

THE TRANSFORMATIVE POWER OF BIODIVERSITY

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The Fitness of Goodness

Moral Minds: How Nature Designed Our Universal Sense of Right and Wrong. Marc D. Hauser. Harper-Collins, New York, 2006. 512 pp. \$27.95 (ISBN 9780060780708 cloth).

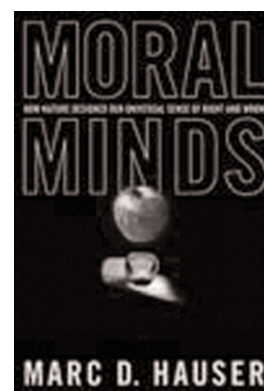
The main idea behind *Moral Minds: How Nature Designed Our Universal Sense of Right and Wrong*, by Marc D. Hauser, is deceptively simple. Our brains are equipped with a moral organ, a collection of innate principles with adjustable parameters, set by the environment to produce one of many possible moral systems. Some endorse capital punishment and oppose abortion while others take the reverse view, the result of different parameter settings on the same principle. Other features of the moral organ are that it requires little stimulus input during development and, fully fledged, can deliver ethical judgments quickly and unconsciously.

human moral sense. Hauser is well qualified for this gigantic endeavor. He received his PhD in 1987 from the University of California–Davis for fieldwork on free-ranging vervet monkeys. Since 1992, he has held a faculty position at Harvard University, where he is now a full professor of psychology, organismic and evolutionary biology, and biological anthropology, and a leading authority on primate behavior, cognition, and the evolution of language.

Hauser starts *Moral Minds* by summarizing some relevant philosophical work on the topic. His approach is ostensibly dialectic: Kant and Hume are juxtaposed to extract two opposing positions, with some sassy sketches (the “Kantian creature,” a limbed torso with a brain as a head, and the “Humean creature,” featuring a heart-shaped appendix) to illustrate the simple point that moral judgments can be either reasoned

call his Rawlsian creature by its real name: “the Chomskyan creature.”

The sections that follow crisscross through an extensive literature. Hauser demonstrates his vast knowledge and ability to provide broad, comprehensive coverage of the current state of the art in numerous fields. He reviews experimental economics research to illustrate



The significance of Moral Minds is not in the philosophical progress it provides, but in its extensive review of the empirical literature on the mechanisms, ontogeny, and evolutionary roots of the human moral sense.

In “Knowledge of Language: Its Elements and Origins,” Chomsky (1981) outlines the idea of an innate mental state, common to humans, that enables us to acquire knowledge of grammar. He writes that “this innate endowment consists of a system of principles, each with certain possibilities of parametric variation, and that acquisition of knowing of grammar...is, in part, a matter of setting these parameters...on the basis of presented experience.” If Hauser is correct, Chomsky’s universal grammar (known to aficionados as UG) has a baby brother!

The significance of *Moral Minds* is not in the philosophical progress it provides, but in its extensive review of the empirical literature on the mechanisms, ontogeny, and evolutionary roots of the

conclusions or mere emotional responses. Both positions are wrong, Hauser argues, and by sleight of hand he introduces the big-eyed “Rawlsian creature,” after the late John Rawls, a political philosopher and former colleague at Harvard. The Rawlsian creature essentially represents Chomsky’s idea of principles and parameters. It computes moral judgments by mere appraisal of events, generated (somehow) by adding up sequences of actions, including their causes and consequences. Why Rawls obtained his privileged position here remains somewhat mysterious. His major work, *A Theory of Justice* (1971), deals with questions of political obligation, the relationship between individual citizens, and the laws created by states, and one is left to wonder why Hauser did not

cross-cultural differences in senses of fairness and conditions for cooperation and punishment. Sections on cognitive development follow, which explain how abilities such as distinguishing between accident and intention are necessary for children’s development of a moral sense, in conjunction with general sociocognitive skills such as joint attention, pretend play, understanding of false belief, and the ability to delay gratification. He then looks at the adult brain, and it is obvious why this is important: The survival of the “moral organ” metaphor irrevocably depends on empirical evidence of brain circuits that are especially dedicated to moral judgments. Hauser reviews the neuroimaging literature, but fails to find anything conclusive. He then turns to studies on brain-damaged and mentally disturbed people, with much the same results. “At present, none of these studies pinpoint a uniquely dedicated moral organ, circuitry that is selectively triggered by conflicting moral duties but no other,” he concludes. A final section deals with the evolutionary roots of the human moral sense.

Hauser goes over much of the relevant literature on nonhuman primate behavior and cognition, his own field of expertise. Throughout, Hauser's prose is manifestly casual. To motivate or illustrate moral problems, he retells episodes from mainstream cinema or popular American television shows (e.g., "Desperate Housewives"), or resorts to artificial moral dilemmas of questionable relevance ("Is it OK to push someone before a train to save five people?").

More important, what should we make of Hauser's appropriation of Chomsky's theory of principles and parameters to model the human moral sense? I remain unconvinced by this application of Chomsky's ideas for a number of reasons. First, the principles-and-parameter theory does not work with empirical linguistic material (Tomasello 2005), and it is interesting that the idea has now been widely abandoned by generative grammarians. Hauser acknowledges this fact in a footnote, but nevertheless insists on resurrecting the idea, and it never becomes clear why. The idea of innate predispositions, subsequently fine-tuned by the environment, is hardly controversial; birdsong develops along this pattern, as does the emergence of schizophrenia. But this has little to do with the detailed mechanisms proposed by the principles-and-parameters theory.

Second, both language and morality are examples of unconscious knowledge systems, of which there are many more, including mathematics, music, and knowledge of artifacts. Baseball caps are trendy for some and a sign of mediocrity to others. Adolescents deliver such fashion verdicts quickly and unconsciously, a function of their subcultural background. A fundamental question left unanswered is, therefore, in what ways the cognitive processes that deliver moral judgments differ from those that deliver other forms of assessment, including such worldly problems as the trendiness of artifacts.

What needs to be sorted out is the role of generalization abilities and concept formation skills in human knowledge systems—how they interact with innate predispositions, what sort of input they require, how they operate as part of larger

knowledge systems, and how these knowledge systems interact with each other. Some of the core cognitive abilities are clearly present in nonhuman primates, as outlined by Hauser's own research (Santos et al. 2001), and one of the book's main merits is that it convincingly points to the potential biological roots of these abilities. *Moral Minds* also makes it clear how much more empirical and theoretical work is still needed to get even a rudimentary understanding of how nature designed our sense of right and wrong. I would like to hear more, but the notion of universal moral grammar appears to be more of an obstacle than a means of pursuing this journey.

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References cited

- Chomsky N. 1981. Knowledge of language: Its elements and origins. *Philosophical Transactions of the Royal Society B* 295: 223–234.
- Rawls J. 1971. *A Theory of Justice*. Cambridge (MA): Harvard University Press.
- Santos LR, Hauser MD, Spelke ES. 2001. Recognition and categorization of biologically significant objects by rhesus monkeys (*Macaca mulatta*): The domain of food. *Cognition* 82: 127–155.
- Tomasello M. 2005. Beyond formalities: The case of language acquisition. *Linguistic Review* 22: 183–197.
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ENGAGING DYNAMIC SYSTEMS

Resilience Thinking: Sustaining Ecosystems and People in a Changing World. Brian Walker and David Salt. Island Press, Washington, DC, 2006. 192 pp., illus. \$25.00 (ISBN 9781597260930 paper).

Systems theorists have been divided by a common language. Disparate definitions of terms for key concepts relating to dynamic systems have historically impeded communication about the attributes of those systems. Resilience, for example, has sometimes been quantified as inversely proportional to the time required for a system to return to its former state after perturbation. Brian Walker and David Salt, along with their colleagues in the Resilience Alliance (www.resalliance.org), prefer to think of resiliency more in terms of "getting back, rather than bouncing back." And what exactly does that mean? After an industry colleague implored, "Just give me five good case studies, then I'll know what you mean," Walker and Salt responded with *Resilience Thinking*, an excellent book that will very likely influence the way many of us perceive and cope with change.

Brian Walker, born and raised in Zimbabwe, was for many years the chief of Australia's Commonwealth Scientific and Industrial Research Organisation's Division of Wildlife and Ecology. He is now the science program director of the Resilience Alliance, a small group of eminent international ecologists, economists, and ecosystem scientists. Inspired by C. S. "Buzz" Holling, these scientists have worked together since 1999 to increase the resiliency, and thus the sustainability, of social-ecological systems, and to communicate that science to the public. Walker said he felt "the specter of colleagues peering over his shoulder and pointing at unsubstantiated statements and loose definitions" (p. xiii) while he was writing this book, which prompted him to partner with experienced science writer David Salt "to remove jargon and boring qualification" (p. xiii). The result is vivid, comprehensible, persuasive, and plainly written, though not compromised by oversimplification.

The purpose of *Resilience Thinking* is captured on page 14: "Resiliency thinking is about understanding and engaging with a changing world. By understanding why the system as a whole is changing, we are better placed to build a capacity to work with change, as opposed to being a victim of it." In other words, the goal of

this book is to present a framework for understanding the world that increases the likelihood of sustaining Earth's life-support systems through the coming decades of accelerating global and regional change.

Drawing from their work and collaborations with the Resiliency Alliance, the authors explain resiliency thinking with carefully stated definitions, with effective visual metaphors (e.g., the ball-in-the-basin metaphor represents domains of attraction and the thresholds that separate them with a double-looped figure 8 diagramming system evolution and devolution through time), and, most vividly, with five diverse case histories of humans confronting significant change in their environments under very different economic and ecological circumstances.

Our thinking must expand to see enough of the whole system, including the links across scales, to recognize what drives change and when to embrace natural change, not resist it.

The case of the drought-stricken farmers of the Goulburn-Broken basin of southeastern Australia is particularly powerful. The farmers pray for rain, but not for so much as to raise saline groundwater up to root level, where it would kill orchard trees or pasture grasses. The problematic salinity of the soil is a result of a history of flood irrigation and removal of native trees. The thinning soil stratum that separates drought disaster from flood disaster mirrors the thinning divide between ecosystem states (here, sustainable farms and irreversible desertification) in the ball-in-the-basin metaphor.

Three other case histories also demonstrate how land use or resource extraction can, with little warning, make the social-ecological system brittle—less capable of absorbing change without shattering into a degraded system. The everglades sawgrass meadows and the sea-grass beds in adjacent coastal waters “self-organized for 5000 years around low levels of nutrients” and were resilient

to hurricanes and fire. Now, however, both are threatened by eutrophication caused by agricultural pollution and water diversion. When Caribbean corals are stressed by nutrient loading, hurricanes, warming sea surface temperatures, pollution, or disease, they are not protected from overgrowth by fleshy algae, because grazing fishes and invertebrates have been overfished or have succumbed to disease. Increasing human densities and globalized businesses and recreational activities threaten natural values of the Northern Highland Lake District of northern Wisconsin. In this case history, the authors illustrate how constructing future alternative scenarios can prod native tribes, local businessmen, recreational fishermen, and others invested in the region to share their hopes, concerns, and ideas for sustaining the region's important natural values.

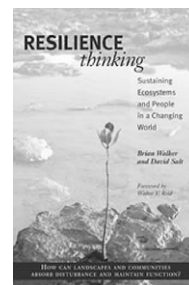
The final case history, of the Kristianstads Vattenrike marshlands in southern Sweden, is an interesting contrast to the other four. Here, human land use, rather than potentially tipping the system into a degraded state, is required for maintaining the favored state. Historical grazing and haymaking are the only ways to prevent the valued marshland from reverting to forest through natural succession.

Each case history is presented with enough historical background to explain how past land-use decisions inadvertently led to the present situation, in which worried or desperate human beings attempt to sustain their livelihoods in damaged and increasingly brittle ecosystems buffeted by disturbances that have ever more unpredictable consequences. The case studies reinforce the generalization that social (human) and ecological systems are inextricably linked: “We are all part of the system.” The authors touch lightly, yet effectively, on three human conditions that underlie our degradation of natural systems: desperation (no choice), greed (willful heedlessness of future consequences), or misunderstanding. This book focuses on ameliorating the third problem.

Another point made forcefully throughout the book is that business as

usual, in particular the management goal of optimizing production or extraction of one or a few resources, is not sustainable. Our thinking must expand to see enough of the whole system, including the links across scales, to recognize what drives change and when to embrace natural change, not resist it.

To describe natural change in social-ecological systems, the authors introduce a temporal succession metaphor that was more obscure than the ball-in-the-basin metaphor. The argument, again from the Resilience Alliance, is that systems cycle between four phases: rapid growth, conservation of “capital,” release (“creative destruction”), and reorganization. All possible transitions between ecosystem states occur except for that from release back to conservation. Although the reader can begin to glimpse how this cycle might describe the rise and fall of empires or other social-ecological systems, another book of case histories may be necessary to elucidate these ideas for the general public. Walker and Salt simply introduce the notion that if we are aware of the current phase of our social-ecological system, we may be able to recognize windows of opportunity, or manage relatively graceful transitions from the creative destruction to the reorganization phase.



Walker and Salt have interwoven the five case histories requested by their industry colleague with clear definitions of challenging concepts, and geometric or other, more playful metaphors (e.g., “bugworld” versus “cogworld”). The resulting book should make resiliency thinking come alive, and hopefully,

become part of the lives of a broad, diverse audience, including many whose future actions will either rebuild or erode Earth's resiliency. This short, highly effective book may tip us toward the more constructive path.

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THE TRANSFORMATIVE POWER OF BIODIVERSITY

Biodiversity and Environmental Philosophy: An Introduction. Sahotra Sarkar. Cambridge University Press, New York, 2005. 276 pp. \$75.00 (ISBN 9780521851329 cloth).

What exactly is biodiversity? Why does it matter? How valuable is biodiversity compared with other things that we value? What is the metric for making such comparisons? What are the best ways to protect biodiversity? How do we manage trade-offs between biodiversity and other things that we value? Opinions about these matters are ubiquitous, but real progress in answering these questions is rare. For this reason, we should welcome *Biodiversity and Environmental Philosophy: An Introduction*, by Sahotra Sarkar, professor of integrative biology and philosophy at the University of Texas. Sarkar does not definitively answer all these questions, but he states an important position clearly, marshals scientific and philosophical considerations in its defense, and introduces his readers to enough disparate literatures to put us right in the middle of the contemporary discussion in a range of important fields.

Sarkar does not attempt to define *biodiversity*, but he is not shy about telling us why it matters. Biodiversity has "transformative value," in that our encounters with it change our "demand values." That is, such encounters transform the content

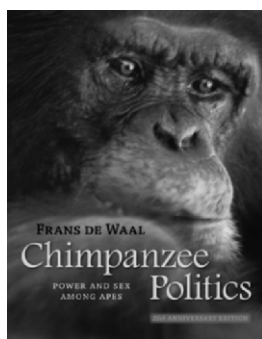
of our preferences and affect how much we are willing to pay to have them satisfied. For example, imagine someone who is completely indifferent to the fate of Neotropical rainforests but for some reason finds himself in the middle of one. He is overwhelmed with its variety and majesty, and his indifference is transformed into a strong preference for its preservation. On returning home, he immediately writes a check to the Nature Conservancy.

There are obvious objections to such a view, which Sarkar notes. Transformations can be positive or negative. Some fraction of Nature Conservancy donors might withdraw their contributions were they actually to spend time in a Neotropical rainforest slapping insects and avoiding snakes. Moreover, what is transformational for one person can leave another person cold. There is the further difficulty that transformative value may be excessively ubiquitous. Surfing, for example, has transformative value for many people. Once you can stand on the board, you're willing to

pay a lot of money to go surfing anytime there is a good break, even while neglecting your job.

Sarkar tries to rule out such cases by distinguishing things that have "systematic" transformative value from those whose transformative value is incidental. Biodiversity has systematic transformative value because it is an object of scientific investigation, and science has a deep and profound effect on our demand values, in part through its relation to technology. When something has systematic transformative value, we have an obligation to preserve it. Thus, we have an obligation to preserve species (for example), though the urgency of this obligation is sensitive to the difference in systematic transformational value that different species may have. Sarkar summarizes his view when he writes, "Biodiversity is thus signally valuable because of its intellectual interest" (p. 85).

This response may find a sympathetic hearing among biologists, but developers and politicians, who are also in the business of deploying transformative values,

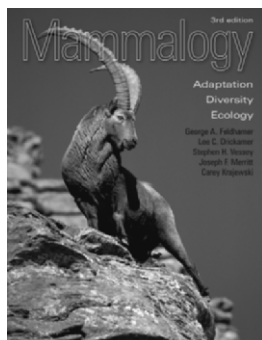


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are unlikely to be moved by it. Consumer sovereignty appears to be a systemic transformative value in Sarkar's sense, and it has led to draining swamps and building subdivisions all over the world. If this is so, then the fate of endangered species may rest on which transformative value gains precedence over the others. But this is just another way of describing the conflict between biodiversity preservation and land-use change, rather than providing a principle for resolving it.

It is hardly surprising that such large philosophical questions remain open in the wake of Sarkar's book. The author is quite aware that these are early days for work in this area, and he makes a point of registering the tentative nature of his conclusions. What he has given us is a sophisticated introduction to both the science and the philosophy of biodiversity protection, not a textbook with some pabulum for conclusions. Sarkar speaks clearly in his own voice and does not pretend that there is consensus when really there is controversy. Most important, he gives his readers substantive views with which we can engage.

This is not to say that *Biodiversity and Environmental Philosophy* is perfect. There are many details left to be worked out and small internal inconsistencies to be resolved, and sometimes Sarkar's readings of the literature and descriptions of the controversies are themselves controversial. Because the first four chapters are a high-level introduction and contribution to environmental philosophy, and the final four chapters are just as sophisticated with respect to conservation biology, the book is surprisingly demanding for an introduction; not many readers will feel equally comfortable with all its parts. The book is also sometimes marred by the author's uncharitable characterizations of the views of others.

These minor flaws should not be allowed to obscure Sarkar's achievement. Thinking clearly about biodiversity is difficult, and conservation biologists typically just want to get on with it, while philosophers are mostly somewhere else doing other things. Sarkar has done his readers a great service by bringing his philosophical skills and biological ex-

pertise to bear on this difficult issue. While others have also made important contributions to this field (e.g., Bryan Norton, Martin Gorke, and Holmes Rolston), there is no book quite like Sarkar's. It is essential reading for anyone who wants to theorize about conservation in a philosophically respectable way, or to philosophize about biodiversity in a way that is responsive to our best science.

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