

Neurophilosophy or Philoneuroscience

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When, in 1986, Patricia Churchland coined the term “neurophilosophy” (1), few philosophers thought that neuroscience and philosophy had much to say to each other. Now, philosophical issues involving neuroscience are mainstream philosophy. *Brain-Wise* is an introductory textbook in philosophy aiming to show that discoveries in cognitive science and neuroscience allow for “progress where progress was deemed impossible” on the “big problems” of philosophy. The exposition of cognitive science

Brain-Wise
Studies in
Neurophilosophy
by Patricia
Smith Churchland

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and neuroscience is done with flair, insight, and clarity. Churchland (the chair of the Philosophy Department, University of California, San Diego) has a great eye for philosophically interesting bits of the science of the mind. However, the ratio of philosophy to science is too low for a philosophy course and high enough to preclude it from adoption in all but the most exceptional science courses, which leads one to wonder whether this book has a market.

In a subject matter that attracts extremists—both reductionist and antireductionist—Churchland has a sensible, balanced view of the relation between cognitive science and neuroscience. Her view, which she calls coevolution, is that the science of the mind requires investigation at many levels and that these levels can mutually enrich one another. In the course of elaborating this view, she provides an excellent discussion of the rationale for theoretical identities (such as heat = molecular kinetic energy). Here, as throughout the book, examples from the history of science are brought in to good effect.

Although some of Churchland’s views have taken root in mainstream philosophy, she is not part of it. This distance shows in the book, which suffers from a neglect of contemporary philosophy. For example, in her chapter on epistemology (theory of knowledge), she wonders why traditional “non-empirical” epistemology still exists. Her dis-

cussion reveals no awareness of the tremendous ferment in epistemology over the last 15 years or recognition that this ferment often has knowledge of the science of the mind in the background—examples include work by Tyler Burge and Christopher Peacocke (2, 3). Further, mainstream philosophers have provided insights about the very issues Churchland addresses, often from positions close to her own. For example, in a series of recent works (4), Jaegwon Kim has produced exciting new arguments for the reductionist point of view, based on considerations about causation and multiple realization, and these arguments have sparked an illuminating controversy. Although Churchland discusses both causation and reduction at length, what she says about these topics would have been broadened and deepened by more engagement with recent works.

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Another way in which the book suffers from the neglect of contemporary philosophy appears in its superficial treatment of views Churchland criticizes, for example recent arguments for dualism offered by Saul Kripke, David Chalmers, and Frank Jackson (5–7). I can’t explain their views or her criticisms in so short a space, but I will give one tiny example: her argument against their use of the conceivability of “zombies” to argue for dualism. The dualists argue that the fact that we can conceive of creatures physically exactly like us but with no consciousness shows consciousness is not physical. Churchland says that we can also conceive of creatures (“deadbies”) that are physically like us and possess mechanisms of reproduction, digestion, respiration, growth, metabolism, and

manufacture of proteins, but are not alive. Just as our ability to conceive of these functions without life does not show that life is explanatorily independent of the physical, she argues, so the conceivability of zombies does not show that consciousness is explanatorily independent of the physical. Although I am on Churchland’s side against dualism, I don’t approve of her cavalier treatment of the dualist’s position. Some of the philosophers whom she is arguing against hold (roughly) that life can be analyzed a priori in terms of a set of functions such as reproduction, digestion, metabolism, etc. (this is explicit in Chalmers’s book), but that consciousness cannot be so analyzed. So they would regard her deadbies as inconceivable and in that way not analogous to zombies.

The “big questions” Churchland is after include the nature of the self, the relation between free will and determinism, consciousness, and the justification of knowledge. According to Churchland, the self is a connected set of representational capacities that is a locus of control. Free will and determinism are compatible because there is a real distinction between control and out of control, even though actions in both categories are caused and determined. The main line of her views on these big questions are familiar from thinkers who predate the neuroscientific claims she discusses. She elucidates empirical claims made by some of the great philosophers in the days before philosophy and psychology were distinct fields—for example, the positions of Aristotle and Hume on the conditions required for a child to develop practical rationality. But this is not a case of “progress where progress was deemed impossible.” No one would have doubted that such empirical claims are subject to empirical evaluation.

Churchland thinks the contact points between philosophy and neuroscience lie in what neuroscience has to say about the big problems and in theoretical neuroscience. But the first does not amount to much, and the second assumes that philosophical training somehow provides an advantage in constructing theories in neuroscience, something I doubt.

In my view, the intersections between philosophy and the sciences of the mind reside largely in smaller problems, conceptual issues arising in the sciences themselves and invoking ideas or distinctions that have come up in philosophy or that are well served by the methods of philosophy. Philosophy is often defined as the study of issues in which the questions themselves are up for grabs. Thus it is no surprise that the smaller problems are often messy and so are disdained by some—

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but definitely not all—scientists. Oddly, Churchland appears to adopt the “just the facts” mindset of those scientists who are impatient with the more conceptual and foundational issues in their fields.

Here is an example of the kind of issue I am talking about. There has been a vigorous debate among both psychologists and philosophers about whether mental images represent in the manner of pictures (Kosslyn) or in the manner of sentences (Pylyshyn), and the discussion of this issue has involved conceptual issues about representation that link up to long-standing philosophical literature. Although Churchland devotes an entire chapter to how the brain represents, this issue does not come up.

Churchland's impatience with foundational issues also extends to conceptual issues more closely connected to the big problems. For example, anti-innatists have argued that no phenotypic characteristic can be genetically determined, because there is always some environmental feature (even within the womb) in which the phenotypic characteristic would not develop (e.g., as demonstrated in imprinting in chicks). The innatists say that although every phenotypic characteristic is produced by a complex gene-environment interaction, in some cases when we ask where a certain phenotypic informational structure comes from, the best answer is “from the genes.” This is the classic “poverty of the stimulus” argument. Churchland has a section on innateness, but instead of grappling with this conceptual issue, she confines herself to describing the com-

plexity of the gene-environment interaction. Lastly, in her discussion of consciousness, Churchland takes theories that see experiential consciousness as a kind of brain activation and theories that see the essence of consciousness in terms of higher order cognitive states as rivals. But many philosophers have suggested that such theories may be talking about consciousness in different senses of the term: experience is one thing and experience accompanied by higher order cognition is another. One would think a philosophical treatment of the relation between these theories would at least discuss this possibility, if only to dismiss it.

Brain-Wise makes many excellent methodological points and has some interesting and sensible things to say about the big problems of philosophy. Unfortunately, Churchland, despite her militantly interdisciplinary views, approaches many conceptual issues in the sciences of the mind like the more antiphilosophical of scientists.

References and Notes

1. P. Churchland, *Neurophilosophy: Towards a Unified Understanding of the Mind-Brain* (MIT Press, Cambridge, MA, 1986).
2. T. Burge, *Philos. Rev.* **102**, 457 (1993).
3. C. Peacocke, *A Study of Concepts* (MIT Press, Cambridge, MA, 1992).
4. These include J. Kim, *Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation* (MIT Press, Cambridge, MA, 1998).
5. S. Kripke, in *Semantics of Natural Language*, D. Davidson, G. Harman, Eds. (Reidel, Dordrecht, Netherlands, 1972), pp. 253–355.
6. D. Chalmers, *The Conscious Mind* (Oxford Univ. Press, New York, 1996).
7. F. Jackson, *From Metaphysics to Ethics: A Defence of Conceptual Analysis* (Clarendon, Oxford, 1998).

MATHEMATICS

A Polemic on Probability

Andrew H. Jaffe

What is probability? This question has long puzzled scientists (who must make inferences based on inexact data) as well as philosophers like Karl Popper and polymaths like John Maynard Keynes. In *Probability Theory: The Logic of Science*, Edwin Jaynes provides an answer and works out its repercussions for scientists confronted with data from their experiments and observations. Jaynes is a Bayesian: he holds that probabilities encode degrees of belief and do not exist except as a representation of information about the world. For some, this position means that a Bayesian view of

probability is hopelessly, fatally subjective—“unscientific.”

An important theme reiterated throughout the book is the distinction between frequencies, which may be objective experimental results, and probabilities, which are assigned based on experimental and theoretical information. Jaynes makes the case (correctly, I think) that rather than worrying about subjectivity, we need to think of probabilities as irrevocably conditional: they can only be assigned based on information. The probability (P) of some proposition (A) depends on background information (I) and is given by $P(A|I)$. Objectivity arises from the requirement that the same information I will lead to the same probability assignment and thus the same inference.

Probability Theory

The Logic of
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by E. T. Jaynes. G.
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