

Preface

During the past fifty years, dramatic changes have occurred in the use of laboratory animals to study learning and memory. Yet the basic reasons for this research, diverse as they are, have not changed. At one extreme is the need for relatively direct application of findings with animal models to medical or educational problems of humans; at the other extreme, the quest for understanding animal behavior for its own sake. It is probably fair to say that no chapters in this book represent either of these extremes, although in each case the author's purposes can be said to be like those of some scientists working in this area fifty years ago. In contrast to this continuity of purpose, the approach that scientists now take in this area of study is really quite different from that of most or all scientists in the 1930s.

It is of course frequently possible to find current ideas similar to those expressed long ago. But today the conceptual frameworks that dictate what specific experiments are conducted and exactly how they are performed differ in important ways from those seen fifty or even twenty-five years ago. To an observer unfamiliar with this area for the past twenty years or so, the theoretical concepts that direct study in this area would seem distinctly different and the underlying technology decidedly improved. This is so for the experimental paradigms applied, the responses measured, the tests used to infer learning and retention, and the inferences drawn from the consequences of the experimental treatments. One theme representing these differences is the greater concentration on the consequences of the learning process relative to its dynamics—consequences such as what is learned, the structure of what is learned, and the determinants of what is remembered afterward. These consequences are frequently discussed under the heading "memory processes." We felt that a book describing the state of

the art on this topic was needed to help document the changes in this field and perhaps contribute to the direction of future research.

On a more practical level, this book and the symposium from which it was derived were a logical outgrowth of a continuing spontaneous exchange of ideas and information among several of its participants. The need for increased interchange among persons interested primarily in basic conditioning and learning and those more concerned with memory seemed to demand more formal interaction. To accomplish this we gathered together at Binghamton a set of speakers who presented their ideas and data and discussed them together with a number of distinguished visitors. From the benefit of these lectures and subsequent discussions, the speakers prepared the chapters presented in this volume.

The order in which the chapters appear is in accord with a not wholly successful attempt to achieve some sort of conceptual grouping. Each of the chapters will be seen to be a rather complete document in itself, addressing a variety of important issues, any of which could have served as a basis of its categorization. From one rough characterization, the first four chapters can be said to be concerned with the determinants of basic conditioning and learning; the next four, with the structure of memory as a representation of what is learned; and the last four, with the remembering. Another categorization might group the chapters by Wagner, Miller-Balaz, and Rescorla-Durlach as emphasizing classical conditioning; those of D'Amato et al. and Adams-Dickinson, as emphasizing instrumental learning; those of Honig, Maki, and Grant, as focused upon retention after relatively short intervals; and those of Thomas, Riccio-Ebner, Gordon, and Spear as dealing with retention after relatively long intervals. Neither of these classification schemes is very satisfying. Essentially every chapter presents, for analysis and explanation, phenomena of proven generality, derived from a number of different kinds of tests, and often having explicit contact with other issues of importance for learning and memory broadly speaking, including those performed with human subjects. There is, by intent, a great deal of overlap in the subject matter from chapter to chapter although, we believe, little or no redundancy.

The material is written for professional scientists, graduate students, and advanced undergraduate students. Each chapter should prove useful both to persons working directly on these problems and also to those whose interests touch the topics of learning and remembering from other disciplines, such as human cognition or neuroscience. In its focus upon the role of memory mechanisms in the retention and expression of acquired information, the present collection of new chapters has much in common with two previous books of the same kind, *Animal Memory*, edited by Honig and James in 1971, and *Processes of Animal Memory*, edited by Medin, Roberts and Davis in 1976.

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The success of the Symposium stemmed not only from the high quality of the presentations, but from the dialogues that occurred during the discussion periods and throughout the days and nights of the Symposium. Underrepresented on these pages are the important contributions of the numerous distinguished guests who attended the Symposium and provided much of the critical commentary that made the Symposium so stimulating and the social occasions so enjoyable. Among the many observers to whom we are grateful are Harold Babb, Richard Burright, Jaw-Sy Chen, Alexis Collier, Ruth Colwill, Helen Daly, Michael Domjan, Peter Donovan, Bruce Dudek, Vahram Haroutunian, Gary Horowitz, Robert Isaacson, Herb Jenkins, Donald Kendrick, Donald Levis, Robert Malmi, Michael Nagy, William Pavlik, Michael Rashotte, Mark Rilling, William Roberts, Ronald Salafia, Stanley Scobie, Shepard Siegal, Linda Spear, Andrew Strouthes, Delos Wickens, and Ronald Weisman.

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