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0521836425 - Cognition and the Brain: The Philosophy and Neuroscience Movement

Edited by Andrew Brook and Kathleen Akins

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Cognition and the Brain

The Philosophy and Neuroscience Movement

This volume provides an up-to-date and comprehensive overview of the philosophy and neuroscience movement, which applies the methods of neuroscience to traditional philosophical problems and uses philosophical methods to illuminate issues in neuroscience. At the heart of the movement is the conviction that basic questions about human cognition, many of which have been studied for millennia, can be answered only by a philosophically sophisticated grasp of neuroscience's insights into the processing of information by the human brain. Essays in this volume are clustered around five major themes: data and theory in neuroscience; neural representation and computation; visuomotor transformations; color vision; and consciousness.

Andrew Brook is Director of the Institute of Cognitive Science and Professor of Philosophy at Carleton University in Ottawa, Ontario. He is the author of a number of books and articles, including *Kant and the Mind* and, with Paul Raymont, *A Unified Theory of Consciousness*.

Kathleen Akins is Director of the McDonnell Project in Philosophy and Neuroscience and Associate Professor of Philosophy at Simon Fraser University in Burnaby, British Columbia.

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Contributors

With a few noted exceptions, the contributors' doctoral degrees are in philosophy. Nearly all of them have doctoral-level training in neuroscience, too. The list focusses on that aspect of their background.

Kathleen Akins (PhD Michigan), Associate Professor of Philosophy and Director, James D. McDonnell Project in Philosophy and Neuroscience, Simon Fraser University. Her education in neuroscience includes coursework in neuropsychology and sensory processing as a PhD student and clinical rounds at Massachusetts General Hospital with Dr. Marcel Kinsbourne while a research associate at Tufts. She was a member of the Neuroscience Faculty working in the laboratory of Joseph Malpeli on mammalian vision at the University of Illinois, Urbana-Champaign.

Andrew Brook (DPhil Oxon.), Professor of Philosophy and Director, Institute of Cognitive Science, Carleton University. Author or editor of seven books including *A Unified Theory of Consciousness* (with Paul Raymont, MIT Press, forthcoming) and numerous papers centred on consciousness and the Kantian model of the mind, Brook is the reason for the qualification 'nearly all' in the opening comment.

Paul M. Churchland (PhD Pittsburgh), Professor of Philosophy, UC San Diego. Churchland began learning neuroscience in the lab of Professor Larry Jordan at the University of Manitoba in 1978. After he moved to UCSD in 1984, Francis Crick and Terry Sejnowski (both at the Salk Institute) had a lasting influence on his grasp of both experimental and theoretical neuroscience. However, he says that he has learned more neuroscience from his wife and colleague, Patricia Churchland, than

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from anyone else. Both of their children are experimental neuroscientists, so, as he puts it, “I am now learning to sit respectfully at *their* feet.”

Diego Cosmelli has just finished his PhD in Cognitive Neuroscience, Ecole Polytechnique, Paris, where he worked under the direction of the late Francisco Varela. His main interests centre on the relationship between brain dynamics and human experience.

Chris Eliasmith (PhD Philosophy, Neuroscience and Psychology [PNP] programme, Washington University, St. Louis), Assistant Professor of Philosophy and Engineering and Director, Computational Neuroscience Research Group, University of Waterloo. While at WUSTL, Eliasmith collaborated with Charles Anderson in computational neuroscience for six years. Their recent book was the result. After completing his PhD in the PNP programme, he was a Postdoctoral Fellow at the Washington University Medical School in Dr. David van Essen’s lab.

Rick Grush (PhD Cognitive Science and Philosophy, UC San Diego), Associate Professor of Philosophy, UCSD. As a graduate student he did coursework in neuroscience, worked in Vilayanur Ramachandran’s lab for several years, and studied the mathematical underpinnings of neuro-computing with Robert Hecht-Nielsen. His work in this area is in theoretical cognitive neuroscience, the attempt to formulate theories of how cognitive phenomena (such as imagery, thought, temporal perception, spatial representation, etc.) are implemented in neural mechanisms.

Valerie Gray Hardcastle (PhD Philosophy and Cognitive Science, UC San Diego), Professor of Philosophy, Virginia Polytechnic. Hardcastle studied neuroscience while a graduate student at UCSD and as a member of the James S. McDonnell Project in Philosophy and the Neurosciences for the last five years. More recently, she has collaborated with C. Matthew Stewart, Johns Hopkins University, on issues of localization in the brain. Her area in the philosophy of mind and cognitive science is how (and whether) psychological phenomena relate to underlying neurophysiology. She is the author of *The Myth of Pain* (1999), four other books, and numerous articles and book chapters.

Pierre Jacob (PhD Harvard), Professor of Philosophy and Director, Jean Nicod Institute, Paris. A member of the world-famous CREA in Paris for many years and founder of the Institute of Cognitive Science in Lyon, he has no formal training in neuroscience. He learned neuroscience in the course of collaborations with cognitive neuroscientists of

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the Lyon Institute: Driss Boussaoud, Jean-René Duhamel, Angela Sirigu, and especially Marc Jeannerod, with whom he has written several papers and a book entitled *Ways of Seeing: The Scope and Limits of Visual Cognition* (Oxford University Press, 2003). His collaboration with Jeannerod has focussed on the two-visual-systems model of human vision.

Zoltán Jakab (Dipl. Psych, Loránd Eötvös University, Budapest; PhD Cognitive Science, Carleton), Békésy Postdoctoral Fellow, Budapest University of Technology and Economics. He studied neuroscience in the 1990s with Péter Érdi at the Central Research Institute for Physics in Budapest. The focus of his research was building a detailed, physiologically faithful neural network model of the hippocampal system. His current work is centred on colour vision.

Sean D. Kelly (PhD UC Berkeley), Assistant Professor of Philosophy, Princeton. He began work in neuroscience while a student in the MA programme in Cognitive and Linguistic Sciences at Brown. His thesis, written under the direction of neuroscientist Jim Anderson, was on the computational properties of neural nets. At UC Berkeley, he worked not only with the philosophers Hubert Dreyfus and John Searle but also with the neuroscientist Walter Freeman. He has also learned a lot of neuroscience during his affiliation with the James S. McDonnell Project in Philosophy and the Neurosciences over the last five years.

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Pete Mandik (PhD PNP programme, Washington University, St. Louis), Assistant Professor of Philosophy and Coordinator, Cognitive Science Lab, William Paterson University. Mandik learned his neuroscience in the PNP programme and as a member of the James S. McDonnell Project in Philosophy and the Neurosciences over the last five years. In addition to his many other publications, he is one of the editors (with William Bechtel, Jennifer Mundale, and Robert Stufflebeam) of *Philosophy and the Neurosciences: A Reader* (Basil Blackwell, 2001). His primary areas of interest concern neurophilosophical approaches to both consciousness and representational content.

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Victoria McGeer (PhD Toronto), Research Associate, Center for Human Values, Princeton. McGeer was a Postdoctoral Fellow in Alison Gopnik's developmental psychology lab at Berkeley. Most of the rest of her training in neuroscience has been through the James S. McDonnell Project in Philosophy and the Neurosciences over the last five years. Her work is informed by cognitive neuroscience and examines the philosophical preconceptions that underlie certain research programmes in cognitive psychology (mostly in connection with theory of mind research).

Jesse J. Prinz (PhD Chicago), Associate Professor of Philosophy, University of North Carolina at Chapel Hill. He learned neuroscience while teaching in the PNP Program at WUSTL. Author of three books and editor of the forthcoming *Handbook of Philosophy of Psychology* (Oxford University Press), Prinz concentrates his research on categorization, emotion, moral psychology, the nature/nurture debate, and the neural basis of consciousness.

C. Matthew Stewart is a resident at Johns Hopkins University in Otolaryngology, Head and Neck Surgery. He holds a combined MD/PhD from the University of Texas Medical Branch, with a specialization in neuroscience. His research focusses on the interactions of the vestibular and visual systems and how these interactions contribute to recovery of vestibular function after disease, injury, or surgery.

Evan Thompson (PhD Toronto), Canada Research Chair and Associate Professor of Philosophy, York University. While a doctoral student, he studied neuroscience in the laboratory of the late Francisco J. Varela at the Institut des Neurosciences in Paris. This work led to their writing, with Eleanor Rosch, *The Embodied Mind: Cognitive Science and Human Experience* (MIT Press, 1991). Thompson is the author or editor of two other books on vision and many papers and book chapters.

Special thanks to Steven Davis (PhD Pittsburgh), Professor of Philosophy, Carleton University, without whom this volume would not exist.