



NEUROBIOLOGY

COGNITIVE GADGETS: THE CULTURAL EVOLUTION OF THINKING.

By Cecilia Heyes. *Belknap Press, Cambridge (Massachusetts); Harvard University Press.* \$29.95. ix + 292 p.; ill.; index. ISBN: 9780674980150. 2018.

With this volume, the author stakes out a bold, authoritative position in the multidisciplinary literature on cultural evolution and human uniqueness. Recent monographs from the likes of anthropologists, biologists, and philosophers (e.g., T. Lewens. 2015. *Cultural Evolution: Conceptual Challenges*. Oxford (UK): Oxford University Press; J. P. Henrich. 2016. *The Secret of Our Success: How Culture Is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter*. Princeton (NJ): Princeton University Press; and K. N. Laland. 2017. *Darwin's Unfinished Symphony: How Culture Made the Human Mind*. Princeton (NJ): Princeton University Press) make the evidential case for cultural evolution and offer high-level frameworks for organizing the existing theoretical approaches. A renowned psychologist specializing in the evolution of cognition, Heyes stands out by getting down to the cognitive nitty-gritty: how deeply implicated is cultural evolution in the construction of human minds? The author's answer is "very deep." Indeed, she argues that the very cultural learning mechanisms that make humans distinctive (social learning, imitation, mindreading, and language capacity) are themselves culturally inherited constructs. These (among other cognitive mechanisms) are her "cognitive gadgets": nonmetaphorical pieces of embodied cognitive technology, laid down in development by enculturation operating on a minimal "starter kit" of genetically inherited traits.

The initial chapters outline scope and ambitions; situating the view via an updated notion of cultural evolutionary psychology that includes cultural inheritance but retains the focus on selection (in contrast to the fitness-orthogonal cultural dynamics of Henrich and others). Central here is a useful metaphorical distinction between products of cognition (like ideas and behaviors, the "grist"), and the mechanisms of cognition that produce them (the "mills"). Even theorists in cultural evolution tend to see the mind's mills as biologically fixed points, around which to understand cultural evolution's influence on the grist. This is the assumption Heyes wants to challenge. For her, the mills too are fair game for explanation via cultural inheritance, with only very broad traits (specified in Chapter 3) being definitively genetically entrenched. The rest of the book takes a deep dive into the experimental litera-

ture in order to substantiate the idea that what is distinctively human about our cultural learning mechanisms is best explained within the cognitive gadgets paradigm. The details here are intriguing, and the author's mastery of this literature (as with her prior influence on it) is both deep and profound.

One way of reading this volume is as the intellectual equivalent of an engineering challenge. The brain is not a "tabula rasa" before enculturation, but how close to one can we imagine it being (given high-end estimates of what cultural inheritance can deliver) and still expect recognizable human minds to develop? Heyes makes a strong case for the *plausibility* of a minimal explanatory role for genetic inheritance, with enculturation taking the lion's share. Inevitably, evidence underdetermines reality so the case for *probability* is less certain; it would still be surprising if such an extreme possibility were true. But this book should at least give pause to betting against, and is highly recommended to anyone willing to have their assumptions challenged.

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CELL AND MOLECULAR BIOLOGY

VISIONS OF CELL BIOLOGY: REFLECTIONS INSPIRED BY COWDRY'S *GENERAL CYTOLOGY*. *Convening Science: Discovery at the Marine Biological Laboratory.*

Edited by Karl S. Matlin, Jane Maienschein, and Manfred D. Laubichler. *Chicago (Illinois): University of Chicago Press.* \$135.00 (hardcover); \$45.00 (paper). vi + 368 p. + 4 pl.; ill.; index. ISBN: 978-0-226-52048-3 (hc); 978-0-226-52051-3 (pb); 978-0-226-52065-0 (eb). 2018.

In 1896, Edmund B. Wilson published *The Cell in Development and Inheritance* (New York: Macmillan Company) and followed it with a second edition in 1900 and a third edition in 1925. Wilson's effort was to collect everything that was known about the cell at the time of each edition. By the third edition the field was too big and diverse to fit into a single volume. The field also had changed from a stress on "heredity and development" to what could be called cell biology. It shifted from being largely descriptive in 1896 to being highly experimental with efforts to simulate living cells to reveal the structures and functions of cell components and the different activities cells carry out. The idea of a "general cytology textbook" arose in 1922 at Woods Hole, Massachusetts, where most of the participants in the writing of the text gathered each summer to carry out