Mental health of a self-selected sample of psychedelic users and self-medication practices with psychedelics

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INTRODUCTION

A substantial number of people worldwide suffer from mental health problems during their lifetime (Kessler et al., 2005; Steel et al., 2014). The psychiatric symptoms often lead to distress, compromising patients’ quality of life (Connell, Brazier, O’Cathein, Lloyd-Jones, & Paisley, 2012). Standard treatments like cognitive behavioral therapy or psychiatric drugs, such as antidepressants or anxiolytics, are usually efficient means to reduce symptoms or even lead to remission. It is however known that therapy is not a “one-size-fits-all” cure and some patients never reach the stage of remission. An example is treatment-resistant depression, which is prevalent in 12%–20% of the depressed population (Mrazek, Hornberger, Altar, & Degtiar, 2014). These numbers highlight the need for new therapeutic targets and agents, or combinations of existing and new treatments (Mrazek et al., 2014). Recently, there has been renewed interest in the use of psychedelics in the treatment of psychiatric conditions, such as treatment-resistant depression, post-traumatic stress disorder (PTSD), and depression (Carhart-Harris et al., 2016; Carhart-Harris & Goodwin, 2017; Mitloheuer, Grob, & Brewerton, 2016; Sessa, 2014).

Psilocybin and its metabolite psilocin are the primary psychoactive compounds of hallucinogenic mushrooms and a prototypical example of a classical psychedelic compound (dos Santos et al., 2016). Psilocybin’s effectiveness as a therapeutic agent has been investigated in the treatment of psychiatric conditions as obsessive–compulsive disorder (OCD), anxiety, depression, and substance dependence, and has shown promising results (Bogenschutz et al., 2015; Carhart-Harris et al., 2016; dos Santos et al., 2016; Grob et al., 2011; Johnson, Garcia-Romeu, Cosimano, & Griffiths, 2014; Moreno, Wiegand, Taitano, & Delgado, 2006). Lysergic acid diethylamide (LSD) and ayahuasca, two other examples of psychedelic substances, have also suggested to be beneficial in the treatment of substance-use disorders (dos Santos et al., 2016; Krebs & Johansen, 2012). Similarly, 3,4-methylenedioxymethamphetamine (MDMA) has been shown to be efficacious as an adjunct to psychotherapy in...
the treatment of PTSD and social anxiety (Danforth, Struble, Yazari-Klosinski, & Groh, 2016; Mitrofuer, 2016; Mitrofuer et al., 2013, 2016; Mitrofuer, Wagner, Mitrofuer, Jerome, & Doblin, 2011). Although not a typical psychedelic, MDMA shares the characteristic with classical psychedelics in that it acts on the 5-HT2A receptor (Liechti, Saur, Gamma, Hell, & Vollenweider, 2000; van Wel et al., 2011).

National drug surveys have reported an estimate of last year prevalence (LYP) of less than 1% for LSD and hallucinogenic mushrooms among young adults, aged between 15 and 34 years in Europe. This situates these two psychedelics in the same range of LYP as the “typically” or “traditionally” used recreational drugs such as cocaine (1.9%), MDMA (1.7%) or amphetamines (1.0%), and at the lower end compared to cannabis (13.3%; EMCDDA, 2016). When looking at lifetime prevalence of psychedelics, European surveys have shown prevalence rates in young adults (15–34 years of age) between 0.1% and 5.4% for LSD and 0.3%–8.1% for psilocybin (EMCDDA, 2012). The National Drug Survey on Drug use and Health showed a higher lifetime prevalence rate (17%); however, this survey included a larger age range (>12 years), and clustered LSD, psilocybin, and mescaline (Krebs & Johansen, 2013a).

Despite the number of people having used these substances, population studies have shown that the use of psychedelics is not associated with higher mental health problems (Hendricks, Thorne, Clark, Coombs, & Johnson, 2015; Johansen & Krebs, 2015; Krebs & Johansen, 2013a). On the contrary, in several cases, lower rates of mental health problems were reported in users compared to non-users (Johansen & Krebs, 2015; Krebs & Johansen, 2013a). In a sample of 190,000 responders, lifetime classic psychedelic use was associated with a significantly reduced odds of past month psychological distress, past year suicidal thinking, planning, and attempts (Hendricks et al., 2015).

Altogether, the fact that psychedelics show therapeutic potential in the treatment of psychiatric conditions and the fact that even lower rates of mental problems are reported in users, poses the question as to whether psychedelic users try to self-medicate with these substances. The aim of this study was therefore to investigate, by means of an online questionnaire study, whether psychiatric disorders are prevalent in psychedelic users and whether those users have taken psychedelics to alleviate psychological or physical suffering of disorders. In addition, it was investigated whether self-rated treatment effectiveness was different for treatment offered by a medical professional compared to a self-administered psychedelic. It was expected that psychedelic users who suffered from a diagnosed psychopathology would self-medicate with psychedelics.

METHODS

An online questionnaire was launched on several websites and fora between May and July 2017. To be eligible to fill out the survey, respondents had to be ≥18 years. Qualtrics was used as the platform to create the survey.

In total, 4,892 started the survey and 1,967 respondents (40%) consented, were 18 years or older, and completed the questionnaire. The duration to complete the survey depended on the number of substances a person had ever used before. It was possible to pause the survey and complete it at another time. It took respondents on average 96 min to complete.

Questionnaires

Demographic information

Demographic details included age, gender, continent of origin, and the highest level of education. The level of education was recoded into six separate categories (≥high school, high-school degree/ equivalent, university/college, advanced/post-graduate degree, vocational/trade school, and not specified). The number of different countries will be reported to provide information about the geographical distribution of the sample.

History of drug use

Respondents were asked whether they have used or are currently using alcohol, nicotine, cannabis, MDMA/ Ecstasy, psilocybin, LSD, ayahuasca, or any stimulant, hallucinogenic, or cannabinoid novel psychoactive substance (NPS). If respondents indicated that they use(d) the substance, they were further asked about their use, including their frequency of use, average amount use(d), age they first used the substance, when they last used the substances, if they combine(d) this substance with other substances, if they have ever experienced any unwanted or negative side effects, whether their view on the potential positive/negative effects has changed since using the substance, what setting they use(d) the substance in, and why they use(d) the substance.

Mental health and physical health

Respondents were asked several questions about their mental and physical health and that of their first-degree relatives: (1) “Do you consider yourself as mentally and/or physically healthy?” (2) “Do you currently or have ever suffered from a mental disorder or physical disease?” (3) “Have any of your blood relatives been diagnosed with a mental illness?” and (4) “Have any of your blood relatives committed suicide?” These were all “yes–no” questions with question 2 being followed up by five extra questions in case the answer was affirmative: (2A) “What mental disorder or physical disease did you suffer from or are you suffering from?”, (2B) “Was this disorder diagnosed by a medical professional?”, (2C) “Have you been offered some kind of treatment for this disorder?”, (2D) three questions about treatment efficacy: “Did you feel the treatment worked?” “Did the symptoms disappear to an extent at which daily functioning was not comprised anymore?”, “Did your quality of life improve?”, (2E) “Did you look for treatments or cures for this disorder outside of a medical professional’s recommendation?”

Question 2A was open-ended and respondents were able to write down the disorder(s). Mental disorders were clustered afterward to include the following 20 DSM-5 categories: (a) neurodevelopmental disorders, (b) schizophrenia
spectrum and other psychotic disorders, (c) bipolar and related disorders, (d) depressive disorders, (e) anxiety disorders, (f) OCD and related disorders, (g) trauma- and stressor-related disorders, (h) dissociative disorders, (i) somatic symptom disorders, (j) feeding and eating disorders, (k) elimination disorders, (l) sleep–wake disorders, (m) sexual dysfunctions, (n) gender dysphoria, (o) disruptive, impulse control and conduct disorders, (p) substance use disorders, (q) neurocognitive disorders, (r) impulse control and conduct disorders, (s) substance use disorders, (t) sexual dysfunctions, (u) gender dysphoria, (v) disruptive, impulse control and conduct disorders, (w) substance use disorders.

Question 2C had three answer alternatives: medication, therapy, or other, where they could specify the type of treatment. The three sub-questions under 2D were to be answered on a 100-mm Visual Analogue Scale (VAS) with 0 representing “not at all” and 100 representing “maximal efficacious.” In case 2E was answered affirmative, they were asked whether they have ever used psychedelics to treat or cure this disorder followed by the three questions about treatment effectiveness.

Statistics

Data entered the statistical program SPSS (version 24.0); frequencies and proportions are reported for respondent demographics, drug use history, and answers to questions 1, 2 (B–C–D), 3, and 4. Mean (±SD) is given for age (per gender and the total sample) and for self-rated effectiveness of treatment (three sub-questions). In addition, this effectiveness was divided into quartiles, the first quartile (Q1) representing the number of respondents who indicated the treatment effectiveness being between 0% and 25%, the second quartile (Q2) representing the number of respondents who indicating treatment effectiveness being between 26% and 50%, for Q3 rating of effectiveness was between 51% and 75% and for Q4 between 76% and 100%.

In order to compare the effectiveness of traditional treatments offered by a medical professional and the self-sought treatment with psychedelics (used outside of recommendation of a medical professional), binary logistic regression was conducted for the three “effectiveness” questions: (a) “Did you feel the treatment worked?,” (b) “Did your symptoms disappear to an extent your daily life wasn’t compromised any longer?,” and (c) “Did your quality of life (QOL) improve?” This resulted in odds ratio (OR) values for the three questions OR = (offered treatment positive/offered treatment negative)/(psychedelic treatment positive/psychedelic treatment negative), where “positive” and “negative” were Q4 and Q1, respectively. For each OR, 95% confidence intervals (CIs) were given and statistical significance was set at \( p \leq 0.05 \). An OR of 1.5 is defined as small, 2 as medium, and 3 as large (Sullivan & Feinn, 2012).

Ethics

All respondents had to give informed consent after having read the study information and having had the opportunity to ask questions about the study. Ethics approval was received from the Ethics Review Committee of Psychology and Neuroscience (ERCPN-177_06_03_2017).

RESULTS

Demographic information

Respondents’ mean (±SD) age was 25.9 (8.7) with a maximum age of 71; 1,549 (79%) were males aged on average 25.2 (8.4) years, 392 (20%) females aged on average 28.1 (9.1) years, and 26 (1%) classified themselves as “other” and had an average age of 27.7 (12.7) years. Respondents reported that their highest level of educational attainment was lower than high school (\( N = 21; 1\% \)), 10th grade (\( N = 1; 0.1\% \)), 11th grade (\( N = 2; 0.1\% \)), 12th grade (\( N = 2; 0.1\% \)), high-school degree/equivalent (\( N = 521; 26\% \)), university (\( N = 1,111; 57\% \)), advanced degree/postgraduate (\( N = 245; 12\% \)), not specified (\( N = 17; 0.9\% \)), and vocational/trade (\( N = 47; 2\% \)). The respondents came from the five continents, Africa (\( N = 14; 0.7\% \)), America (\( N = 1,182; 60\% \)), Asia (\( N = 38; 2\% \)), Australia and Oceania (\( N = 72; 4\% \)), and Europe (\( N = 657; 33\% \)); 0.3% (\( N = 4 \)) did not answer this question.

Drug use history

Drug use history details are presented in Table 1; it is shown that the three most used substances in descending order are: cannabis (\( N = 1,850; 94\% \)), alcohol (\( N = 1,810; 91\% \)), and LSD (\( N = 1,565; 79\% \)); the three least used substances in ascending order are ayahuasca (\( N = 152; 8\% \)), cannabinoid NPS (\( N = 157; 8\% \)), and stimulant NPS (\( N = 265; 13\% \)).

| Drug (category) | Number (%) | Missing |
|----------------|------------|---------|
| Alcohol        | Yes (1,807) | No (157) | 3 (0.2) |
| Nicotine       | Yes (1,113) | No (851) | 3 (0.2) |
| Classical      | Yes         | No       | Missing |
| recreational   |             |          |         |
| drugs          |             |          |         |
| Amphetamine    | Yes (567)   | No (1,397) | 3 (0.2) |
| Cannabis       | Yes (1,847) | No (117)  | 3 (0.2) |
| Cocaine        | Yes (641)   | No (1,324) | 2 (0.1) |
| Ecstasy/MDMA   | Yes (1,126) | No (839)  | 2 (0.1) |
| NPS            | Yes         | No       | Missing |
| Cannabinoids   | Yes (158)   | No (1,807) | 3 (0.2) |
| Cathinones     | Yes (265)   | No (1,699) | 3 (0.2) |
| Hallucinogens  | Yes (682)   | No (1,282) | 2 (0.1) |
| Classical      | Yes         | No       | Missing |
| psychedelics   |             |          |         |
| Ayahuasca      | Yes (152)   | No (1,812) | 3 (0.2) |
| LSD            | Yes (1,563) | No (402)  | 2 (0.1) |
| Magic mushrooms| Yes (1,434) | No (530)  | 3 (0.2) |

Note. MDMA: 3,4-methylenedioxymethamphetamine; NPS: novel psychoactive substances; LSD: lysergic acid diethylamide.
Mental and physical health

The respondents rated their current mental health on average (±SD) to be 74.8% (23.70) and their physical health 74.4% (20.90) on a VAS with a range from 0 to 100. In total, 1,101 respondents (56%) rated their mental health to be in Q4, between 76% and 100% and 1,006 (51%) rated their physical health to be in Q4 (Figure 1). For mental and physical health, 3 and 2 ratings were missing, respectively.

Mental health and treatment

Almost half of the final set (N = 900; 46%) indicated to have suffered or to be currently suffering from a mental disorder; 77% (N = 698) of them were diagnosed by a medical professional. Three respondents had missing answers for this question (Table 2).

In 99% (N = 691) of the diagnosed cases, some kind of treatment was offered; in 81% (N = 558) of the respondents, this was the medication; in 71% (N = 494), this was therapy and 8% (N = 53) indicated they were offered something else. When checking the written answers, it was noted that 19 explained the kind of medicinal, behavioral, or combined therapy they received. Five respondents indicated they were offered treatment, but they refused to take it and eight were committed to a mental health treatment facility or hospitalized. Six indicated to have self-managed their disease with the help of psychedelics (N = 4) or education and self-awareness (N = 1) or self-guided behavioral training (N = 1) and are therefore not considered as “other treatment offered by a medical professional.” One participant did not specify the treatment. Thirteen respondents indicated to have been offered some kind of “cognitive-oriented” therapy such as massage, relaxation therapy, yoga, mindfulness, coaching, or some kind of “biologically-oriented” therapy such as repetitive transcranial magnetic stimulation, magnetic resonance therapy, biofeedback or ketamine-assisted psychotherapy.

When asked whether they searched for treatments outside a medical professional’s recommendation, 77% (N = 540) of the diagnosed respondents answered affirmative; 81% (N = 436) answered they used or have used psychedelics to treat or cure symptoms.

When asked about the effectiveness of the treatment, respondents on average (±SD) rated on a scale from 0 to 100 that the offered treatment worked in treating the disorder

![Mental Health and Physical Health Graph](image)

**Figure 1.** A graphical representation of the height of the self-rated mental and physical health of respondents on a 100-mm Visual Analogue Scale. Data were grouped into four categories based on the ratings they gave, i.e., ratings between 0–25, 25–50, 51–75, and 76–100

| Mental disorder                           | Number (% of total sample) | Diagnosed number |
|-------------------------------------------|----------------------------|------------------|
| Neurodevelopmental disorders              | ADHD/ADD 122 (6.2), Autism 6 (0.3), Asperger 13 (0.7), Tourette 1 (0.1) | ADHD/ADD 113, Autism 6, Asperger 12, Tourette 1 |
| Schizophrenia spectrum and other psychotic disorders | Psychosis 14 (0.7), Schizophrenia 15 (0.8), Delusion (Grandiose) 1 (0.1) | Psychosis 9, Schizophrenia 12, Delusion (Grandiose) 0 |
| Bipolar and related disorders             | Bipolar 78 (4.0), Cyclothymia 2 (0.1) | Bipolar 66, Cyclothymia 2 |
| Depressive disorders                      | 625 (31.8)                  | 483              |
| Anxiety disorders                         | 415 (21.1)                  | 341              |
| OCD and related disorders                 | OCD 29 (1.5)                | OCD 22           |
| Dissociative disorders                    | OCD 3 (0.2)                 | Trichotillomania 3 |
| Trauma- and stressor-related disorders    | PTSD 65 (3.3)               | PTSD 61          |
| Dissociative disorders                    | Depersonalization/derealization 15 (0.8), Dissociative disorder 8 (0.4) | Depersonalization/derealization 9, Dissociative disorder 6 |
| Feeding and eating disorders              | 21 (1.1)                    | 18               |
| Sleep–wake disorders                      | 7 (0.4)                     | 7                |
| Substance-related and addictive disorders | Addiction, anxiety due to drug use, and hallucinogen persistent perception disorder 13 (0.7) | Addiction, anxiety due to drug use, and hallucinogen persistent perception disorder 6 |
| Personality disorders                     | Borderline 13 (0.7), Avoidant 3 (0.2), Anti-Social 2 (0.1) | Borderline 12, Avoidant 3, Anti-Social 2 |
| Non-DSM-5 disorders                       | Burn out 4 (0.2), Sensory processing disorder 1 (0.1), and Intermittent explosive disorder 1 (0.1) | Burn out 4, Sensory processing disorder 1, and Intermittent explosive disorder 1 |

**Note.** ADHD: attention-deficit/hyperactivity disorder; ADD: attention-deficit disorder; PTSD: post-traumatic stress disorder; OCD: obsessive–compulsive disorder; DSM-5: fifth edition of the Diagnostic and Statistical Manual of Mental Disorders.

*The following disorders were not reported in the current sample: Somatic symptom disorders, elimination disorders, sexual dysfunctions, gender-dysphoria, disruptive, impulse control and conduct disorders, neurocognitive disorders, and paraphilic disorders.*
49% (32.3), that the symptoms disappeared to an extent at which daily functioning was not compromised any longer 48% (34.0), and that quality of life improved 54% (35.9).

The averages (±SD) for the answers to these three questions were higher when they were with respect to the psychedelic they self-administered to treat or cure their mental disorder, 81% (20.29) for “feeling the treatment worked,” 72% (25.3) for “symptoms disappeared,” and 87% (19.3) for “improvement of quality of life” (Figure 2).

Logistic regression analysis demonstrated that effectiveness of psychedelics to treat the mental disorder was significantly higher compared to the self-rated effectiveness of an offered treatment as indicated by statistically significant OR for the three questions, the OR “did it work” = 41.93 (p < .001; 95% CI [19.21, 91.54]), OR “symptoms disappear” = 4.24 (p < .001; 95% CI [2.94, 6.13]); and OR “QOL improved” = 1.56 (p = 0.01; 95% CI [1.10, 2.22]).

Mental disorder relatives

In the final set, 39% of the respondents indicated they had a first-degree relative who had been diagnosed with a mental disorder and 11% indicated that a first-degree relative committed suicide.

Physical health

In total, 21% (N = 421) indicated they were or had been suffering from a physical disorder of which 88% (N = 369) were diagnosed by a medical professional and 85% (N = 313) of them were offered some kind of treatment. Treatment offered by a medical professional consisted of medicines in 83% (N = 260) of the cases, 19% (N = 60) was some kind of therapy, and 28% (N = 89) indicated they were offered something else. Half (52%; N = 162) of the diagnosed cases sought treatment outside of a medical professional’s recommendation; 28% (N = 46) used psychedelics to treat or cure their physical disorder.

When asked for the effectiveness of the treatment they were offered, respondents indicated on average (±SD) on a scale from 0 to 100 that they felt it worked 70% (30.6), that the symptoms disappeared 66% (33.8), and that their quality of life improved 69% (33.4) (Figure 3).

Only data of effectiveness question 2 “did the symptoms disappear” entered logistic regression analysis, since the assumption of minimal cell count (N ≥ 5) was violated for the two other questions. The OR for “symptoms disappear” = 0.89 was not statistically significant (p = .81; 95% CI [0.34, 2.33]).

DISCUSSION

This study was designed to estimate the prevalence of psychiatric disorders in psychedelic users and to investigate whether the users with diagnosed mental problems self-medicated with psychedelics to alleviate psychological or physical suffering. In addition, it was investigated whether self-rated treatment effectiveness was different for treatment offered to them by a medical professional or self-administered psychedelic.

Almost half of the included respondents (46%) indicated to have either suffered from or to be currently suffering from a mental disease with depression and anxiety as most prevalent diseases. When comparing the lifetime prevalence of the included sample to that of the general population, there is seemingly a discrepancy. In general, the lifetime prevalence rates of mental disorders in the general

Figure 2. Self-rated effectiveness on a 100-mm Visual Analogue Scale of (a) the treatment they were offered by a medical professional for their mental disorder and of (b) the self-selected treatment with psychedelics for their mental disorder
population are below 30% (e.g., Steel et al., 2014; Wittchen & Jacobi, 2005) with the exception of one study showing an annual prevalence rate of almost 40%, which was explained by the inclusion of a broader age range (2–65+), something that is not a common practice (Wittchen et al., 2011). The age range of the present sample (18–65; with five 65+) was in line with standard survey studies. Therefore, the data of this study seem to suggest that the prevalence rating of mental disorders is higher in users of psychedelic substances. Nonetheless, the most prevalent disorders in the general population, depression, and anxiety were also most prevalent in the current sample of psychedelic users (Kessler et al., 2005; Steel et al., 2014).

Current findings show that 99% of the psychedelic users who received a diagnosis of a mental disorder were offered some kind of treatment; 77% of them searched for alternative treatments and in 81% of the cases this was a psychedelic. The likelihood of self-rated effectiveness of a self-administered psychedelic treatment was significantly higher compared to offered standard treatment. This means that for the small group who sought their cure in psychedelics, they found more relief for their symptoms and their quality of life improved. This is in line with reports from people who used ayahuasca to induce life changes or some kind of healing, and experiencing beneficial mental and physical health effects after ayahuasca use (Barbosa, Giglio, & Dalgalaarondo, 2005; Barbosa, Mizumoto, Bogenschutz, & Strassman, 2012; Kjellgren, Eriksson, & Norlander, 2009; Winkelman, 2005). In a series of other studies, the use of psychedelics was not associated with deterioration in mental health after use (Hendricks et al., 2015; Johansen & Krebs, 2015; Krebs & Johansen, 2013b) and could even reduce the risk of suicidality (Argento et al., 2017). Together, these findings imply that psychedelic users who seek to self-medicate with psychedelics perceive, this is as efficient and not eliciting a worsened mental condition.

Interestingly, albeit limiting to this study, was the fact that the range of reported mental disorders and the range of psychedelics that the sample used was broad. It was difficult to analyze whether certain types of drugs or drug use patterns were associated with specific disorders. It was also apparent but nonetheless expected that users combined different types of drugs. In future research, it would be interesting to focus more on this combination use and assess whether groups who combine drugs differ from users who do not combine in terms of mental and physical health and motives to use. A second point that should be addressed in future surveys is to differentiate between the prevalence of current and past disorders, and investigate the association between respective prevalence numbers in regards to the timing of psychedelic use and motive of use. In this study, no distinction was made between current and past disorders and a temporal relationship cannot be determined. A third point emerging from the current findings and which has to be investigated in depth is whether psychedelics can be used without some kind of therapy and be effective, and if so, whether this depends on the disorder and whether this is related to an enhanced sense of meaning induced by the substance. The latter, i.e., substance-induced enhanced meaning, is influenced by set and setting, two keywords in the psychedelic terminology and experience. It has been suggested that set-related variables, such as intention and expectation, should be studied so that their contribution to the experience is better understood (Hartogsohn, 2016). In addition to this, it would be of interest to know in what kind of setting people took the psychedelic, e.g., in group or alone. Although not a typical psychedelic, it was previously
shown that participants under the influence of MDMA had higher confidence levels when this was administered in a social group setting, meaning that the treatment was administered to a group of three persons, whereas these ratings were not increased compared to placebo in single-person sessions (Kirkpatrick & de Wit, 2015). These findings hint at the possibility of enhanced beneficial substance effects in group sessions over individual sessions; however, research with traditional psychedelics is needed to confirm this suggestion in patient populations. A last question that arises is whether it was a biased sample. The respondents self-rated the effectiveness of their treatment and they were potentially already users. This question can be answered in a future study by asking explicitly what came first, the disorder or the psychedelic use. Nonetheless, what really matters is that respondents experienced the self-administered psychedelic treatment as efficacious with symptoms disappearing and quality of life improving.

To conclude, this study demonstrates that psychedelic users in some cases self-medicate and experience this as more beneficial than offered standard treatment. This strengthens the idea that psychedelic treatment can be used to combat serious psychiatric disorders and may be more effective than current lines of treatment.

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