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REVIEW

Effectiveness of Deconstructive Meditative Practices in Improving Mental Health and Well-being: A Systematic Review

Paulina Lamas-Morales[1] · Carlos García-Rubio[2] · María Beltrán-Ruiz[1,3] · Alberto Barceló-Soler[1,3] · Yolanda López-Del-Hoyo[1,3] · Javier García-Campayo[3,4]

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Abstract

Objectives Deconstructive meditative practices (DMPs) aim to transform the perception of the self by fostering an understanding of its constructed and impermanent nature through self-inquiry. This systematic review evaluated the effectiveness of DMPs in improving mental health and psychological well-being among adults.

Method Following PRISMA guidelines, a comprehensive search was conducted in PubMed, PsycINFO, Scopus, and Web of Science until October 2025. Eligible studies included randomized and non-randomized trials of DMPs (e.g., Vipassana and insight meditation). The primary outcomes addressed mental health and psychological well-being, while secondary outcomes included psychological processes related to DMPs, such as mindfulness, emotion regulation, and detachment. Risk of bias was assessed using RoB 2.0 and ROBINS-I tools.

Results Eighteen studies ($n = 2457$) met the inclusion criteria. Most reported significant improvements in depression, anxiety, stress, and psychological well-being, although findings varied depending on study design and intervention characteristics. Mindfulness, non-attachment, and insight were identified as possible mechanisms of change. Preliminary patterns suggest that variability in effects may be partially explained by contextual factors such as intervention duration and type of design. However, methodological heterogeneity and the limited number of randomized controlled trials limit the generalizability of the results.

Conclusions The results suggest that DMPs may be effective in improving mental health and psychological well-being. The methodological quality of studies needs to be improved to strengthen the evidence and inform clinical applications. This review can serve as a guide to drive future studies on DMPs.

Preregistration This review was prospectively registered in PROSPERO (ID: CRD42024559841).

Keywords Deconstructive meditation · Mindfulness · Mental health · Insight · Wellbeing · Systematic review

In recent decades, contemplative science has emerged as an interdisciplinary field that integrates traditional meditative practices with the methods and findings of modern science, particularly neuroscience and psychology (Dorjee, 2016; García-Campayo et al., 2021; Josipovic & Baars, 2015). Among its most influential developments is empirical research on mindfulness-based practices, which has shown efficacy across a range of health conditions, including stress,

✉ Paulina Lamas-Morales
plamas@unizar.es

✉ Alberto Barceló-Soler
a.barcelo@unizar.es

Carlos García-Rubio
garciarubio.carlos@gmail.com

María Beltrán-Ruiz
mariabeltranruiz@gmail.com

Yolanda López-Del-Hoyo
ylopez.iacs@gmail.com

Javier García-Campayo
jgarcamp@gmail.com

[1] Department of Psychology and Sociology, University of Zaragoza, Zaragoza, Spain

[2] Faculty of Psychology, Complutense University of Madrid, Madrid, Spain

[3] Instituto de Investigación Sanitaria Aragón, Zaragoza, Spain

[4] Department of Medicine, Psychiatry and Dermatology, University of Zaragoza, Zaragoza, Spain

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anxiety, and depression (Galante et al., 2023; Zhang et al., 2021). Interventions such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) have been widely studied and validated to consolidate the role of mindfulness in mental health (Galante et al., 2023; Gkintoni et al., 2025; Zhang et al., 2021).

Despite the growing implementation of these interventions, a subset of individuals continues to experience psychological distress, which could be related, among other factors, to the rigidity of the narrative self and the tendency to over-identify with mental content (Chou et al., 2023; Giommi et al., 2023). The "narrative self" refers to the dimension of the self, constructed through memory, language, and self-reflection, which allows coherence in life experiences through personal narratives (Gallagher, 2013). It is functionally associated with the default mode network (DMN), which has been linked to processes such as self-judgment, rumination, and psychological inflexibility (Dor-Ziderman et al., 2013; Giommi et al., 2023). Although adaptive in certain contexts, this mode of the self can become dysfunctional when rigidly fixed, hindering the ability to respond flexibly to internal or external experiences (Giommi et al., 2023; Ong et al., 2024).

While mindfulness is part of a set of meditative methods, it represents only a fraction of the contemplative spectrum. To organize this diversity, several complementary frameworks have been proposed to classify these practices. Some authors have proposed distinctions between first and second generation MBIs (Cayoun & Shires, 2020; Van Gordon & Shonin, 2020), as well as models differentiating concentration, ethics, and wisdom-based approaches (Furnell et al., 2024). Dahl et al. (2015) proposed a functional model that organizes meditative practices into three major categories: (1) attentional, (2) constructive, and (3) deconstructive. Attentional meditations focus on mindfulness training and non-judgmental observation; constructive practices allow the development of positive psychological patterns such as loving-kindness or compassion; and deconstructive meditative practices (DMPs) are oriented towards deep inquiry into subjective experience, facilitating the disarticulation of rigid cognitive patterns and the generation of insight into the constructed, changing, and interdependent nature of the self. While all these frameworks broaden the conceptual landscape of contemporary contemplative methods, the functional taxonomy of Dahl et al. (2015) offers a coherent structure for examining DMPs in this review.

The use of self-inquiry (i.e., understood as the conscious exploration of the dynamics and nature of experience) characterizes DMPs, working as their central mechanism for understanding perceptual, emotional, and cognitive processes, thereby transforming their relationship with the internal models that shape the perception of oneself, others, and the world (Dahl et al., 2015; Josipovic, 2014; Trautwein et al., 2024). DMPs have been classified into three main subtypes according to their focus on self-inquiry: 1) object-oriented insight, directed at the objects of experience, such as physical sensations or thoughts; 2) subject-oriented insight, which focuses on the process of consciousness itself and how mental phenomena arise and disappear; and 3) non-dual insight, which focuses on the perception of direct, unified experience and transcending distinctions between subject and object (Dahl et al., 2015; Josipovic, 2014).

Transforming the perception of the self is fundamental in contemplative traditions such as Buddhism, Advaita Vedanta, and Taoism, which question the idea of a solid and permanent self. Buddhist thought emphasizes the relational and dynamic nature of the self (Gallagher et al., 2024; García-Campayo et al., 2023). This view aligns with the development of theoretical models of the self in scientific literature, which, as in the development of mindfulness, have been influenced by the philosophy and methods of this tradition (Gallagher, 2013; Gallagher et al., 2024; Vago & Silbersweig, 2012).

From a psychological perspective, although DMPs are defined by their central mechanism of self-inquiry according to Dahl et al. (2015), this type of investigation into the nature of conscious experience may also give rise to emergent psychological effects, such as greater decentering or increased flexibility in relation to rigid mental patterns (Lamas-Morales et al., 2025). In the Buddhist contemplative tradition, this experiential form of inquiry is cultivated mainly through practices such as Vipassana, Mahamudra, and Dzogchen, which emphasize the direct exploration of the components of experience and the nature of the self (Dahl et al., 2015). Research on Vipassana and Insight meditation approaches—the traditional English rendering of Vipassana described by Kornfield (1979)—has demonstrated benefits for psychological well-being, emotional regulation, and coping in both general and clinical populations (Andreu et al., 2019; Chiesa, 2010; Nave et al., 2021). In addition, Vipassana and other non-dual meditative approaches have shown preliminary evidence pointing to neurobiological correlates, including reduced activity in the DMN, decreased beta activity in posterior medial and temporoparietal regions, and the involvement of circuits related to attention, emotional regulation, and interoception (Dor-Ziderman et al., 2013; Josipovic, 2014; Kumari et al., 2024; Schweitzer et al., 2024; Trautwein et al., 2024). Taken together, these findings reinforce the notion that DMPs may modulate brain systems involved in self-related processing, emotional regulation, and cognitive flexibility.

However, despite their central role in ancient contemplative traditions and growing empirical interest, the benefits of DMPs remain unclear (Britton et al., 2021; Dor-Ziderman et al., 2013; García-Campayo et al., 2023). To date, no

systematic review has rigorously synthesized their effects on mental health. A systematic synthesis of their clinical impact may facilitate their integration into current transdiagnostic clinical models that address rigid identity-related distress and aim to promote psychological flexibility (Berkovich-Ohana et al., 2024; Giommi et al., 2023). Therefore, this manuscript presents a systematic review of the effects of DMPs on mental health to synthesize the scientific literature and further develop this field. To this purpose, we adopt an operational definition of DMPs based on the functional criteria proposed by Dahl et al.(2015). Within this framework, the practices considered in this review correspond to those belonging to the deconstructive family and explicitly oriented toward self-inquiry, such as Vipassana/Insight meditation, Mahāmudrā, Dzogchen, kōan (Zen) meditation, Shikantaza, Advaita Vedānta, and Muraqaba (Sufism).

Conversely, MBIs such as MBCT were excluded, since the central mechanism of change in DMPs, according to the functional classification proposed by Dahl et al., is phenomenological self-inquiry into the constructed, impermanent, and self-referential nature of experience, whereas the core mechanisms of change in MBCT are meta-awareness, decentering, self-compassion, and reduction of cognitive reactivity (Gkintoni et al., 2025; MacKenzie & Kocovski, 2016). In other words, the central mechanism of change in MBCT is more aligned with the family of attentional meditation than with phenomenological self-inquiry into the nature of internal models of the self and conscious experience, which defines the functional core of DMPs, following the model. In MBCT, the goal is to modify the individual's relationship with thoughts, emotions, and feelings (Gkintoni et al., 2025), rather than generating insights into internal models of the self, others, and the world, as is often done in DMPs (e.g., Vipassana).

Furthermore, in line with the World Health Organization's (2025) vision, we define mental health as the reduction of psychological distress and the improvement of psychological well-being and operationalize it by including indicators such as symptoms of depression, anxiety, and stress, as well as general psychological functioning and psychological well-being. We also included other relevant outcomes commonly associated with mental health and meditation practices, such as emotional regulation, decentering, self-compassion, detachment, and acceptance (Hölzel et al., 2011; Lamas-Morales et al., 2025; Miller & Verhaeghen, 2022).

Based on the above, this systematic review aimed to identify, characterize, and evaluate the effects of DMPs on mental health. To date, the literature lacks a systematic synthesis specifically focused on this type of practice; consequently, the review examined the effects observed on mental health following the implementation of DMPs, as well as the methodological characteristics, limitations, and research gaps identified in existing studies and their implications for the design of future research.

Method

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021).

Search Strategy and Study Selection

A comprehensive search was conducted using four electronic databases: PubMed, PsycINFO, Web of Science, and Scopus through October 2025. No date restrictions were applied, and all studies published in English or Spanish until the date of the search were considered for inclusion. In line with the PICO framework, the following primary search terms were employed: “deconstructive meditation”, “vipassana”, “mindfulness”, “insight meditation”, “buddhist meditation”, “dzogchen”, “mahamudra”, “muraqaba”, “koan”, and “shikantaza”. The search terms were adapted for each database and are detailed in the Online Resource 1. Four reviewers independently screened the titles and abstracts of potentially eligible studies based on predefined inclusion and exclusion criteria. Full-text screening of the selected studies was carried out independently by the same reviewers, with any disagreements resolved through discussion with a fifth reviewer.

Inclusion Criteria

Article selection adhered to the PICOS strategy of evidence-based medicine (Methley et al., 2014), based on the following criteria: studies were eligible if they included adults (≥ 18 years) of any gender from clinical or non-clinical populations and evaluated deconstructive meditation practices (DMPs), such as insight meditation, self-inquiry, self-transcendence meditations, vipassana, mindfulness practices framed from a deconstructive perspective, or non-dual meditation. No restrictions were applied to control or comparator conditions. To ensure that deconstructive mechanisms were central to the intervention, studies were included only when more than 50% of the intervention content could be classified as DMP according to the functional taxonomy proposed by Dahl et al. (2015). This proportion was estimated by reviewing the number of sessions, days, or total reported practice time explicitly dedicated to DMP content, as described in the intervention protocols or study reports. When this information was unclear or not reported, inclusion decisions were made by consensus between the two reviewers based on a detailed qualitative assessment of the intervention description, and discrepancies were resolved

through discussion with a third reviewer. Comparators were classified into three categories to facilitate interpretation of study outcomes: passive (e.g., waitlist or no treatment), active (e.g., alternative interventions), and treatment as usual (TAU). Primary outcomes included indicators of mental health and well-being, while secondary outcomes comprised measures of mindfulness, emotional regulation, self-compassion, and prosocial dispositions; no constraints were imposed on outcome assessment, and these secondary outcomes were defined a priori as theoretically relevant psychological processes within contemplative frameworks to explore potential mechanisms of change. Eligible study designs included randomized controlled trials, non-randomized controlled trials, open-label trials with pre–post designs, pilot and feasibility studies, and quasi-experimental studies, provided that they were quantitative and evaluated intervention or prevention programs.

Quality Assessment

The quality and risk of bias of the studies were independently evaluated by four reviewers (PLM, CGR, MBR, and ABS) working in pairs, with discrepancies resolved through discussion and, if necessary, consultation with a fifth reviewer (JGC). For randomized trials, the Revised Cochrane risk-of-bias tool (RoB 2) was used to evaluate five domains: (1) bias arising from the randomization process, (2) deviations from intended interventions, (3) missing outcome data, (4) measurement of outcomes, and (5) selection of reported results. Each domain includes signaling questions rated as "Yes," "Probably yes," "Probably no," "No," or "No information," with final domain ratings categorized as "low risk," "some concerns," or "high risk." For non-randomized studies, the ROBINS-I V2 tool was applied to assess seven domains: (1) confounding bias, (2) classification of interventions, (3) selection bias, (4) deviations from intended interventions, (5) missing data, (6) outcome measurement bias, and (7) reporting bias. The tool includes similar response categories and additional levels to distinguish between weaker and more substantial evidence. Overall, the risk judgments were classified as "low," "moderate," "serious," or "critical."

Data Extraction

Duplicate removal was performed using a Zotero reference manager. Article screening and data coding were independently performed by four authors (PLM, CGR, MBR, and ABS) working in pairs, using the Rayyan QCRI tool (Ouzzani et al., 2016). Articles were screened based on predefined study selection criteria. Titles and abstracts were reviewed to assess relevance when insufficient information was available, and full texts were reviewed. Discrepancies were resolved by consensus or adjudication by a fifth reviewer (JGC). For all included studies, data were independently extracted by the same four reviewers (PLM, CGR, MBR, and ABS) working in pairs, using a standardized extraction form that captured the following information: author(s), publication year, country, study design, sample characteristics, participant age, intervention and comparator details, duration, primary and secondary outcomes, and key findings. Follow-up assessments (e.g., at 1-, 3-, or 12-month post-intervention) were also extracted when available and considered during the analysis to assess the persistence of intervention effects.

Data Analyses

The studies included in this review exhibited considerable heterogeneity in study design (RCT and non-randomized studies), population types (clinical and non-clinical), and outcome measures. These studies assessed a wide range of psychological constructs using various instruments, as described in a table. This variability in outcome measures and constructs precluded meta-analysis or subgroup analyses. Narrative synthesis was conducted according to the PRISMA 2020 guidelines and the Cochrane Handbook. A pre-specified grouping of outcomes guided this synthesis. It was structured around the following key domains of interest: mental health symptoms (e.g., depression), indicators of well-being (e.g., general health), and psychological processes (e.g., non-attachment and mindfulness). Additionally, the study design and population characteristics were considered to provide a comprehensive view of the findings.

Results

Search Outcomes

In total, 1,917 articles were retrieved from the selected databases. After removing duplicates, 1,299 unique records remained and were screened for further analyses. After screening the abstracts and titles, 133 full-text articles were reviewed in detail. Of these, 18 met the inclusion criteria and were included in the final analysis (Fig. 1).

Study Characteristics

Table 1 presents a detailed summary of the study characteristics.

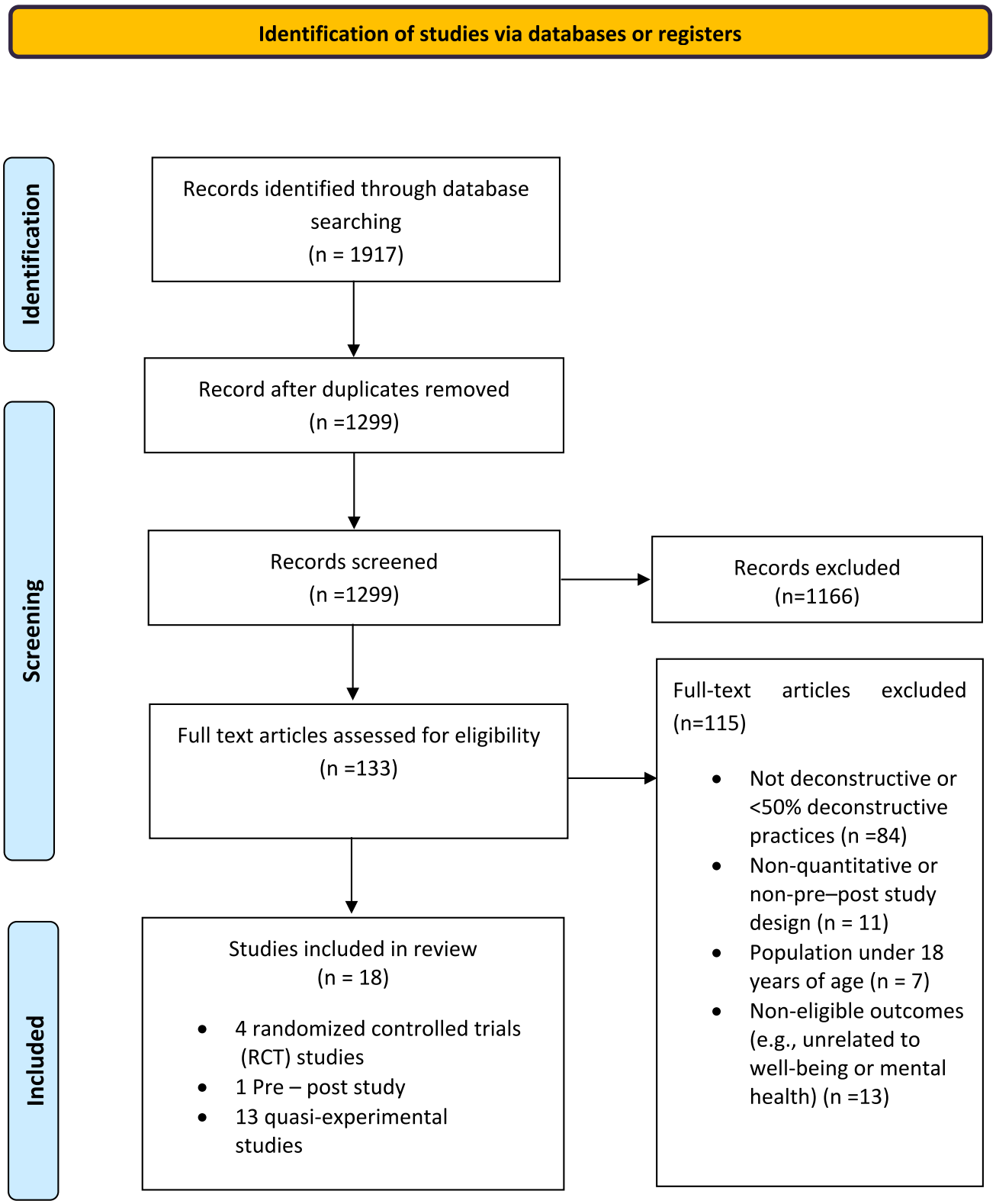

Fig. 1 PRISMA 2020 flow diagram

Table 1 Characteristics of included studies

#	Authors, Year, Country	Study Design	Sample (% Female)	Dropouts (n)	Participant Type	Age Mean (SD)	Facilitators	Intervention (Format)	Techniques	Control Intervention	Duration	Follow Up
1	Wongtongkam & Bhavanaveeranusith, (2019), Thailand	RCT	IG: 24 (100.00%); CG: 22 (100.00%)	20 (IG: 10; CG: 10)	Female drug users in rehabilitation	IG: 29.54 (7.43); CG:29.54 (7.43)	Monk (with over 20 years of experience)	Vipassana (Course)	Sitting meditation (1hr) Walking meditation (1hr)	Active control: TAU	5 d (2.50 hr/d)	-
2	Vongareesawat et al., (2012), Thailand.	RCT	IG: 10 (100.00%); CG: 16 (88.00%)	N.R.	Psychiatric Nurses	N.R.	Researcher (N.R.) Monk selected days (N.R.)	Insight (Course)	N.R.	Passive control	8 d (9 hr/d)	1 m
3	Surinrut et al. (2016), Thailand	Quasi-experimental, non-randomized, with a control group	IG: 330 (83.90%); CG: 326 (71.60%)	49 (IG: 18, CG: 26)	Volunteers' non-clinical population aged ≥45	IG: 57.80 (7.52), CG: 58.40 (10.49)	Instructor (N.R.)	Vipassana (Retreat)	Sitting meditation (N.R.) Walking meditation (N.R.)	Passive control	7 d (11 hr/d)	-
4	Szekeres & Wertheim., (2015), Australia	Quasi-experimental, non-randomized, with a control group	IG: 122 (71.00%); CG: 50 (66.00%)	59 (IG: 32; CG: 27).	Volunteers	39.90 (12.30); N.R by group.	N.R.	Vipassana (Retreat)	N.R.	Passive control	10 d (10 hr/d)	6 m
5	Conklin et al. (2018), United States.	Quasi-experimental, non-randomized, with a control group	IG: 28 (50.00%); CG: 34 (67.60%)	14 (IG: 5; CG: 9)	Experienced meditators	50.74 (N.R)	6 experienced teachers (N.R.)	Insight (Retreat)	Sitting meditation (6h total) Walking meditation (4h total)	Passive control	21 d (10 hr/d)	-
6	Goyal et al. (2023), United States.	Uncontrolled pre-post design	45 (86.70%)	13 (N.R.)	Participants with chronic or episodic migraine	46.88 (N.R)	Teacher (N.R.)	Vipassana (Retreat)	Sitting meditation (1 hr and 2 hrs per meditation session)	-	10 d (10 hr/d)	3, 6, and 12 m

Table 1 (continued)

#	Authors, Year, Country	Study Design	Sample (% Female)	Dropouts (n)	Participant Type	Age Mean (SD)	Facilitators	Intervention (Format)	Techniques	Control Intervention	Duration	Follow Up
7	Hartkamp & Thornton (2017), Italy	Quasi-experimental, non-randomized, with a control group	IG: 40 (60.00%); CG: 30 (80.00%)	N.R.	Adults in an intensive Vipassana retreat and control from the university/government.	IG: 48.90 (12.90); CG: 28.50 (13.50)	Person authorized to teach in the Vipassana tradition in the lineage of Mahasi Sayadaw (N.R)	Vipassana (Retreat)	Sitting meditation (45 mins per meditation session) Walking meditation (45 mins per meditation session)	Passive control	6 d (6 hr/d)	-
8	Perelman et al. (2012), United States.	Quasi-experimental, non-randomized with a control group	IG: 60 (0.00%); CG: 67 (0.00%)	60 (IG: 30; CG:30)	Incarcerated adults in a maximum-security prison	35.40 (9.34); N.R by group.	2–3 Experienced teachers (N.R.)	Vipassana (Retreat)	Sitting meditation (1 hr and 2 hrs per meditation	Active control: Houses of Healing (HOH)	10 d (11hr/d)	12 m.
9	Bowen et al. (2006), United States	Quasi-experimental, non-randomized, with a control group.	173 (20.80%); NR by group.	86 (IG:28; CG: 58)	Incarcerated adults in a minimum-security prison	37.48 (8.57); N.R by group.	Instructor meditators (N.R.)	Vipassana (Retreat)	Sitting meditation (1 hr and 2 hrs per meditation	Active control: TAU	10 d (10hr/d)	6 m (post-test measures taken 3 m post-intervention)
10	Krygier et al. (2013), Australia	Quasi-experimental (just intervention group)	36 (55.60%)	N.R.	Volunteers	43.80 (N.R)	Teacher (N.R)	Vipassana (Course)	Sitting meditation (1 hr and 2 hrs per meditation	-	10 d (10 hr/d)	-

Table 1 (continued)

#	Authors, Year, Country	Study Design	Sample (% Female)	Dropouts (n)	Participant Type	Age Mean (SD)	Facilitators	Intervention (Format)	Techniques	Control Intervention	Duration	Follow Up
11	Wongtongkam et al. (2017). Thailand	RCT	IG: 23 (0.00%); CG: 22 (0.00%).	N.R.	Alcohol-dependent individuals reside at a therapeutic rehabilitation center.	IG: 40.69 (8.24); CG: 39.72 (9.23)	Monk (with 30 years of experience)	Vipassana. (Course)	Sitting meditation (1h) Walking meditation (1h)	Active control: Routine treatment without mindfulness practice	5 d (2hr/d)	1 m
12	Montero-Marín et al. (2016), Spain.	Quasi-experimental, non-randomized with a control group	IG: 19 (47.40%); CG: 19(47.40%)	6 (IG:4; CG:2)	Experienced meditators	IG: 53.11 (10.38); CG: 52.16 (9.62)	Master Dhiravamsa (N.R.)	Vipassana (Retreat)	Meditative practice was mainly unguided (N.R)	Active control: Regular focused meditation practice (40–50 min/day)	30 d (8-9hr/d)	-
13	Simpson et al. (2007), United States.	Quasi-experimental, non-randomized, with a control group.	IG:29 (48.00%); CG:59 (27.00%)	86 (IG:28; CG:58)	Incarcerated adults with PTSD and substance use.	37.60 (8.70); N.R by group.	Experienced meditators appointed by Goenka (N.R.)	Vipassana (Course)	N.R.	Active control: TAU	10 d (11hr/d)	3 m
14	Falkenström., (2010), Sweden	Quasi-experimental, non-randomized, with a control group	IG: 48 (56.00%); CG: 28 (75.00%).	9 (IG: 4; CG: 5)	Experienced meditators	IG: 48.50 (11.30); CG: 46.80 (12.20)	International teachers with extensive experience in teaching Vipassana meditation.	Vipassana (Retreat)	Sitting meditation (N.R) Walking meditation (N.R)	Active control: Regular meditation practice	5–7 d (10hr/d)	-

Table 1 (continued)

#	Authors, Year, Country	Study Design	Sample (% Female)	Dropouts (n)	Participant Type	Age Mean (SD)	Facilitators	Intervention (Format)	Techniques	Control Intervention	Duration	Follow Up
15	Qazinezam et al., (2014), Iran.	Quasi-experimental non-randomized with a control group.	IG: 150 (NR); CG: 170 (NR).	263 (N.R.)	Adults without previous meditation experience	38.00 (3.60); N.R by group.	Teacher (N.R.)	Vipassana (Retreat)	Body-scan (N.R)	Passive control	10 d(10hr/d)	3 m (post-intervention assessment)
16	Cohen et al. (2017), United States.	Quasi-experimental with repeated measures within the group	195 (68.40%)	101	Community sample attending meditation retreats	47.63 (15.82)	Instructors (N.R.)	Vipassana (Retreat)	Sitting meditation (4-5h) Walking meditation(4-5h)	-	7 d (8–10 hr/d)	1 m
17	Al-Hussaini et al., (2001), Oman	Quasi-experimental, non-randomized with a control group	IG: 14 (50.00%);CG: 31 (55.00%)	N.R.	Vipassana meditators (volunteers); University students (control)	IG: 40.14 (12.67); CG: 19.77 (0.84)	N.R.	Vipassana (Retreat)	N.R.	Passive control	10 d (N.R.)	-

Table 1 (continued)

#	Authors, Year, Country	Study Design	Sample (% Female)	Dropouts (n)	Participant Type	Age Mean (SD)	Facilitators	Intervention (Format)	Techniques	Control Intervention	Duration	Follow Up
18	Jarukasemthawee et al., (2019) Thailand &Australia	RCT for the Thai sample; pre- to post-evaluation for the Australian sample.	Thailand:141 (71.60%); Australia: 96 (69.80%).	Thailand: 24 (IG: 14; CG: 10); Australia: 15 (N.R.)	Thailand: Undergraduate students; Australia: University students and community residents.	Thailand: 20.50 (1.20); Australia: 38.20 (11.90); N.R. by group.	Researcher (N.R.)	Insight-Based Program	Meditation on physical and psychological suffering (N.R) Meditation on the impermanence of objects and the link to bodily suffering and impermanence (N.R.) Meditation on the nature of experience, insight into the impure process of the Interconnectedness of feelings, and suffering (N.R.) Meditation on the impermanence of thoughts (N.R.) Meditation on nature, beauty, and gratitude (N.R.) Meditation on the impermanence of nature and interconnectedness of nature and us (N.R.) Meditation on suffering, impermanence,nonself-attachment and compassion (N.R.)	Thailand: Passive control; Australia: -	30 d (N.R)	1.2 m (for both groups)

This table summarizes the main characteristics of the included studies as reported by the original authors. IG: intervention group; CG: control group; RCT: randomized controlled trial; TAU: treatment as usual; N.R.: not reported; d: days; hr/d: hours per day; m: months. The percentage of female participants is shown in parentheses next to the total sample size. Dropouts were reported as absolute numbers, indicating the number of participants who did not complete the intervention or follow-up. When specific data (e.g., age, sex by group, duration, frequency of practice, or other relevant information) were not available, they were indicated as N.R. A dash (–) indicates that the information does not apply to the study design or intervention. Waitlist or no-treatment conditions were classified as passive controls, whereas TAU was reported separately as it represents an active control condition. The follow-up assessments are detailed in the respective columns. The study type and design classification were based on the authors' descriptions or, when unclear, inferred from the methodological details

Study Design and Context

Eighteen studies published between 2001 and 2023 with 2,457 participants were included in this systematic review. All studies examined the effects of DMP, specifically Vipassana and a variant called Insight Meditation (n = 18), primarily conducted in the form of intensive retreats or structured courses, lasting between 5 and 30 days, with a daily practice frequency of between 2 and 11 h, except for two studies that did not report the hours of practice. The designs included quasi-experimental studies with a control group (n = 11; #3, #4, #5, #7, #8, #9, #12, #13, #14, #15, #17), RCTs (n = 4; #1, #2, #11, #18), quasi-experimental studies without a control group (n = 2; #10, #16) and pre–post designs without a control group (n = 1; #6). The countries covered by the sample of studies were United States (n = 6; #5, #6, #8, #9, #13, #16), Thailand (n = 5; #1, #2, #3, #11, #18), Australia (n = 3; #4, #10, #18), Italy (#7), Sweden (#14), Spain (#12), Iran (#15), and Oman (#17), reflecting significant geographical and cultural diversity (n = 8 countries).

Sample Characteristics

The participants were adults from both clinical (n = 6) and non-clinical populations (n = 12). Regarding clinical populations, these included patients with chronic and episodic migraine (#6), female drug users in rehabilitation (#1), people with alcohol dependence in residential treatment (#11), and adults incarcerated in minimum- or maximum-security prisons, some with a history of posttraumatic stress disorder (PTSD) and substance use (#8, #9, #13). Non-clinical samples comprised volunteers enrolled in meditation courses or attending retreats (#4, #7, #10, #17), experienced meditators (#5, #12, #14), adults with no previous meditation experience who participated in intensive Vipassana retreats (#15, #16), psychiatric nurses (#2), university students (#18), and a non-clinical community sample of individuals over 45 years of age (#3)**.** In study #17, volunteers formed the intervention group, while the control group consisted of university students, reflecting differing recruitment sources within the non-clinical population.

Intervention Characteristics

All studies implemented DMPs based on Vipassana or Insight Meditation. The majority were delivered in residential retreat formats, with durations clustered around three main lengths: short 5–8-day courses (n = 3; #1, #2,#11), 6–10-day retreats representing the most common format (n = 12; #3, #4, #6, #7, #8, #9, #10, #13, #14, #15, #16, #17), and longer programs of 21 days or more (n = 3; #5, #12, #18). Daily practice requirements also varied. Most studies reported intensive schedules between 8 and 11 h per day (n = 13; #2, #3, #4, #5, #6, #8,#9, #10, #12, #13, #14, #15, #16), whereas a smaller group implemented shorter daily sessions of 2 to 6 h (n = 3; #1, #7, #11). Two studies did not report the number of daily practice hours (n = 2; #17, #18). In addition to sitting and walking meditation, which were the most frequently reported practices, several interventions incorporated periods of silence and/or theoretical instruction, although not all studies specified the exact contemplative components included. Finally, it is relevant to highlight the lack of reported information on the facilitators of the interventions, with only two studies specifying the years of experience of the person who led the intervention program (n = 2; #1, #11).

Risk of Bias Assessment

Of the 18 included studies, only four were RCTs, while the remaining 14 used non-randomized or pre-post designs. This distribution reflects moderate-to-serious overall risk of bias across the evidence base. Detailed quality assessments are provided in Online Resources 2–5.

The RoB 2.0 evaluation of the four RCTs revealed predominantly "some concerns" or "high risk" judgments across domains, with domain 4 (measurement of the outcome) driving most ratings due to reliance on unblinded, self-reported measures. Additionally, domain 1 (randomization process) was often unclear, and domain 3 (missing outcome data) infrequently reported dropout rates. By contrast, Domains 2 (deviations from intended interventions) and 5 (selection of reported results) generally posed fewer issues. For the 14 non-randomized studies assessed using ROBINS-I V2, the overall risk judgments ranged mainly from "moderate" to "serious." Confounding bias (domain 1) and missing data (domain 5) were the most frequent sources of concern, reflecting limited control over co-interventions and incomplete reporting of outcomes. Outcome measurement bias (domain 6) also contributed to downgraded ratings owing to unblinded assessments, whereas classification and reporting biases were less prominent.

Effects of DMPs

Overall, most studies (16/18) reported significant improvements in at least one mental health or psychological well-being outcome after DMPs. Perhaps these findings tentatively may suggest promising therapeutic effects. There is broader heterogeneity in study designs, measurement tools, and follow-up duration. The following subsections summarize the results for the different variables of interest. See Online Resource 6 for further details.

Effects on Mental Health

Several studies observed changes in depression (n = 7; #1, #5, #10, #11, #16, #17, #18). Two studies found differences favoring the intervention (#10, #18), with moderate to large effect sizes (d = 0.43–0.81). Significant within-group reductions in depression also appeared among those who completed meditation retreats (n = 2; #16, #17), with small to moderate effect sizes (d = 0.30–0.53). Three studies did not report significant changes (#1, #5, #11).

Among studies measuring anxiety (n = 5; #5, #10, #16, #17, #18), two observed within-group decreases among meditation retreat participants (#16, #17). Effect sizes, when reported, were small to moderate (d = 0.31 for #16). Three studies showed between-group reductions in favor of intervention (#5, #17, #18), though only study #18 reported effect sizes (d = 0.41–0.72, small to moderate). One study found no significant changes (#10).

All studies that measured stress reported significant reductions after the intervention (n = 5; #3, #4, #6, #10, #18). Two studies found both intra-group and between-group effects (#3, #4), with effect sizes ranging from small to large (#3; η^2_p = 0.04, #4; r = 0.62). The other three studies found only intra-group reductions (#6, #10, #18), with moderate to large effect sizes (d = 1.09 for #10, d = 1.04 for #18). All studies on psychological distress (n = 4; #6, #9, #14, #17) found significant post-intervention effects. These effects were both intra-group (#6, #17) and between-group (#9, #14). When reported, effect sizes were small to moderate (#14; d = 0.38).

Four studies measured negative affect (n = 4; #6, #8, #10, #12). Three studies reported significant within-group reductions (#6, #8, #10), with only #10 specifying the effect size (d = 0.97, moderate to large). One study did not observe significant changes (#12). One study assessed pain catastrophizing and reported significant within-group effects (#6), but did not report the effect size.

Effects on Psychological Well-being

Psychological well-being indicators included happiness, positive affect, life satisfaction, eudaimonic well-being, and positive functioning. All studies evaluated (n = 8; #3, #4, #6, #7, #10, #12, #15, #18) reported significant improvements in at least one well-being variable within the DMPs intervention group. Some studies also observed significant between-group changes (n = 6; #3, #4, #7, #12, #15, #18). When effect sizes were available, they ranged from moderate to large. Positive affect was the most frequently assessed construct, with all related studies (n = 4; #3, #4, #10, #12) showing significant improvements. Happiness or subjective well-being also increased significantly in all studies that measured this outcome (n = 4; #3, #4, #10, #12). When effect sizes were reported, they ranged from moderate to large (r ≈ 0.28–0.55). Life satisfaction was assessed in two studies (#10, #12). One study (#10) reported significant within-group improvements, yielding a large effect size (d = 0.79), whereas the other study (#12) found no significant changes. One study (#6) examined the quality of life in patients with migraine and reported significant within-group improvements in all quality-of-life domains immediately after intervention. These changes were largely maintained at 3-, 6-, and 12-month follow-ups. However, this study did not report effect sizes or group comparisons.

Effects on Psychological Processes

Psychological processes associated with contemplative practices were evaluated in approximately two-thirds of the studies (12/18), including constructs such as mindfulness, acceptance, self-kindness, emotional regulation, non-attachment, and insight. Of the studies that measured mindfulness (n = 11; #1, #4, #6, #7, #8, #10, #11, #12, #14, #16, #18), nine showed significant intra-group improvements (#4, #6, #7, #8, #10, #12, #14, #16, #18), five reported between-group improvements (#4, #7, #8, #12, #18) favoring DMPs. The effect sizes, when reported, range from small to very large (e.g., r ≈ 0.17–0.67; d/g ≈ 0.40–1.70). In contrast, two studies found no significant changes (#1,#11).

The variables of acceptance and self-kindness were evaluated in one study (#4). Acceptance increased significantly after the intervention and during follow-up in the experimental condition, with effect sizes ranging from small to moderate (r ≈ 0.40–0.47). However, the between-group comparison did not reach statistical significance (p = 0.06). Self-kindness showed significant improvements both within the intervention group and between groups, with moderate to large within-group effects (r ≈ 0.54–0.62), and small to moderate between-group effects in favor of the DMP intervention (r ≈ 0.29).

Emotion regulation and related emotional skills were assessed in three studies (#2, #8, #16). Two of these studies (#2, #8) reported significant improvements in emotional intelligence, conceptualized as a set of skills related to the perception, understanding, and regulation of one's own emotions and those of others (Salovey et al., 1995). One study (#2) showed both within-group improvements and between-group differences favoring the DMP condition at post-intervention and follow-up, while the other study (#8) observed within-group changes from pre- to post-intervention and follow-up. Additionally, one study (#16) examined emotion regulation but found mixed results; significant within-group improvements were detected in emotional avoidance as measured by the Emotional Avoidance Questionnaire (EAQ) (Taylor et al., 2004), whereas no significant changes were observed in emotion regulation as measured by the

Emotional Regulation Questionnaire (Gross & John, 2003). No effect sizes were reported for these outcomes.

Non-attachment was assessed in one study (#12), which showed significant intra-group increases with large effect sizes ($d = 1.10$) and significant inter-group improvements in the DMPs condition. On the other hand, contemplative insight of Buddhist principles was evaluated in an RCT (#18), which showed intra-group increases in introspection from pre- to post-intervention ($g \approx 1.70$), with effects that remained substantial at follow-up ($g \approx 1.10$–1.50). Furthermore, significant inter-group differences favored the DMP-based interventions in both the Thai and Australian samples.

Potential Moderators

While most studies (16/18) demonstrated significant improvements in mental health and well-being, two RCTs (#1, #11) reported no significant between-group differences in Beck Depression Inventory (Beck et al., 1996) scores immediately after the intervention or at the one-month follow-up after a five-day Vipassana course. Both trials employed passive control conditions and brief intervention formats. In contrast, longer retreats (seven–ten days) consistently yielded larger effect sizes (n = 7; #3, #4, #8, #9, #15, #16, #17). Moreover, studies using active comparators (e.g., treatment-as-usual or educational interventions) tended to report smaller between-group differences than those using passive controls (n = 6; #1, #8, #9, #11, #12, #13). Together, these patterns indicate that both intervention duration and comparator type likely moderate the effectiveness of DMPs.

Adverse Effects

Of all the studies included in the review, only two provided information on adverse effects (n = 2; #1, #6). One study (#1) reported transient muscle pain during the first few days of practice due to prolonged sitting postures in Vipassana sessions, which decreased as participants adapted to the practice. The other study (#6) described a single adverse event in which a participant experienced hallucinations during a retreat. The participant discontinued participation and reported no further symptoms at follow-up. The authors noted that the event might be related to concomitant medication use rather than meditation practice itself.

Discussion

The results of this review provide preliminary evidence of DMPs' effectiveness in improving mental health and psychological well-being. Of the included studies, 89% (n = 16) showed significant improvements in at least one mental health or well-being outcome, suggesting the therapeutic potential of these practices. These findings are summarized in Online Resource 6, which presents outcome-level effects across studies. However, these results should be interpreted with caution, given that most of the included studies (n = 14) employed non-randomized or uncontrolled designs, and several showed a moderate to high risk of bias. These methodological limitations reduce the certainty of the evidence and warrant careful interpretation of observed effects.

Key findings included improvements in psychological well-being (n = 8), life satisfaction (n = 1), positive and negative affectivity (n = 4), decreased perceived stress (n = 5), depressive symptoms (n = 4), anxiety (n = 4), and psychological distress (n = 4). Furthermore, one study (Goyal et al., 2023) reported positive changes in the quality of life of patients with migraine, broadening the spectrum of clinical applications. Similarly, two studies (Conklin et al., 2018; Montero-Marín et al., 2016) also showed changes in personality dimensions, finding improvements in self-direction (e.g., goal orientation), cooperation, and conscientiousness, although changes in neuroticism were small or inconsistent. These personality dimensions are commonly conceptualized as reflecting goal-oriented behavior and interpersonal functioning (Cloninger et al., 1994; John et al., 1991), and their improvement may suggest broader and potentially more stable changes in psychological functioning. However, the specific processes underlying these changes were not directly assessed in the included studies.

However, these results were not consistent across populations. While some clinical samples showed reductions in general psychological distress, two studies with participants in substance abuse rehabilitation—both using short interventions (5 days) and passive control groups—found no significant benefits (Wongtongkam & Bhavanaveeranusith, 2019; Wongtongkam et al., 2017). However, these findings may reflect contextual and methodological factors rather than a lack of effectiveness. A plausible explanation for the variability in effects observed across studies is that outcomes may be shaped by moderating factors highlighted in the DMP literature, such as participants' prior preparation, intervention duration, the availability of therapeutic support, and differences in population characteristics (Lamas-Morales et al., 2025; Lindahl & Britton, 2019; Van Gordon et al., 2017).

Another focus of this review was the evaluation of psychological processes commonly examined in contemplative research and potentially associated with DMPs (Hölzel et al., 2011; Vago & Silbersweig, 2012). Of the included studies, twelve assessed at least one psychological process, providing exploratory information that helps clarify how these practices may relate to experiential and regulatory dimensions. Among these studies, the most consistent positive changes were observed in mindfulness levels (n = 9), including facets such as present-moment attention, observation of internal content, non-reactivity, and non-judgment. These findings

suggest that DMPs may facilitate more flexible ways of attending to and relating to internal experiences. In addition, some studies reported improvements in emotional regulation (n = 2), acceptance (n = 1), self-kindness (n = 1), non-attachment (n = 1), and contemplative insight (n = 1). Taken together, these findings point to potential changes in psychological processes commonly associated with contemplative practice. However, these interpretations remain preliminary, as the included studies did not directly assess constructs such as self-flexibility, decentering, or non-duality.

It is important to note that some of these processes, such as mindfulness (as a skill), emotional regulation, acceptance, and self-kindness, were not explicitly trained as specific psychological skills in the DMPs, in contrast to interventions such as MBCT or MBSR, which mainly aim to cultivate mindfulness or acceptance through structured skills training (Gkintoni et al., 2025; Goldsmith et al., 2023). Although all studies provided meditation instruction, and certain contemplative contexts may incorporate explicit teachings on particular principles, the DMPs examined here introduced meditation primarily through a phenomenological, insight-oriented approach that emphasized the observation of impermanence, the dissolution of self-referential patterns, and the cultivation of experiential understanding (Dahl et al., 2015; García-Campayo et al., 2023; Kumari et al., 2024). This suggests that the observed changes may arise from this mode of inquiry, which seeks to transform how individuals perceive and relate to experience rather than focusing mainly on symptom reduction (Abellaneda-Pérez et al., 2024; Lutz et al., 2025).

Although the studies included in this review did not directly assess constructs such as self-flexibility or non-dual consciousness (Gallagher, 2013; Josipovic, 2014), the results suggest that participants in DMPs experience a transformation in their perception of the self after the practices**.** Jarukasemthawee et al. (2019) incorporated an explicit measure of contemplative insight based on Buddhist principles such as impermanence, non-attachment to the self, and a direct understanding of experience. Similarly, Montero-Marín et al. (2016) reported increases in non-attachment, while both Montero-Marín et al. (2016) and Conklin et al. (2018) documented changes in personality dimensions such as self-directedness, cooperativeness, and conscientiousness. Nevertheless, it is essential to acknowledge that these constructs are indirect indicators that may not fully capture the complexity of self-related transformation, as envisioned in contemplative frameworks. These findings may indicate a reorganization of the patterns that shape the self, but more direct and specific measures are needed to confirm such changes. This gap in assessment measures represents a significant methodological and epistemological weakness, making it difficult to establish clear empirical links between hypotheses and effects observed in the DMPs.

The interpretation of the potential differences in the effects of DMPs is limited by the considerable heterogeneity of the included studies, including variability in participant populations, intervention formats, practice dose, and implementation conditions. This heterogeneity is further compounded by inconsistent reporting of dropout rates and adverse effects, which limits the ability to draw robust conclusions regarding tolerability and differential effectiveness across contexts. Several studies have reported relatively high dropout rates, suggesting that intervention intensity, practice time demands, and participant vulnerability may meaningfully influence adherence and subjective experience. Considerations related to intervention demands, adherence, and the need for a structured framework were already present in early clinical work by Kabat-Zinn (1982) with chronic pain populations, in which programs were implemented using highly structured formats characterized by gradual progression and careful follow-up, underscoring the importance of context and support when working with clinically complex populations (Lindahl & Britton, 2019; Van Gordon et al., 2017). Taken together, these factors highlight the need for caution when interpreting the effects of DMPs and emphasize the importance of more systematic reporting of adverse effects, dropout rates, the training background and years of contemplative experience of instructors, and implementation conditions in future research, to advance a more precise understanding of mechanisms of change and the clinical boundaries of these practices.

Limitations and Future Directions

Several limitations should be considered when interpreting the results of this study. First, although the search strategy was grounded in a broad theoretical perspective informed by a deconstructive framework, the available evidence focused exclusively on interventions derived from Vipassana or Insight meditation. Consequently, other deconstructive traditions described in contemplative literature, such as Mahamudra, Dzogchen, or Zen koan practice, remain largely unexplored in empirical research. This represents a significant gap and limits the generalizability of the observed effects across a broader family of DMPs. Second, substantial heterogeneity was observed across studies in terms of participant populations, intervention formats, practice dosages, and implementation contexts, which limited meaningful comparisons and hindered quantitative synthesis. Third, many studies had a moderate to high risk of bias, relied on non-randomized or pre-post designs, had small sample sizes, and reported limited follow-up periods. Furthermore, insufficient reporting of dropout rates, adverse effects, and detailed information regarding instructor training was common, limiting the conclusions about tolerability and

implementation-related factors. Finally, although the review protocol registered in PROSPERO considered the inclusion of grey literature and citation tracking, these strategies were not implemented in this review. In addition, the lack of validated instruments specifically designed to assess experiential and self-related transformations further limits the precision of the conclusions that can be drawn.

Future research on DMPs would benefit from more rigorous study designs, including randomized controlled trials with active control groups, longer follow-up periods, and systematic monitoring of adherence, dropout rates, and adverse effects. Additionally, greater attention should be paid to the characteristics and contemplative expertise of instructors delivering DMPs interventions. Taken together, these factors can meaningfully influence the efficacy and tolerability of interventions, particularly in clinically vulnerable populations. Furthermore, empirical research needs to be broadened beyond Vipassana and Insight-based interventions to include other deconstructive traditions described in contemplative literature. This would help address the current empirical gap, improve the generalizability of the observed effects, and clarify the potential differences in the mechanisms of change across DMPs. Future studies would benefit from integrating methodologies, including qualitative and neurophenomenological approaches, to capture experiential and narrative transformations in self-perception, which may not be fully reflected in conventional psychometric measures (Lutz et al., 2025; Milliere et al., 2018). In parallel with methodological advances, there is a clear need to develop and validate assessment instruments specifically designed to measure the core dimensions emphasized in DMPs. Equanimity has been proposed as a key outcome in contemplative research beyond mindfulness (Desbordes et al., 2014). Recently validated tools, such as the Equanimity Scale-16 (ES-16; Cheever et al., 2023), along with measures targeting non-dual awareness and self-related experiential processes (e.g., Dorjee et al., 2025; Hanley et al., 2018; Soler et al., 2021), offer promising avenues for advancing this field. Additionally, functional and contextual frameworks that differentiate contemplative practices according to their intended depth and clinical demands (e.g., Cayoun & Shires, 2020) may help refine outcome selection and intervention design in future trials. Finally, ethical and contextual considerations should remain central to future research, particularly when implementing DMPs in clinical or high-vulnerability settings. This includes careful participant selection, appropriate differentiation between contemplative and clinical contexts, facilitation by qualified professionals, and availability of psychological support when needed.

Overall, although further research and methodological refinement in the study of such practices remain a priority, this systematic review offers a distinctive contribution by compiling empirical evidence on DMPs. The findings suggest beneficial effects in reducing psychological distress and improving well-being and may indicate a potential impact on changes in self-perception. This transformation may involve processes such as narrative disidentification, self-flexibility, and self-transcendence, in line with contemporary models exploring the self, its states of dissolution, and associated contemplative methods (Berkovich-Ohana et al., 2024; Dahl et al., 2015; Dorjee, 2016; Lamas-Morales et al., 2025). To advance this area of research, emphasis is placed on developing assessment and intervention frameworks that integrate broader experiential dimensions. Proposals such as Pattern Theory of Self or Selflessness (Berkovich-Ohana et al., 2024; Gallagher, 2013) offer a conceptual framework for developing new psychometric tools and clinical approaches that are sensitive to the processes involved in self-transformation. The integration of contemplative science, meditative practices aimed at modifying self-perception, and phenomenological approaches could significantly expand the clinical field, opening up new possibilities for therapeutic change focused on how the self is configured and becomes more flexible, beyond mere symptom reduction (Giommi et al., 2023; Lutz et al., 2025). This review may guide future research in this direction.

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Declarations

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References

Abellaneda-Pérez, K., Potash, R. M., Pascual-Leone, A., & Sacchet, M. D. (2024). Neuromodulation and meditation: A review and synthesis toward promoting well-being and understanding consciousness and brain. *Neuroscience and Biobehavioral Reviews, 166*, Article 105862. https://doi.org/10.1016/j.neubiorev.2024.105862

Al-Hussaini, A., Dorvlo, A. S., Antony, S. X., Chavan, D., Dave, J., Purecha, V., Al-Rahbi, S., & Al-Adawi, S. (2001). Vipassana meditation: A naturalistic, preliminary observation in Muscat. *Journal for Scientific Research. Medical Sciences, 3*(2), 87–92.

Andreu, C. I., Palacios, I., Moënne-Loccoz, C., López, V., Franken, I. H. A., Cosmelli, D., & Slagter, H. A. (2019). Enhanced response inhibition and reduced midfrontal theta activity in experienced Vipassana meditators. *Scientific Reports, 9*(1), Article 13215. https://doi.org/10.1038/s41598-019-49714-9

Beck, A. T., Steer, R. A., & Brown, G. (1996). *Beck Depression Inventory–II (BDI-II)* [Database record]. *APA PsycTests*. https://doi.org/10.1037/t00742-000

Berkovich-Ohana, A., Brown, K. W., Gallagher, S., Barendregt, H., Bauer, P. R., Giommi, F., Nyklíček, I., Ostafin, B., Raffone, A., Slagter, H. A., Trautwein, F. M., & Vago, D. R. (2024). Pattern theory of selflessness: How meditation may transform the self-pattern. *Mindfulness, 15*(8), 2114–2140. https://doi.org/10.1007/s12671-024-02418-2

Britton, W. B., Desbordes, G., Acabchuk, R., Peters, S., Lindahl, J. R., Canby, N. K., Vago, D. R., Dumais, T., Lipsky, J., Kimmel, H., Sager, L., Rahrig, H., Cheaito, A., Acero, P., Scharf, J., Lazar, S. W., Schuman-Olivier, Z., Ferrer, R., & Moitra, E. (2021). From self-esteem to selflessness: An evidence (gap) map of self-related processes as mechanisms of mindfulness-based interventions. *Frontiers in Psychology, 12*, Article 730972. https://doi.org/10.3389/fpsyg.2021.730972

Bowen, S., Witkiewitz, K., Dillworth, T. M., Chawla, N., Simpson, T. L., Ostafin, B. D., Larimer, M. E., Blume, A. W., Parks, G. A., & Marlatt, G. A. (2006). Mindfulness meditation and substance use in an incarcerated population. *Psychology of Addictive Behaviors, 20*(3), 343–347. https://doi.org/10.1037/0893-164X.20.3.343

Cayoun, B. A., & Shires, A. G. (2020). Co-emergence reinforcement and its relevance to interoceptive desensitization in mindfulness and therapies aiming at transdiagnostic efficacy. *Frontiers in Psychology, 11*, Article 545945. https://doi.org/10.3389/fpsyg.2020.545945

Cheever, J., Cayoun, B. A., Elphinstone, B., & Shires, A. G. (2023). Confirmation and validation of the Equanimity Scale-16 (ES-16). *Mindfulness, 14*(1), 148–158. https://doi.org/10.1007/s12671-022-02029-9

Chiesa, A. (2010). Vipassana meditation: Systematic review of current evidence. *Journal of Alternative and Complementary Medicine (New York, n.y.), 16*(1), 37–46. https://doi.org/10.1089/acm.2009.0362

Chou, T., Deckersbach, T., Dougherty, D. D., & Hooley, J. M. (2023). The default mode network and rumination in individuals at risk for depression. *Social Cognitive and Affective Neuroscience, 18*(1), Article nsad032. https://doi.org/10.1093/scan/nsad032

Cloninger, C. R., Przybeck, T. R., Svrakic, D. M., & Wetzel, R. D. (1994). *Temperament and Character Inventory (TCI)* [Database record]. *APA PsycTests*. https://doi.org/10.1037/t03902-000

Cohen, J. N., Jensen, D., Stange, J. P., Neuburger, M., & Heimberg, R. G. (2017). The immediate and long-term effects of an intensive meditation retreat. *Mindfulness, 8*(4), 1064–1077. https://doi.org/10.1007/s12671-017-0682-5

Conklin, Q. A., King, B. G., Zanesco, A. P., Lin, J., Hamidi, A. B., Pokorny, J. J., Álvarez-López, M. J., Cosín-Tomás, M., Huang, C., Kaliman, P., Epel, E. S., & Saron, C. D. (2018). Insight meditation and telomere biology: The effects of intensive retreat and the moderating role of personality. *Brain, Behavior, and Immunity, 70*, 233–245. https://doi.org/10.1016/j.bbi.2018.03.003

Dahl, C. J., Lutz, A., & Davidson, R. J. (2015). Reconstructing and deconstructing the self: Cognitive mechanisms in meditation practice. *Trends in Cognitive Sciences, 19*(9), 515–523. https://doi.org/10.1016/j.tics.2015.07.001

Desbordes, G., Gard, T., Hoge, E. A., Hölzel, B. K., Kerr, C., Lazar, S. W., Olendzki, A., & Vago, D. R. (2014). Moving beyond mindfulness: Defining equanimity as an outcome measure in meditation and contemplative research. *Mindfulness, 5*(3), 356–372. https://doi.org/10.1007/s12671-013-0269-8

Dorjee, D. (2016). Defining contemplative science: The metacognitive self-regulatory capacity of the mind, context of meditation practice, and modes of existential awareness. *Frontiers in Psychology, 7*, Article 1788. https://doi.org/10.3389/fpsyg.2016.01788

Dorjee, D., Nguyen, T., & Märtins, O. (2025, June 4). *Inventory of modes of existential awareness (IMEA): A new tool for assessing distinct self-transcendent and non-dual awareness states. OSF Preprints*. https://doi.org/10.31219/osf.io/smqeg_v2

Dor-Ziderman, Y., Berkovich-Ohana, A., Glicksohn, J., & Goldstein, A. (2013). Mindfulness-induced selflessness: A MEG neurophenomenological study. *Frontiers in Human Neuroscience, 7*, Article 582. https://doi.org/10.3389/fnhum.2013.00582

Falkenström, F. (2010). Studying mindfulness in experienced meditators: A quasi-experimental approach. *Personality and Individual Differences, 48*(3), 305–310. https://doi.org/10.1016/j.paid.2009.10.022

Furnell, M., Van Gordon, W., & Elander, J. (2024). Wisdom-based Buddhist-derived meditation practices for prosocial behaviour: A systematic review. *Mindfulness, 15*(3), 539–558. https://doi.org/10.1007/s12671-024-02323-8

Galante, J., Friedrich, C., Collaboration of Mindfulness Trials (CoMinT), Dalgleish, T., Jones, P. B., & White, I. R. (2023). Systematic review and individual participant data meta-analysis of randomized controlled trials assessing mindfulness-based programs for mental health promotion. *Nature Mental Health, 1*, 462–476. https://doi.org/10.1038/s44220-023-00081-5

Gallagher, S. (2013). A pattern theory of self. *Frontiers in Human Neuroscience, 7*, Article 443. https://doi.org/10.3389/fnhum.2013.00443

Gallagher, S., Raffone, A., Berkovich-Ohana, A., Barendregt, H. P., Bauer, P. R., Brown, K. W., Giommi, F., Nyklíček, I., Ostafin, B. D., Slagter, H. A., Trautwein, F. M., & Vago, D. R. (2024). The self-pattern and Buddhist psychology. *Mindfulness, 15*(4), 795–803. https://doi.org/10.1007/s12671-023-02118-3

García-Campayo, J., López Del Hoyo, Y., & Navarro-Gil, M. (2021). Contemplative sciences: A future beyond mindfulness. *World Journal of Psychiatry, 11*(4), 87–93. https://doi.org/10.5498/wjp.v11.i4.87

García-Campayo, J., Hijar-Aguinaga, R., López-Del-Hoyo, Y., Magallón-Botaya, R., Fernández-Martínez, S., Barceló-Soler, A., Soler-Ribaudi, J., & Montero-Marin, J. (2023). Effectiveness of four deconstructive meditative practices on well-being and

self-deconstruction: Study protocol for an exploratory randomized controlled trial. *Trials, 24*(1), Article 125. https://doi.org/10.1186/s13063-023-07151-0

Giommi, F., Bauer, P. R., Berkovich-Ohana, A., Barendregt, H., Brown, K. W., Gallagher, S., Nyklíček, I., Ostafin, B., Raffone, A., Slagter, H. A., Trautwein, F. M., & Vago, D. R. (2023). The (in)flexible self: Psychopathology, mindfulness, and neuroscience. *International Journal of Clinical and Health Psychology, 23*(4), Article 100381. https://doi.org/10.1016/j.ijchp.2023.100381

Gkintoni, E., Vassilopoulos, S. P., & Nikolaou, G. (2025). Mindfulness-based cognitive therapy in clinical practice: A systematic review of neurocognitive outcomes and applications for mental health and well-being. *Journal of Clinical Medicine, 14*(5), Article 1703. https://doi.org/10.3390/jcm14051703

Goldsmith, E. S., Koffel, E., Ackland, P. E., Hill, J., Landsteiner, A., Miller, W., Stroebel, B., Ullman, K., Wilt, T. J., & Duan-Porter, W. D. (2023). Evaluation of implementation strategies for cognitive behavioral therapy (CBT), acceptance and commitment therapy (ACT), and mindfulness-based stress reduction (MBSR): A systematic review. *Journal of General Internal Medicine, 38*(12), 2782–2791. https://doi.org/10.1007/s11606-023-08140-4

Goyal, M., Haythornthwaite, J. A., Jain, S., Peterlin, B. L., Mehrotra, M., Levine, D., Rosenberg, J. D., Minges, M., Seminowicz, D. A., & Ford, D. E. (2023). Intensive mindfulness meditation reduces frequency and burden of migraine: An unblinded single-arm trial. *Mindfulness, 14*(2), 406–417. https://doi.org/10.1007/s12671-023-02073-z

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*(2), 348–362. https://doi.org/10.1037/0022-3514.85.2.348

Hanley, A. W., Nakamura, Y., & Garland, E. L. (2018). The Nondual Awareness Dimensional Assessment (NADA): New tools to assess nondual traits and states of consciousness occurring within and beyond the context of meditation. *Psychological Assessment, 30*(12), 1625–1639. https://doi.org/10.1037/pas0000615

Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science, 6*(6), 537–559. https://doi.org/10.1177/1745691611419671

Jarukasemthawee, S., Halford, W. K., & McLean, J. P. (2019). When east meets west: A randomized controlled trial and pre- to post-program evaluation replication of the effects of insight-based mindfulness on psychological well-being. *Journal of Psychotherapy Integration, 29*(3), 307–323. https://doi.org/10.1037/int0000179

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *Big Five Inventory (BFI)* [Database record]. *APA PsycTests*. https://doi.org/10.1037/t07550-000

Josipovic, Z. (2014). Neural correlates of nondual awareness in meditation. *Annals of the New York Academy of Sciences, 1307*, 9–18. https://doi.org/10.1111/nyas.12261

Josipovic, Z., & Baars, B. J. (2015). Editorial: What can neuroscience learn from contemplative practices? *Frontiers in Psychology, 6*, Article 1731. https://doi.org/10.3389/fpsyg.2015.01731

Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry, 4*(1), 33–47. https://doi.org/10.1016/0163-8343(82)90026-3

Kornfield, J. (1979). Intensive insight meditation: A phenomenological study. *Journal of Transpersonal Psychology, 11*(1), 41–58.

Krygier, J. R., Heathers, J. A., Shahrestani, S., Abbott, M., Gross, J. J., & Kemp, A. H. (2013). Mindfulness meditation, well-being, and heart rate variability: A preliminary investigation into the impact of intensive Vipassana meditation. *International Journal of Psychophysiology, 89*(3), 305–313. https://doi.org/10.1016/j.ijpsycho.2013.06.017

Kumari, V., Tailor, U., Saifullah, A., Pandey, R., & Antonova, E. (2024). Non-dual awareness and sensory processing in meditators: Insights from startle reflex modulation. *Consciousness and Cognition, 123*, Article 103722. https://doi.org/10.1016/j.concog.2024.103722

Lamas-Morales, P., Hijar-Aguinaga, R., & García-Campayo, J. (2025). Deconstructive meditations and psychotherapy: Transforming the perception of the self. *World Journal of Psychiatry, 15*(6), Article 107505. https://doi.org/10.5498/wjp.v15.i6.107505

Lindahl, J. R., & Britton, W. B. (2019). I have this feeling of not really being here": Buddhist meditation and changes in sense of self. *Journal of Consciousness Studies, 26*(7–8), 157–183.

Lutz, A., Abdoun, O., Dor-Ziderman, Y., Trautwein, F. M., & Berkovich-Ohana, A. (2025). An overview of neurophenomenological approaches to meditation and their relevance to clinical research. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 10*(4), 411–424. https://doi.org/10.1016/j.bpsc.2024.11.008

MacKenzie, M. B., & Kocovski, N. L. (2016). Mindfulness-based cognitive therapy for depression: Trends and developments. *Psychology Research and Behavior Management, 9*, 125–132. https://doi.org/10.2147/PRBM.S63949

Methley, A. M., Campbell, S., Chew-Graham, C., McNally, R., & Cheraghi-Sohi, S. (2014). PICO, PICOS and SPIDER: A comparison study of specificity and sensitivity in three search tools for qualitative systematic reviews. *BMC Health Services Research, 14*, Article 579. https://doi.org/10.1186/s12913-014-0579-0

Miller, J. T., & Verhaeghen, P. (2022). Mind full of kindness: Self-awareness, self-regulation, and self-transcendence as vehicles for compassion. *BMC Psychology, 10*, Article 188. https://doi.org/10.1186/s40359-022-00888-4

Millière, R., Carhart-Harris, R. L., Roseman, L., Trautwein, F. M., & Berkovich-Ohana, A. (2018). Psychedelics, meditation, and self-consciousness. *Frontiers in Psychology, 9*, Article 1475. https://doi.org/10.3389/fpsyg.2018.01475

Montero-Marin, J., Puebla-Guedea, M., Herrera-Mercadal, P., Cebolla, A., Soler, J., Demarzo, M., Vazquez, C., Rodríguez-Bornaetxea, F., & García-Campayo, J. (2016). Psychological effects of a 1-month meditation retreat on experienced meditators: The role of non-attachment. *Frontiers in Psychology, 7*, Article 1935. https://doi.org/10.3389/fpsyg.2016.01935

Nave, O., Trautwein, F. M., Ataria, Y., Dor-Ziderman, Y., Schweitzer, Y., Fulder, S., & Berkovich-Ohana, A. (2021). Self-boundary dissolution in meditation: A phenomenological investigation. *Brain Sciences, 11*(6), Article 819. https://doi.org/10.3390/brainsci11060819

Ong, C. W., Barthel, A. L., & Hofmann, S. G. (2024). The relationship between psychological inflexibility and well-being in adults: A meta-analysis of the Acceptance and Action Questionnaire. *Behavior Therapy, 55*(1), 26–41. https://doi.org/10.1016/j.beth.2023.05.007

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan: A web and mobile app for systematic reviews. *Systematic Reviews, 5*, Article 210. https://doi.org/10.1186/s13643-016-0384-4

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ (Clinical research ed.), 372*, Article n71. https://doi.org/10.1136/bmj.n71

Perelman, A. M., Miller, S. L., Clements, C. B., Rodriguez, A., Allen, K., & Cavanaugh, R. (2012). Meditation in a deep South prison: A

longitudinal study of the effects of Vipassana. *Journal of Offender Rehabilitation, 51*(3), 176–198. https://doi.org/10.1080/10509674.2011.632814

Qazinezam, M., Momtazi, S., & Yaghubi, N. (2014). Study the effects of Vipassana meditation on increasing the level of psychological well-being of people. *Biosciences Biotechnology Research Asia, 11*(3), 1657–1665. https://doi.org/10.13005/bbra/1565

Salovey, P., Mayer, J. D., Goldman, S. L., Turvey, C., & Palfai, T. P. (1995). Emotional attention, clarity, and repair: Exploring emotional intelligence using the Trait Meta Mood Scale. In J. W. Pennebaker (Ed.), *Emotion, disclosure, & health* (pp. 125–154). American Psychological Association. https://doi.org/10.1037/10182-006

Schweitzer, Y., Trautwein, F. M., Dor-Ziderman, Y., Nave, O., David, J., Fulder, S., & Berkovich-Ohana, A. (2024). Meditation-induced self-boundary flexibility and prosociality: A MEG and behavioral measures study. *Brain Sciences, 14*(12), Article 1181. https://doi.org/10.3390/brainsci14121181

Simpson, T. L., Kaysen, D., Bowen, S., MacPherson, L. M., Chawla, N., Blume, A., Marlatt, G. A., & Larimer, M. (2007). PTSD symptoms, substance use, and vipassana meditation among incarcerated individuals. *Journal of Traumatic Stress, 20*(3), 239–249. https://doi.org/10.1002/jts.20209

Soler, J., Montero-Marin, J., Domínguez-Clavé, E., González, S., Pascual, J. C., Cebolla, A., Demarzo, M., Analayo, B., & García-Campayo, J. (2021). Decentering, acceptance, and non-attachment: Challenging the question "Is it me?" *Frontiers in Psychiatry, 12*, Article 659835. https://doi.org/10.3389/fpsyt.2021.659835

Surinrut, P., Auamnoy, T., & Sangwatanaroj, S. (2016). Enhanced happiness and stress alleviation upon insight meditation retreat: Mindfulness, a part of traditional Buddhist meditation. *Mental Health, Religion & Culture, 19*(7), 648–659. https://doi.org/10.1080/13674676.2016.1207618

Szekeres, R. A., & Wertheim, E. H. (2015). Evaluation of Vipassana meditation course effects on subjective stress, well-being, self-kindness and mindfulness in a community sample: Post-course and 6-month outcomes. *Stress and Health, 31*(5), 373–381. https://doi.org/10.1002/smi.2562

Taylor, C. T., Laposa, J. M., & Alden, L. E. (2004). Is avoidant personality disorder more than just social avoidance? *Journal of Personality Disorders, 18*(6), 571–594. https://doi.org/10.1521/pedi.18.6.571.54792

Trautwein, F. M., Schweitzer, Y., Dor-Ziderman, Y., Nave, O., Ataria, Y., Fulder, S., & Berkovich-Ohana, A. (2024). Suspending the embodied self in meditation attenuates beta oscillations in the posterior medial cortex. *Journal of Neuroscience, 44*(26), Article e1182232024. https://doi.org/10.1523/JNEUROSCI.1182-23.2024

Vago, D. R., & Silbersweig, D. A. (2012). Self-awareness, self-regulation, and self-transcendence (S-ART): A framework for understanding the neurobiological mechanisms of mindfulness. *Frontiers in Human Neuroscience, 6*, Article 296. https://doi.org/10.3389/fnhum.2012.00296

Van Gordon, W., Shonin, E., & Garcia-Campayo, J. (2017). Are there adverse effects associated with mindfulness? *Australian and New Zealand Journal of Psychiatry, 51*(10), 977–979. https://doi.org/10.1177/0004867417716309

Van Gordon, W., & Shonin, E. (2020). Second-generation mindfulness-based interventions: Toward more authentic mindfulness practice and teaching. *Mindfulness, 11*(1), 1–4. https://doi.org/10.1007/s12671-019-01252-1

Vongareesawat, C., Thapinta, D., Disayavanish, C., Anders, R. L., & Tungpunkom, P. (2012). Effect of insight meditation on enhancing emotional intelligence among Thai psychiatric nurses. *Chiang Mai University Journal of Natural Sciences, 11*(1), 61–75.

World Health Organization. (2025, October 8). *Mental health: Strengthening our response*. https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

Wongtongkam, N., & Bhavanaveeranusith, P. (2019). A pilot study of Vipassana meditation with female drug users at a rehabilitation centre, Thailand. *Therapeutic Communities : The International Journal of Therapeutic Communities, 40*(3/4), 132–141. https://doi.org/10.1108/TC-05-2019-0005

Wongtongkam, N., Lampoo, S., Choocherd, P., & Chiangkuntod, S. (2017). Partial efficacy of Vipassana mindfulness approach in alcohol-dependent persons. *Alcoholism Treatment Quarterly, 36*(1), 3–14. https://doi.org/10.1080/07347324.2017.1355224

Zhang, D., Lee, E. K. P., Mak, E. C. W., Ho, C. Y., & Wong, S. Y. S. (2021). Mindfulness-based interventions: An overall review. *British Medical Bulletin, 138*(1), 41–57. https://doi.org/10.1093/bmb/ldab005