

Changing brains for the better; article documents benefits of multiple practices

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(Medical Xpress) -- Practices like physical exercise, certain forms of psychological counseling and meditation can all change brains for the better, and these changes can be measured with the tools of modern neuroscience, according to a review article now online at *Nature Neuroscience*.

The study reflects a major transition in the focus of neuroscience from disease to well being, says first author Richard Davidson, professor of psychology at University of Wisconsin-Madison.

The brain is constantly changing in response to [environmental factors](#), he says, and the article "reflects one of the first efforts to apply this conceptual framework to techniques to enhance qualities that we have not thought of as skills, like well-being. Modern [neuroscience research](#) leads to the inevitable conclusion that we can actually enhance well-being by training that induces neuroplastic changes in the brain."

"Neuroplastic" changes affect the number, function and interconnections of cells in the brain, usually due to external factors.

Although the positive practices reviewed in the article were not designed using the tools and theories of modern neuroscience, "these are practices which cultivate new connections in the brain and enhance the function of neural networks that support aspects of pro-social behavior, including empathy, altruism, kindness," says Davidson, who directs the Center for Investigating Healthy Minds at UW-Madison.

The review, co-written with Bruce McEwen of Rockefeller University, begins by considering how social stressors can harm the brain. The massive neglect of children in orphanages in Romania did not just have psychological impacts; it created measurable changes in their brains, Davidson says. "Such studies provide an important foundation for understanding the opposite effects of interventions designed to promote wellbeing."

Davidson says his work has been shaped by his association with the Dalai Lama, who asked him in the 1990s, "Why can't we use the same rigorous tools of neuroscience to investigate kindness, compassion and wellbeing?"

Davidson, who has explored the neurological benefits of meditation, says, "meditation is one of many different techniques, and not necessarily the best for all people. Cognitive therapy, developed in modern psychology, is one of most empirically validated treatments for depression and counteracting the effects of stress."

Overall, Davidson says, the goal is "to use what we know about the brain to fine-tune interventions that will improve well-being, kindness, [altruism](#). Perhaps we can develop more targeted, focused interventions that take advantage of the mechanisms of neuroplasticity to induce specific changes in specific brain circuits."

Brains change all the time, Davidson emphasizes. "You cannot learn or retain information without a change in the brain. We all know implicitly that in order to develop expertise in any complex domain, to become an accomplished musician or athlete, requires practice, and that causes new connections to form in the brain. In extreme cases, specific parts of the brain enlarge or contract in response to our experience."

Scientific documentation for the benefits of brain training may have

broader social impacts, says Davidson. "If you go back to the 1950s, the majority of middle-class citizens in Western countries did not regularly engage in physical exercise. It was because of scientific research that established the importance of physical exercise in promoting health and well-being that more people now engage in regular [physical exercise](#). I think mental exercise will be regarded in a similar way 20 years from now.

"Rather than think of the brain as a static organ, or one that just degenerates with age, it's better understood as an organ that is constantly reshaping itself, is being continuously influenced, wittingly or not, by the forces around us," says Davidson, author of the new book "The Emotional Life of Your Brain." "We can take responsibility for our own brains. They are not pawns to external influences; we can be more proactive in shaping the positive influences on the [brain](#)."

Provided by University of Wisconsin-Madison

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