

LeDoux, Joseph E. 2019. *The Deep History of Ourselves: The Four-Billion-Year Story of How We Got Conscious Brains*

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In this book, LeDoux offers a grand and sweeping account of living organisms from the prebiotic soup through simple cells to more complex beings, including ourselves. For LeDoux, all behaviors are in multifaceted ways directed at survival, and many are dependent on various “survival circuits” that respond to “danger.” Thus, evolutionary history may provide insights into the workings of all organisms; though with us humans, a significant inflection point occurred with the emergence of self-consciousness.

This inflection point provides the framework for a conceptual division between roughly two parts of this 400-plus page book. The story of billions of years of evolution seems a prelude to what this reviewer finds the more interesting, if controversial, second part of the book—about us and what makes us human. Evolutionary accounts and their supporting theories can, in my opinion, offer significant heuristic suggestions about the processes of current organisms, but such accounts require strong evidence and comparative biological research into currently living organisms (Schaffner 1993, chapter 7). The past two decades of research into “model organisms” as tools for understanding humans is a case in point (Schaffner 2016, chapters 3–5).

Accordingly, I found LeDoux to be most persuasive in the second half of this book. His analysis of “thinking” encompasses deliberation, planning, and various types of memory. A key element is “working memory”—the ability to keep several thoughts present for active manipulation. But working memory is also found in

birds, bees, and other mammals. More significant, and the fulcrum on which much of the last half of the book is levered, are the related ideas of “episodic memory” and “autonoetic consciousness.” The two concepts were originally introduced by the world-famous neuroscientist Endel Tulving, but they are generalized by LeDoux.

Episodic memory involves personal recollections of complex episodes *as we experienced them* in our own lives. It is distinct from less vivid, factual, or “semantic” memories. A simpler form of thinking, termed *noesis*, involves stored representations of events and objects as semantic memories. *Autonoesis* is a term that embraces both personal awareness and mental “time travel,” including visiting the past in memory and projecting future possibilities, anticipating ways of altering them. These distinctions frame much of what LeDoux says subsequently about human consciousness and emotions. He maintains that no animals can show clear evidence of possessing either episodic memory or autonoesis, though animals are conscious and can experience suffering. Primates, perhaps especially great apes, *may* exhibit autonoesis and possess episodic memory, but we lack any consensus tools to ascertain that fact. Investigation is made more difficult by animals’ lack of true linguistic abilities. Thus, LeDoux remains agnostic about the possibility of animal models to study what he argues are the most important human traits about thought and emotion.

LeDoux builds on this episodic memory-autonoesis dyad by both drilling down and abstracting up. The drilling down examines brain

circuits that may be distinctively human, including the majorly expanded prefrontal cortex. These chapters on “hardware” (or “wetware”) may be a challenge to readers not versed in the basics of neuroscience. But LeDoux keeps the chapters short—as he does throughout the book—concentrating on a few main points in each chapter. The second half of the book abstracts up from LeDoux’s basic terminology, generalizing—often speculatively, as is the current practice—about theories of human consciousness and the notion of the “self.” The latter topic has recently been treated from a variety of disciplinary perspectives, including the neurosciences, psychology, psychiatry, and philosophy. For LeDoux, the existence of a conscious “self” is critical and is discussed more deeply in terms of “self schemas.” Self schemas are bundles of stored information (memories) about related items (230), akin to the perhaps better known term “mental models.” The “self” is fundamental for LeDoux because, for him, if there is no self, there is no emotion. He expresses this belief succinctly in a slogan embossed on a T-shirt that is available on his book’s website: “No self, no fear.” (Readers may also wish to access the page that includes complete references to the citations in the book: <https://deep-history-of-ourselves.com/pages/literature&sources.html>.)

LeDoux’s review of consciousness theories is broad but brief, and most of the recurring discussion of them focuses on LeDoux’s preferred theory of “Higher Order Thought” (HOT). This is a theory that involves re-representations in the brain, and has also been contributed to by Lau, Brown, and Rosenthal among many others (for more details, see Brown, Lau, and LeDoux 2019). I find the theory somewhat persuasive among other accounts such as the global workspace theory, but it still requires further development in order to generate hypotheses that can be tested experimentally. LeDoux suggests that HOT gives rise to the related notion of “higher-order representation of a representation theory,” or HOROR. HOROR encompasses

quasi-perceptual experiences and vivid memories, including even hallucinations that go beyond sense perceptions. His further speculations on consciousness lead to questions about how we view “other minds.” It is obviously possible for humans to infer the existence of “other minds” using language (unless you ask some philosophers), but LeDoux is again agnostic on whether other animals possess anything quite like “human minds.”

The final section of the book deals with LeDoux’s many important contribution to the study of fear. This includes his pioneering studies of the role of the amygdala, a small almond-shaped mass of gray matter in the anterior extremity of the temporal lobe. The amygdala has often been viewed as the fear center, but here LeDoux parts ways with the traditional approach. He claims that consciousness has a major role in fear emotions. In fact, LeDoux maintains that the word “fear” should be reserved *only* for the *conscious* experience of fear, and not used for those unconscious and partially conscious experiences stressed in traditional fear studies, which rely heavily on studies of other animals, such as mice. Animal models have their place, and LeDoux grants them the power to guide substantive research programs through extrapolation in both behavioral and cognitive capacities, though not in autozoetic conscious processes. He also suggests that animals are frequently subject to “anthropomorphic” projection, thus confusing what needs to be the focus of fear studies.

LeDoux summarizes a recent controversy about the role of consciousness in fear research, initiated by his 2016 article cowritten with Daniel Pine (LeDoux and Pine 2016). The article was followed by critiques and responses that have lasted over the past three years (for references, see Schaffner 2020). Following this discussion, LeDoux presents a general theory of emotions involving key contributions of consciousness. He provocatively suggests that emotions may be mere “exaptations”—useful traits that have emerged as byproducts of

adaptations—rather than adaptations inherited from earlier animals. A more recent account of this general theory of emotions can be found in LeDoux 2020.

LeDoux concludes his book with a cautionary “Epilogue.” Here he notes that for all the benefits produced by specifically human types of cognition, “autonoetic consciousness is ultimately personal and selfish, and at its worst moments, narcissistic” (378). This selfish quality of human consciousness can lead to—and has led to—a wide range of historical calamities, the most recent of which, he notes, being unregulated climate change. Since his book appeared, other

worldwide catastrophes have begun to emerge, further supporting his gloomy outlook. But LeDoux remains somewhat optimistic. Though he notes that evolution cannot save us, since it works too slowly, he declares that we will “have to depend on the more rapid avenues of change—cognitive and cultural evolution, which, in turn, depend on our autonoetic brains and their choices.”

This is a superb and fascinating book, both for the novice interested in long-term evolution and in consciousness and emotions, and for experts wanting an overview of LeDoux’s more recent challenges to traditional fear and anxiety studies.

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