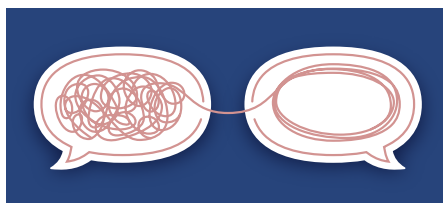


Mindfulness research needs an intervention



The past 40 years have seen a surge in exploring mindfulness-based practices and interventions as a non-pharmacological alternative to treating various physical and psychological conditions. Addressing specific challenges that the field faces is crucial for moving it forward in a meaningful direction.



Mindfulness is an umbrella term for a range of practices: centering ourselves in the present moment, taking notice of our internal states and surroundings, engaging or refocusing our attention that can lead to improved self-regulation. It is conceptualized as a process or technique of dismissing internal or external judgments and instead observing and accepting one's sensations, thoughts or feelings as they arise.

Forms of mindfulness meditation predicated on religious traditions, such as Hinduism and Buddhism, have been widely practiced for millennia. By contrast, interest in these practices in Western settings blossomed with counter-culture and the embrace of the esoteric, but the empirical study of mindfulness meditation has only begun in the past few decades. [Herbert Benson](#), a cardiologist who conducted work on autonomic responses of meditating individuals in the late 1960s, and [Jon Kabat-Zinn](#), who developed the Mindfulness Based Stress Reduction (MBSR) in 1979, were pivotal to exploring the use of meditation and mindfulness techniques in the context of stress and coping. [Richard Davidson's work](#) on the brain-based effects of meditation and its connection with emotion regulation has also been central in spurring research on mindfulness neuroscience. Out of this pioneering experimentation has grown an expansive domain of research devoted to understanding the mechanisms that underlie mindfulness meditation and ways for mindfulness to be used as a tool to improve mental health and wellbeing.

The growing cultural acceptance of meditation, interest in mind-body interactions as well as the relative ease of implementing such techniques have prompted a proliferation of mindfulness-based practices. Across health

outlets outlining self-care regimens, as part of smartphone apps and web-based mental health platforms, and integrated into corporate wellness programs, mindfulness is being marketed and monetized. Conservative current valuations estimate that the [market size value](#) for apps employing mindfulness alone are over US \$530 million and are projected to quadruple in a decade. Parallels with psychedelic medicine, including the positive reception by the public and corporate interests, raise the question about whether enthusiasm for mindfulness may outpace evidence of efficacy. While there is a growing literature linking mindfulness to positive aspects of psychological health, such as subjective wellbeing, establishing the effectiveness of individual mindfulness-based interventions and specific mental health disorders is a more complex process with a greater burden of proof.

Mindfulness-based interventions, including MBSR and Mindfulness-Based Cognitive Therapy, which incorporates aspects of cognitive-behavioral therapy, are the most common mindfulness applications studied. Preliminary investigations of these techniques have shown promise in reducing self-reported stress and enhancing cognitive and emotional regulation in a range of conditions and disorders, including chronic pain, COVID-19, anxiety, depression, substance use disorder, Parkinson's disease and post-traumatic stress disorder (PTSD). For disorders that can be challenging to treat, such as PTSD, mindfulness meditation provides an alternative to existing therapeutic paradigms. Psychotherapy treatment for PTSD, for example, often includes exposure therapy, which allows individuals to confront their fears in a controlled therapeutic environment, but which may be contraindicated in the presence of some symptoms such as psychosis or suicidality. Mindfulness meditation for PTSD, for example, has been suggested to share a conceptual similarity with exposure as

participants face their emotional experience, but that also draws on other self-regulatory processes such as the practice of acceptance and refraining from reacting. Mindfulness practices may also be mediated by neurobiological systems that are common to other affective and cognitive processes, producing structural and functional differences in brain regions that mediate attention, bodily awareness, emotional response and cognitive regulation, including the prefrontal cortex, striatum, anterior cingulate cortex, insula, amygdala and posterior cingulate cortex.

Despite the substantial progress in extending the potential clinical applications and in identifying possible neural substrates of mindfulness, crucial limitations and challenges remain. Although not specific to investigations of mindfulness-based techniques, low sample sizes of patients or participants result in potentially underpowered studies and findings that cannot be replicated. The cross-sectional design of the majority of mindfulness studies in mental health to date also preclude determining causality and further highlight the need for randomized clinical trials and longitudinal studies. As mindfulness is generally a young and developing field of research employing descriptively challenging concepts, many studies lack well-articulated theoretical foundations, and the interpretation of data is often reliant on post-hoc analyses and explanations.

A major challenge in the experimental design of mindfulness-based interventions is the potential inability to distinguish between what could be construed as one engaging in intentional mindfulness meditation compared with a more intrinsic, dispositional mindfulness (sometimes referred to as 'trait mindfulness'). People who may be more inclined to engage in meditation may have preexisting differences that might be linked to their personality and temperament, and that might affect their responses to a given mindfulness intervention. Further, participants of different ages, physical health status, cultures and socioeconomic backgrounds may have varied responses to mindfulness-based interventions. Evidence is limited regarding the most appropriate type of intervention for individuals or specific subgroups. Many studies do not include an active control condition that would

allow better control for non-specific factors, for example, the influence of an instructor or one's expectations on the benefits of a mindfulness intervention. Relatedly, the majority of investigations of mindfulness-based interventions are preliminary and few later-stage clinical translation studies and phase 3 randomized clinical trials comparing interventions are conducted and published, which limits the quality and quantity of evidence.

As a step toward addressing some of the methodological limitations and potential knowledge gaps, in this issue of *Nature Mental Health*, we include two papers that investigate mindfulness, providing insights into potential clinical and organizational applications. In the first paper, [Parisi and coauthors](#) report findings from a secondary analysis of a clinical trial that investigates Mindfulness-Oriented Recovery Enhancement (MORE) compared with supportive group psychotherapy for reducing PTSD symptoms in patients with chronic pain who misused opioids¹. MORE is a multimodal intervention that unites mindfulness training, cognitive behavioral therapy and principles

of positive psychology. These data indicate that cognitive reappraisal alleviates PTSD symptoms by mediating the effect of MORE on diminishing opioid misuse, which highlights a specific mindfulness-related mechanism and the importance of addressing trauma in substance use disorder.

A second paper in this issue is a systematic review and meta-analysis by [Galante et al.](#) that evaluated mindfulness-based programs for adult mental health promotion in non-clinical settings. Comparing the effects of teacher-led mindfulness-based programs with passive control groups (no intervention, waitlists or treatment-as-usual), the authors demonstrate reduced average psychological distress in community adults, with effects lasting for at least 6 months. Interestingly, the authors found no indication that factors such as baseline psychological distress, gender, age, education level or dispositional mindfulness modified these effects.

These two different investigations of mindfulness-based interventions underscore the potential breadth of the mindfulness research

field and some of the methodological considerations that are necessary to produce a robust evidence base. As the field moves forward and to avoid some of the pitfalls of over-enthusiasm, we need to take into account the strong bias toward the publication of positive or statistically but not clinically significant results. A more comprehensive and rigorous approach is also needed in designing the next wave of mindfulness research, including careful consideration of how the results and limitations are interpreted as well as how those findings are communicated within the research community, in the media, and for consumers and patients. Taking the proper steps to provide empirically informed applications of mindfulness-based interventions that are aligned with specific groups' mental health needs is something we should all be enthusiastic about.

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References

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