

Traits and states in mindfulness meditation

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In our Review (The neuroscience of mindfulness meditation. *Nat. Rev. Neurosci.* **16**, 213–225 (2015))¹, we described recent research into the neural mechanisms and consequences of mindfulness meditation. In their comment on our article (What is being studied as mindfulness meditation? *Nat. Rev. Neurosci.* <http://dx.doi.org/10.1038/nrn.2015.6>)², Wheeler, Arnkoff and Glass pointed out the importance of differentiating between dispositional mindfulness (also known as trait mindfulness) and deliberate (intentional) mindfulness meditation². Their suggestion is consistent with our point of view with regard to individual differences in mindfulness meditation^{1,3}. Although we restricted our Review to studies that aimed to investigate mindfulness as an intentional practice¹, pre-existing differences in dispositional mindfulness might have affected the findings described.

So far, relatively little is known about how differences in dispositional mindfulness might influence brain processing and the effective practice of mindfulness. However, a number of studies within the past decade have investigated the neural correlates of dispositional mindfulness and have identified some functional and structural brain areas involved^{4–9}.

Dispositional mindfulness is usually assessed through self-report questionnaires, such as the Mindful Attention Awareness Scale¹⁰, the Kentucky Inventory of Mindfulness Skills¹¹ or Five Facet Mindfulness Questionnaire¹². The use of these questionnaires comes with specific challenges and limitations, which have been critically discussed¹³, and a recent review has concluded that the evidence to support the validity of these questionnaires is lacking¹². It is therefore important to remember that what is interpreted as ‘dispositional mindfulness’ is what these questionnaires assess.

It is known that people differ in their attitude towards and practice of mindfulness meditation^{1,3}. Growing evidence has indicated that mindfulness practice induces both state and trait changes: that is, it temporarily changes the condition of the brain and the corresponding pattern of activity or connectivity (state change), and it also alters personality traits following a longer period of practice. It had been traditionally assumed that personality traits are relatively stable entities, but more recent research demonstrates that personality, including disposition towards mindfulness, can change over time as a result of life experiences or through mindfulness practice^{14,15}, suggesting that personality is itself flexible. Although this demonstrates that individuals can change the way that they feel, believe, and act, it also complicates the systematic investigation of the construct of ‘dispositional mindfulness’, as Wheeler, Arnkoff and Glass suggest². Nevertheless, this recent evidence suggests that it will be important to assess dispositional mindfulness at different points during studies investigating the effects of mindfulness meditation and distinguish it from intentional mindfulness.

Individual differences in personality are likely to contribute to how people respond to and benefit from mindfulness practice, in the same way that differences in brain function and structure, genetic predisposition, life experiences and environmental factors do. However, more empirical studies are needed to establish a definitive effect of these factors on mindfulness. More longitudinal, randomized, and actively controlled studies with larger sample sizes should deepen our understanding of how people with different personality traits practice effectively.

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Competing interests statement

The authors declare no competing interests.