

Meditation really can change the brain, study finds

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Courtesy of Massachusetts General Hospital
and World Science staff

An eight-week program of meditation led to brain structure changes in people participating in a study, researchers say. It's the first time that meditation, a practice advocated by a range of religious traditions, has been shown to lead to such changes, according to the scientists.

Previous research, they said, had revealed structural differences in the brains of meditators, but couldn't document that meditation had actually caused those changes. The researchers reported that participating in an eight-week meditation program appeared to make measurable changes in brain regions associated with memory, sense of self, empathy and stress.

"Although the practice of meditation is associated with a sense of peacefulness and physical relaxation, practitioners have long claimed that meditation also provides cognitive and psychological benefits that persist throughout the day," said Sara Lazar of the Massachusetts General Hospital's Psychiatric Neuroimaging Research Program, the study's senior author. "This study demonstrates that changes in brain structure may underlie some of these reported improvements and that people are not just feeling better because they are spending time relaxing."

The study is to appear in the Jan. 30 issue of the journal *Psychiatry Research: Neuroimaging*.

The investigators scanned the brain structures of 16 study participants two weeks before and after they took part in the eight-week Mindfulness-Based Stress Reduction Program at the University of Massachusetts Center for Mindfulness. In addition to weekly meetings that included practice of mindfulness meditation – which focuses on nonjudgmental awareness of sensations, feelings and state of mind – participants received audio recordings for guided meditation practice and were asked to keep track of how much time they practiced each day. A group of non-meditators also had their brains scanned during the same time period.

The meditators reported spending an average of 27 minutes each day practicing mindfulness exercises, and their responses to a "mindfulness questionnaire" indicated significant improvements compared with pre-participation responses, the scientists reported.

Analysis of the brain scans, which focused on areas where meditation-associated differences were seen in earlier studies, found increased grey-matter density in the hippocampus, known to be important for learning and memory, and in structures associated with self-awareness, compassion and introspection. Grey matter is the brain tissue that contains nerve cells.

The reductions in stress reported by the participants were also correlated with decreased grey-matter density in the amygdala, a structure known to play an important role in anxiety and stress, researchers said. None of these changes were seen in the non-meditators.

"It is fascinating to see the brain's plasticity and that, by practicing meditation, we can play an active role in changing the brain and can increase our well-being and quality of life," said research team member Britta Hölzel of Massachusetts General. "Other studies in different patient populations have shown that meditation can make significant improvements in a variety of symptoms, and we are now investigating the underlying mechanisms in the brain that facilitate this change."

The finding also "opens doors to many possibilities for further research... to protect against stress-related disorders, such as post-traumatic stress disorder," said University of Miami neuroscientist Amishi Jha, who wasn't involved in the study but researches mindfulness training's effects on stressed people.