

Mindfulness meditation training alters how we process fearful memories

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Participating in an eight-week mindfulness meditation program appears to alter how the brain processes fear memories. In a study that will appear in the November 1st print issue of *Biological Psychiatry*, a team led by Massachusetts General Hospital (MGH) researchers report that mindfulness meditation appears to help extinguish fearful associations.

A common way to treat [anxiety disorders](#) is to expose patients to the cause of their anxiety in a safe environment until it no longer elicits [fear](#), a process known as exposure therapy. This exposure provides an

opportunity to learn that these causes are not threatening and thereby help individuals regulate their emotional responses. To be successful, first a new memory must be created between the root of the anxiety and a feeling of safety, then the 'safety' memory must be recalled when the cause is presented again in a new environment, rather than the original fearful memory.

Mindfulness [meditation](#) been proposed to provide an optimal condition for exposure therapy because it involves experiencing the present moment with an open, curious and non-reactive mindset. Numerous studies have documented that mindfulness meditation programs are useful for reducing anxiety, however, the exact reasons were unknown. The current study investigated enhanced learning of the 'safety' signal as one way through which mindfulness can help individuals learn to adapt more positively to the causes of their anxiety.

"Mindfulness training may improve emotion regulation by changing the way our [brain](#) responds to what we're afraid of and reminding us that it is no longer threatening," said Gunes Sevinc Ph.D., investigator in the Department of Psychiatry at MGH and the paper's first author.

The researchers used MRI brain scans and a fear-conditioning task to examine changes in the brain associated with attention and memory following [mindfulness meditation](#) training. In the study, 42 participants completed an eight-week mindfulness-based stress reduction program in which they learned formal meditation and yoga practices. Another 25 participants were randomized to an exercise-based stress management control group, in which they were taught about the impact of stress and performed light aerobic exercise. The researchers found that changes in the brain after mindfulness training were associated with enhanced ability to recall the safety memory, and thus respond in a more adaptive way.

"Fear and anxiety have a habitual component to them—the [memory](#) of something that provoked fear in the past will trigger a habitual fear response when we are reminded of the event, even if there is no direct threat at the present. The data indicate that mindfulness can help us recognize that some fear reactions are disproportional to the threat, and thus reduces the fear response to those stimuli. Mindfulness can also enhance our ability to remember this new, less fearful reaction, and break the anxiety habit," says Sara Lazar, Ph.D., of the MGH Psychiatric Neuroimaging Research Program, the study's senior author.

One of the major caveats in the study was that all of the participants were healthy individuals without anxiety. Future studies need to be done with clinical samples and using threatening stimuli relevant to their [anxiety](#) (e.g. spiders, cues that trigger panic or PTSD, etc.) to determine if similar changes in brain activation occur in these conditions. Furthermore, some of the findings were observed in both the mindfulness and control groups, suggesting that some of the changes are not unique to mindfulness training, or might be due to some other component of the program, such as social support.

More information: Gunes Sevinc et al, Strengthened Hippocampal Circuits Underlie Enhanced Retrieval of Extinguished Fear Memories Following Mindfulness Training, *Biological Psychiatry* (2019). [DOI: 10.1016/j.biopsych.2019.05.017](#)

Provided by Massachusetts General Hospital

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