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PREFACE

Conditioning and learning is one of the core topics in psychology and has shaped how we think about and investigate problems in many areas of psychology and allied disciplines. The purpose of this book is to provide a concise, current, and sophisticated summary of the essentials of conditioning and learning for students, researchers, and instructors for whom this topic is not their primary area of specialization.

Although the field of conditioning and learning is more than 100 years old, new discoveries continue to be made and new applications of the basic research continue to be explored to solve major clinical problems such as the treatment of fears and phobias, the development of training procedures for autism spectrum disorders and developmental disabilities, and the treatment of drug addiction and other forms of compulsive behavior. We review some of the key basic research findings that have translational implications for these applied domains. Recent research has also led to new perspectives on the psychological and neurobiological mechanisms of Pavlovian and instrumental conditioning, and the application of behavioral economic analyses to the study of instrumental conditioning. Considerable changes have also occurred in how we think about discrimination learning and perceptual learning, extinction, memory consolidation, and memory reconsolidation processes. This book provides a concise and highly accessible summary of these new perspectives and the supporting new findings.

Concepts from conditioning and learning are frequently used in the neurosciences, developmental psychology, clinical psychology, psychopharmacology, comparative psychology, and comparative cognition. Researchers in these areas are interested in how nonverbal organisms learn, process, and remember information. Investigation of learning and cognition in nonverbal subjects invariably

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requires using conditioning procedures in some way. Developmental psychologists, for example, frequently use habituation and instrumental conditioning procedures to study problems in infant cognition. Neuroscience programs often include a “behavioral core,” which is devoted to collecting behavioral data on learning and memory to complement data from more molecular levels of analysis. A major goal of this book is to provide easy access to the “essentials” of conditioning and learning for students and scientists who use these procedures and concepts in their own areas of specialization. Indeed, we think that meaningful progress in those research efforts that use learning and memory tasks will be greatly supported by a firm understanding of the essential concepts used to explain learning and memory at the levels of analysis we discuss (e.g., ethological, associative, behavioral economic).

The basic procedures of habituation, classical conditioning, and instrumental conditioning are familiar to many students and professionals. However, our understanding of these procedures has changed dramatically in recent decades, with the result that many common presumptions about learning are no longer valid. For example, did you know the following?

- Pavlovian conditioning is not limited to glandular responses such as salivation but is also involved in preferences and aversions, fears and phobias, drug tolerance and addiction, maternal and sexual behavior, and even causal reasoning.
- Conditioning not only results in new responses to the conditioned stimulus but also changes how organisms interact with the unconditioned stimulus.
- The important concept of a reward prediction error as driving neuroplasticity has its origins in early influential associative theories of Pavlovian conditioning.
- Instrumental conditioning does not “strengthen” the instrumental response.
- Pavlovian and instrumentally conditioned behavior is often very “flexible,” suggesting a more “cognitive” form of encoding that goes way beyond the simple view that such learning is “automatic” or “procedural.”
- No major theory assumes that avoidance behavior is reinforced by the absence of the avoided aversive stimulus.
- Extinction procedures leave much of the associative structures of Pavlovian and instrumental learning intact.
- Failure to remember something is rarely due to forgetting.
- Consolidated memories are not permanent but can be changed when they are reactivated or retrieved.

Studies of basic conditioning mechanisms have moved heavily into the neurosciences, with numerous investigators studying the neural bases of conditioning and learning, very often as models of various psychopathologies (e.g., related

to fear, anxiety, reward system dysregulations in substance abuse, risky decision making). However, one cannot examine the neural mechanisms of learning without being well informed about conditioning and learning procedures, phenomena, and concepts at the level of behavior. For example, we believe that it is difficult, if not impossible, to understand the functions of various neural circuits and pathways without knowing what psychological functions are at work in the very tasks chosen for investigation. Some graduate students and scientists in the neurosciences have had little or no training in behavioral techniques. Others are only familiar with the small number of behavioral techniques that are pertinent to the experiments they are working on. Such limited knowledge keeps them from achieving a more comprehensive view of how behavior is related to neural mechanisms. It also limits their investigation to a remarkably small number of learning procedures. This book is intended to address this problem by exposing these scientists to the “essentials” of a broad range of conditioning and learning procedures, phenomena, and explanatory concepts.

Students (and professionals) in developmental and clinical psychology face similar challenges. These investigators also rely on conditioning and learning tasks, but their knowledge is limited to a few learning procedures, without understanding the broader intellectual context for those procedures or contemporary theoretical analyses of the relevant phenomena. Such a limited exposure to the field of conditioning and learning as a whole prevents these investigators from fully exploiting conditioning procedures to advance their areas of inquiry. For example, the “standard” therapy for overcoming pathological fears and phobias involves some form of extinction. Extinction is one of the most exciting areas of contemporary research in conditioning and learning, with numerous new techniques and perspectives discovered in the past 10 years. As we review, extinction is a multifaceted phenomenon with many psychological mechanisms at work. Few of these ideas have made their way into the clinical psychology curriculum.

Another area that is closely related to studies of conditioning and learning is applied behavior analysis, which originated in studies of operant conditioning carried out by B. F. Skinner and his intellectual descendants. Unfortunately, since its emergence as a separate field, applied behavior analysis has not maintained strong ties to the basic science on which it was founded. For example, characterizations of Pavlovian conditioning in applied behavior are seriously out of date. By making contemporary perspectives readily available in a brief and accessible format, this book may encourage updating the scientific roots of applied behavior analysis.

This book can serve as the primary text for an introductory course on conditioning and learning. It can also serve as an extremely important supplemental text for courses in neuroscience, clinical psychology, applied behavior analysis, developmental psychology, and psychopharmacology. Finally, the book can be used to provide the foundations for an advanced course, supplemented with journal articles and other assigned readings. To facilitate this, each chapter ends with a list of suggested readings.

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In preparing this book, we were guided by our students, who have encouraged us over the years to keep searching for ways to explain concepts more simply and directly. This fifth edition includes numerous updates and clarifications of the text and the figures. More than 100 new references were added to incorporate new research that appeared since the fourth edition of the book was written just 5 years ago. We expanded our discussion of the clinical and translational relevance of research with laboratory animals. The suggested readings at the end of each chapter were updated, with an emphasis on articles that discuss applications of conditioning principles and articles that integrate behavioral research with research in the neurosciences. Although we retained the original goal of summarizing behavioral research on conditioning and learning, we included some new neuroscience findings in places where those findings helped clarify the behavioral mechanisms we discussed.

We thank Chris Kelaher, Beth Hatch, and everyone at the American Psychological Association who worked on this book with great professionalism and dedication. We also thank Professor Karin Gill of Centre College for her expertise in preparing the instructor resources that accompany the fifth edition.

ADDITIONAL RESOURCES FOR INSTRUCTORS AND STUDENTS

We have prepared supplemental resources for instructors and students who use this book.

- *Instructors:* Visit <https://www.apa.org/pubs/books/essentials-conditioning-learning-fifth-edition> (see the Instructor Resources tab) for sample syllabi, PowerPoint lecture slides, a test bank and answer key, reflection questions, a fifth edition transition guide on what is new in each chapter, and more. The content is secure and requires approval from APA to access. If you do not currently have access, you will be guided to a link to create a free account and request access.
- *Students:* Visit <https://www.apa.org/pubs/books/essentials-conditioning-learning-fifth-edition> (see the Student Resources tab) for chapter summaries, practice quizzes, and links to supplemental videos.