**Preprint: Psychedelic Experiences and Mindfulness are Associated with
Improved Wellbeing**

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Abstract

Rationale: Both psychedelics and mindfulness are a recently emerging topic of interest in academia and popular culture alike. Personal meditation practices and recreational psychedelic use have consistently increased in the past decade. While clinical work has shown both to improve long-term wellbeing, the data on naturalistic applications of psychedelics and mindfulness is rather lacking.

Objective: The current study aims to examine the relationship between psychedelic use, mindfulness, and multi-faceted wellbeing as an outcome. Hierarchical regression was used to quantify these associations on a large sample of people ($N = 1219$), who engage in both meditation practices and psychedelic use.

Results: These results show that both mindfulness and mystical experiences each predict substantial increases in wellbeing. Psychedelics were found to be an important moderator of mystical experience to explain improvements in wellbeing.

Conclusions: These data are among the first to establish a strong relationship between personal mindfulness practice, recreational psychedelic use, and overall psychological wellbeing in a naturalistic framework.

Introduction

Psychedelics

Background

Psychedelic drugs have been used throughout history by various peoples across time and geography (Nichols, 2016). People have used psychedelics for spiritual, cultural, and artistic reasons. Despite this, there has been a hiatus in academic research since the 1970s due to

government intervention and legal restrictions (Doblin et al., 2019). Recently, psychedelics have become a topic of renewed interest in both popular culture and academia. A growing amount of the adult population is gravitating towards psychedelic use (Yockey et al., 2020). Within research communities, many groups are pushing forward, laying the groundwork for this burgeoning field. Since Griffiths and colleagues published their landmark study on psilocybin (R. R. Griffiths et al., 2006), the scientific literature on psychedelics has more than tripled (Petranker et al., 2020).

The current study focuses on the “classical” psychedelics: a group of serotonin 5-HT_{2a} receptor agonists including but not limited to: LSD, psilocybin, DMT, and mescaline (Carhart-Harris et al., 2014; Johnson et al., 2019). These four substances happen to be the most popular culturally and in scientific research. Although not a classical psychedelic, MDMA elicits similar effects and is thus relevant to the current study (Holze et al., 2020). Furthermore, according to the 2020 Global Drug Survey executive summary, MDMA is recreationally more popular than any of the aforementioned classical psychedelics (Winstock, 2019).

Mystical Experience

Psychedelic drugs, particularly psilocybin, have been shown to occasion mystical experiences in controlled clinical settings (Frederick S. Barrett et al., 2015; R. Griffiths et al., 2008; R. R. Griffiths et al., 2006). These mystical experiences encompass four key subjective features: mysticism or a sacred sense of unity, truth, and reverence; transcendence of space and time; positive mood; and ineffability (Frederick S. Barrett et al., 2015). Post-intervention follow-up studies suggest that psilocybin-mediated mystical experiences explain persistent increases in

life meaning, spirituality, personality openness, and healthy psychological functioning (R. Griffiths et al., 2008; Roland R. Griffiths et al., 2011; MacLean et al., 2011). It is currently unclear as to why psilocybin is capable of eliciting mystical-type experiences, though it is uncontroversial that psychedelics are uniquely capable of occasioning mystical experiences compared to active placebos such as methylphenidate (Frederick S. Barrett et al., 2015; Frederick S. Barrett & Griffiths, 2018). Similarly, LSD, MDMA, and DMT have been reported to occasion mystical experiences, though the existing literature is relatively sparse for psychedelics other than psilocybin (Aday et al., 2020; Davis et al., 2020; Holze et al., 2020; Liechti et al., 2017).

Meditation

Background

Meditation and related contemplative practices have a rich and varied history. The origins of these practices are often attributed to Eastern religions, wisdom traditions, and philosophies. Within the last several decades, these practices have gained traction in Western culture. Meditation is an umbrella term that covers a range of contemplative practices. Most of these practices involve training of deliberate attentional focus, often on the breath, sounds, or bodily sensations (Gunaratana, 1993).

Mindfulness

Mindfulness constitutes a subset of the aforementioned meditation practices. Mindfulness has been adopted by both the public and researchers alike and is commonly operationally defined as, “a state of being, characterized by complete attentiveness to present moment experience, in a non-judgmental fashion.” (Brown & Ryan, 2003; Kabat-Zinn & Hanh, 2009). Relevant to the

current study is the construct of trait mindfulness, which describes the basal tendency to remain mindful in everyday life (Baer et al., 2006; Brown & Ryan, 2003; Shapiro et al., 2011).

Many mindfulness practices have become secularized or medicalized, as in the case of Mindfulness-Based Stress Reduction (MBSR) or Mindfulness-Based Cognitive Therapy (MBCT) (Kabat-Zinn, 1982; Segal et al., 2001). These therapies have shown utility in reducing negative affect, stress, depression, and anxiety symptoms with small to medium effect sizes (Goldberg et al., 2018; Parsons et al., 2017). There are several theories suggesting that the benefits of MBSR may be due to diminished rumination, increased self-compassion or increased mindfulness itself (Gu et al., 2015; Spinelli et al., 2019). In addition, Mindfulness-to-Meaning Theory (MMT) has suggested mindfulness produces greater meaning in one's life through mechanisms of cognitive reappraisal and emotional regulation grounded in attentional mechanisms (Garland et al., 2017).

Overlap

Anecdotally, many people report that psychedelic use and mindfulness practice offers similar insights and benefits. Phenomenologically, mindfulness practitioners often report experiences with noetic or mystical qualities (de Castro, 2015; Millière et al., 2018; Vago & Silbersweig, 2012; Van Lente & Hogan, 2020). Meditators report altered states of consciousness referring to descriptors such as unity, oneness with all, deeply positive mood, transcendence of time and space, paradoxicality; all of which are reminiscent of psychedelic-mediated mystical experiences (Barrett & Griffiths, 2018; Davidson, 1976; Van Lente & Hogan, 2020). Incidentally, the few neuroimaging studies in both domains suggest that the neural correlates of meditation and psychedelic states are comparable. A key similarity between psychedelic and

meditation neural correlates is the marked diminishment of default mode network activity in both cases (Millière et al., 2018; Smigielski, Komater, et al., 2019; Smigielski, Scheidegger, et al., 2019). Correspondingly, the phenomenological sense of self—a key function of the default mode—is reportedly diminished or annihilated in both heavy psychedelic doses or deep meditation states (Carhart-Harris et al., 2014). Psychedelic use and mindfulness seem to be different paths that may occasionally lead to the same destination.

A small handful of studies have explicitly studied the benefits of combining psychedelics with contemplative practices. The results of these studies suggest that combining psychedelics with meditation leads to stronger benefits in wellbeing beyond the effect of either practice in isolation (Barrett et al., 2017; Griffiths et al., 2018). Aside from these explicitly combined investigations, psychedelics and meditation have independently been linked to similar types of improvements in wellbeing. Reported benefits common to both practices include: decreased negative affect; decreased mood disorder symptoms; as well as increased positive affect, spirituality, life purpose, life meaning, and wisdom (Anderson et al., 2019; Garland et al., 2017; Goyal et al., 2014; Johnson et al., 2019; Jungaberle et al., 2018; Montero-Marín et al., 2016; Móró et al., 2011; Raglan, 2014).

Naturalistic Use

Evidence from clinical research suggests psychedelics can cause persistent improvements to wellbeing via induction of strong mystical experiences (Aday et al., 2020; Griffiths et al., 2008). However, naturalistic psychedelic use and its potential for improving wellbeing have been relatively unexamined. Many people report using psychedelics for personal growth, spiritual experiences, or simply for recreational enjoyment (Bøhling, 2017; Móró et al., 2011; Roberts et al., 2020). Some recent observational research suggests recreational psychedelic use is capable of

eliciting strong mystical experiences (Haijen et al., 2018; Lyvers & Meester, 2012). A few studies peripherally examined wellbeing as an outcome variable, observing small improvements to single measures of wellbeing (Forstmann et al., 2020; Haijen et al., 2018; Mason et al., 2020). As of yet, there haven't been any reported explicit investigations into how recreational psychedelic-mediated mystical experiences lead to improvements in wellbeing.

Similar claims of increased wellbeing are true of clinical mindfulness-based interventions such as MBSR, MCBT (Gu et al., 2015; Kabat-Zinn, 1982). Mindfulness in everyday life has been more thoroughly explored, with many studies suggesting that non-intervention personal mindfulness practices are linked to increased wellbeing (Baer et al., 2012; Bester et al., 2016; Birtwell et al., 2019; Campos et al., 2016; Montero-Marin et al., 2016).

Objectives

The objective of the current study is to examine the recreational engagement of mindfulness and psychedelic-mediated mystical experiences. Additionally, the study aims to uncover how mindfulness and psychedelic experiences influence multidimensional facets of psychological wellbeing. In particular, we predicted both mindfulness and psychedelic-mediated mystical experience are associated with improvements to affect, meaning in life, satisfaction with life, wisdom, and symptoms of depression, anxiety, and stress (see pre-registered hypotheses: osf.io/s5b7z).

Methods

Design

Open Science

Hypotheses, study design, and planned analyses were pre-registered on Open Science Framework (OSF) prior to data collection (osf.io/s5b7z). Seven explicit hypotheses were registered (*H1–H7*) and were intended to be analyzed using hierarchical regression (Table 1). Hypotheses H7: “MEQ will significantly interact with FFMQ to explain variation in PANAS, BWSS, MLQ, DASS, SWLS scores”, was not tested. This deviation from the protocol is because we tested other interaction effects instead (marked as exploratory); all hypotheses that were not pre-registered on OSF are denoted as exploratory analyses.

Table 1. Pre-registered hypothesized relationships of MEQ, FFMQ to wellbeing outcome measures. The hypothesized relationships are described as positive or negative in the context of hierarchical regression analyses. The two predictor variables are mystical experience (MEQ), and trait mindfulness (FFMQ).

Outcome Measure	Predictor Variable	
	MEQ	FFMQ
Positive Affect (PANAS)	H1a: Positive	H1b: Positive
Negative Affect (PANAS)	H2a: Negative	H2b: Negative
Wisdom (BWSS)	H3a: Positive	H3b: Positive
Life Meaning (MLQ & subscales)	H4a: Positive	H4b: Positive*
Mood Disorder (DASS & subscales)	H5a: Negative	H5b: Negative
Satisfaction (SWLS)	H6a: Positive	H6b: Positive

***Note:** Hypothesis H4b pre-registration on OSF contains a typo, the current version reported in the table is the intended correction.

Online Survey

We employed a cross-sectional survey design, which was distributed online via Qualtrics XM (Qualtrics, 2013). Participants who completed the survey were offered a raffle entry to draw one of three Amazon.com e-giftcard prizes valued at \$50.00 USD. The only inclusion criterion was English competence because all materials were presented in English only. Participants signed informed consent before beginning the study. All study procedures were approved by the Non-Medical Research Ethics Board at the University of Western Ontario.

Statistical Analyses

We used hierarchical regression to assess the effects of predictors on dependent measures of wellbeing. Linear regression assumptions were tested prior to computing the models. Homoscedasticity was evaluated by Levene's test. Models that violated homoscedasticity were corrected using White's robust standard errors method (White, 1980). Failures of normality were appealed on grounds that sufficiently large sample sizes are robust to violation of normality assumption (Schmidt & Finan, 2018). Linearity was visually evaluated using residual vs fitted plots.

We fitted three successive multiple regression models and compared them via analysis of variance (ANOVA). Model 1 was designed to control for confounding demographics variables; model 1 included age, gender, education, participant source, attention check, and COVID-19 affliction as predictor variables. This present study was conducted during the 2020 coronavirus pandemic and thus COVID-19 affliction was a relevant confound to consider. Model 2 added FFMQ as a predictor. Finally, MEQ was included in model 3. All variables were z-standardized such that regression coefficients are interpreted in units of standard deviation. Interaction

variables were tested via the addition of categorical moderation terms to the z-standardized regression model.

Groups were compared using Welch's two-tailed independent samples t-tests and corrected for multiple comparisons via Holm-Bonferroni method. Effect sizes are reported as Hedge's *g*. Statistical significance is denoted at standard $\alpha < .05$, post-corrections. All data cleaning and analyses were done in R and RStudio.

Participants

A total of 2093 participants opened the survey. However, 874 observations were removed due to blatant mischief or exiting before submitting any meaningful data. A final sample size of ($N = 1219$) was used for analyses. Participants were recruited from two distinct sources: (1) Online interest communities relevant to psychedelics and meditation such as Reddit communities, also known as subreddits ($N = 1019$). Sampled subreddits include /r/drugs, /r/meditation, /r/buddhism, /r/nootropics, /r/psychedelics, /r/lsd, /r/dmt, /r/mdma and /r/shrooms. (2) Western University's internal participant recruitment pool, largely consisting of undergraduate students ($N = 200$).

The average age of participants was 25.0 years ($SD = 8.6$). Self-reported religiosity was 24.1 out of 100 ($SD = 26.0$), and spirituality was 54.8 ($SD = 28.8$). Psychedelic users reported relatively young first age of use ($M = 19.7$, $SD = 6.1$), and highly variable total lifetime doses of psychedelic drugs ($M = 43.3$, $SD = 53.0$). Geographic distribution is shown on the world map (*Fig. 1*). Categorical variables are shown in Table 2.

Table 2. Categorical demographics variables. Percentages were calculated out of total ($N = 1219$) survey sample size. Education levels are specified by ISCED 2011 classifications. ISCED level 0 (pre-school) and level 1 (primary education) were dropped because those categories had zero participant responses.

Variable	N	%
Gender		
Male	857	71
Female	342	28
Other	16	1
Ethnicity		
White	870	72
Asian	172	14
Black	62	5
Latin American	48	4
Native American	41	3
Other	18	2
Education		
Lower secondary	34	3
Upper secondary	348	29
Post-secondary non-tertiary	207	17
Short-cycle tertiary	78	6
Bachelor's or equivalent	449	37
Master's or equivalent	71	6
Doctorate or equivalent	23	2
Religion		
No Religion (atheist, agnostic etc.)	425	35
Spiritual, not religious	413	34
Other	75	6
Catholic	93	8
Christian	80	7
Buddhist	44	4
Jewish	25	2
Hindu	29	2
Sikh	8	1
Psychedelic Use		
Yes	968	80
No	242	20

Meditation Practice

Yes	1047	87
No	162	13

Materials***Demographics***

Standard Demographics. Participants were presented with a demographic questionnaire recording the following variables: gender, ethnicity, religion, and International Standard Classification of Education 2011 (ISCED) education level. The questionnaire also included two ratings on a scale from 1-100 of self-reported religiosity and spirituality (All materials will be made available on OSF: <https://osf.io/ph6ks/files/>).

Meditation and Psychedelics. Participants were asked if they participated in meditation practices or psychedelic use. Psychedelic users were further prompted with questions about their age of first use, which drugs they use, lifetime doses, and their estimated average dose for each of the five drugs: LSD, magic mushrooms, DMT, Mescaline, and MDMA. Although MDMA is not classically a psychedelic, we included it due to its popularity and significant overlap in phenomenology and pharmacology with the classical psychedelics (Carhart-Harris et al., 2014; Holze et al., 2020). Meditators were also prompted further with questions about the age at which they first began meditating, their total experience in years, style of practice, and practice duration. However, only meditation experience is included in this report.

Coronavirus Screening. The data reported here were collected in midst of the 2020 coronavirus pandemic. Due to the possible confounds on variables such as mood and wellbeing, some basic information about COVID-19 was collected. This procedure was not pre-registered on OSF. These included: participants testing positive, family or friends testing positive, and general attitudes towards the pandemic and the public health response of their locale.

Psychometrics

Five-Facet Mindfulness Questionnaire (FFMQ). The FFMQ is a 39 item questionnaire that evaluates trait mindfulness (Baer et al., 2006). There are five subscales, each describing a distinct aspect of mindful experience: acting with awareness, observation, non-judgment, non-reaction, and descriptive ability. This questionnaire was rated on a Likert scale from 1 (*never or very rarely true*) to 5 (*very often or always true*); higher scores represent higher mindfulness. Reliability was high based on the present sample ($\alpha = 0.91$).

Mystical Experience Questionnaire (MEQ). A recently revised 30-item version of the original MEQ is used in this study (Frederick S. Barrett et al., 2015). This scale was originally developed to measure the degree of mystical experience under the influence of psychedelic drugs (R. R. Griffiths et al., 2006). This scale has a four-factor structure representing aspects of the psychedelic experience: mystical, positive mood, transcendence of time and space, and ineffability. Participants were asked to refer to the most meaningful experience in their life, psychedelic or otherwise, when rating on a Likert scale ranging from 0 (*none; not at all*) to 5 (*extreme, more than any other time in my life*); higher scores represent strong mystical experience. Reliability was high ($\alpha = 0.97$).

Depression Anxiety and Stress Scale (DASS). A shortened, 21 item version of the original DASS was used because it is suitable for evaluating non-clinical populations (Henry & Crawford, 2005). The DASS has three subscales: depression, anxiety, and stress which are rated on a Likert scale from 0 (*did not apply to me at all*) to 3 (*applied to me very much or most of the time*); lower scores represent less severity of negative mood symptoms. Participants answer the DASS scale with reference to how they have been feeling over the past week. Reliability was

adequate (DASS total $\alpha = 0.93$, depression $\alpha = 0.90$, anxiety $\alpha = 0.80$, stress $\alpha = 0.85$).

Positive and Negative Affect Schedule (PANAS). The PANAS is two combined 10-item inventories of positive and negative mood states administered together (Watson et al., 1988). Participants rated on a 1 (*very slightly or not at all*) to 5 (*extremely*) Likert scale the extent to which they felt the indicated mood state in the past week (e.g. nervous, proud, irritable). Scoring high represents more prevalence of positive or negative mood on their respective scale. Reliability was high (positive $\alpha = 0.89$, negative $\alpha = 0.90$).

Meaning in Life Questionnaire (MLQ). A brief, 10 item questionnaire that evaluates two factors of life meaning: search for meaning, and presence of meaning (Steger et al., 2006). Participants rated on a Likert scale from 1 (*absolutely untrue*) to 7 (*absolutely true*); higher scores indicate more meaning. Reliability was high (presence $\alpha = 0.88$, search $\alpha = 0.90$).

Satisfaction with Life Scale (SWLS). A 5 item scale for measuring general subjective satisfaction with one's life (Diener et al., 1985). SWLS is rated on a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*); higher scores represent higher satisfaction with life. Reliability was high ($\alpha = 0.87$).

Brief Wisdom Screening Scale (BWSS). A 20 item scale derived from aggregating items from previous wisdom scales (Glück et al., 2013). Scored on a Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores represent higher wisdom. Reliability was high ($\alpha = 0.85$).

Fig 1. Map of participant geographic distribution. Anonymous geographic coordinates were collected through Qualtrics and visualized on the world map. Each red dot indicates one unique survey participant.

Results

Pre-registered Hypotheses

We registered seven hypotheses on OSF prior to data collection (osf.io/s5b7z).

Hypotheses H1–H6 were tested; hierarchical regression was used to control for confounding variables and quantify model improvement by the stepwise addition of mindfulness and mystical experience as predictors (Table 3).

Degree of trait mindfulness explains significant variations in all wellbeing measures as predicted by our hypotheses. As expected, improvements to positive affect, negative affect, wisdom, mood disorder, and satisfaction with life are strongly predicted by FFMQ mindfulness

scores (H1b, H2b, H3b, H5b, H6b). The one exception is our hypothesis regarding meaning in life (H4b). Mindfulness predicts increased presence of meaning but contrary to our hypothesis, mindfulness predicts decreased search for meaning in life (Fig 2).

Intensity of mystical experience as measured by MEQ also significantly predicts all wellbeing measures with the exception of the DASS depression subscale (H5a). Contrary to our hypotheses, mystical experience predicts slight increases in PANAS negative affect, DASS anxiety, and DASS stress (H2a, H5a). Consistent with our hypotheses, mystical experience predicts small increases to positive affect, presence of meaning, and life satisfaction (H1a, H4a, H6a). Likewise, mystical experience predicted greater increases to wisdom and search for meaning (H3a, H4a); (Fig 2).

Table 3. Hierarchical regression model comparisons. Three linear regression models were fit and compared by ANOVA for increase of explained variance. The ANOVA statistics F , p , and ΔR^2 represent the change in explained variance as compared to the previous model. Model 1 consisted of demographic confounds only. Model 2 entered FFMQ as an additional predictor; Model 3 entered MEQ as an additional predictor. Bolded values with asterisk; ($p < .05^*$, $p < .01^{**}$, $p < .001^{***}$) indicate a significant increase in model ΔR^2 .

Variable	Model 2				Model 3			
	ΔR^2	F	DF	p	ΔR^2	F	DF	p
DASS								
Depression	.255	99.0	(4, 1073)	<.001***	.001	1.5	(4, 1072)	.217
Anxiety	.167	60.2	(4, 1073)	<.001***	.008	10.9	(4, 1072)	.001**
Stress	.235	91.3	(4, 1076)	<.001***	.004	5.8	(4, 1075)	.016*
MLQ								
Presence	.200	72.3	(4, 1082)	<.001***	.008	11.2	(4, 1081)	.001**
Search	.028	8.6	(4, 1079)	<.001***	.029	35.1	(4, 1078)	<.001***
PANAS								
Positive	.219	82.1	(4, 1079)	<.001***	.009	13.7	(4, 1078)	<.001***
Negative	.278	115.8	(4, 1077)	<.001***	.003	5.5	(4, 1076)	.02*
BWSS	.412	257.2	(4, 1085)	<.001***	.042	105.0	(4, 1084)	<.001***

SWLS .211 75.9 (4, 1093) <.001*** .007 9.4 (4, 1092) .002**

Acronyms for dependent variables: DASS–Depression anxiety and stress scale; MLQ–Meaning in life questionnaire; PANAS–Positive and Negative Affect Schedule; BWSS–Brief Wisdom Screening Scale; SWLS–Satisfaction with Life Scale.

Fig 2. Mindfulness and mystical experience predict increased wellbeing. Each outcome measure of wellbeing shows two plots of regression coefficients for scales: FFMQ and MEQ. Both dependent and independent variables are z-standardized such that the variance explained by each predictor can be compared in terms of standard deviations. Lineranges indicate 95% confidence intervals. Slopes are extracted from model 3 of the hierarchical regression; model 3 contains demographic confounds, FFMQ, and MEQ as predictor variables.

Exploratory Analyses

The following hypotheses and analyses were not pre-registered on OSF and are reported as exploratory analyses.

Fig 3. The most commonly used psychedelic drugs by user proportion. The five most common psychedelic drugs were analyzed. Proportions were calculated out of the total number of participants that report using one or more psychedelic drugs.

Psychedelic User Preferences

The proportion of psychedelic users who have tried each one of the major five psychedelics; LSD, mushrooms, MDMA, DMT, and mescaline are shown as a barplot (Fig. 3). Concerning these five substances, 13.7% of psychedelic users report having tried only one substance; 21.0% report trying exactly two; 29.1% report three; 28.0% report four; 5.8% report all five; and 28.3% report not having used any of the stated substances. Mean estimated dosages for each substance were also recorded. A 0–5 point scale of qualitative descriptors were derived to give a coarse estimation of recreational doses for different substances; 0–insignificant; 1–threshold; 2–light; 3–common; 4–heavy; 5–extreme. We derived this estimation using classifications provided from Erowid Vaults, the oldest and most comprehensive public database

of recreational drug use (*Erowid Psychoactive Vaults*, 2018). Average LSD dose was heavy ($M = 188$, $SD = 99$) μg ; mushroom dose was heavy ($M = 2.84$, $SD = 1.23$) g; MDMA dose was heavy ($M = 131$, $SD = 71$) mg; DMT dose was common ($M = 33.3$, $SD = 18.9$) mg; and mescaline dosage was light ($M = 273$, $SD = 181$). Although the current study only explicitly quantified five of the most common psychedelics, many participants reported use of other related substances. In no particular order, the following drugs were mentioned frequently by participants: cannabis, ayahuasca, ketamine, salvia divinorum, 2-CB, PCP, dextromethorphan, and a variety of grey-market psychedelic derivatives (eg. 1P-LSD, 4-AcO-DMT, NBOMEs, AL-LAD).

Interactions

Psychedelic moderated mystical experience predicts increased wellbeing. Psychedelic use was factor coded as a binary variable and entered as a moderator of mystical experience. Psychedelic moderated mystical experience predicted an increase to wisdom $\beta = 0.24$, $t = 3.25$, $p = .001$; and satisfaction with life, $\beta = 0.19$, $t = 2.28$, $p = .02$, as measured by BWSS and SWLS respectively. Psychedelic moderated mystical experience also predicts decreased negative mood effects. For the DASS scale, decreased total score was predicted by the interaction, $\beta = -0.33$, $t = -3.94$, $p < .001$. Lower negative affect on PANAS was similarly predicted, $\beta = -0.31$, $t = -3.72$, $p < .001$.

Psychedelic moderated mystical experience was also tested on PANAS positive subscale, and both MLQ subscales: presence and search for meaning. No significant interactions were found.

Psychedelic interacts with mindfulness to predict positive affect. Psychedelic use was also tested for interactions with mindfulness as measured by FFMQ. Wisdom, DASS total,

PANAS negative subscale, SWLS, and both MLQ subscales were tested but yielded no significant interactions. However, psychedelic moderated mindfulness predicts increased positive affect, $\beta = 0.16$, $t = 2.29$, $p = .02$, as measured by PANAS positive subscale.

Meditation practice does not interact with mindfulness to predict wellbeing.

Meditation practice was also factor coded and tested as a potential interaction variable.

Participants who reported less than one year of meditation experience were coded as naive; those with over one year of meditation practice were coded as meditators. Both FFMQ and MEQ were tested for interaction effects in predicting the wellbeing outcome variables. No significant interactions were observed.

Comparing experienced against naive participants for psychedelic use and meditation.

Two comparisons were run on both mindfulness and mystical experience total scores. The first comparison contrasted psychedelic users against psychedelic naive participants. The second comparison contrasted meditators, against non-meditators. Meditators were coded as having more than one year of consistent meditation practice; non-meditators coded as less than one year of practice. The proportion of experienced psychedelic and meditation participants far outweighed—by about five to one—the sample of naive participants for either condition. To compensate, the group of psychedelic users and meditators were subsampled to the smaller, naive sample size ($n_{(1,2) \text{ psychedelics}} = 242, 242$; $n_{(1,2) \text{ meditators}} = 162, 162$). In every case, experienced participants in psychedelics and meditation scored higher on mindfulness and mystical experience (*Fig. 4*). Mindfulness showed medium effect sizes; mystical experience showed large effect size differences.

Figure 4. Comparisons of psychedelic use and meditation practice. Mean differences in FFMQ and MEQ scores were compared by binary conditions: psychedelic use, and meditation practice. Pointranges show mean and standard deviation. Violin plots show distribution of participant scores for each condition. **(A)** Psychedelic users have higher FFMQ scores ($M = 3.42$, $SD = 0.54$) than psychedelic naive participants ($M = 3.14$, $SD = 0.46$), $t(472) = 6.1$, $p < .001$, Hedge's $g = 0.55$. **(B)** Psychedelic users have higher MEQ scores ($M = 3.93$, $SD = 0.85$) than non psychedelic users ($M = 2.29$, $SD = 1.00$), $t(452) = 19.1$, $p < .001$, $g = 1.77$. **(C)** Meditators score higher on FFMQ ($M = 3.50$, $SD = 0.53$) than non-meditators ($M = 3.18$, $SD = 0.44$), $t(313) = 5.88$, $p < .001$, $g = 0.41$. **(D)** Meditators score higher on MEQ ($M = 3.76$, $SD = 0.93$) than non-meditators ($M = 2.80$, $SD = 1.12$), $t(298) = 8.19$, $p < .001$, $g = 1.68$.

Discussion

Our results show that higher mindfulness is positively associated with a broad conception of wellbeing. Relative to mindfulness, intensity of mystical experience generally predicts the wellbeing outcomes in the same direction though to a lesser degree, even after controlling for demographic variables. The exception is that mystical experience predicts increased negative mood disorder and negative affect, though these predictions are reversed upon the introduction of psychedelic use as a moderator.

Mindfulness Predicts Global Wellbeing.

Curiously, higher mindfulness predicts increased presence of meaning, yet less searching for meaning. These seemingly discordant results become coherent in the context of Mindfulness-to-Meaning theory, which asserts that deliberate training of attentional mechanisms reappraises experience in a way that is conducive to increased meaning. (Garland et al., 2009; Garland et al., 2017). Indeed, our MLQ results lend support to MMT but the question remains, why does higher mindfulness predict a marked decrease in search for meaning? One aspect of MMT emphasizes the presence of spirituality as an explanatory component of meaning (Garland et al., 2015). The phenomenological state known as nondual awareness is posited to be responsible. Nondual awareness is sometimes characterized by the cessation of seeking, grasping, and self-referential processes; though a precise conception of nondual awareness remains elusive and beyond the scope of this study (Josipovic, 2014). Regardless, individuals with higher mindfulness may experience nondual states with regularity. In a sense, they may have already found what they're looking for; no longer feeling the need to search or locate meaning.

Other than meaning, higher mindfulness predicts global wellbeing such as satisfaction with life, a very coarse-grained approximation of overall wellbeing (Bester et al., 2016; Diener et al., 1985). Furthermore, these results suggest improved affect and decreased mood disorder symptoms, which replicate many previous findings (Garland et al., 2017; Goyal et al., 2014; Gu et al., 2015; Raglan, 2014). The current study is one of the few studies to quantify a positive relationship between mindfulness and wisdom, corroborating one lone study in this area (Verhaeghen, 2020).

Psychedelics, Mystical Experience, and Wellbeing

Consistent with our hypotheses, psychedelics predict increased positive affect, satisfaction with life, and presence of meaning. Mystical experience has two particularly strong associations with wisdom and search for meaning. One interpretation is that many individuals report psychedelics as the means by which they first encounter mystical-type experiences, which often initiates a search for meaning (Bøhling, 2017; Griffiths et al., 2006; Hartogsohn, 2018). Alternatively, people may be turning to psychedelics as a tool for finding answers and meaning in life (Haijen et al., 2018). In regard to mystical experience and wisdom, no previous work has explicitly linked the two. Our results suggest a positive relationship between mystical experience and wisdom, which aligns with peripherally relevant research of microdosing psychedelics. People who microdose psychedelics score higher on wisdom as measured by BWSS, compared to people who do not microdose. (Anderson et al., 2019).

Contrary to our hypotheses and previous evidence, mystical experience predicts increased negative affect, anxiety, and stress (Aday et al., 2020; Griffiths et al., 2008). It is important to denote, while psychedelics can induce mystical experience, they are not the only method by

which people happen upon mystical experiences. These results suggest mystical experiences per se are associated with higher negative affect and mood disorder symptoms. Remarkably, the addition of psychedelic use as an interaction term inverts the association between mystical experience and negative mood. The interaction suggests that mystical experience—as specifically elicited by psychedelics—predicts improved mood, which is consistent with previous findings (Aday et al., 2020; Haijen et al., 2018; Jungaberle et al., 2018). However, non-psychedelic related mystical experiences predict decreased mood, a novel finding.

Notably, psychedelic users score higher on mystical experience and mindfulness than naive participants; the same is true of meditators. Unsurprisingly, psychedelic users have stronger mystical experiences; meditators are more mindful compared to naive participants on both fronts. But experienced meditators also have stronger mystical experiences than novice meditators and psychedelic users are also more mindful than naive participants. It is important to note that the sample had highly overlapping meditators and psychedelic users (58% of participants report both meditation and psychedelic use), which may explain these differences relative to naive participants. Regardless, both psychedelic users and meditators appear distinct from the ordinary population, exhibiting moderately higher mindfulness and substantially higher mystical experience.

Strengths and Limitations

The primary strength of the current study is putting together the pieces of mindfulness and psychedelic moderated mystical experience to explicitly predict a broad array of wellbeing measures. Our study is unique in looking at both of these possible predictors (psychedelic use and mindfulness meditation practice). Previous work tends to only include unidimensional measures of wellbeing. In addition, the non-clinical nature of our sample reveals how many

people behave and engage in psychedelics or contemplative practices outside of a highly-controlled laboratory setting.

That said, the primary limitation of our study is that it is cross-sectional and correlational. These results merely show strong associations between mindfulness, mystical experience, and wellbeing, one would be cautioned to draw causal inferences from these data. In addition, the sample was taken from two populations; online interest forums, and an internal recruitment pool. Although participant source was controlled for in the main analyses, the asymmetrical split in sample source may introduce unexpected confounds. The online-recruited subsample represents a broad variance of demographics and geography, whereas the internally recruited sample largely consists of a WEIRD (white, educated, industrialized, rich and democratic) undergraduate students localized around a medium-sized Canadian city. These subsample differences limit the generalizability of results to the broader population. Finally, the data was collected during the COVID-19 pandemic. While we made efforts to control for possible confounds in our analyses, there are surely many complex but relevant variables we may not have considered.

Conclusion

The present study sought to establish potential relationships between mindfulness, psychedelic experiences, and general wellbeing in non-clinical populations. The primary findings were that mindfulness robustly predicts a broad range of wellbeing measures, with one exception regarding the search for meaning. Mystical experience per se explains wellbeing facets notwithstanding affect and mood disorder measures. However, these relationships concerning affect and mood disorder were inverted by the addition of psychedelic use as a moderator of mystical experience.

The present study suggests that mindfulness and psychedelic moderated mystical experiences have strong positive associations with multifaceted measures of wellbeing. These data show promise of naturalistic or recreational use of psychedelics as means to improve personal wellbeing.

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