1								0.24	—	52.52	—	0.00
	Intercept	27.76		2.48	22.90	36.62	0.00					
	Age	-0.31	-0.02	0.47	-1.23	0.61	0.51					
	Education	1.47	0.13	0.40	0.68	2.26	0.00					
	Financial Stability	6.88	0.38	0.64	5.64	8.13	0.00					
	Social Desirability	1.71	0.19	0.30	1.12	2.30	0.00					
2-i								0.27	0.03	48.88	26.45	0.00
	Life-Time Psychedelic Use (i)	1.33	0.17	0.26	0.82	1.84	0.00					
3-i								0.27	0.00	40.78	0.45	0.00
	Life-Time Psychedelic Use Squared (i)	-0.08	-0.07	0.13	-0.33	0.16	0.51					
2-ii								0.26	0.02	46.43	17.10	0.00
	Frequency Psychedelic Use (ii)	1.31	0.14	0.32	0.69	1.92	0.00					
3-ii								0.27	0.01	40.78	9.57	0.00
	Frequency Psychedelic Use Squared (ii)	-0.57	-0.21	0.19	-0.93	-0.21	0.00					
2-iii								0.24	0.00	31.51	0.84	0.00
	Dose Size (iii)	0.61	0.04	0.67	-0.70	1.92	0.36					
3-iii								0.24	0.00	26.33	0.56	0.00
	Dose Size - Squared (iii)	-0.37	-0.13	0.50	-1.34	0.60	0.46					
2-iv								0.26	0.02	34.88	13.70	0.00
	Use in a Group (iv)	1.82	0.14	0.49	0.86	2.79	0.00					
2-v								0.27	0.04	37.89	25.20	0.00
	Integration (v)	1.19	0.19	0.24	0.73	1.66	0.00					
2-vi								0.26	0.03	36.06	18.22	0.00
	Boredom (vi)	-3.42	-0.17	0.80	-5.00	-1.85	0.00					

Table 6 Continued

Hierarchical Regression Analysis for Psychedelics and Personality Adjustment

Step	Predictor	B	*β*	*SE*	95% CI		*p*	*R2*	*R2Δ*	*F*	*FΔ*	*p*
					LL	*UL*						
2-vii								0.24	0.01	32.49	4.59	0.00
	Socializing (vii)	1.36	0.08	0.63	0.11	2.60	0.03					
2-viii								0.25	0.01	32.75	5.56	0.00
	Sensation (viii)	1.10	0.09	0.47	0.18	2.02	0.02					
2-ix								0.24	0.01	32.11	3.15	0.00
	Mind Expansion (ix)	1.21	0.07	0.68	-0.13	2.54	0.08					
2-x								0.26	0.02	34.63	12.75	0.00
	Creativity-Performance (x)	1.44	0.14	0.40	0.65	2.24	0.00					
2-xi								0.24	0.00	31.29	0.00	0.00
	Fit in With a Group (xi)	-0.01	0.00	0.74	-1.46	1.44	0.99					
2-xii								0.24	0.00	31.35	0.25	0.00
	Curiosity (xii)	0.24	0.02	0.48	-0.70	1.18	0.62					
2-xiii								0.27	0.03	36.71	20.70	0.00
	Forget My Worries (xiii)	-2.49	-0.17	0.55	-3.56	-1.41	0.00					
2-xiv								0.24	0.01	32.35	4.04	0.00
	Introspection (xiv)	1.12	0.08	0.56	0.03	2.22	0.05					
2-xv								0.24	0.00	31.76	1.82	0.00
	Relaxation (xv)	-0.76	-0.05	0.56	-1.87	0.35	0.18					
2-xvi								0.24	0.00	31.32	0.11	0.00
	Party (xvi)	-0.20	-0.01	0.61	-1.40	1.00	0.74					
2-xvii								0.26	0.02	34.57	12.53	0.00
	Spiritual-Religious (xvii)	1.51	0.14	0.43	0.67	2.34	0.00					

Table 7

Regression Analysis for Psychedelics and Personality Growth

Step	Predictor	B	*β*	*SE*	95% CI		*p*	*R2*	*R2Δ*	*F*	*FΔ*	*p*
					LL	*UL*						
1								0.16	—	32.96	—	0.0
	Intercept	182.59		4.77	173.23	191.94	0.00					
	Age	0.55	0.02	0.90	-1.22	2.31	0.55					
	Education	1.57	0.08	0.77	0.05	3.09	0.04					
	Financial Stability	5.11	0.15	1.22	2.71	7.51	0.00					
	Social Desirability	5.38	0.33	0.58	4.25	6.51	0.00					
2-i								0.25	0.08	44.42	75.74	0.0
	Life-Time Psychedelic Use (i)	4.19	0.29	0.48	3.24	5.13	0.00					
3-i								0.25	0.01	38.35	6.25	0.0
	Life-Time Psychedelic Use Squared (i)	-0.58	-0.27	0.23	-1.04	-0.12	0.01					
2-ii								0.22	0.06	38.70	51.77	0.0
	Frequency Psychedelic Use (ii)	4.27	0.25	0.59	3.10	5.43	0.00					
3-ii								0.24	0.02	35.65	16.09	0.0
	Frequency Psychedelic Use Squared (ii)	-1.39	-0.27	0.35	-2.06	-0.71	0.00					
2-iii								0.18	0.02	22.31	12.27	0.0
	Dose Size (iii)	4.27	0.14	1.22	1.87	6.66	0.00					
3-iii								0.18	0.00	18.81	1.23	0.0
	Dose Size - Squared (iii)	1.00	0.20	0.90	-0.77	2.78	0.27					
2-iv								0.16	0.01	19.51	0.51	0.0
	Use in a Group (iv)	0.66	0.03	0.92	-1.16	2.47	0.48					
2-v								0.30	0.14	43.20	99.87	0.0
	Integration (v)	4.11	0.38	0.41	3.30	4.92	0.00					
2-vi								0.18	0.02	21.53	9.01	0.0
	Boredom (vi)	-4.49	-0.12	1.50	-7.43	-1.55	0.00					

Table 7 Continued

Regression Analysis for Psychedelics and Personality Growth

Step	Predictor	B	*β*	*SE*	95% CI		*p*	*R2*	*R2Δ*	*F*	*FΔ*	*p*
					LL	*UL*						
2-vii								0.17	0.01	21.13	7.32	0.01
	Socializing (vii)	3.16	0.11	1.17	0.86	5.45	0.01					
2-viii								0.17	0.01	20.40	4.25	0.01
	Sensation (viii)	1.79	0.08	0.87	0.08	3.49	0.04					
2-ix								0.21	0.05	26.17	28.46	0.01
	Mind Expansion (ix)	6.55	0.21	1.23	4.14	8.96	0.00					
2-x								0.22	0.06	28.70	39.06	0.01
	Creativity-Performance (x)	4.55	0.25	0.73	3.12	5.98	0.00					
2-xi								0.16	0.00	19.42	0.15	0.01
	Fit in With a Group (xi)	-0.53	-0.02	1.37	-3.22	2.16	0.70					
2-xii								0.16	0.00	19.41	0.12	0.01
	Curiosity (xii)	0.30	0.01	0.89	-1.44	2.04	0.73					
2-xiii								0.17	0.01	20.80	5.94	0.01
	Forget My Worries (xiii)	-2.50	-0.10	1.03	-4.52	-0.49	0.02					
2-xiv								0.21	0.05	27.31	33.23	0.01
	Introspection (xiv)	5.78	0.23	1.00	3.81	7.75	0.00					
2-xv								0.16	0.00	19.60	0.91	0.01
	Relaxation (xv)	0.99	0.04	1.04	-1.06	3.04	0.34					
2-xvi								0.16	0.00	19.51	0.50	0.01
	Party (xvi)	-0.80	-0.03	1.13	-3.02	1.42	0.48					
2-xvii								0.27	0.11	36.70	72.64	0.01
	Spiritual-Religious (xvii)	6.35	0.33	0.75	4.89	7.82	0.00					

Appendix F

Table 8

Bivariate Correlations for Entheogenic Drug Use, Self-Transcendence, and Psychospiritual Development

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1. Psychological Distress	14.65	5.35	—							
2. Personality Adjustment	60.68	17.71	-0.70**	—						
3. Personality Growth	225.29	32.57	-0.50**	0.71**	—					
4. Spiritual-Religious Development	25.67	5.17	-0.14**	0.29**	0.47**	—				
5. Awe-Proneness	31.64	6.75	-0.33**	0.53**	0.71**	0.40**	—			
6. Mysticism	48.76	10.52	-0.19**	0.30**	0.52**	0.38**	0.49**	—		
7. Entheogenic Tobacco Use	1.15	0.60	0.00	0.02	0.07	0.07	0.08	0.15**	—	
8. Entheogenic Alcohol Use	1.12	0.39	0.02	0.05	0.08	0.09*	0.05	0.06	0.14**	—
9. Entheogenic Cannabis Use	1.76	1.10	-0.06	0.12**	0.28**	0.22**	0.24**	0.33**	0.23**	0.09
10. Entheogenic Cocaine Use	1.06	0.40	0.06	-0.05	-0.02	-0.08	-0.04	0.05	0.02	0.0
11. Entheogenic MDMA Use	1.74	1.20	-0.11*	0.14*	0.19**	0.12*	0.18**	0.26**	0.12*	0.17
12. Entheogenic Amphetamines Use	1.06	0.35	0.13*	-0.10	-0.09	0.00	-0.06	0.09	0.03	0.0
13. Entheogenic Classic Psychedelic Use	3.23	1.54	-0.17**	0.19**	0.37**	0.30**	0.29**	0.39**	0.19**	0.14
14. Entheogenic Opiate Use	1.08	0.41	0.10	-0.06	-0.06	-0.02	-0.07	0.06	0.05	0.25
15. Entheogenic Inhalant Use	1.16	0.66	0.04	0.01	0.07	0.19**	0.03	0.10	0.23**	0.22
16. Entheogenic Sedative Use	1.02	0.25	0.12*	-0.11	-0.14*	-0.04	-0.17**	0.02	-0.02	-0.0
17. Entheogenic Dissociative Use	1.79	1.29	0.08	-0.04	0.12	0.19**	0.14*	0.18**	0.27**	0.29
18. Entheogenic Atypical Psychedelic Use	2.51	1.68	0.10	-0.06	0.17*	0.29**	0.12	0.25**	0.30**	0.27

*$p < 0.05$. **$p < 0.01$

Table 8 Continued

Bivariate Correlations For Entheogenic Drug Use, Self-Transcendence, and Psychospiritual Development

Variable	9	10	11	12	13	14	15	16	17	18
9. Entheogenic Cannabis Use	—									
10. Entheogenic Cocaine Use	0.20**	—								
11. Entheogenic MDMA Use	0.33**	0.14*	—							
12. Entheogenic Amphetamines Use	0.12*	0.52**	0.30	—						
13. Entheogenic Classic Psychedelic Use	0.43**	0.07	0.41**	-0.01	—					
14. Entheogenic Opiate Use	0.08	0.50**	0.14*	0.46**	0.08	—				
15. Entheogenic Inhalant Use	0.19**	-0.04	0.30**	0.07	0.17*	-0.04	—			
16. Entheogenic Sedative Use	0.07	0.72**	0.01	0.65**	-0.07	0.61**	0.00	—		
17. Entheogenic Dissociative Use	0.37**	0.15*	0.42**	0.14	0.42**	0.24**	0.38**	-0.05	—	
18. Entheogenic Atypical Psychedelic Use	0.52**	0.13	0.41**	0.15	0.52**	0.12	0.24**	0.11	0.40**	—

*$p < 0.05$. **$p < 0.01$

Appendix G

Table 9

Moderation Analysis for Personality Growth

Personality Growth						
Model Summary						
R	R^2	MSE	*F*	df1	df2	*p*
0.498	0.248	794.495	70.94	3	644	0.0001
Model						
	B	SE	*t*	*p*	LLCI	ULCI
constant	222.80	1.342	165.99	0.0001	220.167	225.439
Spiritual Psych Use	4.285	0.718	5.97	0.0001	2.88	5.69
Drug Integration	3.27	0.441	7.422	0.0001	2.40	4.13
Interaction Effect	0.796	0.199	3.99	0.0001	0.405	1.19
Test of Highest Order Interaction						
	ΔR^2		*F*	df1	df2	*p*
	0.0187		15.987	1	644	0.0001
Effects of Predictor at Values of Moderator						
Drug Integration Level	Effect	SE	*t*	*p*	LLCI	ULCI
Low (7.84)	1.32	1.129	1.166	0.244	-0.899	3.533
Medium (12)	4.62	07.06	6.552	0.0001	3.240	6.013
High (15)	7.01	0.888	7.892	0.0001	5.269	8.759

Table 10

Moderation Analysis for Personality Adjustment

Model Summary						
R	R^2	MSE	*F*	df1	df2	*p*
0.282	0.079	291.195	18.52	3	644	0.0001
Model						
	B	SE	*t*	*p*	LLCI	ULCI
constant	59.303	0.813	72.982	0.0001	57.707	60.899
Spiritual Psych Use	1.238	0.435	2.849	0.0045	0.385	2.091
Drug Integration	1.072	0.267	4.021	0.0001	0.549	1.590
Interaction Effect	0.3906	0.121	3.242	0.0012	0.154	0.627
Test of Highest Order Interaction						
	ΔR^2		*F*	df1	df2	*p*
	0.015		10.509	1	644	0.0012
Effects of Predictor at Values of Moderator						
Drug Integration Level	Effect	SE	*t*	*p*	LLCI	ULCI
Low (7.84)	-0.219	0.683	-0.321	0.749	-1.561	1.123
Medium (12)	1.406	0.428	3.288	0.0011	0.566	2.245
High (15)	2.577	0.538	4.790	0.0001	1.521	3.634

Table 11

Moderation Analysis for Psychological Distress

K-6 Psychological Distress						
Model Summary						
R	R^2	MSE	*F*	df1	df2	*p*
0.221	0.049	27.313	11.021	3	644	0.0001
Model						
	B	SE	*t*	*p*	LLCI	ULCI
constant	14.722	0.249	59.156	0.0001	14.233	15.210
Spiritual Psych Use	-0.615	0.133	-4.619	0.0001	-0.876	-0.353
Drug Integration	-0.014	0.082	-0.174	0.8622	-0.175	0.146
Interaction Effect	-0.027	0.037	-0.730	0.466	-0.099	0.046
Test of Highest Order Interaction						
	ΔR^2		*F*	df1	df2	*p*
	0.0008		0.533	1	644	0.466
Effects of Predictor at Values of Moderator						
Drug Integration Level	Effect	SE	t	p	LLCI	ULCI
Low (7.84)	—	—	—	—	—	—
Medium (12)	—	—	—	—	—	—
High (15)	—	—	—	—	—	—

Table 12

Moderation Analysis for Spiritual-Religious Development

Spiritual-Religious Development (Xenosophia)						
Model Summary						
R	R^2	MSE	*F*	df1	df2	*p*
0.377	0.142	21.570	35.55	3	644	0.0001
Model						
	B	SE	t	p	LLCI	ULCI
constant	25.474	0.221	115.187	0.0001	25.039	25.908
Spiritual Psych Use	0.445	0.118	3.766	0.0002	0.213	0.678
Drug Integration	0.409	0.073	5.638	0.0001	0.267	0.552
Interaction Effect	0.089	0.033	2.73	0.0066	0.025	0.154
Test of Highest Order Interaction						
	ΔR^2		*F*	df1	df2	*p*
	0.0099		7.431	1	644	0.0066
Effects of Predictor at Values of Moderator						
Drug Integration Level	Effect	SE	*t*	*p*	LLCI	ULCI
Low (7.84)	0.112	0.186	0.601	0.5478	-0.253	0.477
Medium (12)	0.484	0.116	4.158	0.0001	0.255	0.712
High (15)	0.752	0.146	5.135	0.0001	0.464	1.039

Appendix H

Table 13

Bivariate Correlations for Variables Used in Mediation Analyses

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Age	2.09	1.34	—						
2. Education	3.91	1.59	0.31**	—					
3. Financial Stability	3.15	0.97	0.04	0.22**	—				
4. Spirituality	4.47	2.16	0.14**	0.12**	0.06	—			
5. Meditation Frequency	2.68	1.43	0.07	0.10**	0.10**	0.44**	—		
6. Social Desirability	3.59	2.01	0.05	0.08*	0.12**	0.17**	0.06	—	
7. Entheogenic Psychedelic Use	2.41	1.94	0.05	0.04	0.04	0.46**	0.39**	0.09*	—
8. Introspective-Growth Psychedelic Use	3.20	2.13	-0.02	0.00	0.01	0.28**	0.33**	0.09*	0.80**
9. Mind-Expansive Psychedelic Use	3.36	2.13	-0.02	0.01	0.01	0.24**	0.29**	0.07	0.78**
10. Openness to Experience	54.27	7.89	0.07	0.07	0.06	0.23**	0.25**	0.07	0.26**
11. Awe Proneness	31.64	6.75	0.01	0.07	0.19**	0.38**	0.30**	0.22**	0.35**
12. Mystical Experiences	48.76	10.52	0.07	0.00	0.06	0.46**	0.37**	0.09*	0.52**
13. Personality Growth	225.29	32.57	0.07	0.14**	0.21**	0.48**	0.38**	0.36**	0.42**
14. Personality Adjustment	60.68	17.71	0.04	0.22**	0.43**	0.33**	0.24**	0.25**	0.22**
15. Spiritual-Religious Development	25.67	5.17	-0.02	0.09*	0.06	0.47**	0.37**	0.11**	0.32**
16. Psychological Distress	14.65	5.35	-0.12**	-0.20**	-0.32**	-0.27**	-0.22**	-0.18**	-0.21**

*$p < 0.05$. **$p < 0.01$. n = 684.

Table 13 Continued

Bivariate Correlations of Variables Used in Mediation Analyses

Variable	8	9	10	11	12	13	14	15	16
8. Introspective-Growth Psychedelic Use	—								
9. Mind-Expansive Psychedelic Use	0.95**	—							
10. Openness to Experience	0.28**	0.26**	—						
11. Awe Proneness	0.32**	0.31**	0.47**	—					
12. Mystical Experiences	0.50**	0.49**	0.36**	0.49**	—				
13. Personality Growth	0.36**	0.35**	0.48**	0.71**	0.52**	—			
14. Personality Adjustment	0.19**	0.18**	0.26**	0.53**	0.30**	0.71**	—		
15. Spiritual-Religious Development	0.26**	0.24**	0.27**	0.40**	0.38**	0.47**	0.29**	—	
16. Psychological Distress	-0.15**	-0.16**	-0.15**	-0.33**	-0.19**	-0.50**	-0.70**	-0.14**	—

*$p < 0.05$. **$p < 0.01$. n = 684.

Table 14

Mediation Analyses Data

Openness to Experience							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.2593	0.0672		58.126	49.156	1	682	0.0001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	51.726	—	0.466	111.1130	0.0001	50.812	52.640
Entheogenic Psychedelic Use	1.056	0.259	0.1501	7.0112	0.0001	0.760	1.352

Awe-Proneness							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.5223	0.273		33.233	127.744	2	681	0.0001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	10.764	—	1.539	6.996	0.0001	7.743	13.784
Entheogenic Psychedelic Use	0.834	0.239	0.118	7.073	0.0001	0.603	1.066
Openness	0.348	0.406	0.029	12.010	0.0001	0.291	0.405

Mystical Experiences							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.6269	0.3930		67.4320	146.7746	3	680	0.0001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	20.2030	—	2.2689	8.9044	0.0001	15.748	24.658

Entheogenic Psychedelic Use	2.0943	0.3856	0.1741	12.0320	0.0001	1.7526	2.4361
Openness	0.1570	0.1177	0.454	3.4572	0.0006	0.0678	0.2461
Awe-Proneness	0.4739	0.3042	0.0546	8.6816	0.0001	0.3667	0.5811

Personality Growth							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.7529	0.5669		462.0461	222.1903	4	679	0.0001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	85.9027	—	6.2758	12.6879	0.0001	74.580	98.225
Entheogenic Psychedelic Use	2.1207	0.1261	0.5018	4.2263	0.0001	1.1355	3.1060
Openness	0.6050	0.1465	0.1199	5.0462	0.0006	0.3696	0.8403
Awe-Proneness	2.5378	0.526	0.1506	16.8521	0.0001	2.2421	2.8335
Mystical Experiences	0.4336	0.140	0.1004	4.3191	0.0001	0.2365	0.6307

Personality Adjustment							
Model Summary							
R	R^2		MSE	F	df1	df2	*p*
0.5280	0.2788		227.522	65.608	4	679	0.00001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	14.8198	—	4.4039	3.3651	0.0008	6.1728	23.4667
Entheogenic Psychedelic Use	0.2917	0.0319	0.3521	0.8283	0.4078	-0.3997	0.9830
Openness	0.0231	0.0103	0.0841	0.2747	0.7836	-0.1421	0.1883
Awe-Proneness	1.2841	0.4895	0.1057	12.152	0.0001	1.0766	1.4916

Mystical Experiences	0.0670	0.0398	0.0704	0.915	0.3416	-0.0713	0.2053

Spiritual-Religious Development (Xenosophia)							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.4692	0.2202		21.0045	47.9295	4	679	0.0001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	12.7183	—	1.3381	9.5048	0.0001	10.091	15.3456
Entheogenic Psychedelic Use	0.3467	0.1297	0.1070	3.2405	0.0013	0.1336	0.5568
Openness	0.0382	0.0582	0.0256	1.4926	0.1360	-0.012	0.0883
Awe-Proneness	0.1872	0.2442	0.0321	5.8302	0.0001	0.1242	0.2502
Mystical Experiences	0.0846	0.1718	0.0214	3.9505	0.0001	0.0425	0.1266

Psychological Distress							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.3495	0.1221		25.2441	23.6167	4	679	0.0001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	22.0085	—	1.4669	15.0031	0.0001	19.128	24.887
Entheogenic Psychedelic Use	-0.3197	-0.1158	0.1173	-2.7255	0.0066	-0.550	-0.0894
Openness	0.0176	0.0259	0.0280	0.6275	0.5305	-0.037	0.0726
Awe-Proneness	-0.2454	-0.3099	0.0352	-6.9727	0.0001	-0.315	-0.1763
Mystical Experiences	0.0046	0.0091	0.0235	0.1965	0.8443	-0.042	0.0507

Table 15

Mediation Effects for Personality Growth

Effects of Entheogenic Psychedelic Use on Personality Growth					
	Effect	SE	*p*	LLCI	ULCI
Total Effect of Entheogenic Psychedelic Use on Personality Growth	7.0356	0.5849	0.0001	5.8872	8.1839
Direct Effect of Entheogenic Psychedelic Use on Personality Growth	2.1207	0.5018	0.0001	1.1355	3.1060
Indirect Effects of Entheogenic Psychedelic Use on Personality Growth					
Total Indirect Effects	4.9148	0.4927		3.9409	5.9050
Entheogenic Psychedelic Use > Openness > Personality Growth	0.6389	0.1623		0.3541	0.9858
Entheogenic Psychedelic Use > Awe > Personality Growth	2.1171	0.3359		1.4786	2.7986
Entheogenic Psychedelic Use > Mystical > Personality Growth	0.9080	0.2303		0.4755	1.3732
Entheogenic Psychedelic Use > Openness > Awe > Personality Growth	0.9320	0.1696		0.6221	1.2806
Entheogenic Psychedelic Use > Openness > Mystical > Personality Growth	0.0719	0.0312		0.0220	0.1435
Entheogenic Psychedelic Use > Awe > Mystical > Personality Growth	0.1714	0.0515		0.0808	0.2846
Entheogenic Psychedelic Use > Openness > Awe > Mystical > Personality Growth	0.0755	0.0253		0.0338	0.1319

Table 16

Mediation Effects for Personality Adjustment

Effects of Entheogenic Psychedelic Use on Personality Adjustment					
	Effect	SE	*p*	LLCI	ULCI
Total Effect of Entheogenic Psychedelic Use on Personality Adjustment	2.0486	0.3413	0.001	1.379	2.7187
Direct Effect of Entheogenic Psychedelic Use on Personality Adjustment	0.2917	0.3521	0.408	-0.399	0.9830
Indirect Effects of Entheogenic Psychedelic Use on Personality Adjustment					
Total Indirect Effects	1.7569	0.2665		1.2610	2.3009
Entheogenic Psychedelic Use > Openness > Personality Adjustment	0.0244	0.0939		-0.164	0.2069
Entheogenic Psychedelic Use > Awe > Personality Adjustment	1.0713	0.1779		0.7414	1.4541
Entheogenic Psychedelic Use > Mystical > Personality Adjustment	0.1404	0.1468		-0.142	0.4453
Entheogenic Psychedelic Use > Openness > Awe > Personality Adjustment	0.4716	0.0905		0.3106	0.6705
Entheogenic Psychedelic Use > Openness > Mystical > Personality Adjustment	0.0111	0.0128		-0.011	0.0399
Entheogenic Psychedelic Use > Awe > Mystical > Personality Adjustment	0.0265	0.0285		-0.027	0.0863
Entheogenic Psychedelic Use > Openness > Awe > Mystical > Personality Adjustment	0.0117	0.0127		-0.012	0.0387

Table 17

Mediation Effects for Spiritual-Religious Development

Effects of Entheogenic Psychedelic Use on Spiritual-Religious Development (Xenosophia)					
	Effect	SE	*p*	LLCI	ULCI
Total Effect of Entheogenic Psychedelic Use on Xenosophia	0.8511	0.0970	0.0001	0.6607	1.0416
Direct Effect of Entheogenic Psychedelic Use on Xenosophia	0.3467	0.1070	0.0013	0.1366	0.5568
Indirect Effects of Entheogenic Psychedelic Use on Xenosophia					
Total Indirect Effects	0.5044	0.0730		0.3665	0.6505
Entheogenic Psychedelic Use > Openness > Xenosophia	0.0403	0.0311		-0.0188	0.1048
Entheogenic Psychedelic Use > Awe > Xenosophia	0.1562	0.0408		0.0833	0.2462
Entheogenic Psychedelic Use > Mystical > Xenosophia	0.1771	0.0495		0.0824	0.2760
Entheogenic Psychedelic Use > Openness > Awe > Xenosophia	0.0688	0.0187		0.0366	0.1090
Entheogenic Psychedelic Use > Openness > Mystical > Xenosophia	0.0140	0.0064		0.0039	0.0288
Entheogenic Psychedelic Use > Awe > Mystical > Xenosophia	0.0334	0.0114		0.0140	0.0586
Entheogenic Psychedelic Use > Openness > Awe > Mystical > Xenosophia	0.0147	0.0056		0.0057	0.0275

Table 18

Mediation Effects for Psychological Distress

Effects of Entheogenic Psychedelic Use on Psychological Distress					
	Effect	SE	*p*	LLCI	ULCI
Total Effect of Entheogenic Psychedelic Use on Psychological Distress	-0.5830	0.1033	0.001	-0.786	-0.380
Direct Effect of Entheogenic Psychedelic Use on Psychological Distress	-0.3197	0.1173	0.007	-0.550	-0.089
Indirect Effects of Entheogenic Psychedelic Use on Psychological Distress					
Total Indirect Effects	-0.2633	0.0745		-0.416	-0.225
Entheogenic Psychedelic Use > Openness > Psychological Distress	0.0186	0.0326		-0.044	0.083
Entheogenic Psychedelic Use > Awe > Psychological Distress	-0.2048	0.0421		-0.293	-0.127
Entheogenic Psychedelic Use > Mystical > Psychological Distress	0.0097	0.0504		-0.090	0.1068
Entheogenic Psychedelic Use > Openness > Awe > Psychological Distress	-0.0901	0.0207		-0.135	-0.053
Entheogenic Psychedelic Use > Openness > Mystical > Psychological Distress	0.0008	0.0042		-0.008	0.0095
Entheogenic Psychedelic Use > Awe > Mystical > Psychological Distress	0.0018	0.0097		-0.018	0.0209
Entheogenic Psychedelic Use > Openness > Awe > Mystical > Psychological Distress	0.0008	0.0044		-0.008	0.0097

Appendix I

Table 19

Mediation Analyses Data with Confounding Variables

Openness to Experience							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.3196	0.1021		56.4476	10.9846	7	676	0.0000
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	47.605	—	1.285	37.047	0.0001	45.082	50.128
Entheogenic Psychedelic Use	0.666	0.163	0.172	3.877	0.0001	0.328	1.003
Age	0.182	0.031	0.228	0.801	0.423	-0.264	0.629
Education	0.0914	0.0185	0.1950	0.4686	0.6395	-0.2914	0.4742
Financial Stability	0.1583	0.0194	0.3083	0.5133	0.6079	-0.4471	0.7637
Spirituality	0.2631	0.0720	0.1610	1.6339	0.1028	-0.0531	0.5793
Meditation	0.8123	0.1469	0.2322	3.4978	0.0005	0.3563	1.2682
Marlowe-Crowne	0.1322	0.0336	0.1465	0.9029	0.3669	-0.1553	0.4198

Awe-Proneness							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.5988	0.3586		29.5750	47.1664	8	675	0.0001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	6.4471	—	1.6191	3.9818	0.0001	3.2679	9.6263
Entheogenic Psychedelic Use	0.4335	0.124	0.1256	3.4509	0.0006	0.1869	0.6802
Openness	0.3129	0.366	0.0278	11.2395	0.0001	0.2582	0.3676
Age	-0.3355	-0.067	0.1647	-2.0363	0.0421	-0.659	-0.0120

Education	-0.0191	-0.005	0.1411	-0.1353	0.8924	-0.296	0.2580
Financial Stability	0.9142	0.131	0.2232	4.0953	0.0001	0.4759	1.3525
Spirituality	0.6101	0.195	0.1168	5.2237	0.0001	0.3808	0.8394
Meditation	0.2650	0.056	0.1696	1.5624	0.1187	-0.068	0.5980
Marlowe-Crowne	0.4528	0.135	0.1061	4.2690	0.0001	0.2446	0.6611

Mystical Experiences							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.6575	0.4323		63.636	57.0180	9	674	0.0001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	21.1888	—	2.4028	8.8184	0.0001	16.4709	25.9066
Entheogenic Psychedelic Use	1.6133	0.2971	0.1859	8.6781	0.0001	1.2482	1.9783
Openness	0.1394	0.1046	0.0445	3.1329	0.0018	0.0520	0.2268
Awe-Proneness	0.4166	0.2674	0.0565	7.3795	0.0001	0.3058	0.5275
Age	0.3699	0.0470	0.2424	1.5259	0.1275	-0.1061	0.8458
Education	-0.5177	-0.079	0.2070	-2.5005	0.0126	-0.9242	-0.1112
Financial Stability	-0.1515	-0.014	0.3315	-0.4569	0.6479	-0.8023	0.4994
Spirituality	0.8368	0.1719	0.1747	4.7892	0.0001	0.4938	1.1799
Meditation	0.5910	0.0802	0.2492	2.3711	0.0180	0.1016	1.0803
Marlowe-Crowne	-0.1835	-0.035	0.1577	-1.1637	0.2450	-0.4931	0.1261

Personality Growth						
Model Summary						
R	R^2	MSE	*F*	df1	df2	*p*
0.7999	0.6399	387.626	119.575	10	673	0.0001
Model						

	B	β	SE	*t*	*p*	LLCI	ULCI
constant	71.5804	—	6.2630	11.4291	0.0001	59.283	83.8778
Entheogenic Psychedelic Use	1.0718	0.0637	0.4838	2.2155	0.0271	0.1219	2.0217
Openness	0.6183	0.1498	0.1106	5.5899	0.0001	0.4011	0.8355
Awe-Proneness	2.0762	0.4304	0.1449	14.3320	0.0001	1.7918	2.3606
Mystical Experiences	0.3525	0.1138	0.0951	3.7080	0.0002	0.1658	0.5392
Age	-0.1389	-0.006	0.5993	-0.2317	0.8168	0.0144	2.0303
Education	1.0224	0.050	0.5133	1.9916	0.0468	0.0144	2.0303
Financial Stability	2.0638	0.061	0.8182	2.5223	0.0119	0.4572	3.6704
Spirituality	1.9694	0.1306	0.4385	4.4909	0.0001	1.1084	2.8305
Meditation	1.5296	0.0670	0.6177	2.4764	0.0135	0.3168	2.7424
Marlowe-Crowne	3.2222	0.1985	0.3896	8.2711	0.0001	2.4572	3.9871

Personality Adjustment							
Model Summary							
R	R^2	MSE	*F*	df1	df2	*p*	
0.6541	0.4279	182.0835	50.3364	10	673	0.0001	
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	-4.9137	—	4.2925	-1.1447	0.2527	-12.342	3.5146
Entheogenic Psychedelic Use	-0.1113	-0.0122	0.3316	-0.3357	0.7372	-0.7623	0.5397
Openness	0.0487	0.0217	0.0758	0.6426	0.5207	-0.1001	0.1976
Awe-Proneness	0.9505	0.3623	0.0993	9.5729	0.0001	0.7555	1.1454
Mystical Experiences	0.0651	0.0387	0.0652	0.9990	0.3182	-0.0628	0.1930
Age	-0.4530	-0.0342	0.4107	-1.1030	0.2704	-1.2595	0.3534
Education	1.2667	0.1140	0.3518	3.6003	0.0003	0.5759	1.9575

Financial Stability	5.7119	0.3111	0.5608	10.1852	0.0001	4.6107	6.8130
Spirituality	0.9865	0.1203	0.3006	3.2823	0.0011	0.3964	1.5767
Meditation	0.1521	0.0123	0.4233	0.3594	0.7194	-0.6791	0.9834
Marlowe-Crowne	0.8708	0.0987	0.2670	3.2616	0.0012	0.3466	1.3951

Spiritual-Religious Development (Xenosophia)							
Model Summary							
R	R^2		MSE	*F*	df1	df2	*p*
0.5624	0.3163		18.5809	31.1289	10	673	0.0001
Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	13.220	—	1.3712	9.6410	0.0001	10.5276	15.912
Entheogenic Psychedelic Use	0.0365	0.0137	0.1059	0.3451	0.7301	-0.1714	0.2445
Openness	0.0348	0.0530	0.0242	1.4352	0.1517	-0.0128	0.0823
Awe-Proneness	0.1334	0.1741	0.0317	4.2074	0.0001	0.0712	0.1957
Mystical Experiences	0.0464	0.0944	0.0208	2.2312	0.0260	0.0056	0.0873
Age	-0.3954	-0.102	0.1312	-3.0139	0.0027	-0.6531	-0.138
Education	0.1930	0.0595	0.1124	1.7172	0.0864	-0.0277	0.4137
Financial Stability	-0.1355	-0.025	0.1791	-0.7562	0.4498	-0.4872	0.2163
Spirituality	0.6689	0.2792	0.0960	6.9664	0.0001	0.4804	0.8574
Meditation	0.5378	0.1483	0.1352	3.9768	0.0001	0.2723	0.8033
Marlowe-Crowne	0.0165	0.0064	0.0853	0.1936	0.8465	-0.1510	0.1840

Psychological Distress						
Model Summary						
R	R^2	MSE	*F*	df1	df2	*p*
0.4813	0.2317	22.2911	20.2933	10	673	0.0001

Model							
	B	β	SE	*t*	*p*	LLCI	ULCI
constant	27.0180	—	1.5019	17.9892	0.0001	24.0691	29.9670
Entheogenic Psychedelic Use	-0.1804	-0.0653	0.1160	-1.5553	0.1203	-0.4082	0.0474
Openness	0.0188	0.0277	0.0265	0.7076	0.4794	-0.0333	0.0709
Awe-Proneness	-0.2682	-0.2123	0.0347	-4.8414	0.0001	-0.2364	-0.1000
Mystical Experiences	0.0138	0.0271	0.0228	0.6048	0.5455	-0.0310	0.0586
Age	-0.2485	-0.0622	0.1437	-1.7290	0.0843	-0.5306	0.0337
Education	-0.2907	-0.0867	0.1231	-2.3618	0.0185	-0.5325	-0.0490
Financial Stability	-1.3346	-0.2408	0.1962	-6.8019	0.0001	-1.7199	-0.9494
Spirituality	-0.2445	-0.0988	0.1052	-2.3245	0.0204	-0.4509	-0.0380
Meditation	-0.2422	-0.0646	0.1481	-1.6351	0.1025	-0.5330	0.0486
Marlowe-Crowne	-0.1933	-0.0726	0.0934	-2.097	0.0389	-0.3768	-0.0099

Table 20

Mediation Effects for Personality Growth with Confounds

Effects of Entheogenic Psychedelic Use on Personality Growth					
	Effect	SE	*p*	LLCI	ULCI
Total Effect of Entheogenic Psychedelic Use on Personality Growth	3.5113	0.5801	0.001	2.3723	4.6503
Direct Effect of Entheogenic Psychedelic Use on Personality Growth	1.0718	0.4838	0.027	0.1219	2.0217
Indirect Effects of Entheogenic Psychedelic Use on Personality Growth					
Total Indirect Effects	2.4395	0.4207		1.6494	3.3194
Entheogenic Psychedelic Use > Openness > Personality Growth	0.4115	0.1359		0.1828	0.7120
Entheogenic Psychedelic Use > Awe > Personality Growth	0.9001	0.2800		0.3601	1.4829
Entheogenic Psychedelic Use > Mystical > Personality Growth	0.5687	0.1778		0.2419	0.9379
Entheogenic Psychedelic Use > Openness > Awe > Personality Growth	0.4323	0.1252		0.2095	0.7004
Entheogenic Psychedelic Use > Openness > Mystical > Personality Growth	0.0327	0.0185		0.0068	0.0796
Entheogenic Psychedelic Use > Awe > Mystical > Personality Growth	0.0637	0.0280		0.0189	0.1256
Entheogenic Psychedelic Use > Openness > Awe > Mystical > Personality Growth	0.0306	0.0138		0.0100	0.0629

Table 21

Mediation Effects for Personality Adjustment with Confounds

Effects of Entheogenic Psychedelic Use on Personality Adjustment					
	Effect	SE	*p*	LLCI	ULCI
Total Effect of Entheogenic Psychedelic Use on Personality Adjustment	0.6595	0.3368	0.0506	-0.0017	1.3208
Direct Effect of Entheogenic Psychedelic Use on Personality Adjustment	-0.1113	0.3316	0.7372	-0.7623	0.5397
Indirect Effects of Entheogenic Psychedelic Use on Personality Adjustment					
Total Indirect Effects	0.7708	0.1960		0.3930	1.1726
Entheogenic Psychedelic Use > Openness > Personality Adjustment	0.0324	0.0536		-0.0715	0.1441
Entheogenic Psychedelic Use > Awe > Personality Adjustment	0.4121	0.1339		0.1600	0.6926
Entheogenic Psychedelic Use > Mystical > Personality Adjustment	0.1050	0.1061		-0.0941	0.3251
Entheogenic Psychedelic Use > Openness > Awe > Personality Adjustment	0.1979	0.0599		0.0940	0.3262
Entheogenic Psychedelic Use > Openness > Mystical > Personality Adjustment	0.0060	0.0070		-0.0056	0.0226
Entheogenic Psychedelic Use > Awe > Mystical > Personality Adjustment	0.0118	0.0130		-0.0102	0.0400
Entheogenic Psychedelic Use > Openness > Awe > Mystical > Personality Adjustment	0.0056	0.0061		-0.0054	0.0192

Table 22

Mediation Effects for Spiritual-Religious Development with Confounds

Effects of Entheogenic Psychedelic Use on Spiritual-Religious Development (Xenosophia) With Confounds					
	Effect	SE	*p*	LLCI	ULCI
Total Effect of Entheogenic Psychedelic Use on Xenosophia	0.2370	0.102	0.0200	0.0375	0.4365
Direct Effect of Entheogenic Psychedelic Use on Xenosophia	0.0365	0.104	0.7301	-0.1714	-0.1714
Indirect Effects of Entheogenic Psychedelic Use on Xenosophia					
Total Indirect Effects	0.2004	0.0502		0.1064	0.2996
Entheogenic Psychedelic Use > Openness > Xenosophia	0.0231	0.0192		-0.0098	0.0660
Entheogenic Psychedelic Use > Awe > Xenosophia	0.0579	0.0239		0.0170	0.1100
Entheogenic Psychedelic Use > Mystical > Xenosophia	0.0749	0.036		0.0069	0.1490
Entheogenic Psychedelic Use > Openness > Awe > Xenosophia	0.0278	0.0109		0.0092	0.0513
Entheogenic Psychedelic Use > Openness > Mystical > Xenosophia	0.0043	0.0029		0.0002	0.0114
Entheogenic Psychedelic Use > Awe > Mystical > Xenosophia	0.0084	0.0052		0.0005	0.0207
Entheogenic Psychedelic Use > Openness > Awe > Mystical > Xenosophia	0.0040	0.0025		0.0003	0.0098

Table 23

Mediation Effects for Psychological Distress with Confounds

Effects of Entheogenic Psychedelic Use on Psychological Distress With Confounds					
	Effect	SE	*p*	LLCI	ULCI
Total Effect of Entheogenic Psychedelic Use on Psychological Distress	-0.2487	0.1097	0.023	-0.464	-0.033
Direct Effect of Entheogenic Psychedelic Use on Psychological Distress	-0.1804	0.1160	0.120	-0.408	0.047
Indirect Effects of Entheogenic Psychedelic Use on Psychological Distress					
Total Indirect Effects	-0.0682	0.0521		-0.172	0.033
Entheogenic Psychedelic Use > Openness > Psychological Distress	0.0125	0.0194		-0.024	0.054
Entheogenic Psychedelic Use > Awe > Psychological Distress	-0.0729	0.0280		-0.135	-0.026
Entheogenic Psychedelic Use > Mystical > Psychological Distress	0.0222	0.0390		-0.054	0.101
Entheogenic Psychedelic Use > Openness > Awe > Psychological Distress	-0.0350	0.0129		-0.064	-0.014
Entheogenic Psychedelic Use > Openness > Mystical > Psychological Distress	0.0013	0.0025		-0.003	0.007
Entheogenic Psychedelic Use > Awe > Mystical > Psychological Distress	0.0025	0.0045		-0.006	0.012
Entheogenic Psychedelic Use > Openness > Awe > Mystical > Psychological Distress	0.0012	0.0023		-0.003	0.006