NEUROSCIENCE

A Case for the Moral Organ?

Michael R. Waldmann

Imagine a trolley whose brakes have failed is about to run over five men who work on the tracks. However, the trolley could be redirected onto a side track where only one worker would be killed. Is it morally right to throw the switch? How about a similar situation in which one worker could be thrown off a bridge onto the tracks where he would be killed but would save the five by stopping the train with his weight? Most people have different intuitions about these cases, although both describe cases in which five people could be saved by harming one. Moral dilemmas can be challenging. Is it permissible to remove life support when somebody is in an irreversible coma? Is collateral damage in Iraq acceptable? Should we deny expensive medical care to the elderly and instead use the money for curing young children? May I lie to my spouse to avoid hurting her? We often have fast gut reactions to these situations without being able to give coherent justifications.

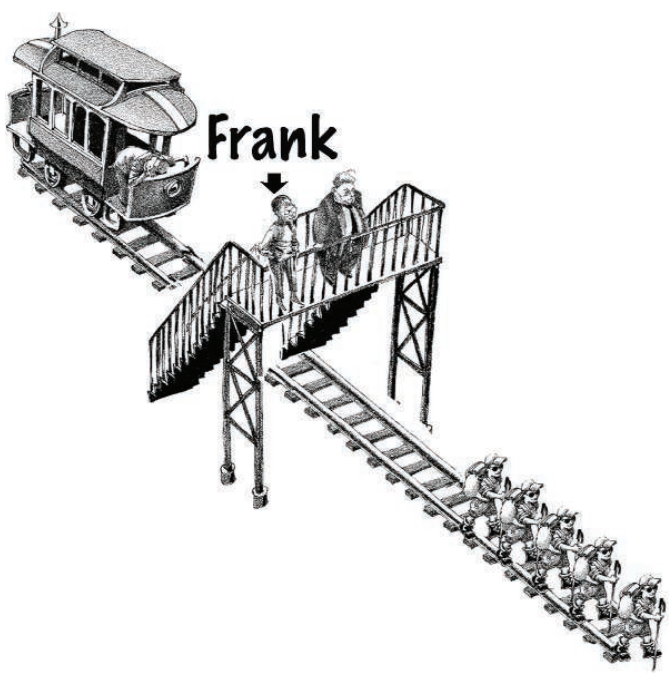
Moral Minds
How Nature Designed Our Universal Sense of Right and Wrong

by Marc D. Hauser

Ecco (HarperCollins), New York, 2006. 511 pp. $27.95, C$35.95. ISBN 0-06-078070-3.

If you are interested in where our intuitions in these and other moral situations come from, you must read Marc Hauser's *Moral Minds: How Nature Designed Our Universal Sense of Right and Wrong*. Written for a wide audience, the book provides a superb overview of one of the hottest topics in the life sciences. Hauser (a professor of psychology and director of the Cognitive Evolution Laboratory at Harvard University) presents a multitude of empirical studies on the cognitive foundations of moral intuitions and actions. He discusses moral cognition in adults, the development of moral competencies in infants and young children, and precursors of morality in animals.

Readers expecting only a discussion of studies narrowly focused on morality are in for a treat. Moral reasoning requires a large number of competencies, including the abilities to comprehend goal-directed actions, to distinguish between intended and merely foreseen side effects, to resist impulses and wait for gratifications, to understand what others are thinking or intending, to feel empathy, to cooperate, to deceive, and to feel emotions relevant for moral judgments (such as envy, pleasure, and pity). Hauser presents a balanced review of research on humans and nonhuman animals about all these topics in an eminently readable and scholarly way. He not only focuses on what is currently known but also points out limitations of the studies and sets goals for future research.



To save five, would you push one? Bystander Frank's dilemma.

CREDIT: TED DEWAN/FROM *MORAL MINDS*

The book's central aim is to provide answers to fundamental questions about the psychological and biological basis of morality: How does our brain generate moral intuitions? Do humans and other animals have an innate sense of morality? Or are moral behavior and moral reasoning based on learning?

Hauser begins the book with a bold theoretical claim: "we evolved a moral instinct, a capacity that naturally grows within each child, designed to generate rapid judgments about what is morally right or wrong based on an unconscious grammar of action." Of course, the author does not believe that we are born with specific moral rules (e.g., "do not cheat on your spouse"), because this would not explain why different cultures have created different moral systems. Rather, his theory draws from an analogy to linguistics. In the 1950s, the MIT linguist Noam Chomsky began developing the view that humans possess a "language organ" that contains a universal grammar. This grammar, in Chomsky's explanation, consists of universal syntactical rules and parameters that encode differences among languages. Learning the syntax of a specific language mainly involves setting the parameters of the universal grammar to the language-specific values. Using this theory as a blueprint for his own account, Hauser argues that we are endowed with an abstract universal moral grammar with parameters that encode cultural differences. [This argument has also been developed by John Mikhail in his doctoral dissertation (*1*) and a forthcoming book (*2*).] The moral grammar along with a variety of cognitive competencies underlies our morality.

Unfortunately, Hauser never explains what the rules and parameters of the moral grammar precisely look like. Findings that show that different cultures generate similar intuitions (as in the trolley problems above) are viewed as evidence for universal rules, whereas other studies showing huge cultural differences are interpreted as evidence for the role of parameters. This flexibility of the theory makes it hard to envision what could constitute a strict empirical test of the theory.

Indeed, many of the empirical studies that Hauser discusses could even be taken as evidence against the moral grammar view. The book is full of examples showing that different cultures have different notions of fairness. In most cultures harming other people is prohibited, but in some cultures female family members may be killed when they are suspected to be unchaste. Some societies allow their members to brutally kill the children of neighbor-

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ing tribes or to torture crime suspects. In the chapter on the trolley problem, Hauser argues that an abstract rule explaining our intuitions could be that harming people can be justified when the harmful act is not intended, but is rather a bad side effect of an act with good intentions. Again there are counterexamples: Some people feel that it is okay to hurt somebody's leg to save a life or that a physician should be held accountable for bad side effects that he did not intend. Hauser would probably argue that these are all parametric variations, but if so it is then hard to discern the underlying common abstract moral rule.

Although Hauser is not shy about his theoretical preferences, he presents alternative theories in a fair manner. One plausible alternative postulates cultural learning mechanisms (*3*) that draw on various general capacities, such as our abilities to understand other people as intentional agents and to imitate them—to mention just two of the capacities whose existence in children and some animals Hauser eloquently describes. Moral judgments need not be based entirely on reflective applications of explicit rules. They may draw on unconscious analogical reasoning, simple heuristics, and gut feelings. General cognitive mechanisms, such as attention, may also influence our judgments. For example, different causal representations of similar situations may highlight different aspects of the moral dilemmas (*4*).

Some of these components may be in part innate, although they need not necessarily be specific to the moral domain. Constraints on moral systems may also have historically developed as a result of cultural evolution. For example, it is hard to imagine a society that would survive if it created a moral system that punishes cooperation. Thus, there is certainly a place for both nature and nurture, and Hauser and his critics would agree that various competencies that are not specific to morality play an important role. Where they part company is on whether a dedicated cognitive system devoted to a moral grammar is also required (*5, 6*).

Regardless of how convincing Hauser's theory eventually proves, its boldness turns reading *Moral Minds* into a suspenseful experience. Near the end, Hauser reveals that he does not expect a definitive resolution soon and that he considers his theory a framework for future research rather than a summary of a finished project: "By leaning on the linguistic analogy, however, we open the door to these questions, and wait for the relevant theoretical insights and observations."

References

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10.1126/science.1132880

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The Powers of Rhythm

Pascal Fries

György Buzsáki's *Rhythms of the Brain* is an excellent compendium on the rapidly expanding research into the mechanisms and functions of neuronal synchronization. Buzsáki presents such synchronization as a binding glue that integrates many levels of neuroscientific investigation with one another and with neighboring disciplines. The text refers to more than a thousand articles and books. For many of these, the author provides a mini-review in a few sentences, and he summarizes selected references in informative figures. For this reason, the book might well have been subtitled "everything you ever wanted to know about how the brain works but never found the time to look up and read in the original literature."

Rhythms of the Brain
by György Buzsáki
Oxford University Press, Oxford, 2006. 464 pp. $69.50, £42. ISBN 0-19-530106-4.

All the same, the book is much more than a giant review. Buzsáki (a professor at Rutgers University's Center for Molecular and Behavioral Neuroscience) manages to elegantly integrate insights from physics, engineering, and cognitive psychology with contributions from cellular, systems, cognitive, and theoretical neuroscience. By connecting the pieces, he produces a whole that greatly exceeds the sum of its parts. His narrative begins and ends with neuronal synchronization, and he presents that as the key to understanding how everything comes together to make the brain work. The book suggests that Buzsáki has already arrived at integrative neuroscience, currently a much-sought target of funding and research organizations.

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CREDIT: JOAN MARCUS

Behavior established through synchrony. "If you have seen Luis Bravo's Broadway extravaganza *Forever Tango*, you can picture the qualitative essence of neuronal synchrony: coupling through time by some invisible links."

The book is organized into 13 chapters, which the author calls "cycles." The first introduces relevant general concepts such as periodicity and prediction. Here Buzsáki also presents his notion that most of the brain's activity is generated from within, whereas external inputs cause perturbations that are only minor albeit essential for rendering the brain's internal operations ecologically useful. He ends the chapter with an excellent summary of *Rhythms of the Brain*:

> The topics discussed in this book—emergence of spontaneous order, oscillations, synchrony, structure–function relationships, and representation and storage by cooperating cell assemblies—represent the middle grounds of brain activities between the microscopic mindless neurons and the wise, performing brain. My goal is to disclose how the brain gains its smartness from the organized complexity of its constituents. What follows is a progress report on the fascinating endeavors of neuroscience, a tour of fields that are usually not linked together in a single piece of scientific writing.