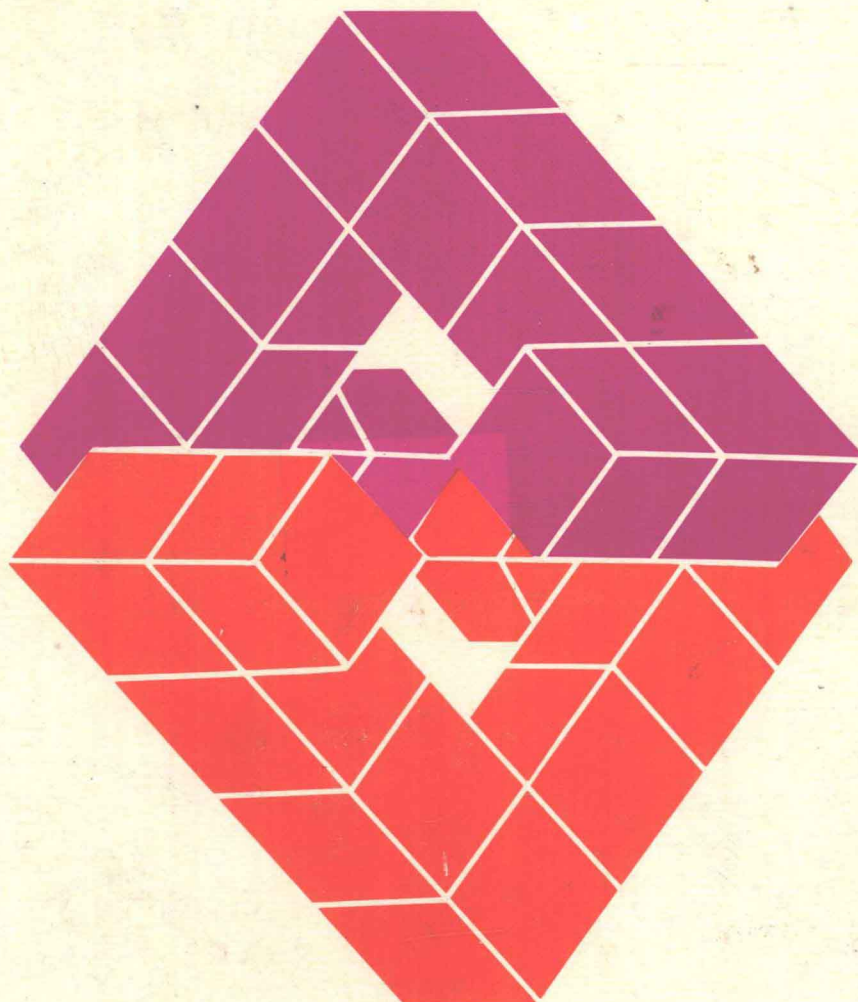


Cognitive Psychology

Second Edition

Allan G. Reynolds

Paul W. Flagg



Second Edition

COGNITIVE PSYCHOLOGY

Allan G. Reynolds

NIPISSING UNIVERSITY COLLEGE

Paul W. Flagg

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Figure 1-2: From H. R. Pollio, *The Psychology of Symbolic Activity*, © 1974, Addison-Wesley, Reading, Mass. *Table 2.1:* Adapted by permission.

Acknowledgments continued on page 467

*For
Patricia Reynolds
and
Susan Marean Flagg (the Hoot)*

Preface

Every year, spring brings two things to New Hampshire: mud and editors from Boston. In 1974, one such editor from Winthrop Publishers got us going on the first edition of *Cognitive Psychology*; in 1979, the direction of travel was reversed, with the senior author travelling to Cambridge to start the discussions that would culminate in this, the second edition of *Cognitive Psychology*.

As in the first edition, we have tried to offer a broad view of human information processing; the topics range from basic sensory processes through bilingual language performance. The book is introductory in that it presupposes no sophistication in psychology beyond the general understanding derivable from a basic first course. Where necessary, we have introduced information (for example, the anatomy of the visual system, elementary linguistics, experimental design) from outside the mainstream of cognition. We have tried to keep these digressions brief and nontechnical. The preponderance of theory and data is drawn from research in human experimental psychology with some sidetrips to other approaches to illuminate points or to illustrate the broad influence of the cognitive view. The book is neither an overly sophisticated reference manual for practicing researchers nor a high priced box of pabulum for lazy undergraduates. In general style, we have tried to walk the tightrope between exactitude and honesty, and interesting and motivating presentation. We have attempted to present the basic questions raised by workers in the field and to reply with the best answers, as we see them.

The book has grown in size and scope since the first edition; the second edition is more than an updating, although that has been done, too. The many comments from adopters and people whose work was covered, the published reviews, and our own experience caused us to make some significant alterations. For example, Chapter 2 (Selection and Processing of Sensory Information) and Chapter 3 (Pattern Recognition) have been greatly rewritten, and Chapter 3 was totally reorganized. Chapter 8 (Language and Memory) covers several new topics and treats more concisely several other topics. In fact, there are few pages in the entire book that have gone without rewording or revision; additionally, several design changes, including consecutive numbering of figures and tables and the addition of a Chapter Notes section, make the book more readable. The major change has been the addition of a chapter on problem solving. We feel this makes the book more representative of the field and balances the emphasis on language and memory in the first edition.

We have continued over the years to be happy that, back in 1974, we signed our initial contract with Winthrop; our thanks for help on the second edition go to the staff there, including Paul O'Connell, Carole Gilbert, our editors John Covell and George Bergquist, and all the people behind the scenes. Just as this second edition was going into publication, Winthrop ceased to exist, and this book is being published by Little, Brown and Company. Our grateful thanks go out to their fine staff, especially our editors Sue Warne and Tom Pavela.

Our thanks go as well to our patient and immensely helpful reviewers. On the first first edition, the reviewers were Dennis Byrnes, University of Massachusetts; Peter Derks, College of William and Mary; James Dooling, Kent State University; Elizabeth Loftus, University of Washington; Colin MacLeod, University of Toronto; and Ulric Neisser, Cornell University. Dr. Derks and Dr. MacLeod were also reviewers for the second edition with the addition of Ruth Day, Duke University; Joanne Miller, Northeastern University; George Potts, University of Denver; and George Wolford, Dartmouth College. Without them, the book would not have half the merits it has, and the second edition would not be nearly the improvement we think it is. We are also grateful to Kaireen Primeau and Susan Cooke for the many careful hours they put in typing, copying, organizing, and helping make the second edition a reality. Finally, our last and greatest thanks go again to our wives, to whom this book is fondly dedicated.

A.G.R.
P.W.F.

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COGNITIVE
PSYCHOLOGY

1 The History and Methods of Cognitive Psychology

The Problem of Mental Representation / GREEK VIEWS /
LATER VIEWS / PASSIVE MAN

Psychological Views of Mind / STRUCTURALISM / BEHAVIORISM
AND NEO-BEHAVIORISM

Other Roots of Cognitive Psychology / COMPUTER SCIENCE /
INFORMATION THEORY / LINGUISTICS

The Newest American Revolution / EMPIRICAL MENTALISM /
ACTIVE MAN

What Is Cognitive Psychology Today?

The Structure of the Book

Summary

This is a book about people and what people do. More specifically it is about normal, adult persons doing things with information — perceiving, transforming, interpreting, remembering, and using it. These processes are only barely understood by researchers because the field of cognitive psychology is only barely underway. Cognitive psychology was conceived with the publication of William James' *Principles of Psychology* in 1890, and after a long gestation period it was formally born with the publication of Ulric Neisser's *Cognitive Psychology* in 1967. Over a decade has passed, and the infant has become sturdy and vigorous, with new skills, new talents, and new problems to address.

Where did cognitive psychology come from? How does the cognitive approach differ from other views of human beings and how is it the same? What kinds of problems does cognitive psychology study?

The Problem of Mental Representation

An enduring problem of great psychological and philosophical significance is this: How does the external world come to be represented in one's mind? The history of attempts to answer this question has two main strands — one emphasizing *mental structures* and another concentrating on *mental processes*. The structural view focuses on aspects of memory storage by asking "What is stored?" (words, ideas, precepts) and "How is it stored?" Is the memory structure like a piece of wax that receives imprints from sensations or like a complex, interconnected, and organized system of associations much like the storage in the core of a digital computer?

The processes view focuses on the dynamics of memory use. Here the spotlight is on reorganization of information, problems of information entry, and issues concerning the retrieval of remembered information. The major distinction between the two approaches is that the former concerns itself with the actual contents of memory and how stored cognitions are represented in the mind, whereas the latter concentrates on mental processes or operations.

A biological analogy might be helpful here. The structure of memory might be thought of as the *anatomy* of the mental body. The processes performed within the structure could be likened to *physiology* or *biochemistry*.

GREEK VIEWS

Early Greek views of the representation issue are often ascribed to Plato, who believed that faint perceptual "copies" of objects — *eidola* — enter the mind directly, and that from these our memories are born. This theory of *eidola* is not taken too seriously today because most of us are aware, as Neisser (1967, p. 1) points out, that experience seems to be the possession mainly of the one who does the experiencing — beauty *is* in the eye of the

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By **Bill Keane**



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Box 1-1. *The problem of differing mental representations.*

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beholder. Nonetheless, the rationale underlying *eidola* is still with us in many ways, ranging from the doctrine of “naïve realism” in perception to some modern approaches to sentence comprehension (Chapter 8).

Aristotle disagreed with the doctrine of *eidola* and suggested in its place three general associative laws that govern the acquisition of information: *similarity*, *contrast*, and *contiguity*. Events that occur together (that are contiguous) are remembered together; those that are perceived as either very similar or very different are also associated. These three structural rules have persisted to the present day almost unchanged. Aristotle also made some mention of the role of active constructive processes in memory but was vague about the nature of these operations.

LATER VIEWS

Little changed in philosophical thinking up until the seventeenth and eighteenth centuries. The basic structural model was still accepted, but the

Box 1-2. *We thought you'd like to know this.*

The expression “Beauty is in the eye of the beholder” was originated by Margaret Wolfe Hungerford under the pseudonym “Duchess” in the short story “Molly Brawn,” published in 1878.