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# Therapeutic Potential of Psilocybin for Treating Psychological Distress among Survivors of Adverse Childhood Experiences: Evidence on Acceptability and Potential Efficacy of Psilocybin Use

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## ABSTRACT

Survivors of adverse childhood experience are at elevated risk for psychological distress. In recent years, renewed interest in psychedelic medicine has highlighted the therapeutic potential of psilocybin for those who have experienced childhood adversity. However, recreational psilocybin use remains illegal and access to approved therapies is difficult. Such use provides an opportunity to explore the therapeutic potential of psilocybin for psychological distress among people with adverse childhood experiences. Therefore, we conducted an online survey to assess interest in, acceptability of, and experiences with psilocybin. We further explored whether the association between Adverse Childhood Experiences Questionnaire (ACEQ) scores and psychological distress was lower among those who had used psilocybin in the past three months. Results showed high levels of interest in and acceptability of psilocybin that did not differ across ACEQ scores. Results also showed that the effect of adverse childhood experiences on psychological distress was lower for people who had recently used psilocybin ( $p = .019$ ). Taken together, these findings suggest that psilocybin therapy may be potentially acceptable and may feasibly help in supporting survivors of adverse childhood experiences with particularly strong benefits to those with more severe childhood adversity.

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Psilocybin; psychological distress; adverse childhood experiences

## Introduction

Adverse childhood experiences, including abuse, neglect, life course disruption, have cascading health and social consequences (Hailes et al. 2019; Kalmakis and Chandler 2015; Petrucci, Davis, and Berman 2019; Sahle et al. 2022). Approximately one-in-six people are exposed to at least four categories of adversity as children (Pereda et al. 2009; Thomas 2020). Demonstrating the profound disruption these experiences have, one systematic review found that nearly 90% of the people experiencing housing instability had experienced at least one adverse childhood experience and more than half had experienced four or more (Liu et al. 2021). Another review reported that the effect of childhood abuse and neglect on adult mortality was stronger than any preventable risk factor (D'arcy-Bewick et al. 2022). Monitoring these effects over time, studies have found that early childhood adversity triggers and predisposes survivors to additional and compounding adversities over the life course (Jackisch,

Ploubidis, and Gondek 2021). Factors contributing to the negative relationship between adverse childhood experiences and mental health include problematic interpersonal relationships, insecure attachment styles, and emotional regulation difficulties (Panagou & MacBeth, 2022). These associations emerge from a variety of complex mechanisms, including disrupted capacity for self-control, diminished resilience responses, and reduced means of coping with adversity (Hughes et al. 2017). Moreover, the effects of adverse childhood experiences are transmitted intergenerationally (Narayan, Lieberman, and Masten 2021; Zhang et al. 2022), meaning that the children of survivors are also likely to experience adversity.

While gold standard treatment for addressing childhood adversity and associated mental health problems (including Post-Traumatic Stress Disorder) does not yet exist (Burbach et al. 2023; Jefferson et al. 2021), multi-component psychosocial interventions targeting early childhood (e.g., family-based cognitive-behavioral

interventions) have been shown to have modest impact in reducing the toll of adverse childhood experiences (Leenarts et al. 2013; Marie-Mitchell and Kostolansky 2019). The success of these interventions rests on their ability to address developmental disruptions and trauma caused by adverse childhood experiences, which include a heightened level of emotional distress and increased social vigilance which in turn makes forming healthy relationships more difficult, reduces psychological resilience, and diminishes one's sense of identity and self-worth (Dias, Mooren, and Kleber 2018; Grossman et al. 2017; Lateef et al. 2023; Morgan et al. 2021). Indeed, survivors of adverse childhood experiences are not only exposed to simple trauma (e.g., a single incident in which one's life or wellbeing is endangered), but often experience "complex trauma" (e.g., prolonged and repeated exposures), which undermine one's fundamental sense of self and security, resulting in long-lasting negative effects on a person's attitudes, behavior, and other aspects of functioning. Given the extent of the developmental disruption that may arise in survivors of adverse childhood experiences, achieving these therapeutic targets is often difficult (Burback et al. 2023; Korotana et al. 2016; Lorenc et al. 2020). The difficulty of meeting survivors' needs arises not only from the barriers that they face in accessing and adhering to treatment regimens (Dias, Mooren, and Kleber 2019; Rith-Najarian et al. 2021; Sahle et al. 2022), but also in the complex nature of trauma. As such, researchers continue to look for ways to improve health outcomes.

While psychotherapies, rather than pharmacotherapies, appear to be most effective (Cummings, Berkowitz, and Scribano 2012; van der Kolk 2005), emerging studies suggest that psychedelic substances, including psilocybin, can be helpful in improving mental health (Burback et al. 2023; Coppola, Bevilacqua, and Mondola 2022), particularly when combined with psychological support or formal psychotherapies. Psilocybin has been shown superior to some medications (e.g., antidepressants, such as escitalopram, which is used to treat depression and anxiety) in supporting mental health problems (Lyons 2022) and to have durable effects even after just one or two doses (Yu et al. 2022). Thus, psilocybin and other psychedelics have been proposed as a complementary or alternative option for treating treatment-resistant mental health conditions (Chao and Horton 2021; Daniel and Haberman 2017; Lowe et al. 2022), including post-traumatic stress disorder (Burback et al. 2023; Mohamed et al. 2022), anxiety (Bogadi and Kaštelan 2021), and substance use disorders

(Bogenschutz 2017), all of which can be clinical manifestations of adverse childhood experiences. The hope is that psilocybin can support people who have otherwise not been helped by established therapies or that it can be added to existing therapies to improve outcomes. This hope has resulted in an explosion of clinical investigations about psilocybin and other psychedelics (Kurtz et al. 2022) and the U.S. Food and Drug Administration has identified psilocybin as a "breakthrough therapy" (Reiff et al. 2020).

Given high levels of interest in psilocybin, popular news coverage regarding its therapeutic value, and the relative ease of accessing psilocybin, many people access psilocybin to improve their mental health (Kruger et al. 2022). Under these circumstances, individuals may access psilocybin on their own, without the support of a mental healthcare provider. When it comes to survivors of adverse childhood experiences, this raises questions about how they view psilocybin, their experiences using it, and whether this population could benefit from psilocybin. There are several reasons to hypothesize that they may be more willing to use these substances. For one, survivors with psychological distress may be keen on using psilocybin for self-exploration or self-help. They may also be more anxious and risk averse, worried both about the legal and social consequences of psilocybin and the potential risks of a "bad trip." There are also reasons to think that they may uniquely benefit from psilocybin. For example, the nature of psychedelic experiences (e.g., ego-dissolution, disassociation) may provide opportunities for individuals to reprocess earlier life experiences and distance themselves from the pain of adverse childhood experiences.

Given these potentialities, we conducted a study to explore the therapeutic potential of psilocybin for survivors of adverse childhood experiences by assessing: (1) The association between naturalistic psilocybin use and changes in the association between adverse childhood experiences and psychological distress, and (2) the acceptability of psilocybin as a therapeutic agent as measured by experiences with and opinions about psilocybin.

## Methods

### *Participant recruitment*

Participants were recruited using online paid advertisements posted on Facebook and Instagram and unpaid advertisements distributed via e-mail, Twitter, Reddit, and LinkedIn. The overall purpose of this survey was to explore the development of lower risk guidelines for

psilocybin use in Canada, where the legal barriers to psilocybin use are shifting. While psilocybin remains illegal, a special access program has increased availability to psychedelic assisted therapies, including those that use psilocybin. Our survey focused explicitly on psilocybin use and was conducted among people in Canada. Figure 1 shows an example advertisement shared to recruit participants. Participants were incentivized to participate with a 1:100 chance to win a \$100 cash prize, payable by e-transfer. Those interested in participating were directed to an informed consent sheet. All participants were required to provide informed consent. Those providing consent were screened for eligibility. Eligibility criteria restricted participation to individuals who reported living in Canada and were at least 16 years of age. Eligible participants completed an online survey, administered on the Qualtrics platform (Qualtrics 2022). The survey took a median time of 33 minutes to complete ( $Q_1$ - $Q_3$  = 24.7, 47.7) for people who had used psilocybin and 11 minutes to complete ( $Q_1$ - $Q_3$  = 9.3, 15.9) for people who had never used psilocybin.

## Measures

Participants self-reported their age (continuous), gender (man, women, non-binary), ethnicity, sexual orientation, income, education-level, and whether they lived with a disability.

The Adverse Childhood Experiences Questionnaire (ACEQ (Felitti et al. 1998); is a 10-item measure used to assess experiences of childhood trauma (e.g., abuse, neglect, exposure to substance use, and domestic violence, loss of a parent). Items are scored as “Yes” or “No” for each category of trauma, resulting in scores ranging from 0 to 10, with higher scores reflecting a higher number of categories of adverse childhood exposure. The ACE-Q is frequently dichotomized at 4, with individuals who have four or more categories of adverse childhood experiences experience large increases in risk for morbidity and mortality (Felitti et al. 1998; Hughes et al. 2017; Liu et al. 2021). The median number of exposures categories was 3 ( $Q_1$ - $Q_3$  = 1.0, 5.0) and the mean number of exposures was 3.05 ( $sd$  = 2.46). The distribution had high kurtosis (2.54) and skewness (0.61). The Cronbach’s alpha for the scale was 0.76 (95% CI = 0.74–0.78).

The Kessler 6-item Psychological Distress Scale (K6 (Kessler et al. 2003), is a general population screening tool used to identify serious mental illness (e.g., nervousness, hopelessness, restlessness, depression, worthlessness). Items are scored on a frequency-based 5-point Likert scale measuring how much of the time participants experience each symptom of distress (i.e., None of the time to All of the time) in the past 30 days. Scores range from 0 to 24, with higher scores representing greater psychological distress. The K6 is frequently



Figure 1. Screenshot of advertisement used for recruiting participants.



dichotomized at 8, signaling clinically relevant distress (Prochaska et al. 2012; Richardson et al. 2021), and 13 (which has been used as the cut point for identifying serious mental illness (Kessler et al. 2003)). The median number of exposures categories was 8 ( $Q_1$ – $Q_3$  = 4.0, 13.0) and the mean number of exposures was 8.75 ( $sd$  = 5.75). The distribution had high kurtosis (2.40) and skewness (0.45). The Cronbach's alpha for the scale was 0.76 (95% CI = 0.74–0.78).

To assess experiences using psilocybin participants were asked when was the last time (if ever) they had consumed psilocybin, whether they had ever consumed a micro (e.g., Less than 0.5 grams), light (e.g., 0.5 to 1.74 grams), medium (e.g., 1.75 to 3.4 grams), strong (e.g., 3.5 to 4.9 grams), hero (e.g., 5.0 or more grams), or unmeasured doses of psilocybin and the number of times they consumed psilocybin at each of these dosing levels in the past 12 months. Participants reported their reasons for using psilocybin (e.g., enhance senses, enhance performance, feel pleasure, feel connected, resolve boredom, gain understanding, spiritual exploration, address mental health or emotional problems), and how knowledgeable about and experienced with psilocybin they considered themselves to be. For our main analysis, a three-month history of psilocybin use (as opposed to lifetime psilocybin use) was selected as the moderator because of the possibility that effects of psilocybin use wain with time (particularly for those who might face ongoing adversity and stressors).

To assess opinions about psilocybin participants were asked about their perceptions about psilocybin, whether they want to use psilocybin, how likely they were to use psilocybin over the next 12 months, and about perceived norms (e.g., approval from friends, family and others) and behavioral controls (e.g., ability to access or use without retribution) influencing psilocybin use.

### Data analysis

All statistical analyses were conducted in R 4.2.2 (R Core Team 2021). We calculated descriptive statistics and bivariable tests between ACEQ scores and each variable (i.e., K6, demographics, opinions about psilocybin, experiencing using psilocybin) using the *CreateTableOne* function from the *tableone* package.

After calculating descriptive statistics, we tested for the potential efficacy of naturalistic psilocybin use in reducing the effect of adverse childhood experiences on psychological distress. This was done by testing whether the effect of ACEQ scores on psychological distress differed among those who had used psilocybin in the past three months and those who had not used psilocybin in the past three months. The three-month cut off

was selected based on community advice regarding the importance of re-dosing psilocybin and because a three-month recall period is common in substance use research. To execute this test, we used linear regression models, using K6 scores as the outcome, ACEQ scores as the primary explanatory variable and an interaction term that tested the moderating effect of whether participants used psilocybin in the past 3 months. Models were tested with and without adjustment for age, gender, sexual orientation, ethnicity, income, education, and disability. Final models included these confounders. Model diagnostics, inspected using visual plots, were used to test assumptions of linear regression and a Breusch – Pagan test to formally assess for heteroscedasticity (R: Breusch-Pagan Test [n.d.](#)). Sensitivity tests explored binomial, Poisson, and log-linear models, finding limited differences across models. Given our interest in the interaction effect, we conducted simple slopes analysis using the *sim\_slopes* function from the *interactions* package (Long 2021) to explore differences in the effects of ACE scores on K6 scores for those who had and had not used psilocybin in the past three months.

After assessing the potential efficacy, we examined participant's opinions about and experiences with psilocybin. In reporting descriptives for these analyses, we show stratified results across the number of ACE exposures reported by participants (i.e., 0 Adverse childhood experiences, 1 to 3 Adverse childhood experiences, and 4 or more Adverse childhood experiences). This was done for ease of interpretation and comparing those who have no adverse experiences, those with some, and those with the standard threshold value of four or more. To test the statistical significance of differences across levels of ACE scores, we relied on the continuous version of the ACE score, not the factor version, thus allowing for maximal use of statistical information (Altman and Royston 2006). For each variable, a multivariable linear model was fit with ACEQ scores as the outcome variable, the variable of interest as the explanatory variable, and demographic factors (i.e., age, gender, ethnicity, sexual orientation, income, education, and disability status) as covariates.

This study was reviewed and approved by the Research Ethics Board at Simon Fraser University (#30001311).

### Results

A total of 1,249 participants were included in this analysis (see [Table 1](#)). The average age of the sample was 39.8 ( $sd$  = 15.5); 44.1% of the sample identified as a man, 45.9% as a woman, and 10.0% as non-binary or another gender. The majority of participants reported being white (72.4%), heterosexual (58.3%), not living with

**Table 1.** Sample description.

| Variable and response             | N (%) / M (SD) |
|-----------------------------------|----------------|
| Age (Mean, SD)                    | 39.79 (15.51)  |
| Gender                            |                |
| Man                               | 551 (44.1)     |
| Non-binary/third gender           | 125 (10.0)     |
| Woman                             | 573 (45.9)     |
| Ethnicity (%)                     |                |
| African, Caribbean, or Black      | 15 (1.2)       |
| Arab/West Asian                   | 20 (1.6)       |
| East Asian                        | 26 (2.1)       |
| Indigenous                        | 151 (12.1)     |
| Latin American                    | 38 (3.0)       |
| South Asian                       | 27 (2.2)       |
| Southeast Asian                   | 8 (0.6)        |
| White                             | 903 (72.4)     |
| Other                             | 60 (4.8)       |
| Sexual Orientation                |                |
| Asexual                           | 19 (1.5)       |
| Bisexual                          | 150 (12.0)     |
| Gay                               | 36 (2.9)       |
| Heteroflexible                    | 62 (5.0)       |
| Lesbian                           | 26 (2.1)       |
| Pansexual                         | 86 (6.9)       |
| Queer                             | 82 (6.6)       |
| Straight                          | 727 (58.3)     |
| Unsure                            | 23 (1.8)       |
| Other                             | 35 (2.8)       |
| Living With Disability            |                |
| No                                | 694 (55.6)     |
| Unsure                            | 80 (6.4)       |
| Yes                               | 474 (38.0)     |
| Income                            |                |
| \$29,999 or Less                  | 291 (25.3)     |
| \$30,000 to \$59,999              | 285 (24.8)     |
| \$60,000 to \$89,999              | 210 (18.3)     |
| \$90,000 to \$119,999             | 52 (4.5)       |
| \$120,000 or more                 | 312 (27.1)     |
| Education                         |                |
| No College                        | 238 (19.1)     |
| Some College or Advanced Training | 579 (46.5)     |
| Bachelor's Degree                 | 266 (21.4)     |
| Graduate Degree                   | 162 (13.0)     |

any form of disability (55.6%), and had received at least some higher education or advanced training (80.9%).

Regarding levels of distress (See Table 2), 46.6% had K6 scores of less than 8 (low distress), 26.2% had scores between 8 and 12 (moderate distress), and 27.2% had scores of 13 and above (high distress). Regarding

exposure to ACE categories, 17.4% reported being exposed to zero ACE exposures, 44.1% had between 1 and 3 ACE exposures, and 38.5% had 4 or more ACE exposures. Regarding psilocybin use in the past three months, 44.7% reported using psilocybin and 55.3% reported not using psilocybin. High rates of use in this sample are likely due to self-selection and mode of recruitment (online and through social media groups focused on psychedelics).

In examining the relationship between ACEQ scores, K6 scores, and recent psilocybin use in the past three months, bivariable analyses showed ACEQ scores ( $\beta = 0.597$ ;  $se = 0.071$ ,  $p < .001$ ) and use of psilocybin in the past three months ( $\beta = -1.959$ ;  $se = 0.324$ ,  $p < .001$ ) were each associated with greater K6 Scores. When entered into the same model and controlling for the effects of age, gender, ethnicity, orientation, income, education, and disability status, the effects of both ACEQ scores ( $a\beta = 0.374$ ;  $se = 0.074$ ,  $p < .001$ ) and use of psilocybin in the past three months ( $a\beta = -1.687$ ;  $se = 0.346$ ,  $p < .001$ )

**Table 2.** Description of primary outcome, explanatory variables.

| Variable and Response | N (%) / M (SD) |
|-----------------------|----------------|
| ACEQ Score (Mean, SD) | 3.05 (2.46)    |
| None                  | 177 (17.4)     |
| 1 to 3                | 449 (44.1)     |
| 4 or more             | 392 (38.5)     |
| K6 Score (Mean, SD)   | 8.75 (5.75)    |
| Less than 8           | 576 (46.6)     |
| 8 to 12               | 323 (26.2)     |
| 13 or more            | 336 (27.2)     |
| Psilocybin Use, Ever  |                |
| No                    | 298 (23.9)     |
| Yes                   | 951 (76.1)     |
| Psilocybin Use, P3M   |                |
| No                    | 691 (55.3)     |
| Yes                   | 558 (44.7)     |

remained statistically significant. However, upon inclusion of an interaction term between ACEQ scores and psilocybin use in the past three months, the effect of past three-month psilocybin use on K6 scores became non-significant ( $a\beta = -0.663$ ;  $se = 0.533$ ,  $p = .21$ ), while the effect of ACEQ scores on K6 scores remained significant ( $a\beta = 0.517$ ;  $se = 0.093$ ,  $p < .001$ ). This was explained by the statistical significance of the interaction term ( $a\beta = -0.322$ ;  $se = 0.137$ ,  $p = .019$ ) – indicating a cross-over effect in which psilocybin use in the past three months was associated with lower K6 scores among those with high ACEQ scores, but not among those with low ACEQ scores (see Figure 2). In interpreting the main effect of psilocybin in this model, one should note that the slope of the main effect represents the value of the predictor when the interacting term is 0. As shown in the figure, there is not a significant difference between those who did and did not use psilocybin among those with ACEQ scores of 0. The difference only emerges among those with higher ACEQ scores. This may suggest the presence of a floor effect in which there is limited opportunity for reducing distress among those who had not experienced any ACE exposures.

Simple slopes analyses confirmed the presence of this described interaction, showing that the slope for ACEQ scores on K6 scores was  $\beta = 0.52$  (95% CI = 0.32, 0.71) for those who had not used psilocybin in the past three months (indicating that ACEQ scores are correlated with psychological distress in those who did not use psilocybin) and  $\beta = 0.20$  (95% CI = -0.02, 0.41) for

those who had used psilocybin in the past three months (indicating that the ACEQ scores were not associated with K6 distress scores in those who had used psilocybin). Supplemental Figure S1 shows similar patterns of moderation from self-rated level of experience using psilocybin.

Recognizing the therapeutic potential of psilocybin, we compared the experiences with and opinions about psilocybin across those with varying levels of adverse childhood experiences. Supplemental Table S1 shows descriptive statistics for variables assessing patterns of use and opinions about psilocybin.

A sizable proportion of respondents had used psilocybin in their lifetime (76.1%) and in the past six months and in the past three months (44.7%). Participants said they were very (16.8%) or somewhat (44.6%) knowledgeable about psilocybin and very (23.2%) or somewhat (39.2%) experienced using it. However, ACEQ scores were not differentially associated with ever using psilocybin ( $p = .502$ ), using psilocybin in the past three months ( $p = .537$ ), the total number of times they used psilocybin in the past 12 months ( $p = .323$ ); number of times in the past 12 months they consumed a micro dose ( $p = .370$ ), light dose ( $p = .866$ ), medium dose ( $p = .315$ ), strong dose ( $p = .591$ ), hero dose ( $p = .769$ ), or an unmeasured dose ( $p = .066$ ); self-rated knowledgeability about psilocybin ( $p = .361$ ), self-rated experience with psilocybin ( $p = .136$ ). ACEQ scores were marginally associated with increased likelihood of future use ( $p = .044$ ).

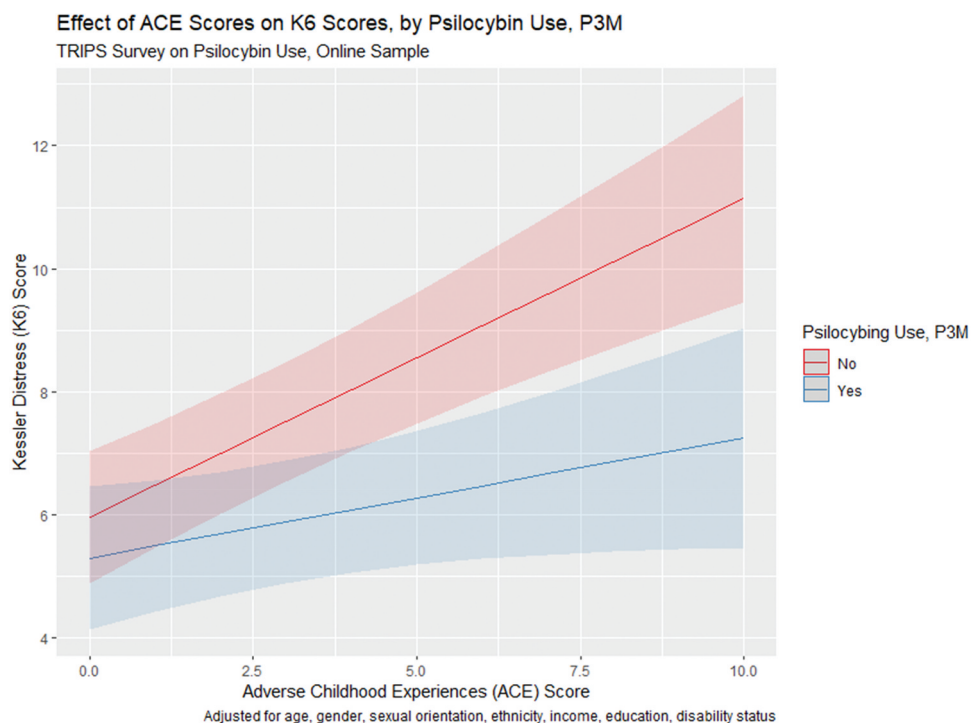


Figure 2. Marginal effects of psilocybin use in the past three months.

Regarding motivations to use psilocybin, among those who had used, a large proportion reported using psilocybin to address mental health and emotional challenges Often/Always (49.9%) or Sometimes (32.2%). Participants also reported a wide variety of other motives to use. However, ACEQ scores were not associated with increased likelihood using psilocybin to enhance sense ( $p = .602$ ), for pleasure ( $p = .445$ ), to connect with others ( $p = .268$ ), resolve boredom ( $p = .698$ ), spiritual purposes ( $p = .504$ ), self-enhancement ( $p = .222$ ), self-understanding ( $p = .419$ ), or for another purposes ( $p = .420$ ). However, ACEQ scores were associated with being more likely to report using psilocybin to help with mental and emotional problems ( $p = .001$ ).

Regarding reasons for not using among those who had not used in the past 12 months, commonly cited reasons were not knowing where to get psilocybin (41.5%) being afraid of legal repercussions about consuming psilocybin (82.9%), and being worried about a bad trip or negative experience while using (48.1%). ACEQ scores were not associated with not using due to: worries of judgment from others ( $p = .830$ ), not knowing where to get psilocybin ( $p = .911$ ), legal repercussions for using psilocybin ( $p = .855$ ), worries about having a bad trip ( $p = .537$ ), or any other non-listed reason ( $p = .470$ ). However, they were more likely to report not using psilocybin because they did not have a safe place where they could use it ( $p = .039$ ).

Regarding opinions about psilocybin, most felt positive, with most saying they either strongly agreed or agreed that psilocybin was beneficial (89.4%) and safe (65.2%). ACEQ scores were not associated with increased likelihood of supporting legalization for adult use ( $p = .466$ ) or to support allowing doctors to prescribe psilocybin ( $p = .559$ ), nor reporting that psilocybin was safe ( $p = .068$ ), enjoyable ( $p = .496$ ), enlightening ( $p = .855$ ), good for mental health ( $p = .212$ ). They were however more likely to report that they believed psilocybin was good for physical health ( $p = .035$ ) and that it was overall beneficial ( $p = .023$ ).

## Discussion

The present study (1) examined the potential efficacy of naturalistic psilocybin use for moderating the effects of adverse childhood experiences on psychological distress and (2) examined potential acceptability of psilocybin as a therapeutic agent among people with adverse childhood experiences by examining their opinions about and experiences using psilocybin. We found that the effect of adverse childhood experiences on psychological distress was lower among those who had used psilocybin compared to those who had not, suggesting potential benefit of psilocybin in treating the psychological consequences of adverse childhood experiences.

These finding aligns with other previously published studies showing that lifetime use of psilocybin is associated with lower odds of a range of adverse outcomes, including criminal arrest (Jones and Nock 2022b, 2022c), suicidality and suicide ideation (Jones, Arias, and Nock 2022), and improved mental health (Hendricks, Johnson, and Griffiths 2015; Jones and Nock 2022a; Krebs, Johansen, and Lu 2013; Thiessen et al. 2018; Walsh et al. 2016). For example, a nationally representative sample of 213,437 US adults showed that lifetime use of psilocybin was associated with lower odds of past year major depressive episodes (aOR = 0.82,  $p < .0001$ , Jones and Nock 2022a). Importantly, there appears to be a dose response effect, with more exposure to psychedelics being associated with greater psychological effect and improvements to psychological well-being (Holze et al. 2023; Raison et al. 2022). Many psilocybin users report that their most important or impactful life experiences have occurred while consuming psilocybin (Cummins and Lyke 2013).

Addressing its potential acceptability as a therapeutic agent among this population, we found that people with adverse childhood experiences reported similar patterns of psilocybin use as is found in those without adverse childhood experiences. Likewise, their opinions about psilocybin use were similar to those of other participants.

Taken together, our results and the existing literature point to a positive therapeutic potential of psilocybin. While naturalistic use of psilocybin is very different from therapeutic trials, our findings converge with emerging evidence from clinical trials and suggest that there may be benefits of use outside of therapeutic settings. Indeed, psilocybin is naturally occurring and can be grown or harvested (Beug and Bigwood 1982; Vorobyeva and Kozlova 2022). As such, it is accessible for some individuals (who are able to manage the complexity of growing or able to take risks in purchasing) and in some jurisdictions (such as Canada), including through online websites and dispensaries (Lott, Marlowe, and Forman 2009). When administered clinically, psilocybin can be combined with other therapies to assist in their therapeutic effect (Carhart-Harris et al. 2018; Felsch and Kuypers 2022; Heuschkel and Kuypers 2020; Horton, Morrison, and Schmidt 2021), but most people do not have access to these therapies and therefore access psilocybin recreationally or as a self-help tool. Our study points to potential benefits related to this pattern of access.

Supporting psilocybin's use as a therapeutic agent, feasibility studies suggest that psilocybin has good safety profile and low addiction potential (Hodge et al. 2023; Johnson et al. 2018), particularly at low doses (Garcia-Romeu et al. 2021; Henríquez-Hernández et al. 2023) and even among those with complex psychiatric needs



(Anderson et al. 2020). In fact, many people (84% in one study) who've used psilocybin endorse it as a beneficial experience (Carbonaro et al. 2016). Among people accessing mental health services, 59% supported psilocybin as a medical treatment and 55% would accept the treatment if offered by a doctor (Corrigan et al. 2022). Physicians have demonstrated neutrality toward psilocybin (Meyer et al. 2022), but an openness to referring patients to psilocybin assisted therapies – with one study suggesting that over three-quarters of physicians would inform patients about these interventions if they received approval (Meir et al. 2023). Given support for these interventions, it is perhaps unsurprising that an increasing number of people are using psilocybin to resolve their mental health problems (Smith 2022) and that support for the drug, at least in Canada, is following a similar pattern to that of cannabis (which is now legal across the country; Basky 2021). Some jurisdictions have already taken steps to legalize psilocybin production, possession, and consumption (Dos Santos et al. 2021; Webster 2019) and the psilocybin industry is rapidly developing (Strauss et al. 2022). Of course, psilocybin use outside the care of a provider can result in adverse experiences (e.g., bad trips characterized by anxiety or paranoia, psychotic episodes; Gard et al. 2021; Kopra et al. 2022).

The present study has limitations. First, we rely on an online, opt-in, non-representative, convenience sample. This exposes our study to favorable responding and sampling bias. Second, our data collection is observational and cross-sectional, meaning we cannot assess causal effects. Despite these limitations, agreement between our findings and both population-based studies and randomized control trials is reassuring. Further replication of this specific analyses is warranted using higher cost methods, including larger sample size, representatively sampling, and deeper theoretical examination (e.g., exploring mechanisms, moderators) in both quantitative and qualitative assessments.

The present study showed that a large number of survivors of adverse childhood experiences may use psilocybin or are interested in accessing it recreationally, therapeutically, or as a self-help tool. Furthermore, in showing that the effects of adverse childhood experiences on psychological distress is moderated by naturalistic psilocybin use in the previous three months, we provide preliminary evidence showing that those with greater childhood adversity may uniquely benefit from psilocybin as a therapeutic agent.

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## Disclosure statement

Zach Walsh is in a paid advisory relationship with Numinus Wellness EntheoTech Biomedical regarding the medical development of psychedelics, and is a member of the Advisory Boards of the Multidisciplinary Association for Psychedelic Studies (MAPS) Canada and MycoMedica Life Sciences. The remaining authors have no conflict of interest to declare.

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