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Reviews the book, "Cerebrum 2008: Emerging ideas in brain science" by Cynthia A. Read (see record 2008-04790-000). This book features contributions spanning numerous facets of our lives that brain science either has or will likely transform: from medicine, education, and architecture, all the way to the creative arts. Compared with other compilations with a similar flavor, "Cerebrum 2008" stands out in communicating a few key issues in contemporary neuroscience while gearing the presentation toward a wide, uninitiated readership. "Cerebrum 2008" successfully captures the promise and future prospects of brain science. Each contribution reports current developments in a major area of neuroscience while amply contextualizing the overarching implications. These readable essays appeal to a wide readership as they provide an accessible glimpse into current issues in brain science, including several that compel us all to reexamine our concept of self. "Cerebrum 2008" reaffirms that we have much to look forward to from future research in brain science. Beyond striving for a better understanding of the organ of behavior, neuroscience offers us the potential to transform our brains, minds, and humanity. (PsycINFO Database Record (c) 2009 APA, all rights reserved)

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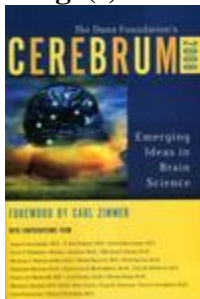
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Emergent Effects of Investigating the Human Brain

Review By: [Amir Raz](#)
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Review of: *Cerebrum 2008: Emerging Ideas in Brain Science*
By: Cynthia A. Read (Ed.), New York: Dana Press, 2008. 221 pp. ISBN 978-1-932594-33-1. \$14.95, paperback

Findings from brain research often stimulate reconsideration of what it means to be human. *Cerebrum 2008: Emerging Ideas in Brain Science* features contributions spanning numerous facets of our lives that brain science either has or will likely transform: from medicine, education, and architecture, all the way to the creative arts. Edited by Cynthia Read and published by Dana Press, this anthology brings together articles from leading brain scientists including Michael Frank, Mark Hallett, Paul McHugh, and Anjan Chatterjee. Compared with other compilations with a similar flavor (Pomerantz, 2008; Rees & Rose, 2004), *Cerebrum 2008* stands out in communicating a few key issues in contemporary neuroscience while gearing the presentation toward a wide, uninitiated readership.

In this review, we focus on three articles from the *Cerebrum 2008* collection that collectively compel readers to reflect upon the way they construe themselves as persons. This notion of *self-concept* is appealing: While investigating the human brain furthers understanding of body and mind, findings from such studies often carry broader philosophical, social, and ethical implications. Thus, unraveling the workings of the brain goes beyond improving treatment of neurological disorders and psychopathologies.

The question of whether humans possess free will has ceased to be the exclusive purview of philosophers as many neuroscientists are now seeking clues for this inquiry in the brain. Because the exercise of reason is a defining human feature, the free-will debate strikes at the heart of our concept of self. In “Seeking Free Will in Our Brains: A Debate,” Hallett and McHugh demonstrate how the perspectives of a motor physiologist and a psychiatrist inform the age-old question, respectively. On the one hand, Hallett advocates for a mechanistic tradition by relying on studies by Libet, whose findings suggest that unconscious action initiation precedes the conscious intention to act. On the other hand, McHugh sides with intuition, citing clinical observations to support the existence of free will. These opposing positions characterize two major traditional accounts regarding thought and action.

Neuroscience evidence tends to support a deterministic approach toward the question of free will. Libet’s studies, however, are just one piece of the puzzle. Discovering that actions initiate unconsciously is exactly what to expect if mental events arise only from brain activity. Those continuing in Libet’s tradition have unlocked the neural substrates of action initiation and how our brains can differentiate internally and externally generated movements (Frith, Blakemore, &

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Wolpert, 2000). Widespread evidence also exposes the inaccuracy of how we appear to ourselves in consciousness, thus discrediting the main type of evidence for the existence of free will (Wegner, 2003). Furthermore, findings shed light on how we can tease apart one's experience of will from one's actions, allowing for automatism and false impression of control (Aarts, Custers, & Wegner, 2005).

Collectively, therefore, considerable arguments have been advocating the notion of the illusion of conscious will (Wegner, 2002). For example, subjects experience willfully pointing toward an object they had prior thoughts about even when the pointing is controlled by a confederate (Wegner & Wheatley, 1999). The distinction between the experience of being in control of one's actions and actually being in control, however, requires further exploration (Johansson, Hall, Sikstrom, & Olsson, 2005). Remaining mindful of this delineation, neuroscientists have begun to sketch the influence of a "sense of control" (Raz & Zigman, in press). While future work will likely further illuminate the link between the experience of will and action initiation, a wealth of recent research supports Hallett's position.

Our subjective experience of being free to act renders the free-will debate viscerally unintelligible. McHugh suggests that we shield our will from the barrage of science behind our insufficient understanding of mind-brain interaction. The nature of McHugh's position, however, becomes apparent in his rebuttal to Hallett's argument. If phenomenological accounts are the main defense for free will, it seems that either the basic human conscious experience must change or no amount of scientific evidence could ever compel some scholars to accept determinism. One gets the impression that defenders of free will say, "If we cannot believe in free will, what can we believe in?"

In discussing the equally pivotal notion of personal identity, Derek Parfit has wondered whether we as humans are simply incapable of believing certain facts about ourselves, regardless of what psychologists and philosophers affirm (Parfit, 1984). At the very least, we may acknowledge certain possibilities without believing them with confidence and flamboyance. In order for the free-will debate to move forward, neuroscientists must assign the conscious experience of bodily functions its proper role in argumentation.

Scholars advocating that free will is merely a perception often cite findings coupling human behavior with unconscious causes. In "'Go' and 'NoGo': Learning and the Basal Ganglia," Frank discusses such findings, including how we can attribute many of our actions to "principles of learning that are embedded in our neural machinery" (p. 149). For example, the basal ganglia are crucial for action-based learning and underlie unconscious decision-making rooted in rewards and punishment (Graybiel, 1995). Feedback, in the form of dopaminergic activity, adaptively shapes much of our behavior. Frank's research, utilizing computer models, supports the hypothesis that different dopamine receptors direct different types of learning (Frank, D'Lauro, & Curran, 2007).

Findings from this line of research are of special interest to those studying the abundant disorders associated with the basal ganglia and the neuromodulator dopamine. For example, elevating dopamine levels while treating Parkinson's patients can render negative reinforcement ineffective. "'Go' and 'NoGo'" also leaves readers wondering whether they may be genetically

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predisposed toward responding differently to positive or negative feedback. Such a possibility highlights that, despite the sizeable role of action-based learning, introspection leaves us unaware of its workings.

In addition to illuminating longstanding inquiries, scientific research can also propel new questions. The ability to transplant faces, for example, raises issues about personal identity and the salient role of a face—issues that are largely absent when discussing organ transplants (Caplan, 2008). Because of the importance of the brain, neuroscience generates similar thorny dilemmas. “Cosmetic neurology”—the practice of modifying cognition, motor skills, and affect in healthy individuals—allows us to mold and manipulate not only our bodies but also our minds. Along with presenting a snapshot of the practice, Chatterjee’s contribution, “‘Cosmetic Neurology’ and the Problem of Pain,” addresses the ethical concerns that go hand in hand with cosmetic neurology. The potential to modulate motor skills, memory, affect, and the perception of pain is probably exciting and problematic in the same way that seeing a loved one’s face on another person may help some and irk others.

The historical discussion of physical anesthesia complements the article’s focus on psychological trauma; by providing perspective, it forces readers to reconsider their gut reaction to insulating individuals from painful memories and daily hardships with medication. While scientists unveil new ways to dampen psychological pain, many consider experiencing obstacles as integral to an individual’s life and character. Consequently, capabilities approximating cosmetic neurology induce the reexamination of psychological well-being.

Cerebrum 2008 successfully captures the promise and future prospects of brain science. Each contribution reports current developments in a major area of neuroscience while amply contextualizing the overarching implications. These readable essays appeal to a wide readership as they provide an accessible glimpse into current issues in brain science, including several that compel us all to reexamine our concept of self.

Perhaps the only glaring omission from the present volume is a piece on consciousness. Although the topic of consciousness emerges throughout the book, it is often in reference to the liquid understanding with which scientists typically construe this topic. We would have welcomed an article capturing contemporary neuroscience theories of consciousness, followed by a discussion of their potential repercussions. *Cerebrum 2008* reaffirms that we have much to look forward to from future research in brain science. Beyond striving for a better understanding of the organ of behavior, neuroscience offers us the potential to transform our brains, minds, and humanity.

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