



AKADÉMIAI KIADÓ

# Lifetime classic psychedelic use is associated with greater psychological distress in unemployed job seekers

Journal of Psychedelic Studies

7 (2023) 2, 90–99

DOI:

10.1556/2054.2023.00246

© 2023 The Author(s)

BENJAMIN A. KORMAN<sup>1,2\*</sup> 

<sup>1</sup> Cluster of Excellence “Politics of Inequality”, University of Konstanz, Konstanz, Germany

<sup>2</sup> Chair of Organizational Behavior, University of Konstanz, Konstanz, Germany

Received: November 16, 2022 • Revised manuscript received: February 24, 2023 • Accepted: April 18, 2023

Published online: May 16, 2023

## ORIGINAL RESEARCH PAPER



### ABSTRACT

**Background:** Despite recent research linking lifetime classic psychedelic use to positive mental health outcomes, little work has explored the role played by classic psychedelics in healthy users' ability to cope with ordinary, yet stressful, life situations. **Aims:** This study begins to fill this gap by exploring whether lifetime classic psychedelic use is associated with attenuated or exacerbated psychological distress in unemployed job seekers. **Methods:** Drawing on openly-available data from the National Survey on Drug Use and Health (2013–2019) on 208,136 adults in the United States, this study tests whether lifetime classic psychedelic use interacts with employment status to predict differences in respondents' psychological distress experienced in the last 30 days. **Results:** After adjusting for sociodemographics, health factors, and other substance use, unemployed job seekers with lifetime classic psychedelic use are found to report greater psychological distress relative to unemployed job seekers without lifetime psychedelic use. No differences in psychological distress based on lifetime classic psychedelic use were found in employed individuals. **Conclusion:** This study suggests that lifetime classic psychedelic use (of indoleamines specifically) may exacerbate stressful phases of life and provides context to previous studies linking lifetime classic psychedelic use to predominantly positive mental health outcomes in healthy populations. **Declaration of interest/funding:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. Furthermore, the author declares that there is no conflict of interest.

### KEYWORDS

psychedelics, indoleamines, employment, unemployment, psychological distress

## INTRODUCTION

Numerous empirical studies have demonstrated that classic psychedelics, including lysergic acid diethylamide (LSD), psilocybin (magic mushrooms), and mescaline (peyote), are safe and of high therapeutic use for treating mental health disorders such as depression and anxiety (for reviews see [Aday, Mitzkovitz, Bloesch, Davoli, & Davis, 2020](#); [Carhart-Harris & Goodwin, 2017](#); [Chi & Gold, 2020](#); [Else, 2017](#)). These serotonin receptor agonists, which can alter individuals' perceptions, moods, and cognitive processes ([Nichols, 2016](#)), are believed to help individuals process difficult feelings like anxiety and distress by increasing their feelings of connectiveness with the world and others ([Lutkajtis, 2021](#); [Studerus, Kometer, Hasler, & Vollenweider, 2010](#)) and decreasing their fear of death ([Gasser, Kirchner, & Passie, 2015](#); [Sweeney et al., 2022](#)). Although clinical studies into the effects of these psychoactive substances are still quite new, they have been used for healing purposes for millennia ([Strassman, 1995](#)). Support for the positive effects of classic psychedelic use on mental health comes also from studies on healthy population samples that have shown lifetime classic psychedelic use (i.e., any prior use of a classic psychedelic) to be associated with lower odds of mental health

\*Corresponding author. Tel.: +49 7531 88 5480;  
E-mail: [benjamin.korman@uni-konstanz.de](mailto:benjamin.korman@uni-konstanz.de)



problems (e.g., psychological distress, suicidality; Hendricks, Thorne, Clark, Coombs, & Johnson, 2015; Jones & Nock, 2022; Krebs & Johansen, 2013).

Although their findings are reassuring, these studies did not consider whether lifetime classic psychedelic use attenuates negative feelings (e.g., psychological distress) during stressful or uncertain phases of life, such as when one is unemployed and looking for work. That being said, recent studies conducted during the global COVID-19 pandemic offer insight into how lifetime classic psychedelic use might shape individuals' responses to stressful life phases. An Argentinian study conducted in the midst of the pandemic suggested that lifetime psychedelic use is associated with "enhanced resilience and well-being in the light of challenging situations" (Cavanna et al., 2021; p. 91). Another study conducted during this time (primarily in Spain and Brazil) showed that regular psychedelic use was associated with less psychological distress and less peritraumatic stress, causing the authors to note that, when it comes to stressful events like a global pandemic, "psychedelics might be a protective factor" (Révész et al., 2021; p. 2). Although both of these aforementioned studies focused on the uniquely stressful conditions offered by a global pandemic (e.g., lockdowns, social isolation, and fear of infection or even death), their findings would suggest that use of classic psychedelics can attenuate the stress experienced during difficult life phases, such as during unwanted periods of unemployment.

Unemployment for job seekers has been described as "a discouraging process, replete with rejections and uncertainty" (McKee-Ryan, Song, Wanberg, & Kinicki, 2005, p. 58) and portrayed as such in numerous narrative reviews about job loss (e.g., Hanisch, 1999; Winefield, 1995). Employment is considered valuable not only for the financial security it offers but also because it offers individuals structure to their day, opportunities to socialize and engage in activities with others, and provides individuals social status and a sense of purpose (Jahoda, 1982). It is therefore no surprise that unemployed individuals generally report lower mental health, physical health, and life satisfaction than their employed peers (for a meta-analysis see McKee-Ryan et al., 2005). According to recent data from the U.S. Bureau of Labor Statistics, younger baby boomers (i.e., those born between 1957 and 1964) were unemployed but seeking work for an average of 5% of their time between the ages of 18 and 54, equal to roughly 94 weeks of unemployment in total (U.S. Department of Labor, 2021). Due to the burden that unemployment can have on job seekers (and the economy) over one's lifetime, it would be useful to know whether lifetime classic psychedelic use can offer relief to those in this uncertain and stressful phase of life.

The unique impact that lifetime classic psychedelic use can have on unemployed job seekers is important given that a) classic psychedelics are becoming increasingly popular (Killion et al., 2021; Walsh, Livne, Shmulewitz, Stohl, & Hasin, 2022) and b) a global recession is predicted to occur within the coming years (Guénette, Kose, & Sugawara, 2022). Furthermore, recent work by Jones and Nock (2022)

has highlighted the importance of investigating moderators of the link between lifetime classic psychedelic use and psychological distress. The authors report that lifetime psilocybin use does not provide the same buffer against serious psychological distress for racial and ethnic minority groups as it does to White individuals, inviting further research into the role played by status and identity in predicting outcomes of classic psychedelic use. Employment can be indicative of one's status and serve as an important part of one's identity (Brand, 2015), making it a moderating variable worth considering. Moreover, employment and unemployment represent life phases that most individuals will cycle through numerous times in their lives, thereby giving one's employment status the potential to be a uniquely impactful moderator.

## MATERIALS AND METHODS

### Data and population

Data on the general United States civilian non-institutionalized population openly available from the National Survey on Drug Use and Health (U.S. Department of Health and Human Services, 2020) was used in this study. Survey respondents were randomly selected from across all 50 U.S. states and awarded \$30 for their participation. Detailed information on the sampling and data collection methods implemented by the NSDUH can be found on their website (<https://nsduhweb.rti.org/>). The study sample was limited to respondents aged 18 or older, who were either employed or unemployed and seeking employment, and had participated in the survey in the years from 2013 to 2019. The study sample was limited to the survey years from 2013 to 2019 as these were the survey years in which all study variables were available. Complete data were available for 208,136 individuals (50% female), the majority of whom were White (62%) with at least some college experience (64%).

### Independent variable

The independent variable was lifetime classic psychedelic use. Similar to previous work (Johansen & Krebs, 2015; Krebs & Johansen, 2013), respondents' lifetime classic psychedelic use was coded based on whether they reported ever having used LSD (variable LSDFLAG; 0 = never used, 1 = ever used), psilocybin (variable PSILCY2; 0 = never used, 1 = ever used), mescaline (variable MESC2; 0 = never used, 1 = ever used), or peyote (variable PEYOTE2; 0 = never used, 1 = ever used). Peyote was included as it contains the active ingredient mescaline (Nichols, 2016). In the study sample, 32,745 respondents (i.e., roughly 16%) reported lifetime classic psychedelic use.

### Moderating variable

The moderating variable was employment status, specifically whether the respondent was unemployed and seeking work or employed either part-time or full-time. Respondents were



coded with 0 if they reported being unemployed (variable EMPSTATY for 2013–2014 and IRWRKSTAT for 2015–2019) and looking for work in the past week (variable JBSTATR2 for 2013–2014 and WRKSTATWK2 for 2015–2019). Alternatively, respondents were coded 1 if they reported having part-time or full-time work. In the study sample, 14,830 respondents (i.e., 7%) had employment status coded with 0 whereas 193,306 had employment status coded with 1.

### Dependent variable

The dependent variable was psychological distress experienced in the last 30 days as measured by the 6-item Kessler Psychological Distress Scale (variable K6SCMON; Kessler et al., 2002). Respondents indicated to what extent they felt the following in the last 30 days: 1) Nervous, 2) hopeless, 3) restless or fidgety, 4) sad or depressed that nothing could cheer you up, 5) that everything was an effort, and 6) down on yourself, no good, or worthless. Respondents indicated their score for each item on a scale from 0 (“none of the time”) to 4 (“all of the time”) and these individual item scores were summed to calculate the total scale score. In the study sample, psychological distress had an average value of 4.49 ( $SD = 4.64$ ).

### Covariates

The covariates were age in years (variable AGE2 recoded; 18–25, 26–34, 35–49, 50–64, 65 or older), sex (variable IRSEX; 1 = male, 2 = female), ethnoracial identity (variable NEWRA2; 1 = non-Hispanic White, 2 = non-Hispanic African American, 3 = non-Hispanic Native American/Alaska Native, 4 = non-Hispanic Native Hawaiian/Pacific Islander, 5 = non-Hispanic Asian, 6 = non-Hispanic more than one race, 7 = Hispanic), educational attainment (variable EDUCCAT2 for 2013–2014 and EDUHIGHCAT for 2015–2019; 1 = less than high school, 2 = high school graduate, 3 = some college or Associate’s degree, 4 = college graduate), marital status (variable IRMARIT for 2013–2014, 2016–2019 and IRMARITSTAT for 2015; 1 = married, 2 = widowed, 3 = divorced or separated, 4 = never been married), annual household income (variable IRPINC3; 1 = less than \$20,000, 2 = \$20,000–49,999, 3 = \$50,000–74,999, 4 = \$75,000 or more), overall health (variable HEALTH recoded; 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent), body mass index (BMI) (variable BMI2), health insurance (variable IRINSUR4; 1 = yes, 2 = no); lifetime depressive episode (variable AMDELT; 1 = yes, 2 = no), self-reported engagement in risky behavior (variable RKFQRSKY for 2013–2014 and RSKYFQTES for 2015–2019; 1 = never, 2 = seldom, 3 = sometimes, 4 = always), lifetime marijuana use (variable MRJFLAG; 0 = never used, 1 = ever used), lifetime cocaine use (variable COCFLAG; 0 = never used, 1 = ever used), lifetime other stimulant use (variable STMFLAG for 2013–2014 and STMANYFLAG for 2015–2019; 0 = never used, 1 = ever used), lifetime sedative use (variable SEDFLAG for 2013–2014 and SEDANYFLAG for 2015–2019; 0 = never used, 1 = ever used), lifetime

tranquilizer use (variable TRQFLAG for 2013–2014 and TRQANYFLAG for 2015–2019; 0 = never used, 1 = ever used), lifetime heroin use (variable HERFLAG; 0 = never used, 1 = ever used), lifetime phencyclidine (PCP) use (variable PCPFLAG; 0 = never used, 1 = ever used), lifetime 3,4-methylenedioxyamphetamine (MDMA/ecstasy) use (variable ECSFLAG for 2013–2014 and ECSTMOFLAG for 2015–2019; 0 = never used, 1 = ever used), and lifetime inhalant use (variable INHFLAG for 2013–2014 and INHALFLAG for 2015–2019; 0 = never used, 1 = ever used). All covariates were coded separately. The inclusion of these covariates broadly mirrors those used in prior investigations of lifetime classic psychedelic use in the United States population (Johansen & Krebs, 2015; Krebs & Johansen, 2013; Simonsson, Sexton, & Hendricks, 2021) with the exception of the following health-related variables: Overall health, BMI, health insurance, and lifetime depressive episode. These additional health-related covariates were included as they have previously been shown to predict psychological distress (Brandheim, Rantakeisu, & Starrin, 2013; Cappeliez, Sève-Rousseau, Landreville, & Prévaille, 2004; Shih & Eberhart, 2008; Tessler & Mechanic, 1978; Ward & Martinez, 2014; Weissman, Pratt, Miller, & Parker, 2015).

Variables with the prefix ‘IR’ were revised by the NSDUH for missing values using imputation. The NSDUH uses various constraints when imputing missing values so that they remain consistent with non-missing values when used together in multivariate statistical analyses. Additional information regarding the imputation procedure used by the NSDUH is available in the ‘Statistical Imputation’ section of each annual NSDUH codebook.

### Statistical analyses

Respondents with missing data were excluded from the analyses (listwise deletion) as is common practice when using NSDUH datasets to investigate lifetime classic psychedelic use (Johansen & Krebs, 2015; Simonsson et al., 2021). Furthermore, the variance inflation factors for all predictor variables used in the following analyses were under 2.5, indicating that multi-collinearity was not an issue. Stata/SE 16.1 was used for all analyses (StataCorp, 2019).

A Shapiro–Wilk test for normality of psychological distress was conducted to determine whether psychological stress is normally distributed ( $W = 0.92$ ,  $V = 4,107$ ,  $p < 0.001$ ). Psychological distress was found to be right skewed and negative binomial regression was implemented in these analyses to deal with this non-normality in the data. Although a Poisson model was a possible alternative, the negative binomial model (AIC = 1,084,816, BIC = 1,084,836) was selected as it fit the data better than the Poisson model (AIC = 1,516,920, BIC = 1,516,930). Furthermore, due to the unbalanced group sizes regarding lifetime classic psychedelic use (12,570 never used and were unemployed job seekers; 2,260 ever used and were unemployed job seekers; 162,821 never used and were employed; 30,485 ever used and were employed), group frequencies were taken into account when estimating the mean psychological distress for each group as



well as differences between these groups (this was done using Stata's 'asobserved' option).

## RESULTS

### Main analysis

Without accounting for covariates, lifetime psychedelic use significantly interacted with employment status to predict psychological distress experienced in the past 30 days (see Table 1: Model 1). After estimating the average psychological distress in each group (see Table 2: Model 1) and implementing planned contrasts (see Table 3: Model 1), unemployed job-seeking respondents were found to report greater psychological distress than employed respondents, regardless of their lifetime classic psychedelic use. Surprisingly, unemployed job seekers who had used classic psychedelics in their lifetime reported higher psychological

Table 2. Means and standard deviations across conditions

	Model 1		Model 2		Model 3	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Never used and unemployed	5.67	0.05	5.16	0.05	5.06	0.04
Never used and employed	4.18	0.01	4.45	0.01	4.49	0.01
Ever used and unemployed	8.11	0.18	5.63	0.12	5.29	0.10
Ever used and employed	5.42	0.03	4.43	0.03	4.43	0.03

*M*: mean; *SD*: standard deviation; (N)ever used refers to lifetime use of psilocybin, LSD, and/or mescaline/peyote; (un)employed refers to whether respondents were employed or unemployed job seekers; *N* = 208,136 for all analyses.

distress than unemployed job seekers who had not (see Table 3: Model 1: Row B). Employed respondents who had used classic psychedelics in their lifetime also reported

Table 1. Regression results predicting psychological distress

Variables	Model 1			Model 2			Model 3		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Age				-0.19	0.00	<0.001	-0.19	0.00	<0.001
Sex				0.23	0.01	<0.001	0.17	0.00	<0.001
Ethnoracial Identity									
African American				-0.02	0.01	0.010	0.03	0.01	<0.001
Native American/Alaska Native				-0.05	0.02	0.016	-0.05	0.02	0.016
Native Hawaiian/Pacific Islander				0.08	0.03	0.017	0.11	0.03	<0.001
Asian				0.13	0.01	<0.001	0.13	0.01	<0.001
More than one race				0.06	0.01	<0.001	0.02	0.01	0.138
Hispanic				-0.10	0.01	<0.001	-0.09	0.01	<0.001
Education				-0.01	0.00	<0.001	0.01	0.00	0.107
Marital Status									
Widowed				0.14	0.02	<0.001	0.10	0.02	<0.001
Divorced or separated				0.15	0.01	<0.001	0.09	0.01	<0.001
Never been married				0.14	0.01	<0.001	0.11	0.01	<0.001
Annual household income				-0.07	0.00	<0.001	-0.04	0.00	<0.001
Overall health							-0.17	0.00	<0.001
BMI							-0.01	0.00	<0.001
Health insurance							0.01	0.01	0.232
Lifetime depressive episode							-0.70	0.01	<0.001
Risky behavior				0.17	0.00	<0.001	0.15	0.00	<0.001
Lifetime classic psychedelic use	0.36	0.02	<0.001	0.09	0.02	<0.001	0.05	0.02	0.037
Employment	-0.31	0.01	<0.001	-0.15	0.01	<0.001	-0.12	0.01	<0.001
Lifetime classic psychedelic use × Employment	-0.10	0.03	<0.001	-0.09	0.02	<0.001	-0.06	0.02	0.005
Marijuana				0.14	0.01	<0.001	0.09	0.01	<0.001
Cocaine				-0.02	0.01	0.002	-0.01	0.01	0.237
Other stimulants				0.12	0.01	<0.001	0.09	0.01	<0.001
Sedatives				0.21	0.01	<0.001	0.12	0.01	<0.001
Tranquilizers				0.27	0.01	<0.001	0.18	0.01	<0.001
Heroin				0.07	0.02	<0.001	0.05	0.02	0.001
PCP				0.06	0.02	0.001	0.04	0.02	0.009
MDMA/Ecstasy				-0.02	0.01	0.038	-0.01	0.01	0.714
Inhalants				0.16	0.01	<0.001	0.11	0.01	<0.001
Constant	1.74	0.01	<0.001	1.53	0.02	<0.001	3.49	0.03	<0.001

*B*: beta coefficient; *SE*: standard error; classic psychedelic use refers to lifetime use of psilocybin, LSD, and/or mescaline/peyote; the comparison group for ethnoracial identity is White; the comparison group for marital status is married; *N* = 208,136 for all analyses.

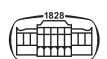


Table 3. Pairwise comparisons between conditions

Pairwise comparisons	Model 1				Model 2				Model 3			
	B	SE	LCI	UCI	B	SE	LCI	UCI	B	SE	LCI	UCI
A) Never used and employed vs. Never used and unemployed	−1.49	0.06	−1.60	−1.38	−0.72	0.05	−0.81	−0.62	−0.56	0.04	−0.65	−0.48
B) Ever used and unemployed vs. Never used and unemployed	2.44	0.19	2.07	2.81	0.46	0.13	0.21	0.72	0.23	0.11	0.01	0.46
C) Ever used and employed vs. Never used and unemployed	−0.25	0.06	−0.37	−0.12	−0.73	0.06	−0.85	−0.62	−0.63	0.06	−0.74	−0.52
D) Ever used and unemployed vs. Never used and employed	3.93	0.18	3.58	4.29	1.18	0.12	0.95	1.42	0.80	0.11	0.59	1.01
E) Ever used and employed vs. Never used and employed	1.25	0.04	1.18	1.32	−0.02	0.04	−0.09	0.06	−0.07	0.04	−0.14	0.00
F) Ever used and employed vs. Ever used and unemployed	−2.68	0.18	−3.04	−2.32	−1.20	0.12	−1.43	−0.97	−0.87	0.10	−1.07	−0.66

B: beta coefficient; SE: standard error; LCI: lower 95% confidence interval; UCI: upper 95% confidence interval; (N)ever used refers to lifetime use of psilocybin, LSD, and/or mescaline/peyote; (un)employed refers to whether respondents were employed or unemployed job seekers;  $N = 208,136$  for all analyses.

higher psychological distress than employed respondents who had not (see Table 3: Model 1: Row E).

### Robustness analyses

To check the robustness of the findings, two additional statistical models (Models 2 & 3) which incorporated an array of covariates commonly used in studies on lifetime classic psychedelic use using NSDUH data (e.g., Johansen & Krebs, 2015; Mellner, Dahlen, & Simonsson, 2022) were tested. While Model 2 was limited predominantly to socio-demographic variables and prior illicit substance use history, Model 3 included various physical and mental health variables (i.e., overall health, BMI, health insurance, and lifetime depressive episode) previously shown to relate to psychological distress. In both Model 2 and Model 3, a significant interaction effect of lifetime classic psychedelic use and employment status was found to predict respondents' psychological distress experienced in the past 30 days (see Table 1: Models 2 & 3). Pairwise comparisons again showed that unemployed job seekers with lifetime classic psychedelic use reported on average greater psychological distress in the last 30 days than unemployed job seekers who did not (see Table 3: Models 2 & 3: Row B), however no difference in psychological distress was found between employed individuals based on their lifetime classic psychedelic use (see Table 3: Models 2 & 3: Row E).

### Supplemental analyses

In order to determine whether the differences observed in unemployed job seekers depend on the class of classic psychedelics users had lifetime experience with, supplemental analyses based on the aforementioned robustness analyses (specifically Model 3) were conducted to investigate

the effects of indoleamine use (i.e., LSD and psilocybin) separate from phenylalkylamine use (i.e., mescaline/peyote). Whereas indoleamines are considered non-selective serotonin receptor agonists, phenylalkylamines are selective serotonin receptor agonists (Halberstadt & Geyer, 2011). In the sample, 31,976 (i.e., 15%) reported lifetime indoleamine use and 6,329 (i.e., 3%) reported lifetime phenylalkylamine use.

While lifetime indoleamine use significantly interacted with employment status to predict psychological distress experienced in the past 30 days, lifetime phenylalkylamine use did not (see Table 4 for details). Furthermore, unemployed respondents with lifetime indoleamine use reported higher psychological distress on average than unemployed respondents without it (see Table 5: Indoleamine Model). The difference between these two groups of unemployed job seekers was statistically significant (see Table 6: Row B), demonstrating that lifetime indoleamine use was responsible for the effects found in the main analysis.

In sum, and contrary to expectations, the results of this study suggest that lifetime classic psychedelic use (specifically lifetime indoleamine use) is associated with increased psychological distress in unemployed job seekers; a conservative estimate being that these unemployed job seekers experience roughly 10% more symptoms than unemployed job seekers without lifetime classic psychedelic use.

## DISCUSSION

Although research on classic psychedelics is undergoing a revival (Sessa, 2018), little is known regarding how classic psychedelic use is associated with healthy users' outcomes



Table 4. Regression results predicting psychological distress (supplemental analyses)

Variables	Indoleamine Model			Phenylalkylamine Model		
	B	SE	p	B	SE	p
Age	−0.19	0.00	<0.001	−0.19	0.00	<0.001
Sex	0.17	0.00	<0.001	0.17	0.00	<0.001
Ethnoracial Identity						
African American	0.03	0.01	<0.001	0.03	0.01	<0.001
Native American/Alaska Native	−0.05	0.02	0.015	−0.04	0.02	0.021
Native Hawaiian/Pacific Islander	0.11	0.03	<0.001	0.11	0.03	<0.001
Asian	0.13	0.01	<0.001	0.13	0.01	<0.001
More than one race	0.02	0.01	0.139	0.02	0.01	0.131
Hispanic	−0.09	0.01	<0.001	−0.09	0.01	<0.001
Education	0.01	0.00	0.107	0.01	0.00	0.105
Marital Status						
Widowed	0.10	0.02	<0.001	0.10	0.02	<0.001
Divorced or separated	0.09	0.01	<0.001	0.09	0.01	<0.001
Never been married	0.11	0.01	<0.001	0.11	0.01	<0.001
Annual household income	−0.04	0.00	<0.001	−0.04	0.00	<0.001
Overall health	−0.17	0.00	<0.001	−0.17	0.00	<0.001
BMI	−0.01	0.00	<0.001	−0.01	0.00	<0.001
Health insurance	0.01	0.01	0.233	0.01	0.01	0.233
Lifetime depressive episode	−0.70	0.01	<0.001	−0.70	0.01	<0.001
Risky behavior	0.15	0.00	<0.001	0.15	0.00	<0.001
Lifetime classic psychedelic use	0.05	0.02	0.028	0.03	0.05	0.520
Employment	−0.12	0.01	<0.001	−0.13	0.01	<0.001
Lifetime classic psychedelic use × Employment	−0.06	0.02	0.005	−0.07	0.05	0.165
Marijuana	0.09	0.01	<0.001	0.09	0.01	<0.001
Cocaine	−0.01	0.01	0.220	−0.01	0.01	0.163
Other stimulants	0.09	0.01	<0.001	0.09	0.01	<0.001
Sedatives	0.12	0.01	<0.001	0.12	0.01	<0.001
Tranquilizers	0.18	0.01	<0.001	0.18	0.01	<0.001
Heroine	0.05	0.02	0.001	0.06	0.02	<0.001
PCP	0.04	0.02	0.010	0.05	0.02	0.003
MDMA/Ecstasy	−0.01	0.01	0.683	−0.01	0.01	0.487
Inhalants	0.11	0.01	<0.001	0.11	0.01	<0.001
Constant	3.49	0.03	<0.001	3.49	0.03	<0.001

B: beta coefficient; SE: standard error; classic psychedelic use refers to lifetime use of indoleamines (LSD or psilocybin) or phenylalkylamines (mescaline or peyote); the comparison group for ethnoracial identity is White; the comparison group for marital status is married;  $N = 208,136$  for all analyses.

Table 5. Means and standard deviations across conditions (supplemental analyses)

	Indoleamine Model		Phenylalkylamine Model	
	M	SD	M	SD
Never used and unemployed	5.06	0.04	5.09	0.04
Never used and employed	4.49	0.01	4.49	0.01
Ever used and unemployed	5.31	0.11	5.24	0.24
Ever used and employed	4.43	0.03	4.33	0.06

M: mean; SD: standard deviation; (N)ever used refers to lifetime use of indoleamines (LSD or psilocybin) or phenylalkylamines (mescaline or peyote); (un)employed refers to whether respondents were employed or unemployed job seekers;  $N = 208,136$  for all analyses.

during difficult phases of life. This is surprising given that several studies have demonstrated favorable associations between lifetime classic psychedelic use and mental health

outcomes in general (e.g., Hendricks et al., 2015; Jones & Nock, 2022; Krebs & Johansen, 2013). By exploring differences in psychological distress between employed individuals and unemployed job seekers based on their lifetime classic psychedelic use, this study provides a first look into what the current trends in classic psychedelic use can mean for the mental health of the unemployed but job seeking population. The study's findings suggest that lifetime use of classic psychedelics, specifically indoleamines, is positively associated with the psychological distress of unemployment for job seekers, without affecting the psychological distress of employed individuals.

One reason why classic psychedelics may alter an individual's response to stressful or uncertain life phases (e.g., unemployment) is because these psychoactive substances have been found to have long-term effects on mindfulness (Madsen et al., 2020; McCulloch et al., 2021). Defined as "receptive attention to and awareness of present events and

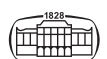


Table 6. Pairwise comparisons between conditions (supplemental analyses)

Pairwise comparisons	Indoleamine Model				Phenylalkylamine Model			
	B	SE	LCI	UCI	B	SE	LCI	UCI
A) Never used and employed vs. Never used and unemployed	−0.56	0.04	−0.65	−0.48	−0.60	0.04	−0.69	−0.52
B) Ever used and unemployed vs. Never used and unemployed	0.25	0.12	0.02	0.48	0.15	0.24	−0.32	0.62
C) Ever used and employed vs. Never used and unemployed	−0.63	0.06	−0.74	−0.52	−0.76	0.07	−0.90	−0.62
D) Ever used and unemployed vs. Never used and employed	0.81	0.11	0.60	1.02	0.76	0.24	0.29	1.21
E) Ever used and employed vs. Never used and employed	−0.06	0.04	−0.13	0.01	−0.16	0.06	−0.28	−0.04
F) Ever used and employed vs. Ever used and unemployed	−0.88	0.11	−1.09	−0.67	−0.91	0.24	−1.39	−0.44

B: beta coefficient; SE: standard error; LCI: lower 95% confidence interval; UCI: upper 95% confidence interval; (N)ever used refers to lifetime use of indoleamines (LSD or psilocybin) or phenylalkylamines (mescaline or peyote); (un)employed refers to whether respondents were employed or unemployed job seekers;  $N = 208,136$  for all analyses.

experience” (Brown, Ryan, & Creswell, 2007; p. 212), mindfulness is linked to an increased “capacity for objectivity about one’s own internal experience” (Shapiro, Carlson, Astin, & Freedman, 2006; p. 378). Because of this, classic psychedelics may provide users a greater capacity to judge the (negative) sensations, emotions and thoughts (cf. Coffey, Hartman, & Fredrickson, 2010) shaping their psychological distress. This interpretation is in line with reports of increased insights regarding emotions and self from patients participating in clinical studies of psychedelic-assisted therapies (for a review see Wheeler & Dyer, 2020).

Another possibility as to why the findings of this study do not align with those linking classic psychedelic use to better mental health outcomes during the COVID-19 pandemic is that classic psychedelics have been noted to ease one’s fear of death (Grof, Goodman, Richards, & Kurland, 1973; Kast, 1967), a fear fed by the global pandemic (Chalhoub, Koubeissy, Fares, & Abou-Abbas, 2022). Although potential mechanisms were not tested, the associations between classic psychedelic use and mental health outcomes reported by Cavanna et al. (2021) and Révész et al. (2021) may have been driven by classic psychedelic users’ greater acceptance of their own mortality (i.e., decreased fear of death). This study, in contrast, focuses on unemployment, an acute problem accompanied by status loss and immediate material effects. The incongruity in findings could suggest that, while classic psychedelics have the ability to help individuals accept the things they cannot change (e.g., their own mortality), these substances may not have the ability to alleviate more mundane, earthly problems over which they have at least some control (e.g., financial insecurity).

Finally, this study’s results may differ from those of previous work linking lifetime classic psychedelic use to psychological distress (Hendricks et al., 2015; Jones & Nock, 2022; Krebs & Johansen, 2013) due to methodological considerations. The studies mentioned in the previous sentence looked specifically at *serious* psychological distress, operationalized with a binary variable indicating whether respondents had a psychological distress score equal to or greater than 13. While this operationalization has proven useful in understanding serious mental health outcomes, looking at the lower end of the psychological distress spectrum can provide insight into the less drastic and more

common experiences of psychological distress in (unemployed) individuals. Taking this work together, lifetime classic psychedelic use appears to have the potential to be associated with higher psychological distress on the low end of the spectrum but lower psychological distress at the high end of the spectrum and these mixed findings invite continued research on this topic.

Although the results of this study suggest that lifetime classic psychedelic use is associated with a relatively mild 10% increase in psychological distress in unemployed job seekers, the expected impact of lifetime classic psychedelic use on psychological distress is considerable when extrapolated to the 5.7 million unemployed job seekers in the U.S. alone (U.S. Department of Labor, 2022). This is not only because lower psychological health can hinder the speed with which job seekers are employed (Paul & Moser, 2009; Vinokur & Schul, 2002), but it also puts individuals at greater risk of self-harm (Moller, Tait, & Byrne, 2012). Furthermore, these findings are important as they provide a more granular look at the link between lifetime classic psychedelic use and psychological distress as compared to work operationalizing psychological distress in a binary manner (e.g., Hendricks et al., 2015; Jones & Nock, 2022; Krebs & Johansen, 2013). In doing so, this study demonstrates how taking a deeper dive into the study of lifetime classic psychedelic use may reveal associations contrary to those previously found at a broader, more general level.

### Limitations and future research

As has been mentioned before (Hendricks et al., 2015), the cross-sectional, self-report design of this study has its limitations. As it relates to the specific relationships tested in this study, the NSDUH data is limited in that it does not allow for a more in-depth exploration of why lifetime classic psychedelic use is associated with greater psychological distress in unemployed job seekers. Future research is therefore needed in order to understand which mediating mechanisms link lifetime classic psychedelic use to negative mental symptoms in individuals during a stressful phase of life (e.g., when unemployed and looking for work). Furthermore, given the recent work linking psychedelic use with more positive outcomes during the COVID-19



pandemic (Cavanna et al., 2021; Révész et al., 2021), future research should continue to explore when lifetime classic psychedelic use attenuates or exacerbates stressful life situations. Although unemployment and a global pandemic both represent stressful life events, they differ in that unemployment is an individual hurdle linked to social status (Neubert, Süßenbach, Rief, & Euteneuer, 2019; Pohlan, 2019) that the individual has at least some control over and can reasonably overcome. A global pandemic, on the other hand, is a largely uncontrolled event that entire societies face simultaneously. By investigating a range of stressful life events, researchers can help paint a clearer picture of the conditions in which classic psychedelic use does or does not provide relief to burdened individuals.

## CONCLUSION

This study investigates the moderating role of employment status on the relationship between lifetime classic psychedelic use and psychological distress. The results provide initial evidence that lifetime use of indoleamines (LSD and psilocybin) is associated with greater psychological distress in unemployed job seekers, thus suggesting that prior use of these classic psychedelics has the potential to exacerbate stressful life events. These results contradict studies conducted during the COVID-19 pandemic which suggested that classic psychedelic use may offer users a protective factor during stressful life events and they, therefore, encourage further research into when and how psychoactive substances shape individuals' experiences during challenging times.

## REFERENCES

- Aday, J. S., Mitzkovitz, C. M., Bloesch, E. K., Davoli, C. C., & Davis, A. K. (2020). Long-term effects of psychedelic drugs: A systematic review. *Neuroscience & Biobehavioral Reviews*, 113, 179–189. <https://doi.org/10.1016/j.neubiorev.2020.03.017>.
- Brand, J. E. (2015). The far-reaching impact of job loss and unemployment. *Annual Review of Sociology*, 41(1), 359–375. <https://doi.org/10.1146/annurev-soc-071913-043237>.
- Brandheim, S., Rantakeisu, U., & Starrin, B. (2013). BMI and psychological distress in 68,000 Swedish adults: A weak association when controlling for an age-gender combination. *BMC Public Health*, 13, 68. <https://doi.org/10.1186/1471-2458-13-68>.
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, 18(4), 211–237. <https://doi.org/10.1080/10478400701598298>.
- Cappeliez, P., Sèvre-Rousseau, S., Landreville, P., & Préville, M. (2004). Physical health, subjective health, and psychological distress in older adults: Reciprocal relationships concurrently and over time. *Ageing International*, 29(3), 247–266. <https://doi.org/10.1007/s12126-996-1001-y>.
- Carhart-Harris, R. L., & Goodwin, G. M. (2017). The therapeutic potential of psychedelic drugs: Past, present, and future. *Neuropsychopharmacology*, 42(11), 2105–2113. <https://doi.org/10.1038/npp.2017.84>.
- Cavanna, F., Pallavicini, C., Milano, V., Cuiule, J., Di Tella, R., González, P., et al. (2021). Lifetime use of psychedelics is associated with better mental health indicators during the COVID-19 pandemic. *Journal of Psychedelic Studies*, 5(2), 83–93. <https://doi.org/10.1556/2054.2021.00172>.
- Chalhoub, Z., Koubeissy, H., Fares, Y., & Abou-Abbas, L. (2022). Fear and death anxiety in the shadow of covid-19 among the Lebanese population: A cross-sectional study. *Plos One*, 17(7), e0270567. <https://doi.org/10.1371/journal.pone.0270567>.
- Chi, T., & Gold, J. A. (2020). A review of emerging therapeutic potential of psychedelic drugs in the treatment of psychiatric illnesses. *Journal of the Neurological Sciences*, 411, 116715. <https://doi.org/10.1016/j.jns.2020.116715>.
- Coffey, K. A., Hartman, M., & Fredrickson, B. L. (2010). Deconstructing mindfulness and constructing mental health: Understanding mindfulness and its mechanisms of action. *Mindfulness*, 1(4), 235–253. <https://doi.org/10.1007/s12671-010-0033-2>.
- Elsely, J. W. B. (2017). Psychedelic drug use in healthy individuals: A review of benefits, costs, and implications for drug policy. *Drug Science, Policy and Law*, 3, 1–11. <https://doi.org/10.1177/2050324517723232>.
- Gasser, P., Kirchner, K., & Passie, T. (2015). LSD-assisted psychotherapy for anxiety associated with a life-threatening disease: A qualitative study of acute and sustained subjective effects. *Journal of Psychopharmacology*, 29, 57–68. <https://doi.org/10.1177/0269881114555249>.
- Grof, S., Goodman, L., Richards, W., & Kurland, A. (1973). LSD-assisted psychotherapy in patients with terminal cancer. *International Pharmacopsychiatry*, 8(3), 129–144. <https://doi.org/10.1159/000467984>.
- Guénette, J. D., Kose, M. A., & Sugawara, N. (2022). *Is a global recession imminent? Equitable growth, finance, and institutions, policy Note No. 4*, World Bank, Washington, DC. <https://openknowledge.worldbank.org/bitstream/handle/10986/38019/Global-Recession.pdf>.
- Halberstadt, A. L., & Geyer, M. A. (2011). Multiple receptors contribute to the behavioral effects of indoleamine hallucinogens. *Neuropharmacology*, 61(3), 364–381. <https://doi.org/10.1016/j.neuropharm.2011.01.017>.
- Hanisch, K. A. (1999). Job loss and unemployment research from 1994 to 1998: A review and recommendations for research and intervention. *Journal of Vocational Behavior*, 55, 188–220. <https://doi.org/10.1006/jvbe.1999.1722>.
- Hendricks, P. S., Thorne, C. B., Clark, C. B., Coombs, D. W., & Johnson, M. W. (2015). Classic psychedelic use is associated with reduced psychological distress and suicidality in the United States adult population. *Journal of Psychopharmacology*, 29(3), 280–288. <https://doi.org/10.1177/0269881114565653>.
- Jahoda, M. (1982). *Employment and unemployment: A social psychological analysis*. New York: Cambridge University Press.
- Johansen, P.-Ø., & Krebs, T. S. (2015). Psychedelics not linked to mental health problems or suicidal behavior: A population





- study. *Journal of Psychopharmacology*, 29(3), 270–279. <https://doi.org/10.1177/0269881114568039>.
- Jones, G. M., & Nock, M. K. (2022). Race and ethnicity moderate the associations between lifetime psychedelic use (MDMA and psilocybin) and psychological distress and suicidality. *Scientific Reports*, 12, 16976. <https://doi.org/10.1038/s41598-022-18645-3>.
- Kast, E. (1967). Attenuation of anticipation: A therapeutic use of lysergic acid diethylamide. *The Psychiatric Quarterly*, 41, 646–657. <https://doi.org/10.1007/BF01575629>.
- Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S. L., et al. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*, 32, 959–976. <https://doi.org/10.1017/s0033291702006074>.
- Killion, B., Hai, A. H., Alsolami, A., Vaughn, M. G., Sehun Oh, P., & Sals-Wright, C. P. (2021). LSD use in the United States: Trends, correlates, and a typology of us. *Drug and Alcohol Dependence*, 223, 108715. <https://doi.org/10.1016/j.drugalcdep.2021.108715>.
- Krebs, T. S., & Johansen, P.-Ø. (2013). Psychedelics and mental health: A population study. *Plos One*, 8(8), e63972. <https://doi.org/10.1371/journal.pone.0063972>.
- Lutkajtis, A. (2021). Four individuals' experiences during and following a psilocybin truffle retreat in The Netherlands. *Journal of Psychedelic Studies*, 5(1), 22–32. <https://doi.org/10.1556/2054.2021.00162>.
- Madsen, M. K., Fisher, P. M., Stenbæk, D. S., Kristiansen, S., Burmester, D., Lehel, S., ... Knudsen, G. M. (2020). A single psilocybin dose is associated with long-term increased mindfulness, preceded by a proportional change in neocortical 5-HT<sub>2A</sub> receptor binding. *European Neuropsychopharmacology*, 33, 71–80. <https://doi.org/10.1016/j.euroneuro.2020.02.001>.
- McCulloch, D. E., Madsen, M. K., Stenbæk, D. S., Kristiansen, S., Ozenne, B., Jensen, P. S., ... Fisher, P. M. (2021). Lasting effects of a single psilocybin dose on resting-state functional connectivity in healthy individuals. *Journal of Psychopharmacology*, 36(1), 74–84. <https://doi.org/10.1177/02698811211026454>.
- McKee-Ryan, F., Song, Z., Wanberg, C. R., & Kinicki, A. J. (2005). Psychological and physical well-being during unemployment: A meta-analytic study. *Journal of Applied Psychology*, 90(1), 53–76. <https://doi.org/10.1037/0021-9010.90.1.53>.
- Mellner, C., Dahlen, M., & Simonsson, O. (2022). Association between lifetime classic psychedelic use and sick leave in a population-based sample. *International Journal of Environmental Research and Public Health*, 19(18), 11353. <https://doi.org/10.3390/ijerph191811353>.
- Moller, C. I., Tait, R. J., & Byrne, D. G. (2012). Self-harm, substance use and psychological distress in the Australian general population. *Addiction*, 108(1), 211–220. <https://doi.org/10.1111/j.1360-0443.2012.04021.x>.
- Neubert, M., Süßenbach, P., Rief, W., & Euteneuer, F. (2019). Unemployment and mental health in the German population: The role of subjective social status. *Psychology Research and Behavior Management*, 12, 557–564. <https://doi.org/10.2147/prbm.s207971>.
- Nichols, D. E. (2016). Psychedelics. *Pharmacological Reviews*, 68(2), 264–355. <https://doi.org/10.1124/pr.115.011478>.
- Paul, K. I., & Moser, K. (2009). Unemployment impairs mental health: Meta-analyses. *Journal of Vocational Behavior*, 74(3), 264–282. <https://doi.org/10.1016/j.jvb.2009.01.001>.
- Pohlan, L. (2019). Unemployment and social exclusion. *Journal of Economic Behavior & Organization*, 164, 273–299. <https://doi.org/10.1016/j.jebo.2019.06.006>.
- Révész, D., Ona, G., Rossi, G. N., Rocha, J. M., Dos Santos, R. G., Hallak, J. E., ... Bouso, J. C. (2021). Cross-sectional associations between lifetime use of psychedelic drugs and psychometric measures during the covid-19 confinement: A transcultural study. *Frontiers in Psychiatry*, 12. <https://doi.org/10.3389/fpsy.2021.687546>.
- Sessa, B. (2018). The 21st century psychedelic renaissance: Heroic steps forward on the back of an elephant. *Psychopharmacology*, 235(2), 551–560. <https://doi.org/10.1007/s00213-017-4713-7>.
- Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, 62(3), 373–386. <https://doi.org/10.1002/jclp.20237>.
- Shih, J. H., & Eberhart, N. K. (2008). Understanding the impact of prior depression on stress generation: Examining the roles of current depressive symptoms and interpersonal behaviours. *British Journal of Psychology*, 99(3), 413–426. <https://doi.org/10.1348/000712607x243341>.
- Simonsson, O., Sexton, J. D., & Hendricks, P. S. (2021). Associations between lifetime classic psychedelic use and markers of physical health. *Journal of Psychopharmacology*, 35(4), 447–452.
- StataCorp. (2019). *Stata statistical Software: Release 16*. College Station, TX: StataCorp LLC.
- Strassman, R. J. (1995). Hallucinogenic drugs in psychiatric research and treatment perspectives and prospects. *The Journal of Nervous and Mental Disease*, 183(3), 127–138.
- Studerus, E., Komater, M., Hasler, F., & Vollenweider, F. X. (2010). Acute, subacute and long-term subjective effects of psilocybin in healthy humans: A pooled analysis of experimental studies. *Journal of Psychopharmacology*, 25(11), 1434–1452. <https://doi.org/10.1177/0269881110382466>.
- Sweeney, M. M., Nayak, S., Hurwitz, E. S., Mitchell, L. N., Swift, T. C., & Griffiths, R. R. (2022). Comparison of psychedelic and near-death or other non-ordinary experiences in changing attitudes about death and dying. *Plos One*, 17(8). <https://doi.org/10.1371/journal.pone.0271926>.
- Tessler, R., & Mechanic, D. (1978). Psychological distress and perceived health status. *Journal of Health and Social Behavior*, 19(3), 254. <https://doi.org/10.2307/2136558>.
- U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality (2020) *National Survey on Drug Use and health 2002-2019* [Data set]. <https://datafiles.samhsa.gov/>.
- U.S. Department of Labor. (2021, August 31). *Number of jobs, labor market experience, marital status, and health: Results from a national longitudinal survey* [Press release]. Bureau of Labor Statistics. <https://www.bls.gov/news.release/pdf/nlsoy.pdf>.
- U.S. Department of Labor. (2022, November 4). *The employment situation – October 2022* [Press release]. Bureau of Labor Statistics. [https://www.bls.gov/news.release/archives/empst\\_11042022.htm](https://www.bls.gov/news.release/archives/empst_11042022.htm).
- Vinokur, A. D., & Schul, Y. (2002). The web of coping resources and pathways to reemployment following a job loss. *Journal of*



- Occupational Health Psychology*, 7(1), 68–83. <https://doi.org/10.1037/1076-8998.7.1.68>.
- Walsh, C., Livne, O., Shmulewitz, D., Stohl, M., & Hasin, D. (2022). Use of plant-based hallucinogens and dissociative agents: U.S. Time trends, 2002–2019. *Addictive Behaviors Reports*, 16, 100454. <https://doi.org/10.1016/j.abrep.2022.100454>.
- Ward, B. W., & Martinez, M. E. (2014). Health insurance status and psychological distress among us adults aged 18-64 years. *Stress and Health*, 31(4), 324–335. <https://doi.org/10.1002/smi.2559>.
- Weissman, J., Pratt, L. A., Miller, E. A., & Parker, J. D. (2015). *Serious psychological distress among adults: United States, 2009–2013. NCHS data brief, No 203*. Hyattsville, MD: National Center for Health Statistics.
- Wheeler, S. W., & Dyer, N. L. (2020). A systematic review of psychedelic-assisted psychotherapy for Mental Health: An Evaluation of the current wave of research and suggestions for the future. *Psychology of Consciousness: Theory, Research, and Practice*, 7(3), 279–315. <https://doi.org/10.1037/cns0000237>.
- Winefield, A. (1995). Unemployment: Its psychological costs. In C. L. Cooper, & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (Vol. 10, pp. 169–211). Chichester, England: Wiley.

