

## **Who's in Charge: Free Will and the Science of the Brain**

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embodied and energy to be communicated. And when they are embodied, they are obviously present (to my mind)—in particular, as those alternative possibilities (potential information) in a Shannon communication.

In Deacon's cryptic and counter-intuitive "absentialist" view, the "efficacy of absence" is constituted by the constraints responsible for unactualized potentials that do the work. So natural selection for, say, greater running speed does not actually select, he would say; rather, biological function is "the evolutionary remainder" that results from "correlations that have not been eliminated." Slowness is an absence with an effect. It seems to me, in contrast, that when I select chocolate, I think about that flavor and not the other flavors, only a few of which even come to mind.

Just because, in the minds of many, "science has no place for purpose, meaning, and value," Deacon should not, I would argue, infer from these absences that "we are what we are not, continually, intrinsically, necessarily incomplete in our very nature." Indeed, his book gives us a more-complete physical understanding of *telos*. For me, the book succeeds in making life and the mind more natural and whole, not less so. Deacon's three-level model shows us very plausibly how ideas can move mountains.

BOB DOYLE

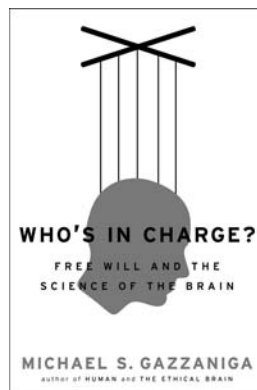
Bob Doyle ([bobdoyle@informationphilosopher.com](mailto:bobdoyle@informationphilosopher.com)) is an associate in the Department of Astronomy at Harvard University, in Cambridge, Massachusetts. His first philosophical book was *Free Will: The Scandal in Philosophy*. His Web site is <http://informationphilosopher.com>.

## RESPONSIBILITY WITHOUT FREE WILL

**Who's in Charge: Free Will and the Science of the Brain.** Michael S. Gazzaniga. Harper Collins, 2011. 272 pp., illus. \$27.99 (ISBN 9780061906107 cloth).

[www.biosciencemag.org](http://www.biosciencemag.org)

Michael S. Gazzaniga, who serves on the President's Council on Bioethics, is director of the SAGE Center for the Study of the Mind at the University of California, Santa Barbara, and Director of the Summer Institute in Cognitive Neuroscience at Dartmouth. Readers who expect to learn from his book *Who's in Charge: Free Will and the Science of the Brain* about brains and phenomena like consciousness, delusions, and confabulation will not be disappointed. They may be surprised, however, to find that they are also learning about quantum mechanics, chaos theory, law, punishment, and evolution. Based on the author's 2009 Gifford Lectures titled "The science of



mind constraining matter," this volume is impressive in its wide range of material, yet its thesis is simple: We are personally responsible and accountable agents, and scientific findings do not undermine this contention.

This is a highly readable, entertaining, and informative book. In a chapter on law, Gazzaniga makes it clear that the kind of responsibility he has in mind is directly relevant to legal judgments of guilt. But what about *free will*? The term appears in the book's subtitle, after all. His answer involves a ghostly or nonphysical element and "some secret stuff that is YOU" (p. 108). Here, of course, he is not reporting on a scientific discovery about free will; he is conveying how he understands the expression.

Given what the term means to Gazzaniga, it is no surprise that, in his view, "free will is a miscast concept, based on social and psychological beliefs...

that have not been borne out and/or are at odds with modern scientific knowledge about the nature of our universe" (p. 219). If he were to believe that personal responsibility depends on free will, he would, of course, take a similarly dim view of responsibility. But Gazzaniga sees personal responsibility very differently: Free will is magical; responsibility is not. "The issue isn't whether or not we are 'free.' The issue is that there is no scientific reason not to hold people accountable and responsible" (p. 106).

Why might some people think that scientific findings undermine Gazzaniga's contention that we are accountable for some of our actions? Some might believe both that personal responsibility depends on our having *conscious* control, and recent experiments have shown that, in fact, unconscious brain processes call all the shots. In the book, Gazzaniga positions himself to take on this challenge: He reviews some of what is known about how human brains work and how they evolved, and he makes an engaging effort to explain how the brain fits into the rest of the universe.

We learn about differences between human and nonhuman brains, split-brain studies, the left-brain interpreter, and what gives individuals a feeling of psychological unity and control. Gazzaniga contends that while the brain enables and generates the mind, "the mind constrains the brain" and "responsibility arises out of social interaction" (p. 144). We become acquainted with the idea of personal responsibility through social interaction, and in the process we gain an ability that is important to our survival—our ability to know what other people intend and how they feel about things. Intentions and feelings are *mental* phenomena, and our mental grasp of these phenomena affects *unconscious* brain processes.

This is not to say that we have nonphysical minds (or souls). Rather, one thing human brains do is enable and generate very useful conscious

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experiences. The ability to have such experiences emerges out of the interactions among brains (p. 133). And this ability facilitates social interaction, learning, and survival.

This is all very reassuring, but at times in the book, Gazzaniga sells our mental life short. For example, he writes, “When we set out to explain our actions, they are all post hoc explanations, using post hoc observations with no access to nonconscious processing” (p. 77). Is it true that we *never* succeed in explaining our actions at least partly in terms of *conscious* processing that preceded them? Consider selecting an exit row seat for extra leg room when booking a long airplane flight. I have a conscious preference for extra leg room, especially on long flights. If I were to explain why I chose a particular seat—or why I might be sitting in a particular seat on a flight—I could offer an answer in terms of that conscious preference, and this explanation would not invoke a nonphysical mind any more than Gazzaniga’s position on emergent mental properties invokes one.

Gazzaniga may be overly impressed by some of the experiments he discusses—well-known investigations by Benjamin Libet and the more recent work by Chun Siong Soon and colleagues. On the basis of brain activity as measured by blood flow, Soon and colleagues were able to predict with 60-percent accuracy about seven seconds in advance of the action itself whether a person would press a left button or a right button. Each person was supposed to decide on a button and then immediately press it. What does this early brain activity signify? Perhaps it signifies just an unconscious bias toward a particular button. In any case, there is no reason to prefer either button over the other, and because there is no place in the experiment for conscious reflection, there is no place for an explanation of the action in terms of conscious reasoning. The same general point applies to Libet’s studies, whose subjects arbitrarily choose a moment to begin flexing their wrists. I discussed experiments of this kind at length in my book *Effective Intentions* (2009).

When it comes to my selecting an exit row seat, things are very different. I know I have a reason—a good one—to select such a seat rather than an ordinary seat in coach. Because I do, I consciously look online for an open seat in an exit row. (I don’t know how to do this unconsciously.) By the way, given what I have told you, you can predict with close to 100 percent accuracy what I will try to do next time I buy a coach seat on a long flight, and you have achieved this degree of accuracy for free, just by consciously attending to what I wrote.

I feel compelled to make one last point. Many people think that what they call “free will” is required for personal (and legal) responsibility. If Gazzaniga’s own conception of free will as a magical power is out of line with mainstream conceptions of it, then, in defending the existence of personal responsibility, he may also unwittingly be defending the existence of free will.

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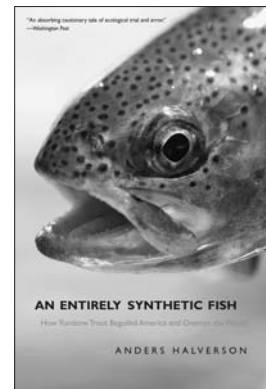
### THE RISE AND FALL OF AN AMERICAN IDEA

**An Entirely Synthetic Fish: How Rainbow Trout Beguiled America and Overran the World.** Anders Halverson. Yale University Press, 2011. 288 pp., illus. \$17.00 (ISBN 9780300140880 paper).

**A**n *Entirely Synthetic Fish: How Rainbow Trout Beguiled America and Overran the World* is not just a thorough account of rainbow trout propagation in the United States. As the subtitle insinuates, the book explains how this fish became the darling of anglers and management agencies alike and reports on the

consequences that followed. Author Anders Halverson weaves a rainbow of colorful characters into a historically rich narrative and provides some powerful insights that will interest a wide readership—beyond just those in fisheries management.

Halverson holds a PhD in ecology from Yale University and is an accomplished journalist. Although the book is well researched and provides a summary of aquatic ecology as it relates to the story, Halverson has produced a volume with more historic and political relevance than scientific weight. His most compelling writing pulls together interesting tidbits of history, starting in the mid-1800s, to focus on the men (literally—no women were implicated) who made the rainbow trout the iconic fish that it is today.



This story begins in nineteenth-century North America but has a familiar theme: Overharvesting, dams, logging, and pollution had depleted fish populations, primarily along the eastern United States. Hunting and fishing regulations were not reasonably in place at the time. Fish culture was the answer. The book continues with Livingston Stone and his compatriots establishing early hatcheries on the McCloud River in California after observing the traditional indigenous peoples’ Pacific salmon fisheries. The story unfolds with the discovery of the benefits of *Oncorhynchus mykiss*, a species that offered a lucrative combination of high productivity under

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