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## Mindfulness and more: Toward a science of human flourishing

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### Abstract

This commentary for this Special Issue on mindfulness highlights the progress and maturity of this growing field of scientific investigation and points the way toward important questions that require further study. Important methodological and implementation issues including the nature of proper comparison groups, the extension of mindfulness-based interventions (MBI's) to underserved populations, the assessment of baseline characteristics that predict beneficial outcomes and how mindfulness might be combined with other health promoting activities such as physical exercise are considered. New questions for future research were also showcased including best practices for mobile interventions, the development and assessment of micro-interventions and the need for a more expansive framework to cultivate human flourishing. The learning of well-being is conceptualized as an urgent public health need that will require new approaches for global scaling.

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This collection of 16 articles on mindfulness attests to the growing influence and maturity of this quite nascent field of science. Recalling back to the first randomized controlled trial of Mindfulness-Based Stress Reduction ever that was published in this journal in 2003 (1), it is thrilling to see how the field has matured in less than 20 years. Collectively these articles showcase the progress that has been made, the range of conditions and populations to which mindfulness-based interventions (MBIs) are being applied, and the underlying mechanisms that are currently under investigation. These articles include applications of MBIs in the relief of pain, substance abuse, diverse communities, women suffering from early life abuse and adversity, lonely older adults, improvements in physical activity, stressed college students and more. It is exciting to see the progress in the widespread application of MBIs to these varied populations and conditions. MBIs are truly a model of a transdiagnostic intervention that may potentially have beneficial impact across a wide range of conditions and populations.

While showcasing the many advances and broadening range of MBIs, this collection also highlights areas that are still very much in need of additional research focus. Moreover, there are a number of questions that were not considered in this collection of articles that I believe are essential to address to increase the likelihood of more widespread adoption of these interventions in different cultural settings. In this brief commentary I will consider areas in need of further research attention and showcase some key questions that have not yet been systematically addressed. I will conclude with a plea that mindfulness be situated within a more expansive framework to cultivate well-being and that interventions be appropriately

broadened to include additional elements that are necessary for human flourishing. The cultivation of well-being will be framed as an urgent public health need and strategies to disseminate practices at scale require investigation.

### **Further work on questions taken up by contributors to this Special Issue**

It is heartening to see several of the reports in this Special Issue based upon samples comprised of large proportions of or even predominantly participants of color(2), (3). Historically, there has been a relative paucity of uptake of MBI's in communities of color as evidenced by the very few studies focused on these and other underserved populations. While the reports in this Special Issue and elsewhere (4) are welcome additions, it is not clear the extent to which the interventions examined have been co-created by members of these marginalized communities themselves. It will be potentially informative to adopt some of the procedures developed by Weng and her colleagues (5) of deep community engagement in the further development and refinement of MBI's for under-represented populations to insure lasting engagement that continues following the completion of the study.

The prediction of how engaged participants will be in a mindfulness intervention based upon baseline characteristics is a very important question that might ultimately help to more effectively pair a given individual with a personalized strategy to maximize engagement. The article by Canby and colleagues in this Issue (6) examines personality predictors of out of class mindfulness practice. It will be of great interest in future work to examine strategies to maximize engagement and adherence for those individuals who have baseline profiles that predict lack of adherence (e.g., low levels of conscientiousness). It will be especially important in this effort to include behavioral measures taken at baseline to obtain a more comprehensive phenotyping of characteristics that may predict engagement and efficacy (e.g., behavioral measures of attention). Moreover, as will be discussed below, MBI's are not the only form of contemplative intervention that can lead to improvements in well-being (7). For those individuals who have baseline characteristics associated with a lack of adherence to MBI's, it will be of interest to determine whether this generalizes to other forms of contemplative practice (e.g., connection or compassion practice). There will likely be some predictors that are domain-specific and others that are domain general.

The articles in this Special Issue feature a number of different types of control or comparison conditions against which MBIs were compared. Some used a "usual care," "attention," "book listening," or physical exercise control condition, while others used a carefully constructed and very well matched comparison condition including an active comparison condition we developed to carefully match Mindfulness-Based Stress Reduction on all essential parameters except mindfulness (8). It is important in future research to select comparison treatment conditions based upon the question one is asking. In general, it would be ideal to run three-arm randomized controlled trials where one arm is the MBI, a second is the active comparison treatment (e.g., the Health Enhancement Program [8]) and a third arm is an untreated control. In this way, whatever changes are due to non-specific factors can be detected by the contrast of the active comparison treatment with the untreated control.

One of the articles in this Special Section is a pilot study that pairs a mindfulness-based intervention with physical exercise in physically underactive adults (9). This is a potentially very promising line of research that is understudied. There is one theoretical/mechanistic and one practical reason for why this kind of work is especially important. From the theoretical side, we know that aerobic exercise can increase neurogenesis in the hippocampus and promote increased neuroplasticity (10). However, increasing neuroplasticity in and of itself is neutral with respect to well-being. If a person is exposed to a toxic environment or has a mind filled with negative thoughts and emotions, increasing neuroplasticity will only serve to further consolidate these negative qualities. Thus, it is optimal to pair physical exercise with mental exercise designed to promote well-being. There is precious little in the empirical literature that has addressed this question. A notable exception is work conducted by Shors and colleagues on what they have termed MAP (Mental and Physical) training (11). While this combined mental and physical intervention developed by Shors and colleagues (11) is similar to that developed by Sala and colleagues (9), in neither case have the investigators examined the value added of the physical exercise in helping to boost the impact of the mental training. Exactly how this pairing should best be implemented for maximal efficacy has not been studied nor have the neural correlates been explored. There is a field of contemplative aerobics poised to be launched.

A set of issues that was touched upon by some of the contributors to this Special Issue concerns longer-term meditation practice, ways to support continuing practice and longer-term follow-up. With regard to long-term practitioners, it is important to underscore the value of studying long-term practitioners for a variety of reasons including the investigation of higher levels of well-being and its correlates (12), (13) as well as a methodological strategy for the investigation of basic processes of the mind (14), (15). It is also essential that both scientists and teachers of these mindfulness methods refine strategies to support continuing practice after the formal phase of an intervention is completed. There are precious few long-term follow-ups of novice meditators. In one of the few such studies, Solhaug and colleagues report that some changes persist following Mindfulness-based Stress Reduction at a 4-year follow-up while others do not (16). There are data showing that certain attentional gains following an intensive three month retreat persist at a seven year follow-up (17). In both of these cases, measures of continuing practice moderated these long-term effects, underscoring the importance of obtaining granular measures of practice to always include in studies of mindfulness interventions. Even in studies of novices practitioners just learning to meditate that examine short-term effects, there is some evidence of at least a small effect of practice time moderating outcomes (18).

## New Horizons

There are three areas in which the research showcased in this Special Issue might be extended in the future. In this section, I briefly comment on each.

**Mobile delivery:**

The COVID-19 pandemic has brought into sharp relieve both the need for and opportunity of remote mobile delivery of mindfulness and related interventions. The research literature is burgeoning in this area though a recent systematic review or meta-analysis is not currently available. The most recent comprehensive review was published in 2013 (19) and much has changed since that time. There are now many studies applying mobile mindfulness training to many different conditions and populations including workplace stress (20), medical patients with various illnesses (21), (22), and in children (23) and mental health in college students (24). Many of these studies reveal beneficial effects of these mobile applications, often with relatively little daily practice (<20 minutes/day and sometimes averaging ~5 minutes/day). One of the exciting new horizons in this work is the possibility of active practice, by engaging in mindfulness practice as the practitioner is engaged with other non-cognitively demanding activities of daily living such as walking, commuting, certain forms of physical exercise, house cleaning etc. Research is critically needed to determine the efficacy of such active practice. Moreover, it would be valuable to understand the baseline predictors of who elects active versus formal practice. It may be possible in the future to recommend strategies to individuals that are maximally efficacious based upon their baseline characteristics.

**Micro-interventions:**

The increasingly widespread availability of mobile applications for the delivery of mindfulness and related practices invites the possibility of delivering very short practices “in the moment” based upon specific contextual features. For example, a student might receive a prompt for a 30 second mindful moment just prior to an important exam. In the workplace, a leader might receive a prompt for a very short practice just prior to an important team meeting. There are endless opportunities for such micro-interventions and they can be tested in conjunction with more conventional mindfulness training and also as stand alone interventions. We know from other related domains of research that a very brief values affirmation intervention in African-American middle school children had impact on the probability of their college enrollment 7–9 years later (25). These findings suggest that very brief interventions delivered at the right time and place can have outsized consequences. The application of this strategy to mindfulness-related very brief interventions has not yet occurred but is now clearly warranted.

**Need for a more comprehensive approach to human flourishing:**

Several of the articles in this Special Issue are explicitly focused on the reduction of distress and the cultivation of well-being in different populations with mindfulness interventions. While the findings from these studies are very encouraging, there are two issues that I believe most would agree on. One is that there is substantial variability among participants in how effective any given mindfulness intervention is. The second is that while mindfulness is clearly an important ingredient for reducing distress and improving well-being, it is not the only relevant or important ingredient, nor is it necessarily the most important, for at least some individuals. We need a more comprehensive approach that identifies the key pillars of well-being that can be enhanced through training. A group of us at our Center have recently

proposed (7) a novel framework for understanding the plasticity of well-being that features four key pillars: Awareness, Connection, Insight and Purpose. Mindfulness is included in the first pillar. However, there are three other components that are essential for the cultivation of well-being. The development of only mindfulness to the exclusion of the other pillars privileges just this single component. While such training is clearly beneficial, it may be most beneficial for specific types of individuals and, if our aspiration is to maximally relieve suffering and cultivate well-being, it is likely that other essential ingredients will be needed. Exactly what is the most optimal combination of these components for which specific types of individuals is not yet known though is empirically tractable. For the greatest impact in bringing benefit to the largest number of people, we clearly need our full armamentarium of tools that harness all of the key elements of well-being and not restrict our purview to mindfulness. Moreover, it is worth noting that while many psychological scientists working in the mindfulness area are fond of referencing the Dalai Lama, the strategies he emphasizes in the relief of suffering and promotion of well-being are typically not mindfulness but rather mostly fall within our second and third pillars of well-being: connection and insight. These closely connect to the Dalai Lama's emphasis on compassion and wisdom as the two wings of human transformation—"With a deeply compassionate mind and wisdom you can maintain inner peace" (26).

## Conclusion

This Special Issue marks an important milestone in the maturity of research on mindfulness. We are seeing the application of MBI's in a wide range of sectors and along with this increased penetration of mindfulness into these different segments of the culture, we are also witnessing a growing scientific sophistication that is exemplified by this stellar collection. In this commentary, I have highlighted some new directions in areas of research represented in this collection in addition to new areas and questions that are in need of research attention.

Most importantly, in light of the many challenges facing our world today, many of which can be traced back to failures of flourishing, well-being should be regarded as an urgent public health need. And mindfulness is surely going to play an important role in such a public health campaign. However, mindfulness needs to be coupled with other key components of well-being in order to promote optimal human flourishing. And if we are going to frame the problem as an urgent public health need, we need scalable strategies and solutions that we can deploy to promote widespread, systemic change. We can take other public health successes as useful examples. When human beings first evolved on this planet none of us were brushing our teeth. Yet today virtually everyone on the planet engages in this behavior because of the recognition that it is good for our personal physical hygiene. We are addressing a practice that is good for our personal mental hygiene and we critically need to investigate how to effectively disseminate such practices and what the optimal dosing might be for which types of individuals. These are some of the exciting questions that await the next generation of contemplative scientists.

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