

The Brain Research We Should Read

# Mystic Cool



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### FINDING HAPPINESS: Cajole Your Brain To Lean To The Left

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All too many years ago, while I was still a psychology graduate student, I ran an experiment to assess how well meditation might work as an antidote to stress. My professors were skeptical, my measures were weak, and my subjects were mainly college sophomores. Not surprisingly, my results were inconclusive.

But today I feel vindicated.

To be sure, over the years there have been scores of studies that have looked at meditation, some suggesting its powers to alleviate the adverse effects of stress. But only last month did what I see as a definitive study confirm my once-shaky hypothesis, by revealing the brain mechanism that may account for meditation's singular ability to soothe.

The data has emerged as one of many experimental fruits of an unlikely research collaboration: the Dalai Lama, the Tibetan religious and political leader in exile, and some of top psychologists and neuroscientists from the United States. The scientists met with the Dalai Lama for five days in Dharamsala, India, in March 2000, to discuss how people might better control their destructive emotions.

One of my personal heroes in this rapprochement between modern science and ancient wisdom is Dr. Richard Davidson, director of the Laboratory for Affective Neuroscience at the University of Wisconsin. Dr. Davidson, in recent research using functional M.R.I. and advanced EEG analysis, has identified an index for the brain's set point for moods.

The functional M.R.I. images reveal that when people are emotionally distressed - anxious, angry, depressed – the most active sites in the brain are circuitry converging on the amygdala, part of the brain's emotional centers, and the right prefrontal cortex, a brain region important for the hypervigilance typical of people under stress.

By contrast, when people are in positive moods - upbeat, enthusiastic and energized - those sites are quiet, with the heightened activity in the left prefrontal cortex. Indeed, Dr. Davidson has discovered what he believes is a quick way to index a person's typical mood range, by reading the baseline levels of activity in these right and left prefrontal areas. That ratio predicts daily moods with surprising accuracy. The more the ratio tilts to the right, the more unhappy or distressed a person tends to be, while the more activity to the left, the more happy and enthusiastic.

By taking readings on hundreds of people, Dr. Davidson has established a bell curve distribution, with most people in the middle, having a mix of good and bad moods. Those relatively few people who are farthest to the right are most likely to have a clinical depression or anxiety disorder over the course of their lives. For those lucky few farthest to the left, troubling moods are rare and recovery from them is rapid.

This may explain other kinds of data suggesting a biologically determined set point for our emotional range. One finding, for instance, shows that both for people lucky enough to win a lottery and those unlucky souls who become paraplegic from an accident, by a year or so after the events their daily moods are about the same as before the momentous occurrences, indicating that the emotional set point changes little, if at all.

By chance, Dr. Davidson had the opportunity to test the left-right ratio on a senior Tibetan lama, who turned out to have the most extreme value to the left of the 175 people measured to that point.

Dr. Davidson reported that remarkable finding during the meeting between the Dalai Lama and the scientists in India. But the finding, while intriguing, raised more questions than it answered.

Was it just a quirk, or a trait common among those who become monks? Or was there something about the training of lamas - the Tibetan Buddhist equivalent of a priest or spiritual teacher - that might nudge a set point into the range for perpetual happiness? And if so, the Dalai Lama wondered, can it be taken out of the religious context to be shared for the benefit of all?

A tentative answer to that last question has come from a study that Dr. Davidson did in collaboration with Dr. Jon Kabat-Zinn, founder of the Mindfulness-Based Stress

Reduction Clinic at the University of Massachusetts Medical School in Worcester.

That clinic teaches mindfulness to patients with chronic diseases of all kinds, to help them better handle their symptoms. In an article accepted for publication in the peer-reviewed journal *Psychosomatic Medicine*, Drs. Davidson and Kabat-Zinn report the effects of training in mindfulness meditation, a method extracted from its Buddhist origins and now widely taught to patients in hospitals and clinics throughout the United States and many other countries.

Dr. Kabat-Zinn taught mindfulness to workers in a high-pressure biotech business for roughly three hours a week over two months. A comparison group of volunteers from the company received the training later, though they, like the participants, were tested before and after training by Dr. Davidson and his colleagues.

The results bode well for beginners, who will never put in the training time routine for lamas. Before the mindfulness training, the workers were on average tipped toward the right in the ratio for the emotional set point. At the same time, they complained of feeling highly stressed. After the training, however, on average their emotions ratio shifted leftward, toward the positive zone. Simultaneously, their moods improved; they reported feeling engaged again in their work, more energized and less anxious.

In short, the results suggest that the emotion set point can shift, given the proper training. In mindfulness, people learn to monitor their moods and thoughts and drop those that might spin them toward distress. Dr. Davidson hypothesizes that it may strengthen an array of neurons in the left prefrontal cortex that inhibits the messages from the amygdala that drive disturbing emotions.

Another benefit for the workers, Dr. Davidson reported, was that mindfulness seemed to improve the robustness of their immune systems, as gauged by the amount of flu antibodies in their blood after receiving a flu shot.

According to Dr. Davidson, other studies suggest that if people in two experimental groups are exposed to the flu virus, those who have learned the mindfulness technique will experience less severe symptoms. The greater the leftward shift in the emotional set point, the larger the increase in the immune measure.

The mindfulness training focuses on learning to monitor the continuing sensations and thoughts more closely, both in sitting meditation and in activities like yoga exercises.

Now, with the Dalai Lama's blessing, a trickle of highly trained lamas have come to be studied. All of them have spent at least three years in solitary meditative retreat. That amount of practice puts them in a range found among masters of other

domains, like Olympic divers and concert violinists.

What difference such intense mind training may make for human abilities has been suggested by preliminary findings from other laboratories. Some of the more tantalizing data come from the work of another scientist, Dr. Paul Ekman, director of the Human Interaction Laboratory at the University of California at San Francisco, which studies the facial expression of emotions. Dr. Ekman also participated in the five days of dialogue with the Dalai Lama.

Dr. Ekman has developed a measure of how well a person can read another's moods as telegraphed in rapid, slight changes in facial muscles.

As Dr. Ekman describes in "Emotions Revealed," to be published by Times Books in April, these microexpressions - ultrarapid facial actions, some lasting as little as one-twentieth of a second - lay bare our most naked feelings. We are not aware we are making them; they cross our faces spontaneously and involuntarily, and so reveal for those who can read them our emotion of the moment, utterly uncensored.

Perhaps luckily, there is a catch: almost no one can read these moments. Though Dr. Ekman's book explains how people can learn to detect these expressions in just hours with proper training, his testing shows that most people - including judges, the police and psychotherapists - are ordinarily no better at reading microexpressions than someone making random guesses.

Yet when Dr. Ekman brought into the laboratory two Tibetan practitioners, one scored perfectly on reading three of six emotions tested for, and the other scored perfectly on four. And an American teacher of Buddhist meditation got a perfect score on all six, considered quite rare. Normally, a random guess will produce one correct answer in six.

Such findings, along with urgings from the Dalai Lama, inspired Dr. Ekman to design a program called "Cultivating Emotional Balance," which combines methods extracted from Buddhism, like mindfulness, with synergistic training from modern psychology, like reading microexpressions, and seeks to help people better manage their emotions and relationships.

A pilot of the project began last month with elementary school teachers in the San Francisco Bay area, under the direction of Dr. Margaret Kemeny, a professor of behavioral medicine at the University of California at San Francisco. She hopes to replicate Dr. Davidson's immune system findings on mindfulness, as well as adding other measures of emotional and social skill, in a controlled trial with 120 nurses and teachers.

Finally, the scientific momentum of these initial forays has intrigued other

investigators. Under the auspices of the Mind and Life Institute, which organizes the series of continuing meetings between the Dalai Lama and scientists, there will be a round at the Massachusetts Institute of Technology on Sept. 13 and 14. This time the Dalai Lama will meet with an expanded group of researchers to discuss further research possibilities.

Though open to the public, half the seats will be reserved for graduate students and academic researchers. (More information is at [www.InvestigatingTheMind.org](http://www.InvestigatingTheMind.org).)

As for me, I am taking all this to heart. An on-again, off-again meditator since my college days, I have become decidedly on again. Next month, my wife and I are heading to a warm spot for two or three weeks of meditation retreat. I may never catch up with that sublime lama, but I will enjoy trying.

<http://www.nytimes.com/2003/02/04/health/psychology/04ESSA.html?ex=1045372468&ei=1&en=68ed71c6de930eb4>

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkrantz, M., Muller, D., Santorelli, S. F. et al. Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, (in press).