



“As a society, we are becoming hyperfocused, always looking at something, a goal to our gaze.”

Nancy Colier, LCSW, Rev.

The Athlete's Way

Sweat and the biology of bliss
by Christopher Bergland

Mindfulness Training and the Compassionate Brain

Meditation cultivates concentration, empathy, and insight at a neural level.
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There is a gamut of recent neuroscientific studies that support the transformative power of mindfulness and compassion meditation. Different types of meditation are being shown to create different changes in the brain. In this entry I will compare different types of meditation and look at the science behind how they cultivate concentration, empathy, and insight at a neural level.

In the wake of the Sandy Hook school shootings, we are all looking for ways that we can stop the violence and bloodshed. One angle that I see is to demystify 'meditation' and teach young children simple techniques for practicing mindfulness and compassion directed thought.

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The weekend after the shootings in Newtown, Connecticut the Dalai Lama spoke to a gathering of Thai Buddhist monks in New Delhi, India about "Reaching the Same Goal with Different Paths."

The Dalai Lama said that "In the twenty-first century, even in countries with no previous tradition of Buddhism, interest is growing among ordinary people and scientists. The ethics and discipline described in the Vinaya are the foundation for training both in concentration (shamatha) and insight (vipassana). He clarified that with the help of concentration our mind has the ability to remain still and by applying analysis we achieve understanding."

"However," he said, "we must remember the rest of humanity. If we can create a more peaceful world, everyone benefits. And to achieve this I think we need to take a more secular, rather than a religious, approach to fostering ethics. Compassion really brings about inner peace and inner strength. Those who practice compassion become calmer and less subject to fear."

He backed this up by reporting that scientists have also found that when you have compassion, your physical as well as your mental health improves. In recent years multiple studies have come out showing the benefits of mindfulness and compassion meditation.

Mindfulness Training and the Compassionate Brain

Cultivating empathy through compassion meditation affects brain regions that make a person more sympathetic to other peoples' mental states. Richard Davidson, the William James and Vilas Research Professor of Psychology and Psychiatry at University of Wisconsin-Madison, is a pioneer in this field of meditation as a tool for brain plasticity. Davidson and associate scientist Antoine Lutz have been working on this research for years.



Christopher Bergland is a world-class endurance athlete, coach, author, and political activist. [more...](#)

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"Many contemplative traditions speak of loving-kindness as the wish for happiness for others and of compassion as the wish to relieve others' suffering. Loving-kindness and compassion are central to the Dalai Lama's philosophy and mission," says Davidson, who has worked extensively with the Tibetan Buddhist leader. "We wanted to see how this voluntary generation of compassion affects the brain systems involved in empathy."

Davidson and Lutz's work suggests that through mindfulness training, people can develop skills that promote happiness and compassion. "People are not just stuck at their respective set points," Lutz says. "We can take advantage of our brain's plasticity and train it to enhance these qualities."

Functional magnetic resonance imaging (fMRI) brain imaging shows that positive emotions such as loving-kindness and compassion can be learned in the same way as playing a musical instrument or being proficient in a sport. The scans revealed that brain circuits used to detect emotions and feelings were dramatically changed in subjects who had extensive experience practicing compassion meditation.

The research suggests that individuals — from children who may engage in bullying to people prone to recurring depression — and society in general could benefit from such meditative practices, says Davidson.

The capacity to cultivate compassion, which involves regulating thoughts and emotions, may also be useful for preventing depression in people who are susceptible to it, Lutz adds. "Thinking about other people's suffering and not just your own helps to put everything in perspective," he says, adding that learning compassion for oneself is a critical first step in compassion meditation.

The researchers are interested in teaching compassion meditation to youngsters, particularly as they approach adolescence, as a way to prevent bullying, aggression and violence.

"I think this can be one of the tools we use to teach emotional regulation to kids who are at an age where they're vulnerable to going seriously off track," Davidson says. Compassion meditation can be beneficial in promoting more harmonious relationships of all kinds, Davidson adds.

"The world certainly could use a little more kindness and compassion," he says. "Starting at a local level, the consequences of changing in this way can be directly experienced."

Various techniques are used in compassion meditation. Controls in the Davidson and Lutz study were asked first to concentrate on loved ones, wishing them well-being and freedom from suffering. After some training, they then were asked to generate such feelings toward all beings without thinking specifically about a particular individual.

Creating Educational Video Games That Foster Empathy

In 2010 Richard Davidson challenged video game manufacturers to develop games that emphasize kindness and compassion instead of violence and aggression.

With a recent grant from the Bill & Melinda Gates Foundation, Davidson is working with Kurt Squire, an associate professor in the School of Education and director of the *Games Learning Society Initiative*, to design and rigorously test two educational games to help eighth graders develop beneficial social and emotional skills – empathy, cooperation, mental focus, and self-regulation.

"By the time they reach the eighth grade, virtually every middle-class child in the Western world is playing smartphone apps, video games, computer games," says Davidson. "Our hope is that we can use some of that time for constructive purposes and take advantage of the natural inclination of children of that age to want to spend time with this kind of technology."

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The project grew from the intersection of Davidson's research on the brain bases of emotion, Squire's expertise in educational game design, and the Gates Foundation's interest in preparing U.S. students for college readiness—possessing the skills and knowledge to go on to post-secondary education without the need for remediation.

"Skills of mindfulness and kindness are very important for college readiness," Davidson explains. "Mindfulness, because it cultivates the capacity to regulate attention, which is the building block for all kinds of learning; and kindness, because the ability to cooperate is important for everything that has to do with success in life, team-building, leadership, and so forth."

He adds that social, emotional, and interpersonal factors influence how students use and apply their cognitive abilities.

The project will focus on designing prototypes of two games. The first game will focus on improving attention and mental focus, likely through breath awareness.

"Breathing has two important characteristics. One is that it's very boring, so if you're able to attend to that, you can attend to most other things," Davidson says. "The second is that we're always breathing as long as we're alive, and so it's an internal cue that we can learn to come back to. This is something a child can carry with him or her all the time."

The second game will focus on social behaviors such as kindness, compassion, and altruism. One approach may be to help students detect and interpret emotions in others by reading non-verbal cues such as facial expressions, tone of voice, and body posture.

"We'll use insights gleaned from our neuroscience research to design the games and will look at changes in the brain during the performance of these games to see how the brain is actually affected by them," says Davidson. "Direct feedback from monitoring the brain while students are playing the games will help us iteratively adjust the game design as this work goes forward."

Their analyses will include neural imaging and behavioral testing before, during, and after students play the games, as well as looking at general academic performance.

The results will help the researchers determine how the games impact students and whether educational games are a useful medium for teaching these behaviors and skills, as well as evaluate whether certain groups of kids benefit more than others.

"Our hope is that we can begin to address these questions with the use of digital games in a way that can be very easily scaled and, if we are successful, to potentially reach an extraordinarily large number of youth," says Davidson.

Different Types of Meditation Create Different Brain Changes

A study from November of 2012 found that participating in an 8-week meditation training program can have measurable effects on how the brain functions even when someone is not actively meditating. In their report in the November issue of *Frontiers in Human Neuroscience*, investigators at Massachusetts General Hospital (MGH), Boston University (BU), and several other research centers also found differences in those effects based on the specific type of meditation practiced.

"The two different types of meditation training our study participants completed yielded some differences in the response of the amygdala – a part of the brain known for decades to be important for emotion – to images with emotional content," says Gaëlle Desbordes, PhD, a research fellow at the Athinoula A. Martinos Center for Biomedical Imaging at MGH and at the BU Center for Computational Neuroscience and Neural

Technology, corresponding author of the report. "This is the first time that meditation training has been shown to affect emotional processing in the brain outside of a meditative state."

Several previous studies have supported the hypothesis that meditation training improves practitioners' emotional regulation. While neuroimaging studies have found that meditation training appeared to decrease activation of the amygdala those changes were only observed while study participants were meditating. The current study was designed to test the hypothesis that meditation training could also produce a generalized reduction in amygdala response to emotional stimuli, measurable by functional magnetic resonance imaging (fMRI).

In the mindful attention group, the after-training brain scans showed a decrease in activation in the right amygdala in response to all images, supporting the hypothesis that meditation can improve emotional stability and response to stress.

In the compassion meditation group, right amygdala activity also decreased in response to positive or neutral images. But among those who reported practicing compassion meditation most frequently outside of the training sessions, right amygdala activity tended to increase in response to negative images – all of which depicted some form of human suffering. No significant changes were seen in the control group or in the left amygdala of any study participants.

"We think these two forms of meditation cultivate different aspects of mind," Desbordes explains. "Since compassion meditation is designed to enhance compassionate feelings, it makes sense that it could increase amygdala response to seeing people suffer. Increased amygdala activation was also correlated with decreased depression scores in the compassion meditation group, which suggests that having more compassion towards others may also be beneficial for oneself. Overall, these results are consistent with the overarching hypothesis that meditation may result in enduring, beneficial changes in brain function, especially in the area of emotional processing.

Compassion Meditation Boosts Neural Basis of Empathy

Another study released in October of 2012 found that a compassion-based meditation program can significantly improve a person's ability to read the facial expressions of others. This study was published by *Social Cognitive and Affective Neuroscience*. The boost in empathic accuracy was detected through both behavioral testing of the study participants and through functional magnetic resonance imaging (fMRI) scans of their brain activity.

"It's an intriguing result, suggesting that a behavioral intervention could enhance a key aspect of empathy," says lead author Jennifer Mascaro, a post-doctoral fellow in anthropology at Emory University. "Previous research has shown that both children and adults who are better at reading the emotional expressions of others have better relationships."

The meditation protocol, known as Cognitively-Based Compassion Training, or CBCT, was developed at Emory by study co-author Lobsang Tenzin Negi, director of the Emory-Tibet Partnership. Although derived from ancient Tibetan Buddhist practices, the CBCT program is secular in content and presentation.

The research team also included senior author Charles Raison, formerly a psychiatrist at Emory's School of Medicine and currently at the University of Arizona, and Emory anthropologist James Rilling.

When most people think of meditation, they think of a style known as "mindfulness," in which practitioners seek to improve their ability to concentrate and to be non-judgmentally aware of their thoughts and feelings. While CBCT includes these mindfulness elements, the practice focuses more specifically on training people to analyze and reinterpret their relationships with others.

"The idea is that the feelings we have about people can be trained in optimal ways," Negi explains. "CBCT aims to condition one's mind to recognize how we are all inter-dependent, and that everybody desires to be happy and free from suffering at a deep level."

"These findings raise the intriguing possibility that CBCT may have enhanced empathic abilities by increasing activity in parts of the brain that are of central importance for our ability to recognize the emotional states of others," Raison says. "An important next step will be to evaluate the effects of CBCT on diverse populations that may particularly benefit from enhanced empathic accuracy, such as those suffering from high-functioning autism or severe depression."

Findings from this study add to a growing database indicating that compassion meditation CBCT style of meditation may have physical and emotional effects relevant to health and well-being. For example, previous research at Emory found that practicing CBCT reduced emotional distress and enhanced physical resilience in response to stress in both healthy young adults and in high-risk adolescents in foster care.

CONCLUSION

As a society and a nation we must all come together to find solutions to violence and aggression toward one another. Meditation is one way to do this but there are many others. Please share ideas you have in the comments here to help create a dialogue and 'think tank' of ways that we can create change.

As President Obama said at the Newtown Vigil, "We can't tolerate this anymore. These tragedies must end. And to end them, we must change.

We will be told that the causes of such violence are complex, and that is true. No single law, no set of laws can eliminate evil from the world or prevent every senseless act of violence in our society, but that can't be an excuse for inaction. Surely we can do better than this. If there's even one step we can take to save another child or another parent or another town from the grief that's visited Tucson and Aurora and Oak Creek and Newtown and communities from Columbine to Blacksburg before that, then surely we have an obligation to try."

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