

The Principles of Learning and Behavior

ACTIVE LEARNING EDITION

FIFTH EDITION

MICHAEL DOMJAN



WORKBOOK
with Tear-Out Assignments
INSIDE

**THE PRINCIPLES OF
LEARNING AND BEHAVIOR**
ACTIVE LEARNING EDITION
FIFTH EDITION

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Active Learning Edition, Fifth Edition*
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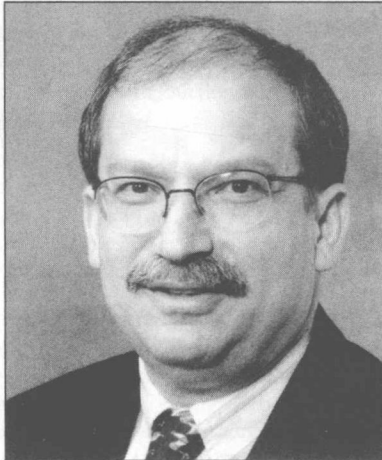
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PREFACE

The investigation of learning and behavior has been an integral part of the study of psychology since the late nineteenth century. Studies of learning provide important insights into ways in which long-lasting changes in behavior occur as a result of particular types of experience. Basic associative learning phenomena have contributed significantly to our understanding of the functions of the nervous system. They have provided useful models for various psychological disorders as well as conceptual tools for the construction of intelligent artificial systems and robots. They have also made possible studies of the evolution of cognition and intelligence in various animal species. The methods and analytical models developed to study conditioning and learning have been adopted in studies of infant cognition, behavioral neuroscience, psychopharmacology, behavioral medicine, behavioral toxicology, rehabilitation training, and special education. Thus, the study of learning is at the crossroads of many different aspects of the study of psychology and behavior.

A Bold New Revision

I'd like to give my thanks to Mark Krause, a psychologist and learning instructor at the University of Portland, who created the Workbook exercises and was kind enough to listen to my suggestions to change them in places.

In preparing the fifth edition of *The Principles of Learning and Behavior*, I reviewed all of the research that has appeared in the major journals devoted to this field since 1996, the year I prepared the fourth edition. In particular, I looked at all articles published since 1996 in the *Journal of the Experimental Analysis of Behavior*, *Animal Learning & Behavior*, the *Journal of Experimental Psychology: Animal Behavior Processes*, the *Quarterly Journal of Experimental Psychology*, and *Learning and Motivation*. I also consulted other sources as needed and reviewed the reprints that were sent to me by numerous investigators in the field. Although I thought I was reasonably well informed before undertaking this review, I was surprised by how much new work has been done in the last five years. I ended up including only about a third of the references that I reviewed, which nevertheless resulted in more than 550 new references being added to the text.

From the early twentieth century to the mid-1960s, the study of learning and behavior provided the foundations of the study of psychology in North America. Prominent investigators of learning, such as Hull, Spence, Mowrer, Tolman, N. E. Miller, and Skinner, were prominent in the field of psychology as a whole rather than major figures in a subspecialty. The thrust of the effort during this period was to develop a general theory of behavior based on extensive laboratory study

of a few experimental situations. Much of the research employed laboratory rats and pigeons. Findings derived from this research were assumed to apply to a variety of species and circumstances. The concepts and findings were also used to construct models of abnormal behavior, personality, and the acquisition of special skills, such as language. Students training in psychology were taught the principles of learning and behavior, even if they planned to specialize in some other area.

The field of psychology has changed dramatically during the past 35 years, with the growth of specialties such as cognitive psychology, health psychology, social and developmental psychology, and behavioral neuroscience. The study of learning and behavior no longer has the dominant position in psychology that it once enjoyed, but it remains a vital area that addresses basic aspects of how behavior is governed by environmental events. A remarkably large number of new studies of learning, many with laboratory animals as subjects, continue to appear each year. This trend is evident in two prominent databases, PsycInfo and Medline. PsycInfo lists most of the published literature in psychology, and Medline lists much of the literature in the medical and biological sciences. There is, however, some overlap in the journals covered by the two databases.

Increased Emphasis on Animal Learning

Figure 1 shows the numbers of papers that are found in PsycInfo and Medline for successive 5-year periods since 1970, if one uses the search term “learning” and limits the search to “animal.” Notice that Medline shows a steady increase in the numbers of

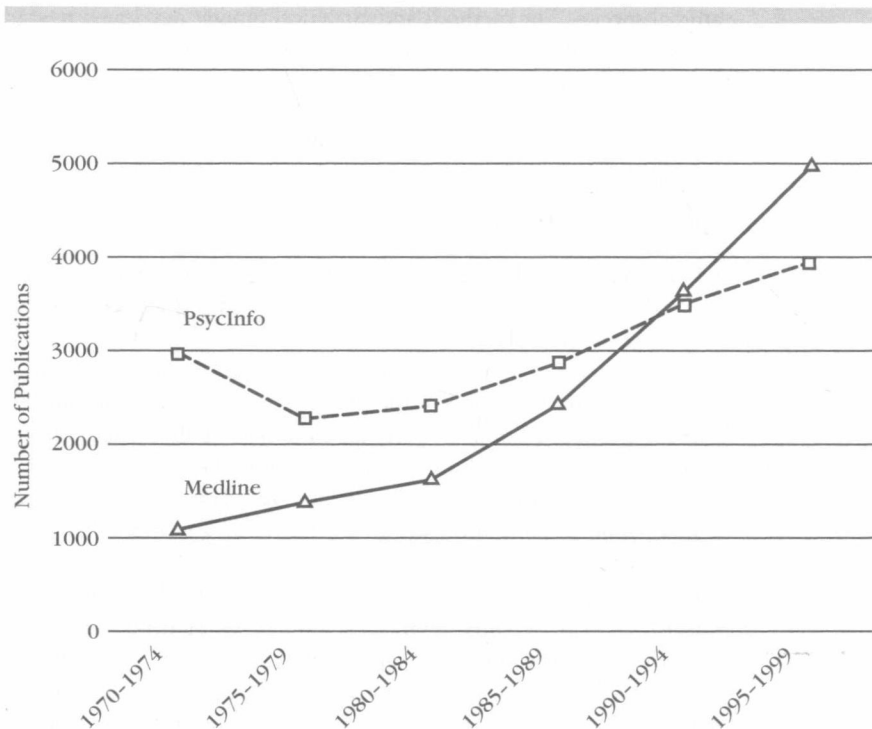


Figure 1 Numbers of papers in Medline and PsycInfo identified by using “learning” as a search term and limiting the search to “animal” in 5-year blocks between 1970 and 1999.

papers that were published on learning in animals from 1970 to 1999. A steady increase is also evident in PsycInfo from 1975 to 1999. The increase in the number of research reports dealing with learning and animals evident in the last quarter of the twentieth century resulted in part from an increase in the total number of published papers on learning in general. However, the proportion of all learning publications that involved animal subjects has remained steady since 1975 (see Figure 2). These data indicate that the investigation of learning with animal subjects remains a vital and growing area of scientific inquiry.

Because Medline covers the scientific literature in medicine and biology, the learning papers listed in Medline tend to cover the physiological or biological bases of learning. The dramatic increase in the number of papers on learning in animals during the last 30 years evident in Medline no doubt reflects increased research on the physiological or biological mechanisms of learning. Neuroscientists have focused on learning as one of the key phenomena they are trying to understand at the molecular level. Today, studies of the neural mechanisms of learning probably exceed studies that examine learning at the behavioral level. Notice that for 1995–1999, Medline lists about 5,000 publications dealing with learning in animals, whereas PsycInfo lists only about 4,000 publications. In addition, the numbers of papers dealing with learning in animals shows a much steeper increase from 1975 to 1999 in Medline than in PsycInfo.

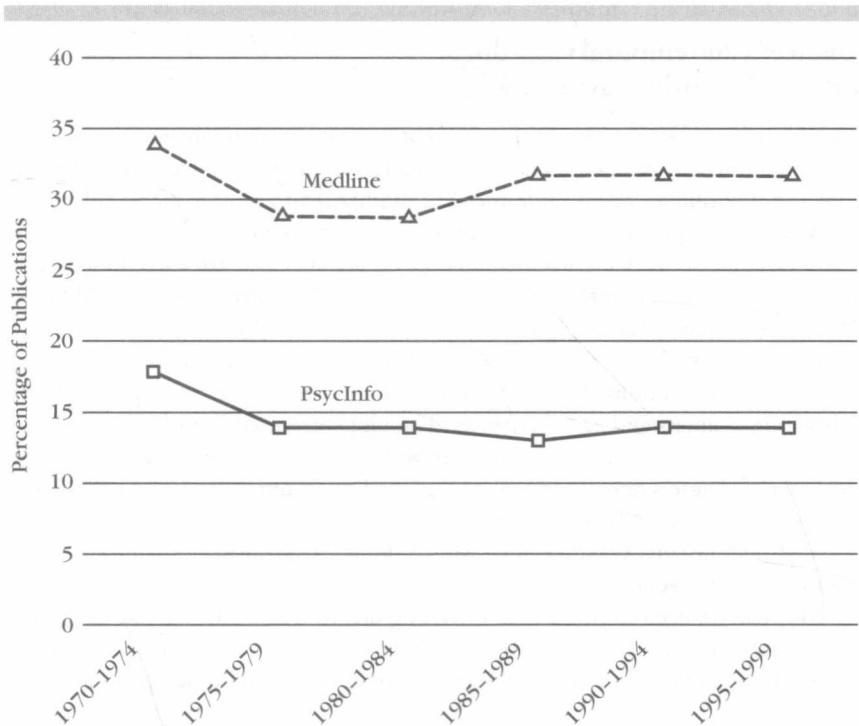


Figure 2 Proportion of papers on learning in Medline and PsycInfo that involves studies with nonhuman animal subjects in 5-year blocks between 1970 and 1999.

Reflects the Biological Bases of Learning

In keeping with increased interest in the biological bases of learning, the 5th edition of the *Principles of Learning and Behavior* includes, for the first time, summaries of some of this research. I am indebted to Professor James W. Grau of Texas A&M University for preparing these summaries, which appear in boxes in Chapters 2, 3, 5, 10, and 11. The emphasis of the book, however, remains on describing learning phenomena at the behavioral level. This emphasis is based on two considerations. First, as the new sections of this text show, scientists are far from having a full understanding of learning at the behavioral level. It therefore remains important to conduct behavioral studies. Second, investigations of the biological bases of learning require first understanding the behavioral characteristics of learning. We cannot study the physiological bases of something without first describing that effect at the behavioral level. Interpretations of the significance and function of various biological processes require relating those processes to well-characterized behavioral end points. The sharp increase in research on the biological bases of learning requires continued attention to the behavioral mechanisms of learning. Without relating the physiology to behavior, we cannot determine the function or significance of a physiological process.

Although the basic paradigms of classical and instrumental conditioning go back about 100 years, our understanding and conceptualization of these types of conditioning continue to evolve in significant ways. Those changes are reflected in numerous revisions I have made to the book. For example, Chapter 7 describes new research on the motivational mechanisms of instrumental behavior, and a new chapter on extinction has been added to the text (Chapter 9).

Balance: Contemporary Findings within a Historic Framework

The fifth edition, like earlier editions, introduces contemporary phenomena and theories about learning and behavior. The emphasis is on presenting recent findings and models, but within an historical framework. Rather than advocate a particular point of view, I strive to present a balanced perspective. I aim to point out the strengths and weaknesses of ideas in an evenhanded fashion. As before, I have tried to emphasize the development of contemporary ideas instead of just listing major findings. Although some contemporary ideas and phenomena cannot yet be fully integrated with earlier findings, I have tried to provide an integrated approach whenever possible.

As in earlier editions, I present information in order of increasing complexity, both within chapters and across chapters. The ideas presented in early chapters serve as a foundation for material presented later, with critical concepts repeated as needed. The order of chapters remains similar to earlier editions, but the material on Theories of Reinforcement and Classical-Instrumental Interactions now comprises a new chapter called Instrumental Conditioning: Motivational Mechanisms. In addition, a new chapter called Extinction of Conditioned Behavior has been added.

My goal has been to provide a captivating description of the field of conditioning and learning. To that end, I have selected interesting examples and added numerous new studies of conditioning and learning conducted with human participants.

More Instructor Support

The Instructor's Manual with Test Bank (0-534-56159-4) is an excellent resource for instructors. Each chapter contains Chapter Summaries, Key Terms and Concepts, In-class Exercises, Suggested Readings, Short Answer and Discussion Questions, Multiple Choice Questions, and material on using Sniffy the Virtual Rat in the classroom. The test items are also available: Examview (0-534-56166-7). The text can also be bundled with a copy of Sniffy, The Virtual Rat, Pro Version 2.0 (0-495-05476-3)—see endsheets in the front of the book for more information.

Acknowledgments

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