HUMAN COGNITION

R. KIM GUENTHER



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R. Kim Guenther

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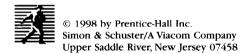
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Preface

"What a piece of work is man! How noble in reason!" Shakespeare's Hamlet may have been sarcastic in his description of humankind, but cognitive scientists are sincere in their appreciation of the wonder of human cognition. Even in the most mundane of activities, the express and admirable qualities of our mental faculties reveal themselves. A mother of two awakens from a dream of travel in a far-off land to the cries of her newborn infant and immediately perceives that her infant is hungry. Perhaps the awakening reminds her that her firstborn is now a walking, talking child of 4 who finally sleeps through the night without waking up. Perhaps she wonders how she can accommodate the demands of her second child and still get the sleep she needs to function effectively during the day. Maybe she will solicit the help of her husband, the baby's father, asking him to bring the baby to bed, to change the baby's diapers, and to return the baby to the crib.

This example illustrations the amazing capabilities of the human mind. Consciousness, perception, memory, reasoning, problem solving, and language are so much a part of our moment-to-moment lives that we easily overlook the intricate and impressive mental processes that make them possible. It is the cognitive scientist who seeks to explain how we accomplish such mental feats, using the techniques of science—controlled observation and hypothesis testing—to try to find the answers. And it is for writers of textbooks like this one to summarize the accomplishments of those cognitive scientists.

Customarily, textbook writers try to justify their work by demonstrating how their textbook is different from and an improvement on the textbooks that have come before. In this book I cover the same topics covered in most other books on the subject. But this book differs from others in several ways. The most important difference is that I focus on what I regard as the essential themes, issues, and controversies that inspire and shape the field of cognitive science. I hope to instill in you, the reader, an interest in cognitive psychology and a sense of the field's implications for the larger society. I do this by organizing each chapter around an important issue designed to explore the essential and enduring contrast between differing perspectives that inform cognitive scientists' thinking on the chapter's topic.

I'll illustrate what I mean with my chapter on memory. Most textbooks discussing memory describe a collection of models and experimental paradigms that have to do with storing and retrieving data located in a short- or a long-term memory. I try to step back from this morass of information about memory and ask what I think is a key question about memory: What is a good metaphor

for how human memory works? Historically, the dominant answer is that memory is a storage system for keeping records of past experiences, and that remembering involves searching through and "reading" the memory records that are retrieved. In my chapter on memory I criticize this metaphor and suggest instead that memory is designed not to recapitulate the past but to anticipate the future. Memory is a constructive process. The human cognitive systems for perceiving, thinking, and acting change as a function of our experiences but do not keep a record-by-record account of those experiences. Remembering, according to the constructionist metaphor, is not reexperiencing the past but reconstructing a plausible version of the past based on current knowledge. I am able to discuss most of the important research on memory in the context of this contrast between the record-keeping and the constructionist perspectives and so integrate the memory research. A discussion of the constructionist model also enhances an appreciation of how a metaphor for memory has implications for evaluating eyewitness reporting, for understanding problem solving, and for devising educational practices.

In each chapter, then, I look for a theme that represents an interesting and ongoing debate about the essential nature of cognition, and organize the material around that theme. My hope is that each chapter reads as an independent, well-integrated essay. However, I extend themes across chapters. Constructionism, for example, makes its appearance in the chapter on perception (where a constructed view of perception is contrasted with direct perception) and in the chapters on memory, implicit and semantic memory, and the physiology of learning and remembering. In some cases I take a distinct point of view, as, for example, when I write in support of a constructionist model rather than a record-keeping model of memory. I think writing is more interesting and science more realistically portrayed when a scientific text is written with a point of view—provided, of course, that the point of view is warranted by the evidence.

Let me mention five other differences between my textbook and most others on the subject. First, I cover more adequately the neurophysiology of cognitive functions, although at a somewhat more simplified level than ordinarily would be the case in a neurophysiology textbook. In addition to the chapter on the physiology of learning and remembering, I cover the physiology of consciousness, perception, problem solving, individual differences, language, and cognitive development in the chapters in which those topics are discussed.

Second, I make extensive use of ecologically oriented research. For example, in the memory chapter I cite John Dean's Watergate testimony and an experiment in which participants in a seminar try to recollect who attended the last meeting, in order to make a point about what people ordinarily return from experiences. By focusing on research in natural contexts, I hope to make research ideas clearer and more interesting to students. At the same time, a more ecologically oriented approach reflects the field's increased emphasis on ecological validity.

Third, I highlight neural net models (also known as connectionist or parallel distributed processing models). Neural nets are models of an idealized brain, designed to simulate the brain's essential properties that are thought to give rise to mental phenomena. Neural net modeling has certainly become a dominant influence in the field in the last fifteen years. Neural nets are featured prominently in the introductory chapter, where you will find a beer-guzzling neural net, and in the chapter on the physiology of learning and remembering, where you will find a neural net that discriminates between the music of two fictional rock-and-roll bands. Neural nets also make brief appearances in the chapters on consciousness and on implicit and semantic memory. I also discuss some of the limitations of neural net approaches to human cognition.

Fourth, I include topics important to the field but usually covered minimally, if at all, in most other textbooks. These topics include the neural basis of consciousness, sleep and dreams, repression, individual differences in cognition, and the evolution of human language and cognitive capacity. The latter topic reflects another growing influence in the field—namely, the idea that many properties of human cognition are adaptive in a Darwinian sense.

Fifth, I end each chapter with a summary and set of recommended readings. My summaries are a bit longer than those in most other textbooks in order to help you better integrate and remember the material in the chapter. I tried to pick readings that would be interesting as well as informative. You will even find a couple of films and works of fiction among my recommendations. The book itself is summarized in the epilogue, where I review the essential themes discussed throughout the book.

Customarily, prefaces end with the author acknowledging those who helped with the book. I would like to thank the original acquisitions editor, Susan Brennan, for her faith in this project, and the editors who helped me see the book through to completion, Nicole Signoretti, Virginia Rubers, Ilene Kalish, and Randy Pettit. Ilene was especially helpful in the last frantic weeks before the manuscript was due, Virginia's copyediting greatly improved the prose, and Randy did a superb job in overseeing the final production of the textbook. I would also like to thank the following reviewers who read drafts of the manuscript and offered advice on how to improve it: Robert G. Crowder, Yale University; Susan Dutch, Westfield State College; Ira Fischler, University of Florida; Peter Gordon, University of North Carolina-Chapel Hill; David K. Hogberg, Albion College; Paul E. Jose, Loyola University of Chicago; F. Philip Rice, University of Maine; Edward S. Wood, University of Wisconsin, La Crosse. If you, the reviewers, manage to read it again, you will see that the book incorporates many of your suggestions. Most of all I thank my family-my wife Donna, who loves me and believes in me more than I do in myself; my son Jacob, who is my real creation; and my father Robert, who instilled in me a sense of love of and enthusiasm for education. God bless you all.

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