

# Roots of Modern Cognitive Psychology

Roy Lachman, Janet L. Lachman, and Earl C. Butterfield

*Cognitive Psychology and Information Processing: An Introduction.* Hillsdale, N.J.: Erlbaum, 1979. Pp. xiii + 573. \$19.95.

Reviewed by ROGER RATCLIFF and GAIL MCKOON

The first two authors are both at the University of Houston, where Roy Lachman is Professor of Psychology. A New York University PhD, he held previous positions at the University of Kansas and the State University of New York at Buffalo. Janet L. Lachman is Associate Professor of Psychology and a student at UH's Bates College of Law. A PhD of SUNY Buffalo, she was previously a faculty member at the University of Kansas. The Lachmans are coauthors of chapters in Cermak and Craik's *Levels of Processing and Human Memory*, Puff's *Memory Organization and Structure*, Vol. 1, and Poon, Fozard, Cermak, Arenberg, and Thompson's *New Directions in Memory and Aging: Proceedings of the George Talland Memorial Conference* (the latter two in press). Earl C. Butterfield is Professor of Psychology in Pediatrics at Kansas University Medical Center. A PhD of George Peabody College, he was previously a Research Associate at Yale University. Butterfield is President of APA's Division on Mental Retardation. He is coeditor with A. Baumeister of *Residential Facilities for the Mentally Retarded* and coauthor with Cromwell, Brayfield, and Curry of *Acute Myocardial Infarction: Reaction and Recovery*. Both reviewers are at Dartmouth Col-

lege, where Roger Ratcliff is Assistant Professor of Psychology. A PhD of the University of Auckland (New Zealand), he was previously Visiting Assistant Professor at Rockefeller University and a Postdoctoral Fellow at the University of Toronto. Ratcliff is coauthor with W. E. Hockley of a chapter in *Attention and Performance VIII* (in press). Gail McKoon is Visiting Assistant Professor of Psychology. A University of Colorado PhD, she has been Assistant Professor at the University of Toronto and a Research Associate at Rockefeller University. McKoon contributed to Kintsch's *The Representation of Meaning in Memory*.

IN *Cognitive Psychology and Information Processing*, we have a book that presents cognitive psychology in its historical context. The authors of the book use the relatively new philosophical views of Kuhn and Lakatos to analyze the contributions that such disciplines as behaviorism, verbal learning, linguistics, and information theory have made to cognitive psychology. This philosophical analysis enhances the presentation of the field rather than detracts from it, and gives a sense of continuity and depth that is often lacking in books of this level. Furthermore, the emphasis

on philosophical analysis and historical context allays the puzzlement often expressed by students as to why we study cognition the way we do. We believe that this book will prove to be a good text at the upper undergraduate and graduate levels because cognitive psychology is presented in reasonable breadth (attention, memory, psycholinguistics, discourse processing), and because the philosophical analysis provides a firm basis for discussion, even if the instructor disagrees with it. (We happen to agree.)

The authors present, in several instances through the book, reconstructions of the factors responsible for the rise and fall of theories or paradigms. Some of the factors examined are the role of pretheoretical ideas in developing and guiding research paradigms, the effect on researchers of repeated experimental or theoretical failures of a paradigm, and the effect of the failure of a paradigm to encompass problems considered important by the research community. We believe that there are other factors that are not discussed in the book, factors that are difficult to evaluate and do not rightly fit into a rational reconstruction (see Feyerabend's book, *Against Method*, for a philosophical analysis of such factors). For example, the direction of a field of research is often under the effective control of a moderately small group of scientists and this small group decides which articles will be published and which grants will be funded. Advantages are often given to established researchers, from whom occasional failures are more likely to be tolerated and novel ideas more likely accepted. One also wonders how the direction of a field of research is affected by the availability of research money. Will the current inflow of Sloan Foundation funds truly lead to the emergence of a new field, cognitive science, or will everyone do more or less what they have been doing, calling it cognitive science? In some respects, the field of cognitive psychology behaves like the stock market. There was a great amount of effort put into research on the Sternberg paradigm; then there seemed to be a lack of confidence, and work within that paradigm diminished. This left a lot of computers out of work, however, and one

wonders if the current surge of interest in the lexical decision paradigm is a result of those computers getting back to work. There must be a great number of other factors affecting a field of research, including the personalities of individuals, their prestige, and their ability to create controversy. We intend no value judgments because all these factors have positive as well as negative consequences. The authors of this book indicate at times that they are aware of many of these factors, but the factors are difficult to assess unless one has access to private meetings and the insides of people's minds.

**L**ENGTHY texts, difficult to produce, are rarely immune to criticism, and this one is no exception. First, the chapter on reaction time is rather fragmented and a major class of models is omitted. Random walk and counter models provide perhaps the best current theories of choice reaction time because they relate accuracy and reaction time, and because they can account for speed-accuracy tradeoffs and bias effects; in fact, they can be viewed as process-model analogues of signal detection theory. Flexibility in criterion setting is an important property of these models and the flexibility of the cognitive system is stressed in this text. Thus, the omission of these models is surprising; they could have provided an integration of several of the topics discussed in the chapter. A second major shortcoming is the chapter on pattern recognition; it is tantalizingly brief and seems out of place in the context of the rest of the book. Some neurophysiology of the visual system is reviewed and some models of pattern recognition are presented, but the discussion that we might have expected—a discussion of how neurophysiological data have interacted with the models and what limits such data might place on the models—is not presented. The main problem with this chapter is that it has not been integrated with the other material in the book. Some more minor problems that came to light include a poor representation of content-addressable storage, the failure to note the linguists Halliday and Chafe and their contribution to the re-

search of Clark and other psycholinguists, and the lack of application of Tulving's encoding specificity principle to cued-recall psycholinguistic experiments (many of which are interpreted as showing encoding effects, but the effects could with equal likelihood be retrieval effects).

From the point of view of an instructor using this book as the major text for an upper undergraduate course, several considerations arise. First, the book is readable and the organization of the material is usually clear. The authors' detailed summaries of each chapter are invaluable and, in fact, are so complete that the rushed or lazy student (or instructor) may read little else and not suffer unduly. Secondly, the philosophical foundations presented

throughout all chapters save the instructor some of the usual difficulties suffered when students find cognition translated into list-learning experiments. On the other hand, the instructor will need to provide some details of experimental methodology and design as well as some aspects of theoretical models and predictions, in contrast to more detailed yet somewhat narrower handbooks such as those by Murdock and by Crowder.

**D**ESPITE the shortcomings mentioned above, this book will be a most useful text and reference book. It should also be useful as an overview for scientists in other disciplines, and for philosophers of science as a case study of a non-mature but developing science.