

Preface

This book is intended for use as a primary text in one- or two-semester undergraduate courses in biopsychology—variously titled *Biopsychology*, *Physiological Psychology*, *Brain and Behavior*, *Psychobiology*, *Behavioral Neuroscience*, or *Behavioral Neurobiology*. It is also intended for educated laypersons and professionals who are interested in a clear, engaging introduction to current biopsychological research.

My mood has changed in the three years since I wrote the preface to the first edition of *Biopsychology*. Three years ago I was worried that *Biopsychology* would not be widely read and that the years that I had spent writing it would prove to be a waste. In particular, I was concerned that instructors and students might react negatively to its unconventional style. Although the first edition of *Biopsychology* was intended for use as a textbook, there was much about it that was “untextbooklike.” Rather than introducing biopsychology in the usual textbook fashion, it wove the principles of biopsychology together with clinical case studies, social issues, personal implications, and humorous anecdotes. It was a friendly mentor who spoke directly and personally to the reader and enthusiastically related recent advances in biopsychological research.

Now, as I begin to write the preface to this, the second edition of *Biopsychology*, my mood is more positive, thanks in large to the many letters of encouragement that I have received from students and other readers of the first edition. Spurred on by such letters, I am excited by the prospects of getting this edition into your hands. I have spent more than a year making *Biopsychology*'s strong points stronger, responding to its shortcomings, and keeping it abreast of the exciting recent developments in biopsychological research. The success of the first edition notwithstanding, the second edition is better—substantially better. I hope that you enjoy it.

Features of the First Edition That Have Been Maintained in This Edition

The following are features of the first edition of *Biopsychology* that have been maintained and, in some cases, strengthened in this edition.

An emphasis on behavior In many biopsychology textbooks, the coverage of neurophysiology, neurochemistry, and neuroanatomy subverts the coverage of behavioral research. This bias is most obvious in the obligatory chapter on research methods, where the various neuroanatomical, neurophysiological, and neurochemical research methods are typically described at great length while behavioral technology receives short shrift. In contrast, *Biopsychology* gives behavior top billing: It stresses that neuroscience is a team effort and that the unique contribution made by biopsychologists to this team is their behavioral expertise. Half of the research methods chapter (chapter 5) deals with methods for studying behavior; the other half deals with methods for studying the nervous system.

Extensive coverage of clinical and human research *Biopsychology* provides more than the customary coverage of case studies of brain-damaged patients and of experiments of healthy human subjects. However, theory-driven experiments on laboratory species are the focus of most of the chapters. One of *Biopsychology*'s dominant themes is that diversity is a major strength of biopsychological research: That major ad-

vances often result from the convergence of pure and applied research and of research involving human and nonhuman subjects.

A focus on the scientific method Several of the themes that are woven through the chapters of *Biopsychology* focus on important, but frequently misunderstood, points about the scientific method. The following are four of them: (1) The scientific method is a means of answering questions that is applicable to daily life as it is to the laboratory. (2) The scientific method is fun—it is similar to the method that detectives use to solve unwitnessed crimes and that treasure hunters use to locate sunken galleons. (3) Widely accepted scientific theories are current best estimates rather than statements of absolute fact. (4) Even theories that ultimately prove to be wrong can contribute to the progress of science.

An emphasis on personal and social relevance Several chapters—particularly those on eating, sleeping, sex, and drug abuse—carry strong personal and social messages. In these chapters, students are encouraged to consider the implications of biopsychological research for their lives outside the classroom. The food-for-thought questions at the end of these chapters are excellent topics for classroom discussion.

Wit and enthusiasm An important element of biopsychology is missing from other biopsychology texts. In my experience, most biopsychology laboratories are places of enthusiasm and good humor, and I have tried to communicate these important elements of “biopsychological life” in my writing of *Biopsychology*.

Learning aids *Biopsychology* has five specific features that are expressly designated to help students learn and remember the material:

- First are the lists of **key terms** and **definitions** that appear at the end of each chapter; these are designed to help students prepare for examinations.
- Second are the **study exercises** that punctuate the text. Rather than appearing at the end of each chapter, these exercises occur at key transition points, where students can benefit greatly by pausing to consolidate their understanding before proceeding to new material.
- Third are the **food-for-thought discussion questions** at the end of each chapter.
- Fourth are the many **demonstrations**, anecdotes, and metaphors that I have used to illustrate important principles.
- Fifth are the illustrations.

Color illustrations *Biopsychology* features full color illustrations throughout. This greatly enhances its look and appeal, but there is far more to it than that. Being able to present photographs of color-coded brain scans and stained neural tissue at appropriate points in the text is necessary for the effective illustration of modern biopsychological research, and color greatly facilitates the interpretation of many drawings and graphs.

Illustrations that teach The attractiveness of *Biopsychology's* illustrations belie their major strength: their pedagogy. Students can rely on each illustration to clarify the written text without introducing gratuitous details or nagging inconsistencies. The first edition of *Biopsychology* established a new standard of pedagogical illustration in biopsychology textbooks; there are more and better illustrations in this edition.

New Features of the Current Edition

The following are features of this edition of *Biopsychology* that were not in the first edition.

A broader definition of biopsychology Biopsychology is more than the study of the neural mechanisms of behavior. This point is made more explicitly in this edition of *Biopsychology*. Comparative psychology has been included with physiological psychology, psychopharmacology, psychophysiology, and neuropsychology as a major division of biopsychology. *Comparative psychology* is defined as the division of biopsychology that focuses on the evolution, genetics, and adaptiveness of behavior.

Evolution, genetics, and development: learning to ask the right questions about the biology of behavior (Chapter 2) Like most teachers, I am more concerned with improving the ways that students think than in having them memorize soon-to-be-forgotten details. Chapter 2, which is new to this edition, is expressly designed to achieve this goal. It is designed to teach students to stop thinking about the biology of behavior in terms of physiological-or-psychological and learned-or-innate dichotomies. It explains why these ways of thinking about biopsychological phenomena have become ingrained in our culture; it identifies their weaknesses; and it introduces more productive alternatives. Chapter 2 also introduces the fundamentals of evolution, genetics, and behavioral development.

Biopsychology of emotions and mental illness (Chapter 17) Chapter 17 is the other new chapter in this edition. Its subject is the biopsychology of emotions. It begins with an historical introduction to biopsychological theories of emotion; then, as the chapter unfolds, the focus becomes increasingly clinical. The following are some of the topics that are covered in this new chapter: autonomic correlates of emotion, facial expression and emotion, brain damage and emotion, aggressive and defensive behavior, anxiety, stress, psychoneuroimmunology, schizophrenia, and affective disorders.

Topics that receive expanded coverage In addition to the two new chapters, several topics receive expanded coverage in this edition of *Biopsychology*. They include the following: the spatial-frequency theory of vision, selective attention, sound localization, the effects of auditory cortex lesions, phantom limbs, peptides and eating, the kidneys, anorexia nervosa, hypothalamic mechanisms of copulatory behavior, the hypothalamus and sexual preference, lucid dreaming, suprachiasmatic nucleus transplantation, improving drug-related social and legal policies, the medial temporal cortex and amnesia, the hippocampus and cognitive maps, recovery from brain damage, and neural reorganization after brain damage.

New references Biopsychology is one of the most rapidly progressing fields of science. This edition of *Biopsychology* has kept abreast of recent developments; it contains numerous references to articles that were published since the beginning of 1989.

How to Use the Text

A useful feature of *Biopsychology* from a course-design perspective is that each chapter is written so that it is as independent as possible from other chapters. Thus, it is feasible to omit chapters or to vary their sequence. Further flexibility in course design is provided by the appendices. The appendices summarize detailed information that is appropriate for some kinds of students and courses but not for others. For example, appendices illustrate the projections of the cranial nerves, the location of each hypothalamic nucleus, and the hormonal correlates of the human female menstrual cycle. By putting these de-

tails in appendices, each instructor can decide whether to assign them or not. There is a table in the Instructor's Manual that suggests sample syllabi for courses with different profiles.

Ancillary Materials That Are Available with Biopsychology

The ancillary materials available with *Biopsychology* differ in several ways from those that are available with comparable texts. The most obvious is that they have been prepared by the author of the text. New with this edition is the Allyn and Bacon biopsychology videotape and laserdisc—a biopsychology first.

Test bank A large multiple-choice test bank is provided to the instructor of each class that uses *Biopsychology*. From the student's perspective, one of the most important parts of any textbook is the test bank—the clarity, difficulty, and focus of test questions have a substantial effect on the degree to which students are appropriately rewarded for their efforts.

The feedback that I received regarding the test bank for the first edition of *Biopsychology* was mixed. In general, users were pleased with the number, clarity, and accuracy of the questions, but some were displeased with the level of difficulty. There were not enough moderately easy items for some instructors' needs. The test bank for the second edition has more test items—over 2,000 in all—a good proportion of which are in the easy-to-moderate range. I have rated the difficulty of each item to further assist instructors with their test construction.

Instructor's manual The instructor's manual for *Biopsychology* provides the instructor with a set of lecture notes that complement the text and a set of overhead transparency masters to accompany each lecture. There are notes for two one-hour lectures to accompany each chapter of the text, and there are two or three overhead masters to go along with each lecture. Each page of the instructor's manual is divided in two columns: a left column, which covers two-thirds of the page, and a right column, which covers one-third. The lecture notes are printed in the left column and the right column is left blank for each instructor to make individual insertions.

The instructor's manual can be used in two ways. Some instructors use it as a basis for preparing their own lectures—it can be obtained on computer disk from Allyn and Bacon for easy editing. Other instructors add their own touches in the right-hand columns and lecture directly from the manual.

Films for the humanities video and laserdisc Instructors who adopt *Biopsychology* can now use a video to augment their lectures. Based on the *Films for the Humanities* series, this 60-minute video provides students with a 1-or-2-minute glimpses of key biopsychological phenomena. Sleep recording, growing axons, memory testing in monkeys, the formation of synapses, gender differences in brain structure, human amnesic patients, rewarding brain stimulation in rats, and brain-scan recording are a few of the offerings. The same material is also available in laserdisc format.

Study guide Each chapter of the study guide includes three sections. Section I is composed of "jeopardy" study items—named after the popular television quiz show. The jeopardy study items are arranged in two columns: questions on the left and answers on the right. Sometimes there is nothing in the space to the right of a question, and the student's task is to write in the correct answer. Sometimes there is nothing in the space to the left of the answer, and the student's task is to write in the correct question. When the jeopardy study items are completed, the student has a list of questions and answers

that summarize all of the main points in the chapter, and they are conveniently arranged for *bidirectional studying*.

Section II of each chapter is composed of essay study questions. Spaces are provided for the student to write outlines of the correct answers to each question. The essay study questions are designed to encourage students to consider general issues.

Section III of each chapter is a practice examination. It is recommended that students write the practice examination at least 24 hours before the scheduled time of their formal examination so that the results of the practice examination can be used to guide the last stages of their studying.

Book of readings *Current Research in Biopsychology* (Pinel, 1991) is a selection of cutting-edge biopsychological research reports. Each article was selected on the basis of scientific criteria and on its ability to interest and motivate students. I have written introductions, glossaries, and study questions to help students get the most out of each article.

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The Allyn and Bacon production team did a remarkable job of designing and producing this book. They shared my dream of a textbook that meets the highest standards of pedagogy but is still personal, attractive, and enjoyable. And, they did a splendid job of giving visual substance to this dream. Thank you Elaine Ober, Deborah Schneck, Laura Pearson, Kathy Smith, Linda Dickinson, and Marnie Greenhut—the book is stunning from cover to cover.

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