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0521561043 - The Brain-Shaped Mind: What the Brain Can Tell Us About the Mind -

Naomi Goldblum

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The Brain-Shaped Mind

What the Brain Can Tell Us about the Mind

Will brain scientists ever be able to read our minds? Why are some things harder to remember than others? Based on recent brain research and neural network modeling, *The Brain-Shaped Mind* addresses these and other questions, and provides a clear account of how the structure of the brain influences the workings of the mind. Neuroscientists are now learning about our minds by examining how the neurons in the brain are connected with one another and the surrounding environment. This book explores how neural networks enable us to recognize objects and learn new things, and what happens when things go wrong. The reader is taken on a fascinating journey into what is arguably one of the most complicated and remarkable aspects of our lives.

Born in New York, NAOMI GOLDBLUM originally studied mathematics at Yeshiva University. She later moved to Israel where, at the Hebrew University, she extended her interests to the field of psychology. Her doctorate was entitled "A psycholinguistic study of metaphor." Naomi Goldblum is now a lecturer in psychology at Bar-Ilan University, where she specializes in cognitive psychology, in particular psycholinguistics and the processes involved in creative endeavors.

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*What the Brain Can Tell Us
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NAOMI GOLDBLUM

Illustrated by

SHIFRA GLICK



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Preface

I first heard of connectionism in 1982, when I began studying cognitive psychology. I had read Edward deBono's pioneering work, *The Mechanism of Mind*, twenty years earlier, and I had found it fascinating, but at that time the term "connectionism" had not yet been invented. When I learned about semantic networks, in which concepts were represented as points connected by links of various sorts, it seemed to me that concepts were much too rich to be described as mere points. Instead, I imagined them as long tangled threads meandering around in several dimensions, and I imagined the links between the concepts as the points where these threads met.

When I described this image to my cognitive psychology professor, Benny Shanon, he said, "That's the new theory everyone is talking about – it's called connectionism." He had just ordered the brand-new book on the topic, Hinton and Anderson's collection of papers, *Parallel Models of Associative Memory*, and was waiting for it to arrive. When the book came we spent a lot of time arguing over who should get to read it first. Each of us would take it home for a week or two and try to read a few pages, then give it to the other for the next week or two. On the one hand, the new ideas were fascinating, but on the other, they were very difficult to grasp.

Over the years since then I have read a great many papers on connectionism, but none of them was easy enough to recommend to a beginner. Even the few "introductory" textbooks that have been published on the topic require a great deal of prior knowledge, mainly of advanced mathematics and computer programming. After searching in vain for a clear, simple introduction to this difficult topic, I finally decided that I would have to write it myself. This book is the result of that decision.

Originally I thought of connectionism as a theory of the "mind–

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brain,” as if mind and brain were simply two sides of one coin. After long discussions with my philosophy professor, Avishai Margalit, I began to realize that mind and brain must be thought of as two separate entities, no matter how closely they may be entwined. The mind is not just an aspect of the brain, but a product of the interaction between the human organism and the environment. Still, the brain is a most important factor in shaping the mind, and so understanding the way this shaping takes place is of utmost significance in understanding human thought processes. The present book is thus devoted to this task.

I would like to thank my psycholinguistics professor I.M. Schlesinger and my research methods professors Maya Bar-Hillel, Ruma Falk and Yaakov Schul, as well as the two abovementioned professors, for teaching me how to think critically about both experimental results and theoretical pronouncements. My thanks also go to Benny Shanon and philosophy professor Avital Wohlman for comments on the manuscript of this book.

My daughter, Shifra Glick, not only read the manuscript but also drew the cartoons. I greatly appreciate her contribution. Various other family members and friends supported me throughout the writing of the book, and I thank them all.

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Jerusalem

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