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REVIEW

Psychedelic-Assisted Psychotherapy and Mindfulness-Based Cognitive Therapy: Potential Synergies

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Abstract

Objectives The mindfulness-informed intervention that has so far received the most attention as an adjunct to psychedelic-assisted psychotherapy is Acceptance and Commitment Therapy (ACT), but little remains known about potential synergies between psychedelic-assisted psychotherapy and mindfulness-based interventions such as Mindfulness-Based Cognitive Therapy (MBCT). This paper examines and evaluates the therapeutic compatibility of MBCT with psychedelic-assisted psychotherapy, and their potential synergies.

Methods This study represents a narrative review of the current literature on psychedelic-assisted psychotherapy and MBCT.

Results We demonstrate how MBCT targets core processes including acceptance, being present, concentration, decentering and embracing difficulties — and outline why strengthening these capacities with systematic meditation training may prove invaluable during the preparation, dosing and integration phases of psychedelic-assisted psychotherapy.

Conclusions MBCT's emphasis on systematic training in mindfulness meditation and fostering nonjudgmental presence aligns well with the states of consciousness induced by psychedelics, highlighting its potential to enhance various stages of both the psychedelic experience and subsequent integration. By equipping individuals with effective mindfulness and cognitive restructuring techniques, MBCT may offer advantages beyond those provided by ACT, such as the ability to skillfully navigate and manage challenging experiences that can emerge during different phases of the psychedelic experience and integration. This suggests that MBCT's unique approach may complement psychedelic-assisted psychotherapy in ways that ACT may not fully address, particularly in the context of handling challenging experiences.

Keywords Mindfulness · MBCT · Psychedelics · Psilocybin · LSD

The research on psychedelics has recently received a resurgence of scientific interest, with promising findings in clinical trials for a range of internalising disorders (Nutt & Carhart-Harris, 2021). Despite these advancements, identifying optimal methods to enhance the therapeutic potential of psychedelics remains underexplored. This paper evaluates the compatibility and potential synergies of Mindfulness-Based Cognitive Therapy (MBCT) as an adjunct to psychedelic-assisted therapies, specifically in comparison to the alternate approach of Acceptance and Commitment Therapy (ACT).

Psychedelic substances, such as psilocybin, lysergic acid diethylamide, ayahuasca (a brew containing N,N-dimethyltryptamine), and mescaline-containing cacti (e.g. Sexton et al., 2019), are differentiated from other psychoactive compounds due to their agonist activity at serotonin 2A receptors (Quednow, 2012). This interaction can cause changes in the brain, resulting in profound emotional, cognitive, and perceptual effects (Stoliker et al., 2022c, d; Studerus et al., 2010). At sufficient doses, these subjective effects can lead to the emergence of mystical-type experiences, often characterised by a dissolving of

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self-boundaries that are referred to as occurrences of ego-dissolution (Griffiths et al., 2018; Lebedev et al., 2015; Stoliker et al., 2022b, 2023. Intriguingly, this dissolution of self-boundaries has been linked to potential therapeutic benefits and suggests that therapeutic outcomes may depend upon the psychological quality of the psychedelic experience (Roseman et al., 2018; Yaden & Griffiths, 2020). Psilocybin has been granted "breakthrough treatment" status by the US Food and Drug Administration (FDA) for its potential benefits for treatment-resistant depression, the first time a pharmacological treatment has been given this designation in 40 years (Heal et al., 2023).

The therapeutic effects of psychedelics have been shown to be sensitive to context (Carhart-Harris et al., 2018), which highlights the importance of psychological and environmental factors — commonly referred to as "set and setting" (Leary et al., 1995). The "set" refers to the intention and mindset of the participant before the psychedelic experience (e.g. hopes, fears, beliefs, personality traits). This is important for minimising the likelihood of challenging experiences — things such as feelings of anxiety, fear, paranoia, confusion, and loss of control — which are commonly reported in psychedelic experiences, especially among naturalistic users (Simonsson et al., 2023). "Setting" refers to the physical and therapeutic environment in which the psychedelic experience takes place (e.g. therapist characteristics, music, lighting and décor). Both are important factors to minimise risk and maximise safety and positive outcomes (Johnson et al., 2008).

The administration of psychedelics in clinical trials has generally occurred in the context of psychedelic-assisted psychotherapy, which normally involves preparation and integration phases, in addition to support provided during the psychedelic experience (Watts & Luoma, 2020). The preparation phase aims to initiate the therapeutic process and prepare participants for the dosing session. Key considerations and target processes include (1) educating people about what to expect during dosing sessions, (2) providing them with tools to deal with the intense thoughts and emotions that commonly arise during dosing, and (3) trusting (rather than resisting) the psychedelic process. Indeed, surrender or letting go into the psychedelic process — rather than resisting this process — has been associated with self-reported positive changes (Russ et al., 2019). The integration phase aims to continue the therapeutic process and integrate events experienced during the psychedelic experience (Sloshower et al., 2020). The content of sessions in the preparation and integration phases has varied considerably across clinical trials, and the most useful and cost-effective approach for psychedelic-assisted psychotherapy remains an open question (Luoma et al., 2019).

Mindfulness-Based Interventions as Potential Adjuncts for Psychedelic-Assisted Psychotherapy

There have recently been attempts to integrate psychedelic-assisted psychotherapy with third-wave cognitive behavioural therapies (Heuschkel & Kuypers, 2020; Walsh & Thiessen, 2018) — often referred to as mindfulness-based interventions (MBIs). Two recent conceptual reviews have explored the potential synergies between MBIs (or the construct of mindfulness more broadly) and psychedelic-assisted psychotherapy (Eleftheriou & Thomas, 2021; Payne et al., 2021). These reviews outline high-level synergies between mindfulness and psychedelics, and the present review attempts to explore these relationships in more granular detail — specifically by examining ways MBCT (Segal et al., 2002) may be useful as an adjunct to the psychedelic process.

MBIs share characteristics that may facilitate preparation for and integration of the psychedelic experience (e.g. emotion regulation, distress tolerance, decentering and mindfulness). However, MBIs vary widely in their content and emphasis (Van Dam et al., 2018) and commonly produce different effects (Singer & Engert, 2019). It is therefore important to elucidate more fully which types of MBIs or mindfulness processes may be most suitable in conjunction with psychedelic-assisted psychotherapy.

A commonly used definition of mindfulness is the awareness that arises when one pays nonjudgmental, non-reactive attention to present-moment experience (Kabat-Zinn, 1982). It has been described both as a skill and as a trait (Bishop et al., 2004). As a skill, mindfulness can be cultivated through formal meditation (attention training) and informal practice (paying mindful attention to everyday activities). It is worth noting that the term "mindfulness meditation" is used within the literature to refer to both focused attention and open awareness meditation, which are related but also distinct, and involve different neural areas (Lutz et al., 2008). A third conceptually and neurologically distinct class of meditation that is nonetheless commonly included in MBIs is loving kindness meditation (Lippelt et al., 2014), also referred to as "metta" and "befriending" meditation.

While the Kabat-Zinn (1982) definition forms the basis of many mindfulness studies, there have been more recent attempts at refining and reformulating this definition to provide greater specificity. One such attempt, by Singer and Engert (2019), emphasises three distinct yet overlapping elements of mindfulness: *presence* (consisting of present-moment attention and interoceptive awareness), *perspective* (consisting of socio-cognitive skills including meta-cognition as well as perspective-taking on self and

others) and *affect* (consisting of socio-affective skills such as loving kindness, compassion, prosocial motivation and acceptance of difficult emotions). Each of these elements is associated with different meditation practices, activation of neural areas, and outcomes produced.

In general, consistent mindfulness practice over time is recognised to result in increased trait mindfulness (Kuyken et al., 2015), which has in turn been associated with improved attentional control, increased awareness of internal and external experiences, and reduced physiological, emotional and behavioural reactivity (Chambers et al., 2009; Creswell & Lindsay, 2014; Garland et al., 2017). Mindfulness practice also cultivates attitudinal qualities such as acceptance, openness, curiosity, compassion and nonjudgment (Crane et al., 2017). While far from clear whether these improvements result equally from formal or informal mindfulness practice, there is some evidence demonstrating that formal practice (meditation) results in greater improvements in trait mindfulness than informal practice (Kakoschke et al., 2021).

The MBI that has so far received the most attention as a potential adjunct to psychedelic-assisted psychotherapy in the literature is ACT. Technically a "mindfulness-informed" rather than "mindfulness-based" therapy, ACT (Hayes et al., 2012) combines mindfulness and acceptance strategies and is designed to increase psychological flexibility (Ciarrochi et al., 2010). In particular, it has been shown to decrease avoidance of uncomfortable thoughts and emotions. This is important because such avoidance has been posited to underlie many forms of mental health problems (Spinhoven et al., 2014). This reduced avoidance facilitates full engagement with life, predicting positive psychosocial functioning (Öst, 2014), and in the psychedelic research, it has been argued that it may also mediate the relationship between acute psychedelic effects and decreased anxiety and depression symptoms (Close et al., 2020). Decreased experiential avoidance may also reduce the likelihood of challenging experiences (commonly referred to as "bad trips") — which can range from unpleasant physical sensations all the way to anxiety, panic, depersonalisation, paranoia, and fear of insanity — during psychedelic-assisted psychotherapy (Gashi et al., 2021).

While ACT may therefore be a useful adjunct to psychedelic-assisted psychotherapy, it is not yet clear whether this specific therapeutic approach outperforms other MBIs. In fact, one of the most widely researched and validated MBIs is MBCT (Segal et al., 2002). MBCT has a number of elements that may prove highly synergistic with psychedelic-assisted psychotherapy. Furthermore, as we will argue, MBCT has certain unique features that may make it particularly useful in psychedelic therapy settings. In the next section, we describe MBCT and highlight the processes that may facilitate the psychedelic process, and then go on to describe the unique features that may differentiate MBCT from ACT and support its integration into psychedelic-assisted therapy models.

Mindfulness-Based Cognitive Therapy

MBCT is an 8-week, group-based program that was originally developed to reduce depressive relapse (Segal et al., 2002). MBCT combines core features of cognitive behavioural therapy with training in mindfulness. The mindfulness training element aims to systematically cultivate present-moment attention and awareness, as well as attitudes such as curiosity, openness to experience and kindness (Bishop et al., 2004). Multiple meta-analyses have shown MBCT significantly reduces the likelihood of depressive relapse (e.g. Goldberg et al., 2019; Kuyken al., 2016; Piet & Hougaard, 2011) and may be at least as effective as antidepressant medication (Kuyken et al., 2015; see also Breedvelt et al., 2021; Huijbers et al., 2015). In addition to reducing depressive relapse, meta-analyses also show that MBCT can have a significant impact on mental health and wellbeing more generally in both clinical (e.g. Chiesa & Serretti, 2011; Galante et al., 2013; Ghahari et al., 2020; Goldberg et al., 2019; Gu et al., 2015; Xuan et al., 2020) and nonclinical samples (e.g. Querstret et al., 2020). In order to better suit nonclinical populations, adaptations of MBCT have been created, such as MBCT for Life (MBCT-L; Bernard et al., 2017) and *Finding Peace in a Frantic World* (Williams & Penman, 2011).

Processes Common to MBCT and ACT That May Aid Psychedelic-Assisted Psychotherapy

Both MBCT and ACT share numerous common elements that may complement psychedelic-assisted psychotherapy. These are outlined in the following section. While existing research suggests the potential utility of ACT in psychedelic-assisted psychotherapy contexts (e.g. Luoma et al., 2019), comprehensive evaluations of MBCT in this field are lacking. Therefore, we will focus on examining MBCT and its potential to enhance therapeutic efficacy in psychedelic-assisted psychotherapy. In particular, we will discuss how the structure and practices of MBCT may integrate well within the preparation and integration phases of psychedelic-assisted psychotherapy and psychedelic experiences more generally.

Acceptance

Acceptance refers to a willingness to embrace an event or situation (Block-Lerner et al., 2009) — allowing and

remaining fully present with any sensory, cognitive and emotional experiences as they arise, moment by moment. Acceptance may prove beneficial in the context of psychedelic-assisted psychotherapy, as research shows participants commonly report aversion to various aspects of the psychedelic experience, which may encompass not only unpleasant physical sensations and emotions but also the emergence of disturbing memories or states characterised by a sense of impaired control and cognition (Studerus et al., 2010; Watts et al., 2017).

Although the current body of evidence is still in its nascent stages, it indicates that challenging experiences themselves do not necessarily predict negative outcomes, although positive experiences have been shown to predict positive outcomes (Haijen et al., 2018; Roseman et al., 2018). For example, in a cross-sectional study, the degree of difficulty of challenging experiences was positively associated, and duration was negatively associated, with enduring increases in wellbeing (Carbonaro, 2016). These findings suggest that prolonged challenging experiences, which are not overcome during the experience, may not lead to improved mental health outcomes, relative to when they are overcome (or "worked through") during the psychedelic experience.

A lack of acceptance of challenging experiences may lead to experiential avoidance, aversion, and resistance, which in turn prolongs the negative experiences and curtails the therapeutic potential afforded by the psychedelic state. Acceptance may therefore be a key factor in allowing the challenging experiences — and facilitate moving through them and towards emotional breakthrough and psychological insight (Roseman et al., 2019), which may lead to enduring improvements to wellbeing. Indeed, a recent meta-analysis showed that high levels of trait openness and acceptance were associated with positive and mystical-type experiences during the acute psychedelic experience (Aday et al., 2021). Such positive experiences have been shown to predict post-acute positive effects of psychedelic use such as reduced psychopathology and enhanced wellbeing (Lebedev et al., 2016; Uthaug et al., 2018, Roseman et al., 2018). Meanwhile, low levels of openness have been associated with negative (or anxious) ego-dissolution and acute adverse reactions (Aday et al., 2021). Moreover, openness to experience is a personality trait that may be increased following psychedelic use, suggesting an underlying synergy between the benefits of openness and the effects of psychedelics (Maclean et al., 2011). It should be noted, however, that this effect may be small (Goldberg et al., 2020). Although distinct concepts, openness and acceptance can work together, being open to experiences can help facilitate acceptance. It may be that cultivating acceptance via MBCT during the preparation phase of psychedelic-assisted psychotherapy better equips participants to accept challenging experiences if and when they arise during dosing sessions.

Acceptance may also play a valuable role during the integration phase of psychedelic-assisted psychotherapy. Originally designed to prevent depressive relapse, MBCT fosters acceptance of depressogenic thoughts, unpleasant emotions, and bodily sensations. Research has shown that resisting depressogenic thinking can lead to over-engagement with such thoughts and memories, intensifying them, whereas acceptance contributes to reduced depressive symptoms and relapse (van der Velden et al., 2015). MBCT has the potential to not only lessen the effects of negative reactions that may arise during psychedelic experiences but also enhance positive outcomes by fostering resilience. Practising acceptance through mindfulness may mitigate distress and bolster positive responses to life challenges, making MBCT a potentially valuable tool.

Being in the Moment

Mindfulness also emphasises present-moment awareness. Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990), from which MBCT was derived, includes the concepts of "doing mode" and "being mode". Doing mode refers to the goal-directed, problem-solving state of mind in which humans spend much of their lives. While useful for solving external problems (e.g. getting work done or planning a holiday), when applied to the internal world of thoughts and feelings, doing mode can lead to rumination, worry and obsessive thinking. When this mode of mind is applied to situations that cannot be "solved" (e.g. rumination or feelings of depression or anxiety), these situations start to occupy more and more of one's awareness, and thereby become exacerbated. MBCT draws on this being/doing mode distinction and encourages people with depressive symptoms — or stress and other mental health issues in the cases of the MBCT-L and *Finding Peace in a Frantic World* derivatives — to disengage doing mode and instead engage its opposite, being mode. Engaging being mode naturally leads to accepting and allowing whatever is experienced, and enhances present-moment awareness. Indeed, present-moment awareness also enables acceptance/allowing, and these constructs may share a synergistic relationship. These capacities have concomitant positive implications for wellbeing, since they result in decreased worry, rumination and experiential avoidance, and an enhanced ability to experience the richness of each moment, as it is.

During the preparation phase, cultivating present-moment awareness may be protective if psychedelic-assisted psychotherapy participants start to worry about the impending dosing session. Apprehension and anxiety prior to dosing are commonly reported anecdotally (Haijen et al., 2018; Johnstad, 2021). Staying in the moment — rather than worrying

about a future event — may reduce participant distress in the lead-up to a dosing session, providing a better "set" during the session.

This may be especially true when present-moment focus is combined with acceptance, as outlined above, as this combination has been shown in at least one case study to produce beneficial effects over and above either present-moment awareness or acceptance by themselves (Tifft et al., 2022).

During psychedelic dosing sessions themselves, an ability to remain present may be helpful. One of the most central tenets of psychedelic-assisted psychotherapy is that fear and expectation can disrupt the natural unfolding of psychedelic peak experiences, and that letting go of fear and expectation is one of the biggest predictors of positive outcomes from psychedelic-assisted psychotherapy (see Mithoefer et al., 2008 for an explanation of how this is applied in MDMA-assisted psychotherapy). Since maintaining nonjudgmental focus on present-moment experience is antithetical to resisting the psychedelic experience, such nonjudgmental focus is likely to be useful for facing challenging experiences in a way that leads to positive outcomes (Eleftheriou & Thomas, 2021; Payne et al., 2021; Smigielski et al., 2019). As described at the beginning of this article, contact with the present moment is one of the six core processes of ACT, and the systematic training of this ability via MBCT during the preparation phase may make it easier for psychedelic-assisted psychotherapy participants to maintain this attentional focus during the peak of dosing experiences. As with acceptance, maintaining present-moment awareness during the integration period may also be an effective way of minimising reactivity to enduring challenging experiences, thereby increasing the likelihood of capitalising upon their constructive value.

Decentering

Instead of identifying with thoughts, feelings, body sensations, and impulses to act, decentering involves relating to present-moment experiences as passing events in the mind and body (Segal et al., 2002). Relating to experiences in this way can diminish the distress associated with everyday psychological stressors such as negative thoughts or feelings (Bennett et al., 2021). Previous research suggests that psychedelics can increase decentering (Franquesa et al., 2018; Murphy-Beiner & Soar, 2020; Sampedro et al., 2017; Soler et al., 2016), as can mindfulness training (Soler et al., 2014), again suggesting the potential utility of MBCT for psychedelic-assisted psychotherapy.

It may be that systematic training in decentering via mindfulness meditation may facilitate this ability during psychedelic dosing. This is likely to have two key positive effects. First, if psychedelic-assisted psychotherapy participants are better able to "step back" from self-reference to their thoughts and emotions (that is, default mode network activity), this is likely to make it easier for them to experience mystical states such as "oceanic boundlessness" (the shift or loss of sense of self and resulting sense of unity between self and the world/nature/universe, also known as the "unitive state"). The magnitude of these experiences during psychedelic dosing sessions appears to be one of the strongest predictors of lasting positive changes following psychedelic-assisted psychotherapy (Roseman et al., 2018). Second, the ability to decenter may also help to reduce distress prior to and during the acute psychedelic experience. For example, during a psychedelic experience, a person might notice a difficult thought (e.g. "I am dying") and experience it as a mental event rather than an indisputable fact, in turn diminishing reactive fear and anxiety. Systematic training via meditation practice in the integration phase may also serve to prolong the experience of ego-dissolution and reduce reactivity to unpleasant thoughts and emotions, in turn enhancing the benefits of psychedelic dosing and minimising challenging experiences, respectively.

Embracing Difficulty

MBCT training also explicitly aims to enhance the ability to "turn toward" and embrace difficult experiences. In its original form, MBCT explicitly targeted the difficult thoughts and emotions associated with major depression, since reducing resistance to, and engagement with, these experiences reduces experiential avoidance. As discussed above, experiential avoidance is strongly associated with negative mental health outcomes, and reducing this is a major aim of any mindfulness intervention. Paradoxically, fully embracing challenging experiences might reduce the secondary distress associated with these, potentially leading to better mental health outcomes.

However, this embracing of difficult experiences must be done in an embodied way (rather than just as an idea that someone should "accept" or "embrace" their difficulties) and is generally extremely challenging to achieve in practice. Unlike ACT, MBCT provides systematic training in recognising, turning towards and ultimately embracing the difficulty of challenging experiences. Sufficient engagement with such training prior in the preparation phase may mean the psychedelic-assisted psychotherapy participant is better equipped to do so when facing challenges during the dosing experience itself.

The integration phase of psychedelic-assisted psychotherapy is another place MBCT may prove important in helping participants embrace difficulties. Previous research suggests that integrating psychedelic experiences can be challenging, particularly as participants return to their usual social context and the pressures of everyday life (Gorman et al., 2021). Furthermore, as default mode network activity (that

is, self-reflective thought) reemerges following an experience of ego-dissolution, this may be experienced as jarring by psychedelic-assisted psychotherapy participants. In both these cases, ongoing systematic training in embracing difficulties may prove extremely useful.

Key Potential Differences Between MBCT and ACT with Regard to Psychedelic-Assisted Psychotherapy

One fundamental difference between MBCT and ACT is that while ACT emphasises acceptance and cognitive defusion from unpleasant thoughts and emotions, MBCT includes systematic attention training via meditation — which ACT does not. As we seek to demonstrate in this review, we believe this systematic training, done prior to dosing sessions (i.e. during the preparation phase), might prove extremely useful during the peak of the psychedelic experience — especially for concentration, when challenging experiences arise (e.g. during challenging states, such as impaired control and cognition) (Studerus et al., 2010).

Concentration

One of the most fundamental skills cultivated in mindfulness meditation is concentration. Indeed, the ability to maintain attentional focus over time is at the foundation of mindfulness practice generally. In MBCT, the attention is kept on the present moment, initially by paying nonjudgmental attention to the sensory experience of being in the body. Once concentration is stabilised through systematic practice of focused attention meditation, the attentional lens is gradually expanded via open awareness meditation practice to include mental contents such as thoughts and emotions (Cullen et al., 2021). While not emphasised in most MBIs, mindfulness meditation ultimately culminates in paying attention to awareness itself (Dunne, 2011; Josipovic, 2014).

Research has demonstrated that this gradual progression from focused attention to open awareness meditation is necessary to improve wellbeing. For example, an MBCT dismantling study by Cullen et al. (2021) showed that the full MBCT intervention (which progresses from focused attention to open awareness) resulted in greater mood improvement than focused attention or open awareness alone. Cullen et al. (2021) also found that teaching participants open awareness without first teaching them focused attention led to *greater* anxiety at a 20-week follow-up than the full MBCT intervention. Focused attention also initially showed the fastest rate of improvement — and lowest level of re-emergence — of stress, anxiety and depression during the treatment phase (Weeks 1 through 8). This likely reflects the increased ability afforded by focused attention to divert focus *away* from distressing thoughts and sensations and back to sensory anchors such as breathing or the feeling of the body. In contrast, open awareness encourages a nonjudgmental engagement *with* and acceptance of such distressing mental content — a much more challenging ability that takes consistent practice over time to cultivate.

Overall, these findings highlight both the importance of including the focused attention to open awareness progression in interventions like MBCT and the clinical utility of focused attention, particularly early in treatment. Within the context of psychedelic-assisted psychotherapy, concentration may therefore prove highly useful for reducing distress during dosing sessions by providing participants with a simple tool for redirecting their attention to sensory anchors whenever distressing mental contents arise in the mind. The finding by Cullen et al. (2021) that focused attention capacities develop relatively quickly indicates that focused attention (and concomitantly improved concentration) might be a useful addition to the preparation phase of psychedelic-assisted psychotherapy interventions, and may also be useful during dosing sessions themselves, especially as challenging material begins to surface. Indeed, Carbonaro et al. (2016) surveyed psychedelic users and found that calming the mind was rated as the most useful strategy for dealing with challenging experiences (see also Simonsson et al., 2023). Since focused attention is relatively straightforward to practice (in contrast to the more subtle and challenging open awareness meditation), it may also be a useful practice for psychedelic-assisted psychotherapy participants to continue practising after dosing sessions, in order to reduce any anxiety or other challenging experiences that may be triggered by the psychedelic-assisted psychotherapy process.

Research has also shown that focused attention or concentration meditation is associated with decreased activity in the default mode network (DMN), a brain area commonly associated with self-referential thinking and "time travelling" (Garrison et al., 2015; Tomasino et al., 2013). Meta-analysis studies have shown higher levels of default mental activity to be consistently associated with a range of mental health problems such as stress, anxiety and depression (e.g. Doucet et al., 2020). It therefore follows that reducing default mode network activity with concentration meditation may in turn lead to improved mental health outcomes.

Also of interest is the amygdala, a brain area strongly associated with fight/flight stress reactivity and mental health problems generally. A study by Doll et al. (2016) found concentration meditation to increase connectivity between the prefrontal cortex and amygdala, resulting in decreased amygdala overactivity and concomitantly improved mental health outcomes. Psychedelic-assisted psychotherapy has been shown to decrease overactivity in both default mode network activity (Palhano-Fontes et al., 2015) and amygdala connectivity (Mertens et al., 2020). Focused

attention practice prior to dosing may therefore facilitate the quieting of these brain areas, thereby amplifying the psychedelic process.

In addition to the above capacities, MBCT might also help to solidify and amplify two common themes in psychedelic research that have emerged from post-treatment interviews with participants: connectedness and health behaviour.

Connectedness

In qualitative interviews with participants in clinical trials, there have been reports of a shift towards greater connection with self, other people and the world in general. For example, thematic analysis by Watts et al. (2017) found participants enrolled in an open-label trial of psilocybin for treatment-resistant depression reported a transition from disconnection to greater connection with self, others and the world 6 months after dosing. Furthermore, they found this increased connection to self was associated with greater acceptance of emotional experiences (and less experiential avoidance).

Such feelings of connectedness may be further amplified by specific elements of MBCT. As described above, mindfulness meditation increases attention and awareness, both of which are fundamental to feeling "connected" to what is happening in the present moment. Furthermore, the mindfulness meditation in MBCT aims to enhance embodiment, which is another foundation of connectedness — in the sense that only by being fully in touch with one's body can we be said to be "connected to self". Finally, mindfulness meditation that emphasises acceptance of whatever is experienced — including embracing unpleasant emotional experiences — further enhances connectedness by increasing experiential acceptance (Lindsay & Creswell, 2019).

In addition to focused attention and open awareness, derivatives of MBCT (e.g. MBCT-L and *Finding Peace in a Frantic World*) also contain befriending meditation. This class of meditations is similar to "lovingkindness" or "metta" meditations, and directly promotes attitudes such as kindness and warmth towards oneself and others. Consistent practice has been shown to lead to increased connection with self (Hutcherson et al., 2008) by counteracting mental habits such as aversion (Salzberg, 2011) and self-criticism (Feliu-Soler et al., 2017; Shahar et al., 2015). A meta-analysis by Zeng et al. (2015) showed that these types of practices may promote positive emotionality, and systematic reviews have found that they significantly reduce mental health problems (Shonin et al., 2015) and enhance prosociality (Luberto et al., 2018; see also Simonsson et al., 2021). As such, the befriending element of MBCT derivatives likely results in increased connection to self, others and world.

Finally, the group format in which MBCT is typically delivered may itself promote connectedness. The transdiagnostic application and universality of mindfulness mean that participants in programs such as MBCT have an opportunity to hear about the life experiences of the other group participants and benefit from group process — what Cormack et al. (2018) term a "collective effort to make yourself feel better". While the predominant psychedelic treatment model in clinical trials involves two therapists and one participant, psychedelic-assisted group therapy showed promise during the first wave of psychedelic research and has recently re-emerged as a model of interest (Trope et al., 2019). For instance, in a sample with serious medical illness, Anderson et al. (2020) demonstrated the relative safety and feasibility of group-based preparation and integration for psilocybin-assisted therapy. Follow-up interviews revealed that many participants experienced feelings of connectedness with other cohort members and emotional security in the group setting, which made them more willing to explore their own unpleasant experiences during their (individual) dosing sessions (Agin-Liebes et al., 2021). MBCT training explicitly encourages a sense of "common humanity" — an awareness of the interconnectivity between all human beings and the universality of challenging life experiences and secondary psychological distress (Germer & Neff, 2013). The group format in the MBCT program may therefore combine well with psychedelic-assisted psychotherapy. No clinical trial in recent times has investigated the effects of delivering the dosing session in a group setting (Trope et al., 2019), but findings from an observational study suggest it might amplify the post-acute effects of psychedelics (Kettner et al., 2021).

Health Behaviour

In addition to reports of increased connectedness, qualitative interviews with participants in clinical trials have also revealed reports of spontaneous health behaviour change related to diet, exercise, and tobacco and alcohol consumption (Teixeira et al., 2021). Other research has found a relationship between lifetime psychedelic use and positive markers of physical health (Simonsson et al., 2021, 2021, 2021). While the MBCT program has a specific session dedicated to health behaviour (Session 7: "How Can I Best Take Care of Myself?"), there are several mechanisms through which mindfulness training can impact health behaviour (Schuman-Olivier et al., 2020). For example, as discussed above, mindfulness enhances attention and cognitive control. Metacognition and the ability to selectively direct attention arguably form the foundation of any behaviour change, including health behaviours. There is an abundance of research linking mindfulness with attentional processes (for a meta-analysis, see Sumantry & Stewart, 2021). Emotion regulation is also vital, as many unhealthy behaviours (e.g. unhealthy eating and misuse of drugs) are commonly attempts to numb

strong unpleasant emotions. There is a well-established link between mindfulness and emotion regulation (Chambers et al., 2009). Mindfulness training can enhance self-related processes such as interoception, self-monitoring and self-compassion, and reduce problematic processes such as rumination and worry (Schuman-Olivier et al., 2020). Finally, mindfulness meditation can lead to enhanced psychological insight (Dahl & Davidson, 2019), a construct that is increasingly gaining attention in psychedelic research. MBCT directly targets these self-related processes, as well as attention and emotion regulation.

Discussion

This review has described various ways in which MBCT might serve as a valuable adjunct for psychedelic-assisted psychotherapy. We demonstrated how MBCT targets core processes including acceptance, being present, concentration, decentering and embracing difficulties. We argue that strengthening these core capacities may prove invaluable during the preparation, dosing and integration phases of psychedelic-assisted psychotherapy. Although other mindfulness-informed therapies such as ACT may be important for supporting psychedelic-assisted psychotherapy, we highlighted how MBCT's systematic training in these core capacities may be particularly beneficial, especially for increasing the likelihood that challenging experiences transform into emotional breakthrough, psychological insights, and improved psychosocial functioning, rather than prolonged and unresolved challenging experiences ("bad trips").

In addition to protecting against challenging experiences, mindfulness training via MBCT may also prolong the positive therapeutic effects of psychedelic-assisted psychotherapy. The importance of integration in psychedelic-assisted psychotherapy is being increasingly recognised (Earleywine et al., 2022). MBCT establishes a foundation for cognitive restructuring, which can be enhanced by the incorporation of psychedelic-assisted psychotherapy. This synergistic approach enables participants to systematically reinforce insights and facilitate cognitive shifts, resulting from the combination of MBCT and the acute psychedelic experience during therapy sessions. Moreover, mindfulness training may capitalise on the enhanced plasticity that has been hypothesised to result from psychedelic dosing (see Olson, 2022; Stoliker et al., 2022a), facilitating an increase in trait mindfulness.

Future research is warranted to explore the potential benefits of using MBCT as an adjunct to psychedelic-assisted psychotherapy, investigating whether group MBCT training alone is sufficient for maximising positive outcomes or if additional individual psychotherapy is necessary. Researchers might examine whether a combination of MBCT and traditional 2:1 (or 1:1) psychedelic-assisted delivers superior results compared to either approach alone.

It is also important to explore the relative benefits of providing MBCT in its manualised form versus adapting the intervention to emphasise certain components, particularly in relation to specific mental health symptoms. While all the various core processes of MBCT support the psychedelic process, certain aspects could be more useful than others. Future research should also explore how MBCT can be adjusted to suit the needs of specific populations, as demonstrated by the development of MBCT-L and the "Finding Peace in a Frantic World" *derivatives*. Researchers and clinicians should consider creating psychedelic-specific MBIs, drawing on elements of MBCT, MBSR, ACT, and other MBIs.

While there is already evidence that formal meditation practice may be a useful adjunct to psychedelic use (Griffiths et al., 2018) and research showing lifetime use of psychedelics is associated with current mindfulness meditation practice (Simonsson, 2023), much remains to be discovered about the dose-response relationship between mindfulness meditation and positive psychedelic outcomes. The emphasis of systematic meditation in MBCT may set it apart from ACT in helping participants face challenging experiences during psychedelic-assisted psychotherapy. While concepts like acceptance and embracing difficulty are relatively easy to grasp in the ACT framework in states of normal waking consciousness, they may be harder to apply during the peak of psychedelic experiences. Research should explore different amounts of meditation and seek to determine the optimal amount of meditation required to reliably support the psychedelic process.

Furthermore, it may be useful to explore the relative utility of different types of mindfulness meditation included in MBCT (focused attention, open awareness, befriending, or a combination) for predicting positive outcomes in psychedelic-assisted psychotherapy. All three types conceptually have a place in psychedelic-assisted psychotherapy; however, elucidating the relative contribution of each is crucial. Finally, mindfulness exercises themselves might be modified to better suit the psychedelic context, such as meditating and practising mindfulness exercises in nature or engaging in mindful listening to music that will be played during the time of psychedelic administration.

Conclusion

In conclusion, MBIs have a clear role in supporting the psychedelic process, particularly in psychedelic-assisted psychotherapy. MBIs are likely to prove extremely useful in the preparation, dosing and integration phases, helping participants avoid challenging experiences, and maximising

the likelihood of surrender to ego-dissolution and emotional breakthrough, and concomitant insights and improved psychosocial functioning. MBCT may prove particularly useful since it provides systematic training in mindfulness meditation, which may serve as a valuable resource for navigating the psychedelic process, especially challenging experiences. Future research is warranted to explore this possibility and confirm which elements of MBCT are most useful in the psychedelic context, and how these may be combined and adapted to produce the most beneficial outcomes.

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Declarations

Conflict of Interest OS and RC were co-founders of Eudelics AB.

References

Aday, J. S., Davis, A. K., Mitzkovitz, C. M., Bloesch, E. K., & Davoli, C. C. (2021). Predicting reactions to psychedelic drugs: A systematic review of states and traits related to acute drug effects. *ACS Pharmacology & Translational Science, 4*(2), 424–435. https://doi.org/10.1021/acsptsci.1c00014

Agin-Liebes, G., Ekman, E., Anderson, B., Malloy, M., Haas, A., & Woolley, J. (2021). Participant reports of mindfulness, posttraumatic growth, and social connectedness in psilocybin-assisted group therapy: an interpretive phenomenological analysis. *Journal of Humanistic Psychology, 0*(0). https://doi.org/10.1177/00221678211022949

Anderson, B. T., Danforth, A., Daroff, R., Stauffer, C., Ekman, E., Agin-Liebes, G., Trope, A., Boden, M. T., Dilley, J., Mitchell, J., & Woolley, J. (2020). Psilocybin-assisted group therapy for demoralized older long-term AIDS survivor men: An open-label safety and feasibility pilot study. *EClinicalMedicine, 27*, 100538. https://doi.org/10.1016/j.eclinm.2020.100538

Bennett, M. P., Knight, R., Patel, S., So, T., Dunning, D., Barnhofer, T., Smith, P., Kuyken, W., Ford, T., & Dalgleish, T. (2021). Decentering as a core component in the psychological treatment and prevention of youth anxiety and depression: a narrative review and insight report. *Translational Psychiatry, 11*, 288. https://doi.org/10.1038/s41398-021-01397-5

Bernard, P., Cullen, C. & Kuyken, W. (2017). *MBCT for life teacher manual*. Oxford Mindfulness Centre.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: a proposed operational definition. *Clinical Psychology: Science And Practice, 11*(3), 230. https://doi.org/10.1093/clipsy.bph077

Block-Lerner, J., Wulfert, E., & Moses, E. (2009). ACT in context: an exploration of experiential acceptance. *Cognitive and Behavioral Practice, 16*(4), 443–456. https://doi.org/10.1016/j.cbpra.2009.04.005

Breedvelt, J. J., Warren, F. C., Segal, Z., Kuyken, W., & Bockting, C. L. (2021). Continuation of antidepressants vs sequential psychological interventions to prevent relapse in depression: an individual participant data meta-analysis. *JAMA Psychiatry, 78*(8), 868–875. https://doi.org/10.1001/jamapsychiatry.2021.0823

Carbonaro, T. M., Bradstreet, M. P., Barrett, F. S., MacLean, K. A., Jesse, R., Johnson, M. W., & Griffiths, R. R. (2016). Survey study of challenging experiences after ingesting psilocybin mushrooms: Acute and enduring positive and negative consequences. *Journal of Psychopharmacology, 30*(12), 1268–1278. https://doi.org/10.1177/0269881116662634

Carhart-Harris, R. L., Roseman, L., Haijen, E., Erritzoe, D., Watts, R., Branchi, I., & Kaelen, M. (2018). Psychedelics and the essential importance of context. *Journal of Psychopharmacology, 32*(7), 725–731. https://doi.org/10.1177/0269881118754710

Chambers, R., Gullone, E., & Allen, N. B. (2009). Mindful emotion regulation: An integrative review. *Clinical Psychology Review, 29*(6), 560–572. https://doi.org/10.1016/j.cpr.2009.06.005

Chiesa, A., & Serretti, A. (2011). Mindfulness-Based Cognitive Therapy for psychiatric disorders: A systematic review and meta-analysis. *Psychiatry Research, 187*(3), 441–453. https://doi.org/10.1016/j.psychres.2010.08.011

Ciarrochi, J., Bilich, L., & Godsell, C. (2010). Psychological flexibility as a mechanism of change in acceptance and commitment therapy. In R. A. Baer (Ed.), *Assessing mindfulness and acceptance processes in clients: Illuminating the theory and practice of change* (pp. 51–75). Context Press/New Harbinger Publications.

Close, J. B., Hajien, E. C., Watts, R., Roseman, L., & Carhart-Harris, R. L. (2020). Psychedelics and psychological flexibility–Results of a prospective web-survey using the Acceptance and Action Questionnaire II. *Journal of Contextual Behavioral Science, 16*, 37–44. https://doi.org/10.1016/j.jcbs.2020.01.005

Cormack, D., Jones, F. W., & Maltby, M. (2018). A "collective effort to make yourself feel better": The group process in mindfulness-based interventions. *Qualitative Health Research, 28*(1), 3–15. https://doi.org/10.1177/1049732317731773

Crane, R. S., Brewer, J., Feldman, C., Kabat-Zinn, J., Santorelli, S., Williams, J. M. G., & Kuyken, W. (2017). What defines mindfulness-based programs? The warp and the weft. *Psychological Medicine, 47*(6), 990–999. https://doi.org/10.1017/S0033291716003317

Creswell, J. D., & Lindsay, E. K. (2014). How does mindfulness training affect health? A mindfulness stress buffering account. *Current Directions in Psychological Science, 23*(6), 401–407. https://doi.org/10.1177/0963721414547415

Cullen, B., Eichel, K., Lindahl, J. R., Rahrig, H., Kini, N., Flahive, J., & Britton, W. B. (2021). The contributions of focused attention and open monitoring in Mindfulness-Based Cognitive Therapy for affective disturbances: A 3-armed randomized dismantling trial. *PLoS ONE, 16*(1), e0244838. https://doi.org/10.1371/journal.pone.0244838

Dahl, C. J., & Davidson, R. J. (2019). Mindfulness and the contemplative life: Pathways to connection, insight, and purpose. *Current Opinion in Psychology, 28*, 60–64. https://doi.org/10.1016/j.copsyc.2018.11.007

Doll, A., Hölzel, B. K., Bratec, S. M., Boucard, C. C., Xie, X., Wohlschläger, A. M., & Sorg, C. (2016). Mindful attention to breath regulates emotions via increased amygdala–prefrontal cortex connectivity. *NeuroImage, 134*, 305–313. https://doi.org/10.1016/j.neuroimage.2016.03.041

Doucet, G. E., Janiri, D., Howard, R., O'Brien, M., Andrews-Hanna, J. R., & Frangou, S. (2020). Transdiagnostic and disease-specific abnormalities in the default-mode network hubs in psychiatric disorders: A meta-analysis of resting-state functional imaging studies. *European Psychiatry, 63*(1), e57. https://doi.org/10.1192/j.eurpsy.2020.57

Dunne, J. (2011). Toward an understanding of non-dual mindfulness. *Contemporary Buddhism, 12*(1), 71–88. https://doi.org/10.1080/14639947.2011.564820

Earleywine, M., Low, F., Lau, C., & De Leo, J. (2022). Integration in psychedelic-assisted treatments: Recurring themes in current providers' definitions, challenges, and concerns. *Journal of Humanistic Psychology*. https://doi.org/10.1177/00221678221085

Eleftheriou, M. E., & Thomas, E. (2021). Examining the potential synergistic effects between mindfulness training and psychedelic-assisted therapy. *Frontiers in Psychiatry, 12*, 788107. https://doi.org/10.3389/fpsyt.2021.707057

Feliu-Soler, A., Pascual, J. C., Elices, M., Martín-Blanco, A., Carmona, C., Cebolla, A., Simón, V., & Soler, J. (2017). Fostering self-compassion and loving-kindness in patients with borderline personality disorder: A randomized pilot study. *Clinical Psychology & Psychotherapy, 24*(1), 278–286. https://doi.org/10.1002/cpp.2000

Franquesa, A., Sainz-Cort, A., Gandy, S., Soler, J., Alcázar-Córcoles, M. Á., & Bouso, J. C. (2018). Psychological variables implied in the therapeutic effect of ayahuasca: A contextual approach. *Psychiatry Research, 264*, 334–339. https://doi.org/10.1016/j.psychres.2018.04.012

Galante, J., Iribarren, S. J., & Pearce, P. F. (2013). Effects of Mindfulness-Based Cognitive Therapy on mental disorders: a systematic review and meta-analysis of randomised controlled trials. *Journal of Research in Nursing, 18*(2), 133–155. https://doi.org/10.1177/1744987112466087

Garrison, K. A., Zeffiro, T. A., Scheinost, D., Constable, R. T., & Brewer, J. A. (2015). Meditation leads to reduced default mode network activity beyond an active task. *Cognitive, Affective, & Behavioral Neuroscience, 15*, 712–720. https://doi.org/10.3758/s13415-015-0358-3

Garland, E. L., Hanley, A. W., Baker, A. K., & Howard, M. O. (2017). Biobehavioral mechanisms of mindfulness as a treatment for chronic stress: An RDoC perspective. *Chronic Stress*. https://doi.org/10.1177/2470547017711912

Gashi, L., Sandberg, S., & Pedersen, W. (2021). Making 'bad trips' good: How users of psychedelics narratively transform challenging trips into valuable experiences. *International Journal of Drug Policy, 87*, 102997. https://doi.org/10.1016/j.drugpo.2020.102997

Germer, C. K., & Neff, K. D. (2013). Self-compassion in clinical practice. *Journal of Clinical Psychology, 69*(8), 856–867. https://doi.org/10.1002/jclp.22021

Ghahari, S., Mohammadi-Hasel, K., Malakouti, S. K., & Roshanpajouh, M. (2020). Mindfulness-Based Cognitive Therapy for generalised anxiety disorder: A systematic review and meta-analysis. *East Asian Archives of Psychiatry, 30*(2), 52–56. https://doi.org/10.12809/eaap1885

Goldberg, S. B., Shechet, B., Nicholas, C. R., Ng, C. W., Deole, G., Chen, Z., & Raison, C. L. (2020). Post-acute psychological effects of classical serotonergic psychedelics: a systematic review and meta-analysis. *Psychological Medicine, 50*(16), 2655–2666. https://doi.org/10.1017/S003329172000389X

Goldberg, S. B., Tucker, R. P., Greene, P. A., Davidson, R. J., Kearney, D. J., & Simpson, T. L. (2019). Mindfulness-Based Cognitive Therapy for the treatment of current depressive symptoms: a meta-analysis. *Cognitive Behaviour Therapy, 48*(6), 445–462. https://doi.org/10.1080/16506073.2018.1556330

Gorman, I., Nielson, E. M., Molinar, A., Cassidy, K., & Sabbagh, J. (2021). Psychedelic harm reduction and integration: A transtheoretical model for clinical practice. *Frontiers in Psychology, 12*, 710. https://doi.org/10.3389/fpsyg.2021.645246

Griffiths, R. R., Johnson, M. W., Richards, W. A., Richards, B. D., Jesse, R., MacLean, K. A., Barrett, F. S., Cosimano, M. P., & Klinedinst, M. A. (2018). Psilocybin-occasioned mystical-type experience in combination with meditation and other spiritual practices produces enduring positive changes in psychological functioning and in trait measures of prosocial attitudes and behaviors. *Journal of Psychopharmacology, 32*(1), 49–69. https://doi.org/10.1177/0269881117731279

Gu, J., Strauss, C., Bond, R., & Cavanagh, K. (2015). How do Mindfulness-Based Cognitive Therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review, 37*, 1–12. https://doi.org/10.1016/j.cpr.2015.01.006

Haijen, E. C., Kaelen, M., Roseman, L., Timmermann, C., Kettner, H., Russ, S., Nutt, D., Daws, R. E., Hampshire, A. D., Lorenz, R., & Carhart-Harris, R. L. (2018). Predicting responses to psychedelics: A prospective study. *Frontiers in Pharmacology, 9*, 897. https://doi.org/10.3389/fphar.2018.00897

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012). *Acceptance and commitment therapy: The process and practice of mindful change* (2nd ed.). Guilford Press.

Heal, D. J., Smith, S. L., Belouin, S. J., & Henningfield, J. E. (2023). Psychedelics: Threshold of a therapeutic revolution. *Neuropharmacology, 236*, 109610. https://doi.org/10.1016/j.neuropharm.2023.109610

Heuschkel, K., & Kuypers, K. P. (2020). Depression, mindfulness, and psilocybin: Possible complementary effects of mindfulness meditation and psilocybin in the treatment of depression. A review. *Frontiers in Psychiatry, 11*, 224. https://doi.org/10.3389/fpsyt.2020.00224

Huijbers, M. J., Spinhoven, P., Spijker, J., Ruhé, H. G., van Schaik, D. J., van Oppen, P., Nolen, W. A., Ormel, J., Kuyken, W., van der Wilt, G. J., & Blom, M. B. (2015). Adding Mindfulness-Based Cognitive Therapy to maintenance antidepressant medication for prevention of relapse/recurrence in major depressive disorder: Randomised controlled trial. *Journal of Affective Disorders, 187*, 54–61. https://doi.org/10.1016/j.jad.2015.08.023

Hutcherson, C. A., Seppala, E. M., & Gross, J. J. (2008). Loving-kindness meditation increases social connectedness. *Emotion, 8*(5), 720–724. https://doi.org/10.1037/a0013237

Johnson, M. W., Richards, W. A., & Griffiths, R. R. (2008). Human hallucinogen research: guidelines for safety. *Journal of Psychopharmacology, 22*(6), 603–620. https://doi.org/10.1177/0269881108093587

Johnstad, P. G. (2021). Day trip to hell: A mixed methods study of challenging psychedelic experiences. *Journal of Psychedelic Studies*. https://doi.org/10.1556/2054.2021.00155

Josipovic, Z. (2014). Neural correlates of nondual awareness in meditation. *Annals of the New York Academy of Sciences, 1307*(1), 9–18. https://doi.org/10.1111/nyas.12261

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

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. Bantam Books.

Kakoschke, N., Hassed, C., Chambers, R., & Lee, K. (2021). The importance of formal versus informal mindfulness practice for enhancing psychological wellbeing and study engagement in a medical student cohort with a 5-week mindfulness-based lifestyle program. *PLoS ONE, 16*(10), e0258999. https://doi.org/10.1371/journal.pone.0258999

Kettner, H., Rosas, F. E., Timmermann, C., Kärtner, L., Carhart-Harris, R. L., & Roseman, L. (2021). Psychedelic communitas: Intersubjective experience during psychedelic group sessions predicts enduring changes in psychological wellbeing and social connectedness. *Frontiers in Pharmacology, 12*, 234. https://doi.org/10.3389/fphar.2021.623985

Kuyken, L. G., Garland, E. L., Bluth, K., Palsson, O. S., & Gaylord, S. A. (2015). From a state to a trait: Trajectories of state mindfulness in meditation during intervention predict changes in trait mindfulness. *Personality and Individual Differences, 81*, 41–46. https://doi.org/10.1016/j.paid.2014.12.044

Kuyken, W., Warren, F. C., Taylor, R. S., Whalley, B., Crane, C., Bondolfi, G., Hayes, R., Huijbers, M., Ma, H., Schweizer, S., & Segal, Z. (2016). Efficacy of Mindfulness-Based Cognitive Therapy in prevention of depressive relapse: An individual patient data meta-analysis from randomized trials. *JAMA Psychiatry, 73*(6), 565–574. https://doi.org/10.1001/jamapsychiatry.2016.0076

Leary, T., Metzner, R., & Alpert, R. (1995). *The psychedelic experience*. Citadel Press.

Lebedev, A. V., Kaelen, M., Lövdén, M., Nilsson, J., Feilding, A., Nutt, D. J., & Carhart-Harris, R. L. (2016). LSD-induced entropic brain activity predicts subsequent personality change. *Human Brain Mapping, 37*(9), 3203–3213. https://doi.org/10.1002/hbm.23234

Lebedev, A. V., Lövdén, M., Rosenthal, G., Feilding, A., Nutt, D. J., & Carhart-Harris, R. L. (2015). Finding the self by losing the self: Neural correlates of ego-dissolution under psilocybin. *Human Brain Mapping, 36*(8), 3137–3153. https://doi.org/10.1002/hbm.22833

Lindsay, E. K., & Creswell, J. D. (2019). Mindfulness, acceptance, and emotion regulation: Perspectives from Monitor and Acceptance Theory (MAT). *Current Opinion in Psychology, 28*, 120–125. https://doi.org/10.1016/j.copsyc.2018.12.004

Lippelt, D. P., Hommel, B., & Colzato, L. S. (2014). Focused attention, open monitoring and loving kindness meditation: effects on attention, conflict monitoring, and creativity–A review. *Frontiers in Psychology, 5*, 1083. https://doi.org/10.3389/fpsyg.2014.01083

Luberto, C. M., Shinday, N., Song, R., Philpotts, L. L., Park, E. R., Fricchione, G. L., & Yeh, G. Y. (2018). A systematic review and meta-analysis of the effects of meditation on empathy, compassion, and prosocial behaviors. *Mindfulness, 9*(3), 708–724. https://doi.org/10.1007/s12671-017-0841-8

Luoma, J. B., Sabucedo, P., Eriksson, J., Gates, N., & Pilecki, B. C. (2019). Toward a contextual psychedelic-assisted therapy: perspectives from Acceptance and Commitment Therapy and contextual behavioral science. *Journal of Contextual Behavioral Science, 14*, 136–145. https://doi.org/10.1016/j.jcbs.2019.10.003

Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences, 12*(4), 163–169. https://doi.org/10.1016/j.tics.2008.01.005

MacLean, K. A., Johnson, M. W., & Griffiths, R. R. (2011). Mystical experiences occasioned by the hallucinogen psilocybin lead to increases in the personality domain of openness. *Journal of Psychopharmacology, 25*(11), 1453–1461. https://doi.org/10.1177/0269881111420188

Mertens, L. J., Wall, M. B., Roseman, L., Demetriou, L., Nutt, D. J., & Carhart-Harris, R. L. (2020). Therapeutic mechanisms of psilocybin: changes in amygdala and prefrontal functional connectivity during emotional processing after psilocybin for treatment-resistant depression. *Journal of Psychopharmacology, 34*(2), 167–180. https://doi.org/10.1177/0269881119895520

Mithoefer, M. C., Designee, S., Doblin, R., & Emerson, A. (2008). *A manual for MDMA-Assisted Psychotherapy in the treatment of posttraumatic stress disorder*. MAPS Public Benefit Corporation. https://doi.org/10.1007/s00213-019-05249-5

Murphy-Beiner, A., & Soar, K. (2020). Ayahuasca's 'afterglow': improved mindfulness and cognitive flexibility in ayahuasca drinkers. *Psychopharmacology, 237*, 1161–1169. https://doi.org/10.1007/s00213-019-05445-3

Nutt, D., & Carhart-Harris, R. (2021). The current status of psychedelics in psychiatry. *JAMA Psychiatry, 78*(2), 121–122. https://doi.org/10.1001/jamapsychiatry.2020.2171

Olson, D. E. (2022). Biochemical mechanisms underlying psychedelic-induced neuroplasticity. *Biochemistry, 61*(3), 127–136. https://doi.org/10.1021/acs.biochem.1c00812

Öst, L. G. (2014). The efficacy of Acceptance and Commitment Therapy: an updated systematic review and meta-analysis. *Behaviour Research and Therapy, 61*, 105–121. https://doi.org/10.1016/j.brat.2014.07.018

Palhano-Fontes, F., Andrade, K. C., Tofoli, L. F., Santos, A. C., Crippa, J. A. S., Hallak, J. E., et al. (2015). The psychedelic state induced by ayahuasca modulates the activity and connectivity of the default mode network. *PloS ONE, 10*(2), e0118143. https://doi.org/10.1371/journal.pone.0118143

Payne, J. E., Chambers, R., & Liknaitzky, P. (2021). Combining psychedelic and mindfulness interventions: Synergies to inform clinical practice. *ACS Pharmacology & Translational Science, 4*(2), 416–423. https://doi.org/10.1021/acsptsci.1c00034

Piet, J., & Hougaard, E. (2011). The effect of Mindfulness-Based Cognitive Therapy for prevention of relapse in recurrent major depressive disorder: a systematic review and meta-analysis. *Clinical Psychology Review, 31*(6), 1032–1040. https://doi.org/10.1016/j.cpr.2011.05.002

Quednow, B. B., Kometer, M., Geyer, M. A., & Vollenweider, F. X. (2012). Psilocybin-induced deficits in automatic and controlled inhibition are attenuated by ketanserin in healthy human volunteers. *Neuropsychopharmacology, 37*(3), 630–640. https://doi.org/10.1038/npp.2011.228

Querstret, D., Morison, L., Dickinson, S., Cropley, M., & John, M. (2020). Mindfulness-based stress reduction and Mindfulness-Based Cognitive Therapy for psychological health and well-being in nonclinical samples: A systematic review and meta-analysis. *International Journal of Stress Management, 27*(2), 173–190. https://doi.org/10.1037/str0000165

Roseman, L., Haijen, E., Idialu-Ikato, K., Kaelen, M., Watts, R., & Carhart-Harris, R. (2019). Emotional breakthrough and psychedelics: Validation of the emotional breakthrough inventory. *Journal of Psychopharmacology, 33*(9), 1076–1087. https://doi.org/10.1177/0269881119855974

Roseman, L., Nutt, D. J., & Carhart-Harris, R. L. (2018). Quality of acute psychedelic experience predicts therapeutic efficacy of psilocybin for treatment-resistant depression. *Frontiers in Pharmacology, 8*, 974. https://doi.org/10.3389/fphar.2017.00974

Russ, S. L., Carhart-Harris, R. L., Maruyama, G., & Elliott, M. S. (2019). States and traits related to the quality and consequences of psychedelic experiences. *Psychology of Consciousness: Theory, Research, and Practice, 6*(1), 1–21. https://doi.org/10.1037/cns0000169

Salzberg, S. (2011). Mindfulness and loving-kindness. *Contemporary Buddhism, 12*(1), 177–182. https://doi.org/10.1080/14639947.2011.564837

Sampedro, F., de la Fuente Revenga, M., Valle, M., Roberto, N., Domínguez-Clavé, E., Elices, M., Luna, L. E., Crippa, J. A. S., Hallak, J. E., De Araujo, D. B., & Friedlander, P. (2017). Assessing the psychedelic 'after-glow' in ayahuasca users: post-acute neurometabolic and functional connectivity changes are associated with enhanced mindfulness capacities. *International Journal of Neuropsychopharmacology, 20*(9), 698–711. https://doi.org/10.1093/ijnp/pyx036

Schuman-Olivier, Z., Trombka, M., Lovas, D. A., Brewer, J. A., Vago, D. R., Gawande, R., Dunne, J. P., Lazar, S. W., Loucks, E. B., & Fulwiler, C. (2020). Mindfulness and behavior change. *Harvard Review of Psychiatry, 28*(6), 371. https://doi.org/10.1097/HRP.0000000000000277

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-Based Cognitive Therapy for depression*. Guilford Press.

Sexton, J. D., Nichols, C. D., & Hendricks, P. S. (2019). Population survey data informing the therapeutic potential of classic and novel phenethylamine, tryptamine, and lysergamide psychedelics. *Front Psychiatry, 10*, 896. https://doi.org/10.3389/fpsyt.2019.00896

Shahar, B., Szepsenwol, O., Zilcha-Mano, S., Haim, N., Zamir, O., Levi-Yeshuvi, S., & Levit-Binnun, N. (2015). A wait-list randomized controlled trial of loving-kindness meditation programme for self-criticism. *Clinical Psychology & Psychotherapy, 22*(4), 346–356. https://doi.org/10.1002/cpp.1893

Shonin, E., Van Gordon, W., Compare, A., Zangeneh, M., & Griffiths, M. D. (2015). Buddhist-derived loving-kindness and compassion meditation for the treatment of psychopathology: A systematic review. *Mindfulness, 6*(5), 1161–1180. https://doi.org/10.1007/s12671-014-0368-1

Simonsson, C., Chambers, R., Hendricks, P. S., Goldberg, S. B., Osika, W., Schlosser, M., Ryde, A., Christersson, E., & Simonsson, O. (2023). Classic psychedelic use and current meditation practice. *Mindfulness, 14*(4), 763–768. https://doi.org/10.1007/s12671-023-02103-w

Simonsson, O., Hendricks, P. S., Carhart-Harris, R., Kettner, H., & Osika, W. (2021). Association between lifetime classic psychedelic use and hypertension in the past year. *Hypertension, 77*(5), 1510–1516. https://doi.org/10.1161/HYPERTENSIONAHA.120.16715

Simonsson, O., Hendricks, P. S., Chambers, R., Osika, W., & Goldberg, S. B. (2023). Prevalence and associations of challenging, difficult or distressing experiences using classic psychedelics. *Journal of Affective Disorders, 326*, 105–110. https://doi.org/10.1016/j.jad.2023.01.073

Simonsson, O., Osika, W., Carhart-Harris, R., & Hendricks, P. S. (2021). Associations between lifetime classic psychedelic use and cardiometabolic diseases. *Scientific Reports, 11*, 14427. https://doi.org/10.1038/s41598-021-93787-4

Simonsson, O., Narayanan, J., & Marks, J. (2021). Love thy (partisan) neighbor: Brief befriending meditation reduces affective polarization, group processes & intergroup relations. *Group Processes & Intergroup Relations, 25*(6), 1577–1593. https://doi.org/10.1177/13684302211020

Simonsson, O., Sexton, J. D., & Hendricks, P. S. (2021). Associations between lifetime classic psychedelic use and markers of physical health. *Journal of Psychopharmacology, 35*(4), 447–452. https://doi.org/10.1177/0269881121996863

Singer, T., & Engert, V. (2019). It matters what you practice: differential training effects on subjective experience, behavior, brain and body in the ReSource Project. *Current Opinion in Psychology, 28*, 151–158. https://doi.org/10.1016/j.copsyc.2018.12.005

Sloshower, J., Guss, J., Krause, R., Wallace, R. M., Williams, M. T., Reed, S., & Skinta, M. D. (2020). Psilocybin-assisted therapy of major depressive disorder using Acceptance and Commitment Therapy as a therapeutic frame. *Journal of Contextual Behavioral Science, 15*, 12–19. https://doi.org/10.1016/j.jcbs.2019.11.002

Smigielski, L., Kometer, M., Scheidegger, M., Krähenmann, R., Huber, T., & Vollenweider, F. X. (2019). Characterization and prediction of acute and sustained response to psychedelic psilocybin in a mindfulness group retreat. *Scientific Reports, 9*, 14914. https://doi.org/10.1038/s41598-019-50612-3

Soler, J., Cebolla, A., Feliu-Soler, A., Demarzo, M. M. P., Pascual, J. C., Baños, R., & García-Campayo, J. (2014). Relationship between meditative practice and self-reported mindfulness: The MINDSENS Composite Index. *PloS ONE, 9*(1), e86622. https://doi.org/10.1371/journal.pone.0086622

Soler, J., Elices, M., Franquesa, A., Barker, S., Friedlander, P., Feilding, A., Pascual, J. C., & Riba, J. (2016). Exploring the therapeutic potential of Ayahuasca: acute intake increases mindfulness-related capacities. *Psychopharmacology, 233*(5), 823–829. https://doi.org/10.1007/s00213-015-4162-0

Spinhoven, P., Drost, J., de Rooij, M., van Hemert, A. M., & Penninx, B. W. (2014). A longitudinal study of experiential avoidance in emotional disorders. *Behavior Therapy, 45*(6), 840–850. https://doi.org/10.1016/j.beth.2014.07.001

Stoliker, D., Egan, G., & Razi, A. (2022a). Reduced precision underwrites ego dissolution and therapeutic outcomes under psychedelics. *Frontiers in Neuroscience, 16*, 827400. https://doi.org/10.3389/fnins.2022.827400

Stoliker, D., Egan, G., Friston, K., & Razi, A. (2022b). Neural mechanisms and psychology of psychedelic ego dissolution. *Pharmacological Reviews, 74*(4), 874–915. https://doi.org/10.1124/pharmrev.121.000508

Stoliker, D., Anticevic, A., Vollenweider, F. X., Egan, G. F., Preller, K. H., & Razi, A. (2022c). Neural mechanisms of imagery under psilocybin. *medRxiv*. https://doi.org/10.1101/2022.09.07.22279700

Stoliker, D., Novelli, L., Vollenweider, F. X., Egan, G. F., Preller, K. H., & Razi, A. (2022d). Effective connectivity of emotion and cognition under psilocybin. *medRxiv*. https://doi.org/10.1101/2022.09.06.22279626

Stoliker, D., Novelli, L., Vollenweider, F. X., Egan, G. F., Preller, K. H., & Razi, A. (2023). Effective connectivity of functionally anti-correlated networks under LSD. *Biological Psychiatry, 93*(3), 224–232. https://doi.org/10.1016/j.biopsych.2022.07.013

Studerus, E., Gamma, A., & Vollenweider, F. X. (2010). Psychometric evaluation of the altered states of consciousness rating scale (OAV). *PLoS ONE, 5*(8), e12412. https://doi.org/10.1371/journal.pone.0012412

Sumantry, D., & Stewart, K. E. (2021). Meditation, mindfulness, and attention: A meta-analysis. *Mindfulness, 12*(5), 1332–1349. https://doi.org/10.1007/s12671-021-01593-w

Teixeira, P. J., Johnson, M. W., Timmermann, C., Watts, R., Erritzoe, D., Douglass, H., Kettner, H., & Carhart-Harris, R. L. (2021). Psychedelics and health behaviour change. *Journal of Psychopharmacology, 36*(1), 12–19. https://doi.org/10.1177/0269881121 1008554

Tifft, E. D., Roberts, M. Z., Underwood, S. B., & Forsyth, J. P. (2022). Acceptance and Commitment Therapy (ACT) for problematic anger: A case study. *Clinical Case Studies, 21*(4), 355–373. https://doi.org/10.1177/15346501221080931

Tomasino, B., Fregona, S., Skrap, M., & Fabbro, F. (2013). Meditation-related activations are modulated by the practices needed to obtain it and by the expertise: an ALE meta-analysis study. *Frontiers in Human Neuroscience, 6*, 346. https://doi.org/10.3389/fnhum.2012.00346

Trope, A., Anderson, B. T., Hooker, A. R., Glick, G., Stauffer, C., & Woolley, J. D. (2019). Psychedelic-assisted group therapy: a systematic review. *Journal Of Psychoactive Drugs, 51*(2), 174–188. https://doi.org/10.1080/02791072.2019.1593559

Uthaug, M. V., Van Oorsouw, K., Kuypers, K. P. C., Van Boxtel, M., Broers, N. J., Mason, N. L., Toennes, S. W., Riba, J., & Ramaekers, J. G. (2018). Sub-acute and long-term effects of ayahuasca on affect and cognitive thinking style and their association with ego-dissolution. *Psychopharmacology, 235*(10), 2979–2989. https://doi.org/10.1007/s00213-018-4988-3

Van Dam, N. T., Van Vugt, M. K., Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., Meissner, T., Lazar, S. W., Kerr, C. E., Gorchov, J., & Fox, K. C. (2018). Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspectives on Psychological Science, 13*(1), 36–61. https://doi.org/10.1177/1745691617709589

Van der Velden, A. M., Kuyken, W., Wattar, U., Crane, C., Pallesen, K. J., Dahlgaard, J., Fjorback, L. O., & Piet, J. (2015). A systematic review of mechanisms of change in Mindfulness-Based Cognitive Therapy in the treatment of recurrent major depressive disorder. *Clinical Psychology Review, 37*, 26–39. https://doi.org/10.1016/j.cpr.2015.02.001

Walsh, Z., & Thiessen, M. S. (2018). Psychedelics and the new behaviourism: Considering the integration of third-wave behaviour therapies with psychedelic-assisted therapy. *International Review of Psychiatry, 30*(4), 343–349. https://doi.org/10.1080/09540261.2018.1474088

Watts, R., & Luoma, J. B. (2020). The use of the psychological flexibility model to support psychedelic-assisted therapy. *Journal of Contextual Behavioral Science, 15*, 92–102. https://doi.org/10.1016/j.jcbs.2019.12.004

Watts, R., Day, C., Krzanowski, J., Nutt, D., & Carhart-Harris, R. (2017). Patients' accounts of increased 'connectedness' and 'acceptance' after psilocybin for treatment-resistant depression. *Journal of Humanistic Psychology, 57*(5), 520–564. https://doi.org/10.1177/0022167817709

Williams, M., & Penman, D. (2011). *Mindfulness: An eight-week plan for finding peace in a frantic world*. Rodale.

Xuan, R., Li, X., Qiao, Y., Guo, Q., Liu, X., Deng, W., Hu, Q., Wang, K., & Zhang, L. (2020). Mindfulness-Based Cognitive Therapy for bipolar disorder: A systematic review and meta-analysis. *Psychiatry Research, 290*, 113116. https://doi.org/10.1016/j.psychres.2020.113116

Yaden, D. B., & Griffiths, R. R. (2020). The subjective effects of psychedelics are necessary for their enduring therapeutic effects. *ACS Pharmacology & Translational Science, 3*(6), 1073–1083. https://doi.org/10.1021/acsptsci.0c00194

Zeng, X., Chiu, C. P., Wang, R., Oei, T. P., & Leung, F. Y. (2015). The effect of loving-kindness meditation on positive emotions: A meta-analytic review. *Frontiers in Psychology, 6*, 1693. https://doi.org/10.3389/fpsyg.2015.01693