Buddha’s Brain

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Following my frequent bouts of anxiety, I search for mental exercises to relax my mind, and continue about my day. As a scientist, I am skeptical of these methods; I want to know why I experience a calming effect as a result of rhythmic breathing or meditation. In Buddha’s Brain (ISBN 10: 1572246952, New Harbinger Publications, first edition November 2009), authors Rick Hanson Ph.D., a neuropsychologist and meditation teacher, and Richard Mendius, MD, a neurologist and cofounder of the Wellspring Institute for Neuroscience and Contemplative Wisdom, interweave classical Buddhist teachings with mental exercises. The authors believe that, through self-guided mental exercise, individuals can improve the human brain’s capacity for happiness, love, and wisdom, and through doing so, kindness, compassion, mindfulness, concentration, and more. The novel is available for $12.57 on Amazon.com.

Classical studies of neuroplasticity show that, according to psychologist Donald Hebb’s theory, “when neurons fire together, they wire together,” (Hanson, 5). To illustrate the concept, Dr. Hanson and Dr. Mendius describe the brains of London taxi drivers who show increased neural circuits for memory formation as a result of remembering London streets. Dr. Hanson and Dr. Mendius believe that through their self-regulation training exercises, they can help individuals form neural circuits that will allow them to further develop the three pillars of Buddhist practice: virtue, mindfulness, and concentration. These practices are crucial to everyday well-being through critical development of fundamental neural functions: regulation, learning, and selection. They explain that virtue involves regulating actions, words, and thoughts in the prefrontal cortex, as well as calming the parasympathetic nervous system (PNS). Mindfulness is the attention to inner and outer worlds, and relies on making good experiences (acquired through learning) part of the self. Finally, wisdom is common sense, reliant on understanding suffering and focusing on life’s pleasures (Hanson, 14). By strengthening the three pillars through the fundamental neural functions, an individual can experience an enhanced well-being.

Dr. Hanson and Dr. Mendius seek to teach individuals ways to handle stress, a lowered mood, anxiety, sorrow, anger, and more. To teach the individuals, they believe, is to decrease an individual’s suffering, which they define as, “the pangs of living range from subtle loneliness and dis-may, to moderate stress, hurt, and anger, and then to intense trauma and anguish” (Hanson, 23). They make clear that to reduce suffering is not to ignore negative experiences, as negative experiences can often have an important impact. For example, anxiety helps individuals recognize threats (Hanson, 68). To decrease suffering, as the Buddha teaches, one must first find the cause of the suffering, find the cure, and then find a way to treat the suffering. First, Dr. Hanson and Dr. Mendius explain individual suffering, and then dedicate the book to training individuals in exercises to decrease suffering. They explain that suffering, among many causes, is primarily a result of a desire to maintain equilibrium of the body and brain mixed with the continuous changes of life disturbing an individual’s mind. For example, an individual must balance inhibition from the prefrontal cortex and arousal from the limbic system to avoid feelings of numbness (from too much inhibition) or feelings of being overwhelmed (from too much arousal). However, signals of threat can impede this balance system, and can make an individual uncomfortable. For example, if an individual sees a predator, the amygdala, which processes emotions, sends a signal to warn the brain, which stimulates the fight-or-flight response. Because of the confrontation, the individual can be left feeling anxious or fearful, which falls under the author’s definition of suffering. From an evolutionary standpoint, individuals are primed to avoid suffering to increase survival. Similarly, individuals are likely to seek rewarding stimuli, as dopamine and oxytocin levels rise to create a pleasurable feeling for an individual who, for example, sought water to reduce thirst.

Dr. Hanson and Dr. Mendius next explain suffering utilizing Buddha’s first and second “dart” metaphor, in which the first dart is mental discomfort and the second is the individual’s reactions to mental discomfort. For example, if someone stubs his or her toe, the first dart is pain. The second dart, which they explain to be the primary cause of suffering, may be anger that the chair was out of place. To ease the discomfort of the second dart, Dr. Hanson and Dr. Mendius explain that suffering is a response to the threats, which are processed in the sympathetic nervous system (SNS) and hypothalamic-pituitary-adrenal axis (HPAA). The thalamus is first signaled by the amygdala to release norepinephrine for stimulation, followed by the sympathetic nervous system, which signals organs and muscles to prepare the body for fighting or fleeing, and then the hypothalamus to release cortisol and adrenaline. The “stress hormones,” (Hanson, 52). Though necessary for reacting to threat, when hyperactive, the SNS and HPAA can lead to major mental and physical problems, such as ulcers, colitis, immunity problems, diabetes, anxiety, depression, and more. For this reason, it is important to stimulate the parasympathetic nervous system to produce relaxation by conserving energy in the body, thus creating a weakened “second dart” response, as well as mildly stimulating the sympathetic nervous system for alertness and vitality.

Dr. Hanson and Dr. Mendius next explain the methods to seek happiness, which will, in turn, lead to the cessation of suffering in an individual. They begin by explaining ways to “take in the goodness of the world” (Hanson, 67). Individuals must foster positive experiences to make them a permanent memory, rather than exclusively suppressing negative experiences. To “take in” this positivity, such as flowers blooming or the smell of oranges (Hanson, 68), they suggest initiating a 20 second focus on the object, and then to actively note the increase in dopamine signaling reward. By focusing on the positivity, with time, individuals can begin to build neural structure to enhance positive experiences.

If an individual is in a state of unhappiness, described as rattled, anxious, or irritated, Dr. Hanson and Dr. Mendius describe a slightly modified approach to seeking happiness. To first initiate a state of relaxation, they suggest activating the PNS to keep an individual from feeling stressed or anxious. Relaxed muscles can send feedback to the brain, and even potentially alter gene expression, which leads to less physical and mental damage due to stress (as, aforementioned, can result from a hyperactive SNS and HPAA). Running warm water over the hands, breathing through the diaphragm, and touching the lips to stimulate muscle relaxation through the PNS. Additionally, meditation, as discussed throughout the novel, can increase activation of the PNS partially by lowering cortisol (stress hormone) levels and uplifting mood (Hanson, 85). Meditation can also strengthen the anterior cingulate cortex (ACC), which monitors progress towards goals, flagging impeding conflict, and influences emotion. By strengthening the ACC, they believe individuals can become closer to reaching equanimity. Equanimity is described as a Buddhist principle in which individuals are, “not disappointed or dissatisfied with life; you simply see through its apparent charms and alarms and are not knocked off center by either” (Hanson, 112). By reaching and maintaining equanimity, individuals become more accepting of negative experiences, and can regulate their “second darts” to reduce their own suffering.

Next, Dr. Hanson and Dr. Mendius believe that by focusing on compassion and empathy, individuals can strengthen their abilities to love, and by doing so, further reduce suffering. An important facet of love is empathy, or the ability to sense the inner state of another person. Mirror neurons, remarkably apparent in humans and primates, allow an individual to feel the emotions of another person. During sad movies, people cry as a result of their mirror neurons. Because of this connection between the inner emotions of two individuals, Dr. Hanson and Dr. Mendius explain that by becoming more aware of ourselves, we can become better at reading others. To strengthen empathy, they suggest activating the prefrontal cortex by becoming conscious to the intentions of others. For example, if someone is angry with you, think about why, from that person’s perspective, the individual is angry. This process helps prime the empathy-related neural networks, and attention helps stimulate the ACC. Additionally, Dr. Hanson and Dr. Mendius suggest that compassion, the intention that others not suffer, can be strengthened by seeing kindness as a reward, and focusing on the rewarding feelings of the dopamine and oxytocin release.

Finally, Dr. Hanson and Dr. Mendius explore wisdom. To attain wisdom, they believe individuals must seek mindfulness, or well-controlled attention. To become more attentive, they explain that one must sleep, exercise good posture to send internal feedback to the reticular formation, which is associated with wakefulness and consciousness, and visualize light, which may send norepinephrine through the brain to stimulate alertness. Additionally, Dr. Hanson and Dr. Mendius believe that through meditation, mindfulness can be attained.

In Buddha’s Brain Dr. Hanson and Dr. Mendius portray not only a clear explanation to understanding the anatomical basis to meditation, breathing techniques, and other relaxation exercises, but also provide ef-
fective (as I, personally, have found) guided meditation practices to readers. Additionally, the authors seamlessly integrate classic Buddhist teachings of relieving suffering without compromising the nature of science or the religion. Often times, when books seek to combine the studies of religion and science, the content from either science or the religion may become distorted and not allow for overlap. As a result, the book is interesting to both individuals interested in the brain, as well as Buddhist principles in the contemporary world. However, many of Dr. Hanson and Dr. Mendius’ guided meditations seemed similar, and that lead me to question the construct validity of their studies. At the beginning of the novel, they stated that they have seen their meditation practices lead to a strengthened well-being of their patients (Hanson, viii). Additionally, later in the novel, they provide the empirical data to several experiments completed by other scientists (Hanson, 85) indicating a true, physiological response to meditation. I would be interested to see a study done in which individuals who meditate using the practices outlined in the novel are compared to control subjects, in order to eliminate a possible placebo effect. Subjects would then be tested on the different facets of lessening suffering (compassion, empathy, mindfulness, attentiveness, etc.) that the novel seeks to strengthen. While the studies shown do support the process of meditating as it activates the parasympathetic nervous system producing a relaxing effect, by testing subjects on the different facets outlined in the novel, the meditation practices could be better centered on an individual patient’s specific needs, and ensure that meditation strengthens the fundamental neurological functions of regulation, learning, and selection.

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