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Exploring the effects of microdosing on health behaviour change

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ABSTRACT

Objective: While microdosing psychedelics is increasingly popular for enhancing well-being, its effects on health behavior change (HBC) remain poorly understood. This study investigated self-reported health-related behavior changes and putative underlying psychological mechanisms associated with psychedelic microdosing in a naturalistic setting.
Methods: A retrospective mixed-method survey was conducted with 365 participants who had experience with psychedelic microdosing. Participants completed quantitative and qualitative items assessing changes in health behaviors (e.g., sleep, physical activity, diet) and psychological mechanisms (e.g., self-efficacy, emotional regulation) as a result of microdosing. Qualitative responses were analyzed thematically, and logistic regressions explored associations between behavioral change and individual/contextual predictors.
Results: Microdosing was associated with positive changes across several health behaviors, most commonly in sleep, contemplative practices, physical activity, and work-life balance. Intention to change emerged as the strongest predictor of behavioral change, while dose, protocol, and psychiatric status were not significant predictors. Thematic analysis identified potential psychological mechanisms such as improved mental health, cognitive clarity, self-awareness, self-determination, and relatedness.
Discussion: This study provides an initial exploration into the health-related behavior changes in microdosing. Future controlled studies should explore how microdosing might best support intentional health-promoting interventions.

1. Introduction

1.1. Background

Chronic diseases are responsible for approximately 18 million deaths annually in individuals under 70, (World Health Organization, 2024). These conditions are largely preventable through engagement in health behaviors, with regular physical activity, a balanced diet, and reduced alcohol and tobacco use playing essential roles. However, modifying unhealthy behaviors remains a significant challenge, often requiring sustained self-regulation and motivation (Hagger et al., 2010). This challenge highlights the need for innovative interventions that can facilitate meaningful, lasting health behavior change. As public interest in microdosing and its potential health benefits continues to grow, gaining a deeper understanding of its potential role in fostering behavior changes has become increasingly important.

Classic psychedelics—such as psilocybin and LSD—act primarily as agonists at the serotonin 5-HT_2A receptor (Nichols et al., 2017). This activation induces widespread changes in brain connectivity and stimulates increased neural plasticity (Carhart-Harris, 2018; Calder and Hasler, 2023). Research on psychedelics has predominantly focused on high doses for therapeutic use in mental health conditions, such as depression and anxiety (Muttoni et al., 2019). However, Teixeira et al. (2022) suggest that psychedelics may benefit a broader population by disrupting maladaptive behavioral patterns, thereby promoting positive changes in health behaviors. In fact, the term “behavioral psychedelics”

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has been coined, referring to “the study of psychedelics to foster intentional changes in habits and behaviours to improve health and resilience” (Neuhaus and Slavich, 2022).

Population studies show evidence of positive associations between psychedelic use and improved physical health markers, including higher self-reported health, lower obesity rates, and reduced risks of diabetes and heart disease (Ona et al., 2019; Simonsson et al., 2021; Matthews et al., 2024). Additionally, clinical trials indicate that psychedelic-assisted psychotherapy can effectively address substance use disorders, such as alcohol dependence (Garcia-Romeu et al., 2019; Bogenschutz et al., 2015, 2022; Perkins et al., 2022) and tobacco addiction (Johnson et al., 2014, 2017a,b; Jones et al., 2022). These and other findings have led some researchers to propose that a link between psychedelic use and change in important health behaviors, such as diet and physical activity, may exist and deserve further scrutiny (Teixeira et al., 2022; Neuhaus and Slavich, 2022). Moreover, it remains a question whether such effects could be observed at the level of microdose.

1.2. Microdosing

Microdosing, the practice of consuming small, sub-perceptual doses of psychedelics for prolonged periods, presents a promising and accessible approach to addressing some of these challenges (Daldegan-Bueno et al., 2024). Unlike larger doses, which can be intense and require significant supervision, microdosing integrates seamlessly into daily routines, offering a more affordable and practical alternative for many individuals (Polito and Stevenson, 2019; Murphy et al., 2024a,b). Microdoses are typically subthreshold (1/10th to 1/20th of a typical clinical dose), meaning they are too small to cause overt psychedelic effects. Its mild effects allow for frequent use, which may support sustained improvements and reduce challenges associated with large doses (Hutten et al., 2024).

However, microdosing remains one of the most understudied areas of psychedelic research. Only a few controlled trials exist, and they have produced mixed results regarding the impact of microdosing on mood and cognition (Bershad et al., 2019; de Wit et al., 2022; Family et al., 2020). Nevertheless, evidence indicates that microdosing significantly impacts the central nervous system without causing serious adverse outcomes (Murphy et al., 2024a,b). Controlled studies have reported neurophysiological changes, including alterations in EEG activity, fMRI connectivity, and increased brain-derived neurotrophic factor (BDNF) levels, indicative of increased neuroplasticity and emotional regulation (Cavanna et al., 2022; Glazer et al., 2023; Bershad et al., 2020). Moreover, microdosing has been associated with improved attention and memory, particularly in individuals with lower baseline cognitive function (Hutten et al., 2024). Regarding physical health, double-blind, placebo-controlled trials show that microdosing can positively affect pain perception (Ramaekers et al., 2021) and improve sleep (Allen et al., 2024). Moreover, a large exploratory cross-sectional study involving over a thousand individuals showed frequent spontaneous reports of improved health habits (Fadiman and Korb, 2019). Future studies are essential for identifying and refining the most prevalent and measurable health behavioral targets, thereby informing the design and outcome selection for subsequent placebo-controlled trials.

1.3. Challenges and gaps in research

Microdosing research is in its early stages and faces various challenges. Future design selection is further complicated by variations in microdosing practices—such as the type of substance used, dosing schedules followed, and the use of additional behavioral strategies (e.g., therapist, coach), that are likely to further shape the observed outcomes (Hutten et al., 2024). For example, practices like “stacking,” which involves combining a psychedelic substance with non-psychedelic supplements such as Lion’s Mane mushrooms, chocolate, or niacin, have been suggested to enhance the neurocognitive effects of microdosing (Rootman et al., 2021). Notably, Rootman et al. (2021) observed that combining psilocybin with other substances led to significant psychomotor improvements in older adults, highlighting the potential of such combinations to augment cognitive benefits. In addition to variations in practice, individual differences at baseline, such as psychiatric health, pre-existing health habits, motives for microdosing, and prior experience with psychedelics, may further influence the observed outcomes (Petranker et al., 2022a,b; Hutten et al., 2024). Future research should consider these factors and utilize tangible measures that ideally reflect real-life applications of microdosing.

1.4. Current study

The primary objective of this study was to characterize microdosing users and to assess the most prevalent perceived health behavioral changes (HBC) attributed to that practice, and whether these changes were perceived as positive or negative. We further explored the psychological mechanisms that may underlie these shifts and examined the interplay between microdosing practices, individual characteristics, and their combined effects on health behavior changes. Furthermore, participants’ qualitative responses were analyzed to identify additional themes related to health behavior change and associated psychological factors.

2. Methodology

This study employed a cross-sectional design with a single-point retrospective assessment, using an online, self-constructed survey and web-based data collection methods. The self-selected sample was opportunistic and volunteer-based.

Participants were eligible if they were over 18, proficient in English, and had either previously or were currently engaged in psychedelic microdosing. Recruitment was conducted through collaborations with microdosing institutes, harm-reduction organizations, and social media platforms. The survey required approximately 20–40 min to complete and was administered via Qualtrics. No reimbursement or incentives were provided to participants. Ethical approval for the study was obtained from the Ethics Committee of Leiden University in the Netherlands, and the study protocol is accessible via the Open Science Framework (OSF). Upon accessing the questionnaire, participants were presented with information about the study’s objective. They then reviewed all relevant details regarding participation and provided informed consent before beginning the survey. A welcome page then introduced the three sections of the questionnaire.

2.1. Section one: Microdosing practices and demographic information

This section focused on participants’ microdosing protocols and demographic information. Participants detailed their microdosing practices, including the frequency, concurrent drug or supplement use, and intentions behind the practice. Participants also reported the substance used and the amount in grams or micrograms, which were later converted into fractions by the research team. This was defined using published literature and field practice (e.g., Hutten et al., 2024; Polito and Stevenson, 2019) and, where relevant, matched standard retail amounts (e.g., Dutch smartshops). Standard full dose was considered as 10 g for fresh truffles, 3 g for dried truffles, 20 g for fresh mushrooms, 2.5 g for dried mushrooms, 100 μg for LSD.

Intentions were categorized based on common motives identified in previous research (e.g., hope for alleviating depression, improving focus, improving habits) (Anderson et al., 2019). The demographic data collected included age, gender, country of residence, education level, and psychiatric diagnoses. Participants were also asked if they engaged in any health habits they believed were harmful to their health (e.g., smoking, alcohol consumption). They could respond with “yes,” “no,” or “prefer not to say.” If they answered “yes,” they were given an open-ended question to elaborate.

2.2. Section two: health behavior changes (HBC)

In this section, respondents reported perceived changes in health behaviors attributed to microdosing. Participants were first asked to identify any specific areas of health behavior change from a list of 21 options or indicate "none" if no changes were observed. Health behavior categories included physical activity, diet, alcohol and caffeine consumption, tobacco use, cannabis and other drug use, psychiatric medication use, mindfulness practices, time in nature, social activities, sleep, adherence to public health guidelines, screen time during leisure, work-life balance, cold exposure (e.g., ice baths), sauna use, and body weight changes. Next, participants selected up to three health behaviors where they experienced the most significant changes. For each of these top behaviors, they answered follow-up questions to specify subcategories of change. For instance, if a participant chose physical activity, they were asked to specify which activity (e.g., walking, running, swimming) and rate the degree of change on a five-point scale ranging from "increased a lot" to "decreased a lot," with a neutral option for "mixed changes." Subcategories were designed for physical activity, diet, eating habits, mindfulness, time in nature, social activities, and work-life balance. A complete list of variables measured is provided in Appendix A.

2.3. Section three: Psychological mechanisms of health behavior change

This section evaluated the psychological factors associated with microdosing that were perceived by participants to be linked to their changes in health behavior. Participants rated their level of agreement on statements related to psychological mechanisms, based on evidence linking psychedelics to psychological well-being in previous research. Participants were presented with a list of 30 possible mechanisms and asked whether they felt each mechanism played a role in their health behavior change. The mechanisms were identified based on previous research (Ryan and Deci, 2000; Neuhaus & Slavich, 2022, 2022; Teixeira et al., 2022; 2022; Petranker et al., 2022a,b). These mechanisms included: connection to nature, behavioral regulation, health as an identity, emotion regulation, perceived motivation for behavior changes, perceived good-life coherence, communitas, general mental health and psychological well-being, open heartedness, coherence/self-concordance, autonomy, bodily awareness, competence, resilience, health as an aspiration, psychological flexibility, self-acceptance, self-efficacy, self-compassion, a perceived sense of purpose in life, relatedness and changes in symptoms of prior mental illnesses. Each mechanism was briefly defined in the survey to ensure participants had a clear understanding of the terms (for the full list and definitions of the mechanisms, see Appendix A). Responses were rated on a scale from "strongly agree" to "strongly disagree." Additionally, participants could suggest other relevant psychological mechanisms in an open-ended response. At the end of the questionnaire, participants were also asked to elaborate on any health-related behavioral changes and mechanisms of change with an open-ended question. Data were thematically analyzed.

2.4. Statistical analyses

To accomplish the first two objectives of the study, demographic, health behavior change, and mechanisms of action were analyzed using frequency statistics and group distributions. Qualtrics provided an initial dataset overview of the data, and further analyses were conducted using JASP (Version 0.19.1).

In addition to the quantitative analyses, participants' responses to open-ended questions regarding mechanisms of change were qualitatively analyzed. We conducted a thematic analysis using a deductive–inductive approach (Fereday and Muir-Cochrane, 2006; Braun and Clarke, 2006). Investigator triangulation was implemented by having two researchers independently code the responses and identify potential themes. Based on these themes, a coding framework was developed and systematically applied to all responses. This process was repeated multiple times until sufficient inter-rater agreement was reached. Inter-rater reliability was good to very good across all categories ($\kappa = 0.61$–0.83; percent agreement also high). Any newly emerging themes were identified and incorporated into the framework (see Appendix B for detail description of the qualitative analyses).

Moreover, we examined the role of key demographic and microdosing protocol variables in influencing behavioral changes. To that end, a series of logistic regression analyses were conducted to predict binary changes (change vs. no change) across behavioral outcomes. Only behaviors with a minimum of 40 responses were included to ensure adequate sample size. The predictors included current microdosing status (e.g. microdosing now vs. microdosed in the past), protocol type, substance type, dose fraction, behavioral strategy, age, stacking with other supplements, intention to change habits, psychiatric status, pre-existing habits, and large dose history. Behavioral outcomes included diet and nutrition, screen use, social activity, sleep, body weight, time in nature, contemplative practices, eating patterns, physical activity, cannabis use, work-life balance, tobacco use, alcohol consumption, caffeine consumption. Each logistic regression model was evaluated for model fit using pseudo-R-squared values, and the significance of the predictors was determined using Wald z-statistics. Bonferroni adjustment for multiple comparisons was applied.

3. Results

3.1. Sample characteristics

Initially, 723 participants completed the informed consent process. Of these, 353 participants were excluded due to missing data, and 5 did not pass an attention check. The remaining 365 participants answered key demographic and health-related questions.

Among the 365 participants who completed the survey, 187 were male (51.23 %), 174 female (47.67 %), three non-binary (0.82 %), and one person preferred not to disclose their gender. Participants' ages were broadly distributed, with a mean age of 44.59 years ($SD = 11.77$). The majority were aged 36 to 55 (55.34 %, $n = 202$), and 17 participants (4.65 %) were 65 or older. Most participants resided in Western countries, predominantly in the Netherlands ($n = 85$; 23.3 %), followed by Ireland (14.79 %, $n = 54$), Italy (8.21 %, $n = 30$), and Sweden (7.12 %, $n = 26$). Educationally, most participants held a bachelor's degree (33.52 %), a master's degree (30.22 %), or some college experience without a degree (16.21 %). Nine participants (2.47 %) reported a high school diploma or less (see Table 1).

3.2. Mental and behavioral health

Most participants (61.92 %) reported no diagnosis of psychiatric illness. However, 135 participants (36.99 %) indicated a diagnosis, with 83 participants reporting depressive disorders (e.g., MDD, bipolar), 37 anxiety disorders (e.g., social anxiety, generalized anxiety), 29 reporting ADHD or ADD, and 20 (C-)PTSD. Personality disorders were reported by 12 participants. Other conditions included burnout, substance use disorders, alcoholism, and eating disorders.

Current negative health habits, potentially detrimental to one's health, were reported by 144 participants (39.45 %), while 203 (55.61 %) indicated no negative health habits. Some participants (3.83 %) preferred not to disclose any detrimental health behaviors. Common habits included alcohol consumption (12.05 %), cannabis use, tobacco use (11.6 %), a sedentary lifestyle, and binge eating. Participants with mental health diagnoses were significantly more likely to report negative health habits compared to those without a diagnosis (χ^2 (2, $N = 347$) $= 8.806$, $p = .012$).

Table 1
Demographic characteristics of the sample.

Total (N = 365)		Frequency (n)	Percentage (%)
Gender (*N* = 365)	Female	174	47,7
	Male	187	51,2
	Non-binary	3	0,8
	Prefer not to say	1	0,3
Highest education level (*N*= 364)	<high school	9	2,5
	Graduated high school	30	8,2
	Trade/technical school	11	3,0
	Some college, no degree	59	16,2
	Bachelor's degree	122	33,4
	Master's degree	120	30,1
	Doctorate or professional degree	23	6,3
Detrimental habits for physical health (*N* = 361)	Yes	144	39,5
	No	203	55,6
	Prefer not to say	14	3,8
Psychiatric diagnosis (*N* = 365)	Yes	135	37,0
	No	226	61,9
	Prefer not to say	4	1,1
Psychiatric diagnosis (*N* = 135)	Depression	73	54,1
	ADHD	20	14,8
	Anxiety	12	8,9
	Trauma/PTSD	7	5,2
	Other	23	17,0

3.3. Intention to microdose

Participants could select multiple intentions for starting microdosing. The most common reason was "increase focus on work or study" (58.9 %, n = 215), followed by "hope for alleviating depression" (38.1 %, n = 139), "improve health habits" (38.1 %, n = 139), and "improve chronic/long-term medical conditions" (15.1 %, n = 55). Open-ended responses included enhancing creativity, improving clarity, reducing anxiety, managing ADHD symptoms, improving sleep and energy, and overcoming PTSD and substance use.

3.4. Microdosing practices

Participants provided details on their microdosing routines and other psychedelic use (see Table 2). At the time of the study, 65.48 % (n = 239) of participants were currently following a microdosing protocol, 30.68 % (n = 112) had followed a protocol in the past, and 3.84 % (n = 14) reported occasional microdosing without ever following a specific longitudinal protocol. The most used substances were fresh magic truffles (41.64 %) and dried magic truffles (37.26 %), followed by magic mushrooms (13.70 %) and LSD or related analogues (2.19 %). Participants reported their doses in open-ended responses, which were then converted to represent fractions of a standard full dose for each substance. After conversion, reported doses ranged from 1/30th of a full dose (3.84 % of participants) to 1/5th of a full dose (22.74 %). The most frequently reported dose was 1/10th of a full dose, used by 23.84 % of participants. Most participants dosed in the morning (86.81 %), with fewer in the afternoon (6 %) or evening (3.6 %). Other drug use (other than microdosing) was indicated by 19.17 % (n = 70), with common substances being cannabis (61.3 %), antidepressants (5.7 %), cocaine (4.2 %), and other synthetic medication (18.5 %). Additionally, supplements, such as vitamins, were used by 45.62 % (n = 125) of the participants. Stacking with Lion's Mane and Niacin (n = 104) was

Table 2
Summary of microdosing protocols, intentions, and behavioral strategies.

Variable	Choice Option	Choice Count (*n*)	Percentage (%)
Microdosing protocol (*N* = 365)	Currently following a protocol	239	65,5
	Followed protocol only in the past	112	30,7
	Tried microdosing without protocol	14	3,8
Intention for microdosing (*N* = 365)	Increased focus (work/study)	215	58,9
	Hope for alleviating depression	156	42,7
	General life improvement	146	40,0
	Improving habits	139	38,1
	Improving medical conditions	55	15,1
Substances (*N* = 364)	Fresh magic truffles	152	41,6
	Dried magic truffles	136	37,3
	Magic mushrooms	50	13,7
	LSD or related analogues	8	2,2
	Other	18	4,9
Dose (N = 365)	1/5th of the full dose	83	22,7
	1/8th of the full dose	63	17,3
	1/10th of the full dose	87	23,8
	1/15th of the full dose	83	22,7
	1/20th of the full dose	32	8,8
	1/25th of the full dose	7	1,9
	Smaller than 1/30th	10	3,8
Time of day (*N* = 364)	Morning	316	86,8
	Afternoon	22	6,0
	Evening	14	3,9
	Other times	12	3,3
Other drugs/ supplements (*N* = 365)	None	170	46,6
	Supplements (including Stacking)	125	34,3
	Stacking (Lion's Mane, Niacin)	104	28,5
	Other drugs (cannabis, cocaine)	70	19,2
Protocol types (*N=365*)	Fadiman	181	49,6
	Stamets Stack	63	17,3
	Every other day	33	9,0
	Intuitive	37	10,1
	Set-days a week	26	7,1
	Other/NA	25	6,9
Additional behavioral strategy (*N* = 363)	None	173	47,7
	Psychologist/Coach	71	19,6
	Mobile app	24	6,6
	Other strategies	71	26,2
Prior psychedelic experience (*N* = 365)	Yes	231	63,3
	No	134	36,7
How many times full dose (N = 231)	<5 times	121	52,4
	5 - 25 times	85	36,8
	25 -50 times	12	5,2
	>50 times	13	5,6

frequently reported as additional substances used alongside microdosing. Commonly followed protocol types included the "Fadiman Protocol" (49.59 %) and the "Stamets Protocol" (17.26 %). Fadiman Protocol (developed by Dr. James Fadiman) involves taking a microdose every third day (e.g., dose on Day 1, skip Days 2 and 3); Stamets protocol (developed by Dr Paul Stamets) suggests microdosing for four consecutive days followed by three days off, often combined with Lion's Mane mushroom and Niacin for further neuro-cognitive benefits.

In terms of previous experience, 231 respondents (63.3 %) reported prior full-dose psychedelic experiences, while 134 (36.7 %) did not. The majority of those reporting past experience with a full dose of psychedelics (52.38 %) had taken a full dose fewer than five times. A substantial proportion (36.80 %) reported taking a full dose between 5 and 25 times, while smaller percentages indicated 25–50 times (5.19 %) or more than 50 times (5.63 %).

Participants were asked if they used additional self-improvement strategies alongside microdosing. Commonly reported practices included meditation, yoga, journaling, breath work, regular exercise, intention setting, and time spent in nature.

3.5. Health behavior changes

A large majority of participants reported health behavior changes attributed to microdosing. The most frequently reported changes included improvements in sleep (47.1 %, n = 172), contemplative practices (46.8 %, n = 171), physical activity (44.1 %, n = 161), work-life balance (37.5 %, n = 137), and social activities (37.3 %, n = 136) (see Fig. 1). When asked to identify their top three most noticeable changes, contemplative practices (32.1 %, n = 117), sleep (25.2 %, n = 92), and physical activity (23.0 %, n = 84) were most frequently chosen, followed by social activities (22.2 %, n = 81) and work-life balance (22.2 %, n = 81) (see Fig. 1). Twenty-four participants (11.8 %) indicated changes unrelated to health behaviors (see the full list of behaviors and frequency reported in Appendix C). The frequency analysis highlighted contemplative practices, sleep, and physical activity as the most notable changes overall.

3.6. Direction of change

Further analyses were conducted to assess whether the reported changes reflected increases or decreases in each health behavior identified as having changed. If a participant selected specific HBCs, follow-up questions prompted them to specify the type of change (e.g., walking, running) and rate the direction of change (five-point scale, from "increased a lot", "mixed-effect", to "decreased a lot"). The most reported HBC variables are presented in Table 3. Due to the limited scope of the paper, we excluded HBCs with fewer than 40 responses and percentages for mixed effects, but the full list can be found in Appendix C.

Table 3 illustrates that microdosing was associated with predominantly positive changes in several health behaviors, particularly in contemplative practices, sleep, physical activity, work-life balance, and social activities. In terms of sub-categories most participants reported increases in mindfulness (97 %), meditation (81 %), and stress reduction practices (90 %), suggesting that microdosing may encourage greater engagement in mental and emotional wellness activities. Similarly, 93 % of participants reported improved sleep, indicating a strong positive impact on sleep quality. In terms of physical activity, behaviors like walking (75 %), physical exercise (81 %), and other individual activities showed notable increases, while some activities, such as swimming, Pilates, and team sports, showed more mixed changes. For work-life balance, practices like scheduling limits (91 %) and reducing time spent working (71 %) were significantly enhanced, reflecting a trend toward improved work-life integration. Social activities also showed substantial positive changes, with participants reporting increased engagement in meaningful social gatherings (86 %) and community involvement (73 %). Notably, alcohol consumption showed a substantial decrease, as 95 % of participants indicated reduced alcohol consumption. The majority of participants indicated increased time in nature across various environments, particularly in surrounding green spaces (93 %) and "high quality" nature experiences (94 %), suggesting that microdosing may foster a stronger connection to nature, especially in natural, less urbanized settings.

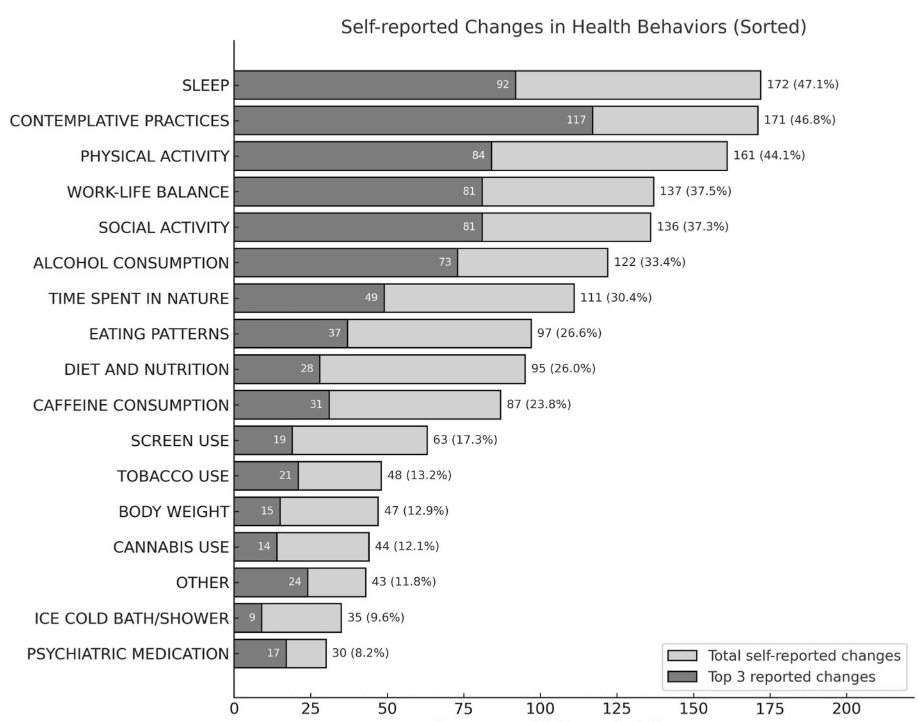

Fig. 1. Self-reported changes in health behaviors by participants. Bars represent the frequency of self-reported changes across different health behaviors, with darker shading representing the frequency of each behavior mentioned as one of the "top three".

Table 3
Direction of change in health behaviors following microdosing.

Frequency of direction of change of HBC	Increased	Decreased	Total N
Contemplative practices			
Meditation	81 %	0 %	108
Mindfulness	97 %	1 %	114
Prayer	37 %	3 %	60
Spiritual practices	78 %	1 %	88
Stress reduction practices	90 %	3 %	101
Other contemplative and/or mindfulness practice	81 %	0 %	86
Sleep	93 %	2 %	92
Physical activity			
Walking	75 %	3 %	76
Running	42 %	2 %	55
Swimming	21 %	3 %	39
Cycling	36 %	4 %	45
Hiking	57 %	2 %	42
Physical exercise	81 %	2 %	54
Yoga	55 %	6 %	49
Pilates	14 %	11 %	35
Dancing	57 %	5 %	42
Martial arts	21 %	18 %	34
Active mobility	71 %	7 %	42
Team sports	20 %	11 %	35
Other physical activity	75 %	7 %	56
Work-life balance			
Not working during leisure hours	75 %	3 %	69
Other work-life balance practice	69 %	0 %	70
Reducing time spent at work/working	71 %	6 %	69
Scheduling limits	91 %	0 %	69
Social activities			
Other personally meaningful social activity	88 %	3 %	69
Social gatherings (e.g. music concerts, art exhibitions, book clubs)	86 %	2 %	65
Community engagement	73 %	3 %	62
Joining a group (e.g. arts, writing, music)	73 %	2 %	55
Volunteering	54 %	6 %	54
Political participation	16 %	19 %	43
Religious services and events	17 %	19 %	42
Alcohol consumption	1 %	95 %	73

Note: The remaining percentage of the sample did not engage in the specific activity or reported no change (or mixed result).

3.7. Regression analyses of demographic and contextual factors

We employed a bivariate logistic regression model to assess whether microdose status and demographic factors were predictive of changes in health behaviors. Factors such as protocol type, relative dose or stacking strategy did not play a significant role in the effects of microdosing on health behavioral changes. Yet, across models, intention to change habits emerged as a consistently significant predictor after Bonferroni adjustment (for a full overview of the analyses, see Appendix C).

Intention to change habits emerged as a significant predictor for multiple behaviors. Specifically, microdosing participants who intended to change their health habits were significantly more likely to experience changes in their eating patterns ($B = 1.04$, $SE = 0.26$, $z = 3.97$, $p < .001$, $OR = 2.83$), diet and nutrition ($B = 1.16$, $SE = 0.27$, $z = 4.28$, $p < .001$, $OR = 3.19$), body weight ($B = 1.33$, $SE = 0.36$, $z = 3.71$, $p < .001$, $OR = 3.77$), tobacco use ($B = 1.21$, $SE = 0.36$, $z = 3.38$, $p < .001$, $OR = 3.36$) and physical activity ($B = 1.02$, $SE = 0.29$, $z = 3.52$, $p < .001$, $OR = 2.77$).

3.8. Psychological mechanisms of action

The survey further examined potential psychological mechanisms mediating the relationship between microdosing and health behaviour change (HBC), as perceived by the participants. Respondents were asked to indicate their level of agreement with several proposed mechanisms of change, which are presented in Table 4. The table summarizes the degree of agreement among participants on various psychological mechanisms. To identify the most relevant mechanism, responses of “strongly agree” and “agree” were added.

The top-rated mechanisms include general mental health and psychological well-being (87.99 %), psychological flexibility (81.43 %), and self-efficacy (79.67 %). Other notable mechanisms with high agreement levels were perceived motivation for behavior changes (76.45 %) and sense of autonomy (69.63 %). Moreover, high levels of agreement were observed for mechanisms such as self-compassion (67.53 %), relatedness (67.52 %), and competence (64.64 %).

3.9. Qualitative analysis

Participants were free to elaborate on any perceived changes in their health behaviors and the mechanisms underlying those changes. In total, 340 participants (93.2 %) provided qualitative responses. Because many responses did not clearly distinguish between the two topics, we combined them into a single thematic analysis.

A thematic analysis of open-ended responses revealed four core themes that closely matched mechanisms assessed in the quantitative data: Mental Health and Well-being (e.g., improved mood, reduced symptoms), Self-awareness (e.g., self-compassion, emotional and bodily awareness), Connectedness (e.g., empathy, social and nature connection), and Self-determination (e.g., autonomy, motivation, self-efficacy). Several additional themes emerged beyond the original questionnaire: Cognitive Capacity, including enhanced focus, memory, and analytical thinking. Other less common but notable themes included psychological factors such as increased creativity, presence, and flow. Physiological factors such as improved energy and sleep and reductions in addictive behaviors (e.g., alcohol, tobacco, cannabis use) were frequently

Table 4
Table shows the level of agreement with the mechanisms of action in HBC.

Mechanism	% Agree	% Strongly Agree	Cumulative % (Agree and Strongly Agree)
General mental health and psychological well-being	47,2	40,8	88,0
Psychological flexibility	44,6	36,9	81,4
Self-efficacy	49,4	30,2	79,7
Perceived motivation for behavior changes	54,4	22,1	76,5
Emotion regulation	42,7	31,3	74,1
Resilience	44,4	29,1	73,5
Autonomy	40,7	28,9	69,6
Self-compassion	42,2	25,4	67,5
Relatedness	41,3	26,2	67,5
Open heartedness	44,5	21,0	65,5
Competence	40,9	23,8	64,6
Self-acceptance	41,0	22,5	63,6
Behavioral regulation	41,8	19,2	61,0
Connection to nature	30,8	28,5	59,2
Health as an aspiration	36,7	22,0	58,7
Coherence/Self-concordance	36,4	20,7	57,1
Communitas	38,0	18,7	56,7
Perceived good-life coherence	35,3	19,2	54,5
Bodily awareness	34,3	20,1	54,4
A perceived sense of purpose in life	34,4	19,8	54,2
Health as an identity	36,1	17,2	53,2
Changes in symptoms of prior mental illnesses	21,9	16,5	38,3

described.

In terms of frequency, Mental Health and Well-being was the most frequently reported theme (67.6 %, n = 230), followed by Cognition and Focus (35.0 %, n = 119), Self-awareness (24.4 %, n = 83), and Connectedness (21.8 %, n = 74). Moreover, frequently reported themes included Self-determination, Addictive behaviors, Flow/Creativity, and Energy/Sleep (each ~12 %). These results highlight both expected and novel mechanisms of perceived change during microdosing (see Table 5).

3.10. No change or negative effects

Of the participants who completed the survey, 13 (3.6 %) reported no benefit—or inconclusive effects—from the microdosing practice. An additional 43 (11.8 %) noted noticeable changes, but not in health-related behaviors. Qualitative analyses identified 11 participants (3.2 %) who explicitly described negative effects. These were primarily physical and included symptoms such as poor sleep (n = 3), stomach discomfort, nausea (n = 3), excessive energy (n = 2), drowsiness on dosing days (n = 1), dizziness (n = 1), and fatigue—sometimes extreme—on the day after dosing (n = 1). Two participants reported adverse psychological reactions, including negative mood shifts and heightened impatience paired with overexcitability. See more details about absent, mixed, or negative effects in Appendix B.

4. Discussion

This study had three primary aims: to examine self-reported changes in health behaviors (HBCs) in microdosing users; to assess perceived psychological mechanisms driving these changes; and to explore possible influence of demographic and contextual factors (e.g., dosing protocol, substance type) on health-related outcomes. Complementarily, participants' qualitative responses were analyzed to confirm and/or uncover additional themes related to health behavior changes. In contrast to earlier studies examining microdosing, where LSD was the preferred substance for microdosing (e.g., Cameron et al., 2020), this study found a strong preference for natural psilocybin-containing substances, such as truffles and mushrooms. This trend likely reflects the geographic composition of our sample, with a significant proportion of participants residing in the Netherlands, where psychedelic truffles are legally accessible. It may also align with broader shifts toward natural products over synthetic compounds, as suggested in recent literature (Meier et al., 2025).

The doses reported in this study ranged mainly from 1/5th to 1/15th of the regular dose, with 1/5th being on the higher end of common microdose (Petranker et al., 2024). The most common protocol followed was the Fadiman protocol, which involves microdosing every third day. The frequent choice of structured protocols illustrates the longitudinal nature of microdosing practice in real-world contexts. This further highlights the need for research examining the effects of longitudinal protocols rather than acute effects after a single dose.

Participants reported various motivations for microdosing, such as improving focus, alleviating depression, enhancing overall well-being, and a notable proportion aimed at changing health habits (38 %). A relatively large proportion (37 %) of participants reported having been previously diagnosed with a mental health condition. These findings align with evidence indicating that microdosing is being used as a supplementary approach to traditional psychiatric treatments (Kuypers, 2020, 2024). Participants who reported prior mental health diagnoses also reported significantly more maladaptive health habits. This effect can be explained by existing literature, indicating that maladaptive habits frequently serve as coping mechanisms for mental challenges (Taylor and Stanton, 2007).

Table 5
Qualitative themes derived from participants' open-ended responses regarding perceived mechanisms of change during microdosing. Each theme is illustrated with representative quotes, and frequencies reflect the number of participants who mentioned the theme.

Names	Sub-categories
Mental Health and Well-being (n = 230)	"It reduces my anxiety, directly reducing the amount of cigarettes I smoke. It also makes me think clearer or slower (I've ADHD) which contributes to me feeling less stressed and worried scared about social interactions ". (314) "I found the first time microdosing, the self-harm thoughts almost went away […] In the past 3 years I've lost 50 pounds and it has helped curb my binge eating."(P181) "Coming from a long period with persistent depression without finding any relief from SSRI […]Psilocybin brakes my thought-habits […] I want to take care of both myself, my home and my friends again.". (P317)
Cognitive Functions (n = 119)	"I found the microdosing allowed more clarity. My focus on individual projects was way better. And scheduling of work day improved dramatically." (P231) "The protocol I followed aimed to improve cognitive abilities and it succeeded well, I now remember things cleary and when studying I get better grades as I can study for more hours without getting tired like I did before." (P 322) "After I started microdosing I started to take more care of my body, e.g. doing more physical exercises, I felt that I was feeling more focused during work and accomplishing more. (P333)
Self and Bodily awareness (n = 84)	"I generally feel more in tune with my body and therefore I found that I make healthier choices spontaneously, without even thinking about it. I eat better, I cannot wait to go workout outside at the end of my working day." (P228) "I feel more 'in my body', closer to myself. I also have a greater visual and taste reception, also auditive. The experience of eating, listening to music and seeing nature is more direct and intense … aware of what my body needs (P258) "In general I feel that microdosing gets me more in tune with myself […], I feel more free to feel and accept whatever I feel, and then interact with that feeling to understand it—whether is good, bad, or neutral for me […]" (P160)
Connection to Others and Nature (n = 74)	"There is a general feeling of belonging to society. […] Since microdosing with the combination with meditation practice and specially mindfulness, I do have a sense of belonging with a much comprehensive towards societies and human condition. […] I feel much more in peace with judgments of others." (P 15) "When I microdose I am so much more aware of my natural surrounding. It makes me appreciate the natural world around me so much more … the little flowers, the birds, the smells. At the same time it makes me feel like it is absolutely non-negotiable to be mindful of my nutrition and to consume plant-based nourishing diet. (P5) "I feel more connected within and with others. Social anxiety is gone as well." (P 227)
Self-determination and Motivation (n = 42)	"I gained more confidence in the world around me and my own potential, less thinking more doing." (P135) "Microdosing keeps me focussed on the changes I wish to accomplish (control over alcohol use and overeating, helping me to lose weight and gain health)" (P163) "I noticed, especially after a burnout, that I lost this very concentrated kind of focus with a singular goal in mind […] it also gave me back my self-discipline when it comes to going to the gym […] These changes have not disappeared and now have become the norm." (P 291)

(*continued on next page*)

Table 5 (*continued*)

Names	Sub-categories
Flow and Creativity (n = 41)	"Felt more confident, more energy, less procrastination, feeling more happy. I could set reachable targets and fulfilled my goals." (P 299) "More creativity, focus, efficiency and self-awareness, leading to a more balanced life with better choices when it comes to health behaviours." (P97) "Microdosing has led to more equanimity, less irritability and more creativity — all of which make me happier, less stressed and nice to be around! I feel more resilient as well." (P119) "Microdosing maintain, a 'flow' state to aid my creativity (I'm a writer) […], a total reduction in over-thinking and those horrible feelings of discontent and frustration!"(P178)
Sleep and Energy (n = 42)	"I was able to get better sleep and I had a lot more positive energy throughout the day so that helped with working, training and everything together leads to a building a good habit […]" (P235) "I sleep better, and I am dreaming, which did not happen for a long time!" (P212) "I dream much more vividly than before […] In addition I notice that I can remember my dreams remarkably better." (P266) " I sleep deep and have vivid dreams, I can now sleep up to 12 h […], even if I only sleep 3–4 h I still feel very well rested." (P51)
Addiction (n = 42)	"After my first cycle I stopped smoking tobacco for almost a year, and completely overcame binge-eating. I have healthy boundaries now and added fasting cycles to rewire my brain better." (P167) "I quit alcohol entirely, for 15 months now. Microdosing helped through the early stages, when social gatherings […] " (P195) "I quit smoking weed. I started as a teenager and smoked every week. Now I haven't smoked for 7 months, my first big break since I was 16. I'm 32 now. This result I couldn't even imagine." (P 194) "The microdosing helped me lower my alcohol consumption, by not making me desire it … " (P226)

4.1. Health behavioral changes

Microdosing appears to lead to primarily positive changes in various health behaviors. The most notable improvements were seen in areas such as contemplative practices, sleep quality, physical activity, work-life balance, social activities, and time spent in nature. Although this study is the first to specifically examine changes in health behaviors in microdosers, the findings align with evidence from recent cross-sectional and placebo-controlled trials.

While most participants reported positive changes, a minority experienced absent or nonspecific effects, and a small subset (3.2 %) described adverse outcomes. These were mostly mild and physical (e.g., nausea, sleep disturbances), with rare reports of negative psychological reactions. These findings underscore the importance of monitoring individual variability and potential side effects in future microdosing research.

Enhanced sleep quality emerged as one of the most notable health benefits, with 93 % of participants reporting improvements. These findings matched those of a recent randomized controlled trial by Allen et al. (2024), where participants who microdosed with LSD (10 μg) experienced an average increase in sleep duration of approximately 24.3 min the night after microdosing, as measured with commercial watch devices. Allen et al. (2024) found no significant changes in sleep architecture or reductions in physical activity, suggesting that the improved sleep duration had no side effects. A large cross-sectional survey study tailored towards more general effects of microdosing involving 278 participants, found that 28 % of respondents reported enhanced sleep quality due to microdosing (Anderson et al., 2019). Similarly, a large cross-sectional study of 3933 microdosers found that improved sleep was a common motivation for microdosing, especially for participants using psilocybin (Rootman et al., 2021).

In contrast with the previous evidence, other studies have reported potential sleep disturbances related to microdosing. A small study involving 24 community members who microdose reported that insomnia was among the most common negative issues encountered. Similarly, an online survey of 525 microdosers revealed that 45 % experienced sleep difficulties at some point, with 3.2 % reporting frequent issues (Lea et al., 2020). One possible explanation for the variation in findings could be attributed to differences in the substances (LSD, psilocybin) or the timing of administration. For example, the majority of participants in the present sample microdosed in the morning and used psilocybin, where acute effects typically last up to 6 h. Consequently, the acute effects were likely to have worn off before bedtime. Also, it is possible that in other studies where participants microdosed LSD, they could have different experiences because of the longer-lasting effects of the substance.

Participants also reported substantial increases in mindfulness, meditation, and other contemplative practices, suggesting that microdosing can foster engagement in mental and emotional wellness activities. Conceptually, these findings align with previous research linking microdosing to a heightened state of mindful processing. For instance, Haijen et al. (2023) found that four weeks of microdosing significantly increased mindfulness ratings in daily life, particularly in areas such as the ability to describe and non-judge inner experiences, while also reducing neuroticism, a trait often linked to emotional instability. Similarly, Hartong and van Emmerik (2022) reported that microdosing was associated with lower anxiety levels, with trait mindfulness acting as a mediator.

However, a study by Szigeti et al. (2021) examining the effects of microdosing psychedelics using a "self-blinding" citizen science method, found that both the microdosing and placebo groups showed significant improvements in mindfulness from baseline to the end of the four-week dosing period. Yet, this effect was complicated by the subjective nature of the CAMS measurement used in the study, and the fact that participants frequently broke blinding to their conditions. To strengthen future research, it would be beneficial to incorporate EEG methodologies and implement rigorous blinding to validate the current findings.

Importantly, in our sample, participants frequently reported improvements in physical activity, better work-life balance, higher social engagement, and increased time spent in nature. While no direct studies have explicitly focused on these outcomes in microdosing, these findings align with prior evidence suggesting that psychedelics can enhance psychological mechanisms supporting such HBC (Polito and Liknaitzky, 2024).

4.2. Psychological mechanisms of change

Several placebo-controlled studies have reported that LSD microdosing can acutely elevate mood, particularly by enhancing mood and feelings of vigor (Bershad et al., 2019; de Wit et al., 2022; Hutten et al., 2024; Molla et al., 2024; Murphy et al., 2024). Enhanced mood and energy may help individuals engage more easily in effortful behaviors that require regulation and persistence, such as exercise or maintaining a healthy work-life balance. Positive mood was also linked to cognitive flexibility (Liu and Wang, 2014) and has also been shown to support motivation and self-regulation, key ingredients for adopting and sustaining health-promoting behaviors (Nes and Segerstrom, 2016).

Consistent with these findings, many participants in our study reported improvements in mental health, flexibility, and self-efficacy. Beyond mood and motivation, previous research has highlighted the role of psychedelics in increasing empathy and prosocial behavior (Bhatt and Weissman, 2024). These effects may help explain the enhanced sense of social connection reported by participants in our study. Similarly, feelings of awe —previously observed even at microdose levels

(Van Elk et al., 2021; Kettner et al., 2019)—were reflected in participants' descriptions of spending more time outdoors and feeling more attuned to the natural world. Finally, many participants described a greater sense of autonomy and competence. These experiences align with established self-determination theory, which emphasizes autonomy, relatedness, and competence as essential for sustained behavior change (Ryan and Deci, 2000; Neff, 2003). These concepts have also been discussed in the context of psychedelic experiences (Teixeira et al., 2022).

Qualitative findings offer additional insights into the perceived mechanisms through which microdosing may support health behavior change. Notably, participants' open-ended responses largely mirrored the psychological constructs assessed quantitatively, highlighting mental health improvements, enhanced self-awareness, greater connectedness, and increased self-determination as key drivers of change. Reports of increased self-compassion and emotional connectedness further suggest that microdosing may enhance emotional integration—both inwardly and in relationships with others. In addition to confirming these core mechanisms, the analysis uncovered novel themes not captured in the original survey—particularly enhanced cognitive capacity (e.g., focus, memory, analytical thinking), as well as experiential states such as creativity, presence, and flow. Participants also frequently described physiological improvements, including better sleep coupled with vivid dreams, increased energy, and reductions in addictive behaviors. These results suggest that microdosing may impact a broad range of psychological and physiological processes, many of which align with known predictors of sustained health behavior change.

4.3. Correlates of self-reported health behavior change

Finally, we tested whether demographic and contextual factors were associated with health behavior change (HBC). Results showed that participants with a clear intention to change habits were significantly more likely to report positive changes in areas such as eating patterns, diet, body weight, physical activity, and tobacco use. While intentionality has long been recognized as central to psychedelic psychotherapy (Dworkin et al., 2023), its role in microdosing remains underexplored. These findings support earlier research emphasizing intention as a predictor of behavior change (Dworkin et al., 2023; Campo and Yali, 2025).

According to Neuhaus and Slavich (2022), psychedelics may open a window of heightened neuroplasticity and psychological flexibility, creating a unique opportunity for individuals to shift their perspectives and adopt new behaviors. From this perspective, microdosing may not directly cause behavioral change, but rather amplify readiness for change. As such, combining microdosing with therapeutic or coaching interventions could further support lasting outcomes. Interestingly, factors such as dose, protocol type, psychiatric status, and stacking behavior did not significantly predict behavioral change, suggesting that popular dosing practices may be driven more by anecdote than evidence.

4.4. Limitations and conclusions

This study offers new insights into the perceived health changes related to microdosing; however, several limitations should be noted. First, the cross-sectional retrospective nature of this study prevents us from establishing causal relationships between microdosing and the reported health behavior changes. The study relied on self-reported data from individuals who voluntarily participated in an online survey. This introduces several potential biases, including self-selection bias, as those with more favorable experiences or positive attitudes toward microdosing may have been more inclined to participate. As such, the current study could not confirm or refute the presence of health behavior change (HBC) in individuals who microdose. Without prospective data or experimental controls, it is impossible to determine whether the observed changes were a direct result of microdosing, expectations, or other effects. Instead, by focusing on participants' subjective accounts, we sought to identify potential targets and hypotheses that can inform the design of future longitudinal studies and placebo-controlled trials. This exploratory approach provides a preliminary foundation for more rigorous experimental investigations into the causal relationship between microdosing and HBC. Additionally, response bias is a concern, as participants may unintentionally overreport benefits or underreport adverse effects, either due to recall limitations or social desirability tendencies. Without controlled conditions, it remains unclear whether microdosing itself drives these changes or whether it acts as a catalyst within a broader self-improvement framework. Finally, a limitation of this study was the low variability in microdosing duration within our sample, with the vast majority of participants following recognized regimens. This unbalanced distribution limited our ability to examine duration as an independent predictor of health behavior change. Future research should aim recruiting more diverse microdosing patterns, including short-term and irregular users, to better assess how protocol length and dosing frequency influence outcomes. Moreover, the present design does not allow us to determine the precise timing of health behavior changes, as participants reported retrospectively. Future longitudinal studies with repeated assessments during the course of microdosing protocols will be necessary to clarify whether such changes emerge rapidly after initiation or require sustained practice.

Despite these limitations, this study serves as a valuable foundation for future research by identifying patterns and potential mechanisms underlying perceived health behavior changes. Future research should employ more rigorous methodologies, including prospective (e.g., large-scale cohort studies) and experimental designs, biometric validation (e.g., physiological markers of health), and qualitative studies that explore subjective experiences in greater depth. Moreover, future studies should continue to investigate the moderating role of intention and individual differences to better understand how contextual factors shape the relationship between microdosing and health behavior outcomes. Expanding research in this direction will provide a more nuanced and scientifically robust understanding of microdosing's potential benefits and limitations.

CRediT authorship contribution statement

Luisa Prochazkova: Writing – review & editing, Writing – original draft, Visualization, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Laura C. Carvalho:** Writing – review & editing, Resources, Project administration, Methodology, Data curation, Conceptualization. **Natasza Marrouch:** Writing – review & editing, Formal analysis, Data curation. **Jorge Encantado:** Writing – review & editing, Resources. **Pedro J. Teixeira:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.neuropharm.2025.110688.

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