

Fifth Edition

PSYCHOLOGY

AN INTRODUCTION



BENJAMIN B. LAHEY

PSYCHOLOGY

A N I N T R O D U C T I O N

Fifth Edition

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University of Chicago

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Acrylic/collage on canvas, triptych

72" x 152"

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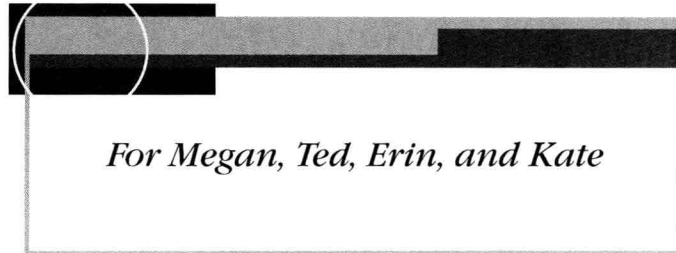
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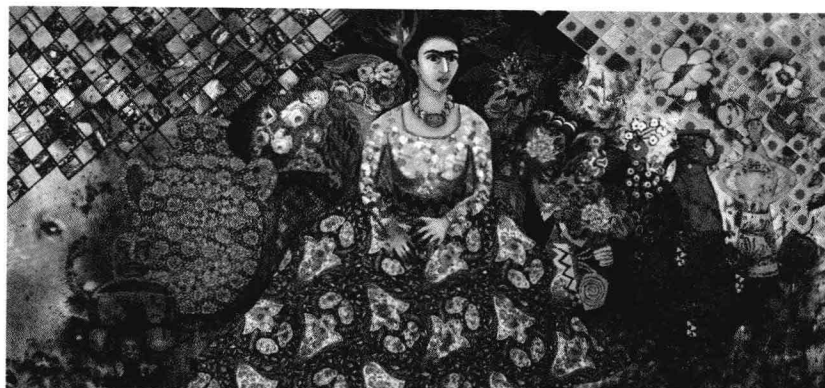
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For Megan, Ted, Erin, and Kate



© Miriam Schapiro, 1988
Conservatory (Portrait of Frida Kahlo), 1988
 Acrylic/collage on canvas, triptych
 72" × 152"

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Miriam Schapiro, painter, collagist, sculptor, printmaker, was born in Toronto, Canada in 1923. She is the recipient of four honorary doctoral degrees and has received many awards including the Skowhegan Award, the John Simon Guggenheim Memorial Foundation Fellowship, the National Endowment for the Arts Fellowship and the Rockefeller Foundation Grant for Artists Residency at the Bellagio Study and Conference Center, Italy. She has been honored by New York NARAL, the National Association of Schools of Art and Design and the National Women's Caucus for Art. She is represented by the Steinbaum Krauss Gallery, NYC.

The portrait is of Mexican artist, Frida Kahlo (1907–1954). Kahlo was a painter whose intense and personal images received some attention in the Americas and Europe during her lifetime, but whose reputation is continuing to grow today. As a young woman, Kahlo was studying to be a physician when she was in a serious bus accident that resulted in a prolonged hospitalization. She took up painting during her period of recuperation from the accident and never returned to the study of medicine. Her paintings combined many elements of Mexican folk art with striking symbols of an almost surreal quality. Kahlo was active in liberal politics in Mexico and was forced to live in the United States during the early 1930s. When she returned to Mexico, Kahlo taught painting in Mexico City at the La Esmeralda school until her premature death at age 46.



ou are starting to read this book where I finished writing it. Although the *Preface* is the first part of the book that you read, it is the last part that I wrote. It is my opportunity to reflect on the completed project in the hope that these reflections will help introduce you to the text. Over five editions, the unchanging goal for *Psychology: An Introduction* has been to *teach*. We (referring to the large group of talented psychologists, editors, consultants, and reviewers that have worked with me) have centered our efforts on giving you a text that fully captures the immense importance and fascination of the scientific study of ourselves. I am genuinely passionate about teaching psychology, and I have done all that I can to share that passion and teach the concepts and facts of psychology in the clearest way possible. The gratifying responses of both instructors and students to the first four editions of this text have been a wonderful source of encouragement for these efforts.

There are four reasons to revise a textbook: (1) to improve the written and visual presentation of information, (2) to change the amount of emphasis given to different aspects of psychology, (3) to present new information, and (4) to add a new pedagogical device to make the book better. We have made many changes of each type in this edition.

Improvements in the Presentation of Information

We have worked very hard to provide you with a textbook that sets a standard for the field in terms of the *clarity* of both the written language and the visual illustrations. Students cannot learn what they do not understand, and this book goes to great lengths to make the science of psychology accessible. Every paragraph in the text was reconsidered—and many were rewritten—to make them clearer to students. Similarly, the great majority of illustrations in the book have been redrawn for greater clarity.

As in previous editions, a concerted effort has been made to appraise realistically the memory required to process the meaning of complex passages. Most texts are based on the assumption that all information from previous sentences has been encoded in memory when this is obviously not always the case. In this text, sentences have been written to avoid unrealistic reliance on previous learning and to build repetition of key terms and concepts into the prose. These features are subtle, but they appear to enhance readability.

The most visible changes, however, are in the organization of some parts of the book. In response to requests from many instructors, I have reduced the coverage of human development to ensure that the details do not obscure the big picture. I have eliminated redundant information and unnecessary facts and combined the key elements of two chapters on development from previous editions into a single chapter. This reorganization is an important advance in helping students view development across the life span as an integrated whole.

In addition, in the interest of greater ease of reading from the text, we have changed the format of the book in a way that has been suggested by many instructors and students in recent years. The high-interest information that was previously presented in “boxes” throughout the chapter is now integrated into the text. Although I resisted this change at first I am now thoroughly pleased with it. The flow of the text is no longer interrupted by four to six boxes per chapter, and the material from the boxes gives greater interest to the text material itself. Now only one box appears in most chapters, of a new type that is described below.

Changes in Emphasis

The balanced emphasis in this text between basic principles and applications of those principles to everyday life has changed very little in this edition. But, to make the applications of psychology even clearer to students, a new **Applications of Psychology** section is presented at the end of each chapter. These are designed to tie together the information in the chapter and leave students with a fuller sense of its applicability to their lives. The brief discussions of applications of each new concept that have always been in the text itself are still a feature of this edition, but the new Applications of Psychology sections provide a more prominent place for applications because we believe that applicability makes the basic principles more meaningful to students.

A second change in emphasis in this edition reflects what instructors tell us they wish to emphasize in their courses. Because there is renewed interest in teaching about human sexuality—perhaps partly because “safe sex” is a concern for everyone—we have included a new chapter on sexuality in this edition of the text. This new chapter builds on the information on sexuality provided in previous editions to maintain continuity, but enough new information was added to justify a new chapter. We feel that this is a long-overdue addition to the text. In the sexuality chapter, a great deal of useful information is presented on behaviors that can reduce the risk of contracting HIV.

New Information

New information has been included in this edition in a number of other ways. First, as always, one of the pleasures of revising a textbook is seeing how much the field advances in three short years. Although coverage of the fundamental principles in this edition remains unchanged, much new information has been integrated. For example, not counting the new references in the sexuality chapter, this edition contains nearly 300 new reference sources to describe new research, facts and concepts! Psychology is clearly a discipline that is still rapidly accumulating information, even if radical changes in basic tenets have not occurred in some time.

The other most significant change in this edition—perhaps the most important change in the broader scope of things—is new material on the sociocultural factors that influence human behavior. New information on the extent to which gender, ethnicity, race, age, sexual orientation, physical limitations, and other sociocultural factors influence human lives is presented throughout the book. The most obvious additions are the new section on the sociocultural perspective in psychology that is presented in chapter 1 and the new chapter on gender and sexuality.

This new material reinforces the emphasis on the general principles of psychology that describe the ways in which all human beings are *the same*. But the new information also emphasizes some of the ways in which human beings *differ* and must, therefore, be understood in their sociocultural context. As we are rapidly becoming a pluralistic and multicultural society, it is important to discuss the sociocultural factors that make us different and to discuss them in a spirit that encourages tolerance and discourages viewing what is different from oneself as inferior.

Although new information on sociocultural diversity has been woven throughout the fabric of the entire text, it has been highlighted in two important ways. First, the only boxed information in this new edition is a feature called **Human Diversity boxes**, which appear in most chapters. These highlight the role of sociocultural factors in basic principles of psychology from perception to motivation. In addition, the photo and illustration program has been reworked to portray the full range of human diversity. In the past, nearly all textbook illustrations were drawn portraying white males, but the artists for this edition have lovingly portrayed people as they are in the world—differing in age, gender, ethnicity, sexual orientation, and physical ability.

All of the persons who worked on this edition are excited about the final product and hope that it will inspire the interest of every student in psychology. I also found great excitement in how much *I learned* while writing the fifth edition. Like most scientists, psychologists have had to become increasingly specialized to cope with the expansion of knowledge in recent years. Happily, the responsibility of revising a basic text forces me to read very broadly in the psychological literature. It is a fascinating field!

New Pedagogical Device

At the request of many instructors, we have added a new teaching feature to the text. At the end of each major section, a new set of review questions is presented to the student. These **Check Your Learning questions** will give students a chance to see if they have mastered the material in that section before moving on. The answers are provided to give students immediate feedback on the correctness of each answer. In addition, the page number of the information on which the question is based is presented next to the correct answer. This will allow students to quickly return to the text to understand *why* their answers were incorrect.

In most ways, the pedagogical structure of this text has stood up well to both advances in research on the psychology of learning from written text and the scrutiny of many hundreds of thousands of students. From the conception of the first edition 16 years ago and through every stage of its development, *Psychology: An Introduction* has been constructed with a single purpose in mind: to create a teaching tool from which students will learn a great deal of basic information about psychology. The accent is on meaningful and efficient learning by students. Although psychologists devote a great deal of time to studying human learning, we have rarely put the information we have acquired to use in writing textbooks. Because I enjoy teaching psychology and am interested in human learning, I based the design of this textbook on what current research told us about the way people learn.

I began by talking with psychologists who were experts on the psychology of learning from written text. To help me synthesize the available information, Professor Bruce Britton was kind enough to write a highly useful summary of the research on this topic. After a tentative plan for the first edition was developed, a group of additional experts on the psychology of learning from textbooks was assembled at the 1981 meeting of the American Psychological Association. During that meeting and in follow-up contacts, several people provided us with the benefit of their expertise: Thomas Andre (Iowa State University); Bruce K. Britton, Ellen D. Gagne, and Shawn M. Glynn (University of Georgia); Lawrence T. Frase and Ernst Z. Rothkopf (Bell Telephone Laboratories); Arthur C. Graesser (California State University, Fullerton); James Hartley (University of Keele); Richard E. Mayer (University of California, Santa Barbara); Gary M. Schumacher (Ohio University); Robert H.W. Waller and Peter Whalley (The Open University); and G. Michael Pressley (University of Western Ontario). These experts were asked the question, “What does research tell us about the way a textbook should be written to make learning most efficient?” Based on their answers and my own research, we settled on a final plan for the book. Before each new edition is revised, the pedagogical plan of the text is evaluated according to the latest research on learning from textbooks. It is gratifying to see that the basic structure of the text continues to be supported by research on human learning and memory, but changes have been made to more actively involve the student in the learning process.

Contributors

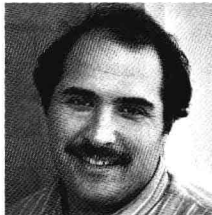
The enormous job of revising this text did not fall on my shoulders alone. In this edition, several other psychology instructors helped me with the revision process. Lisa Whitten wrote the first draft of most of the Human Diversity boxes, and Seth Kalichman, Laura Freberg, and Robin Anderson wrote the first drafts of the gender and sexuality chapter; the learning, memory and cognition chapters; and the social psychology chapter, respectively. In addition, William Dwyer and Frank Leeming wrote the first draft of a new section on the protection of the environment. Steve Schneider prepared the ancillary materials that accompany the fifth edition. The input of these gifted teachers and writers was of tremendous help to me, and their efforts can be seen in the quality of these chapters. I confess, however, to a compelling urge to rewrite everyone's drafts to put them into my own language. Therefore, if these chapters are not perfect, the blame rests with me.



Lisa Whitten earned her B.A. in psychology and anthropology from the University of Michigan. She completed her Ph.D. in clinical psychology in 1982 at the Gordon Derner Institute, Adelphi University. She is currently an Associate Professor in the psychology program at the State University of New York, College at Old Westbury in Old Westbury, New York, and has a private practice in Flushing, New York. Dr. Whitten has conducted numerous workshops on teaching in the multicultural classroom and on cultural and racial issues in clinical work. She has served as president of the New York chapter and as the eastern regional representative of the Association of Black Psychologists, Inc.



Robin A. Anderson received her Ph.D. in 1987 from the University of Iowa. Her major areas of study were social psychology and health and behavioral science. Dr. Anderson's current research interests include stereotyping, mood and information processing, and stress and coping issues. Since 1990, she has been an Assistant Professor of psychology at St. Ambrose University in Davenport, Iowa, where she teaches Social Psychology, Health Psychology, Research Methods, Industrial Psychology, Psychology of Women, and Introductory Psychology.

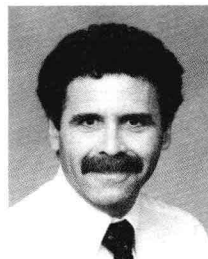


Seth C. Kalichman is an Assistant Professor in the Department of Psychiatry and Mental Health Sciences at the Medical College of Wisconsin and teaches psychology part-time at Marquette University. Dr. Kalichman received his Ph.D. in Clinical-Community Psychology from the University of South Carolina in 1990. After completing his clinical internship at the University of Mississippi Medical Center, Dr. Kalichman spent two years as an Assistant Professor of Psychology at Loyola University of Chicago. Dr. Kalichman's research and clinical interests span several areas, but his focus is now in the area of psychological interventions for AIDS prevention and treatment.

William O. Dwyer received his Ph.D. degree in 1969 from Southern Illinois University. Frank C. Leeming received his Ph.D. degree in 1963 from the University of Mississippi. Both are professors in the Department of Psychology at the University of Memphis where they are the co-directors of the doctoral program in Applied Experimental Psychology. They are involved in research and writing in the environmental area and have a particular interest in fostering proenvironmental behavior in children. They are the co-editors of the recent book entitled *Earth's eleventh hour: Environmental readings from the Washington Post Writers' Group*. Other current research is in the areas of increasing compliance with environmental codes, fire-safety education, traffic safety, and reducing teenage pregnancy.



Laura Freberg received her doctorate in psychology from UCLA with specializations in learning, physiological psychology, and development. Her dissertation research was conducted at Yale University under the direction of Robert Rescorla. She is currently an Associate Professor of psychology at California Polytechnic State University, San Luis Obispo, where she teaches Introductory Psychology, Learning and Memory, Physiological Psychology, and Behavior Disorders in Children. Coauthoring the chapters on learning, memory and cognition, language, and intelligence allowed Laura to integrate knowledge and experience from her major fields of teaching and research interests. Laura's current research centers around the organization of memory in adults with learning disabilities.



Steven A. Schneider received his B.A. in psychology and M.Ed. in educational psychology from the University of Arizona. He has taught at Pima Community College for over 20 years, including several years as department chair. Steve has taught a variety of psychology courses, including Developmental Psychology, Social Psychology, and Personality Theory, but he continues to enjoy the challenge of teaching Introductory Psychology. Over the past 10 years, Steve has written popular and successful student study guides and instructor's course planners to accompany several Brown & Benchmark texts.

Reviewers

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Many talented editors and illustrators also played an essential role. The results of that combined effort are before you, and I hope that it will serve the needs of students and instructors even better than did the fourth edition.

In the two sections that follow, the mechanics of *Psychology: An Introduction* are explained in detail. “To the Instructor” describes the pedagogical strategy used in the text and my reasons for selecting the elements that are included. The next section, entitled “To the Student: How the Book Works,” explains in a step-by-step manner each teaching device I have used. It’s essential that the student understand the purpose of each teaching device to derive maximum benefit from this text.

P *Psychology: An Introduction* offers thorough topic coverage and standard organization designed to fit courses as they are most commonly taught. But, it differs significantly from other texts in two main ways.

First, every effort has been made to create a writing style that is—as one former student kindly described it—“friendly.” This book is not a pompous attempt to impress students with the complexities of the science of psychology. It was written to provide a clear, informative, challenging, exciting, and personal introduction to psychology.

Second, *Psychology: An Introduction* differs from other texts in that its emphasis is on meaningful learning. This text contains many elements designed to enhance learning and remembering based on an organizational model of semantic memory. The content of the first course in psychology can be thought of as a *hierarchical organization* of concepts and facts. Quite simply, this means that information about psychology is not a disorganized jumble of new facts. Some information “goes with” other information, some concepts are detailed elaborations of more general concepts, and so on. To improve learning and memory, it is as important for students to understand the overall organization of new information as it is for them to understand the individual concepts and facts.

Based on what is now known about learning from textbooks, this book helps students to understand how new information about psychology is organized and to process that information more deeply, in five primary ways:

1. *Questions to stimulate critical thinking.* An important feature of the fifth edition is the set of questions designed to stimulate critical thinking (Baron & Sternberg, 1987). These **critical thinking questions** appear at the end of each section. They are designed to catch the students’ attention and stimulate thought for two reasons. First, it is important that students not passively absorb new information, but rather critically evaluate and ponder what they are learning. Moreover, as suggested by Perkins (1987), it may well be more effective to teach critical thinking skills through the content of a specific course than in the abstract. And what course is more appropriate than psychology—in which human beings ponder themselves. Second, current research suggests that thinking about what you have just learned leads to deeper semantic processing and better retention (Ellis & Hunt, 1989). Thus, both as an aid to student reading and as a stimulus for classroom discussion, these high-interest questions at the end of each section should prove to be highly important pedagogical tools. To help students

prepare to use these critical thinking questions, a section called “Critical Thinking” appears in the preliminary pages. In addition, the *Instructor’s Course Planner* includes pertinent information to help the instructor.

2. *Advance organizers.* Considerable research indicates that students learn and retain information better when they have an advance understanding of the hierarchical organization of the information being learned. To accomplish this, the students are given two kinds of advance organizers before reading the main body of the text. The students are first presented with an **outline** of the major topics covered within the chapter, a device common to many textbooks. But to add to the effectiveness of this barebones overview, a prose advance organizer, called the **preview**, highlights the major concepts and shows how they are related to one another before the chapter opens. Thus, the students are provided with two forward looks at the chapter to create a cognitive organization on which to “hang” new facts and concepts.
3. *Nested hierarchical reviews.* The interrelationship of the new information is further strengthened in the **review** and **summary** sections. Following each major section within each chapter, the content of that section is briefly reviewed in prose. At the end of each chapter, the main content of the chapter is again summarized, but this time in a hierarchical outline that visually highlights the organization of the material.
4. *Visual organizational cues.* Using hierarchical outlines in the end-of-chapter summaries is only one way in which the students are actually shown the organization of the new material. Close attention has been paid to the use of visual cues—such as typeface, type size, color of type, and indentions—to indicate the organization of the text. The difference between this text and others is intentionally subtle in this respect, but students should have little trouble distinguishing the superordinate-subordinate structure of A, B, and C sections in the text. In diagrams and figures, colors were chosen not to be decorative, but to show students which elements are related and which are different. In addition, lists—like the one you are reading now—have been frequently (but not excessively) used to show that each element in the list is at the same level of organization and

subordinate to the text description of the list ("five primary ways to help students understand organizational structure" in the case of the list you are reading now).

5. *Verbal cues to organization.* Another important way to help readers see how concepts and facts are related is to simply tell them in words. Many references are made in the text, therefore, to the organization of the new information. This is done in two main ways. First, when a newly introduced concept is related to another concept that was discussed in an earlier section, this fact is specifically pointed out. Second, information that is subordinate to a concept is frequently introduced in a way that makes that relationship very clear (i.e., "The two factors that cause forgetting in short-term memory are . . ."). Although these cues are subtle so as not to interrupt the flow of the text, they have been added to help improve the students' comprehension and memory.

The use of these pedagogical devices in the text was chosen over two other pedagogical approaches after much consideration. I chose not to use the SQ3R (survey, question, read, recite, review) method of organizing the text because the author, not the students, must ask the questions, which reduces student involvement and discourages students from critically evaluating and deeply processing the new information. However, the SQ3R approach is useful as a general study method and can be used with any text, including this one. Therefore, I have included its application in the study skills section on pages 42-44.

I also chose not to use specific instructional objectives and review questions on empirical grounds. Research suggests that while these devices do improve learning for the specific information targeted in the objectives and questions, they reduce learning for all other material in the chapter. In other words, they focus learning, but they do not increase the overall amount of material learned by students. To avoid excluding the use of instructional objectives altogether, however, I have provided a list of key terms with page references at the start of each chapter, which can be used to focus learning to some extent. For those instructors who wish to use instructional objectives, we have included them in the *Student Study Guide* and *Instructor's Course Planner* that accompany this text. In addition, an appendix on measurement, research design, and statistics appears at the end of the book for those professors who wish to teach a more research-oriented course.

Supplementary Materials

Brown & Benchmark Publishers has gathered a group of talented individuals with many years of experience in teaching psychology to create supplementary materials that will assist instructors and students who use this text. The supplements are designed to make it as easy as possible to

customize the entire package for the unique needs of professors and their students.

Annotated Instructor's Edition. In the fifth edition, useful teaching material is conveniently included right in the instructor's copy of the text. The *Annotated Instructor's Edition* was prepared by Steven A. Schneider of Pima Community College. The instructor's matter in the front of the book contains, for each chapter, learning objectives, an expanded outline, suggestions on teaching the chapter, suggestions for going beyond the text material in lecture, and summaries of appropriate class activities. (Complete directions and handout masters for class activities can be found in the *Brown & Benchmark Introductory Psychology Activities Handbook* described below.) Timely ideas for using transparencies, lecture suggestions, and classroom activities appear in the margins of the *Annotated Instructor's Edition*.

Each new copy of the fifth edition of *Psychology: An Introduction* comes shrinkwrapped with a booklet of **practice tests**, prepared by R. Eric Landrum, of Boise State University, and Teresa Landrum. The practice tests offer a set of learning objectives for each chapter of the text (learning objectives are reprinted in the Annotated Instructor's Edition and the Student Study Guide) and a multiple-choice test item keyed to every learning objective.

The Brown & Benchmark Introductory Psychology Activities Handbook was also created by Steve Schneider. It contains a comprehensive collection of surveys, demonstrations, and other activities designed to promote the active learning of psychology. Complete directions for activities are supplied. Ready-to-copy handout masters are included for instructor convenience. The *Activities Handbook* will be updated regularly, providing instructors with a continuous stream of innovative and exciting teaching ideas.

Two **Test Item Files** will be available to instructors who adopt the fifth edition of *Psychology: An Introduction*. The first was prepared by R. Eric Landrum of Boise State University and Teresa Landrum. It includes 3,000 multiple-choice test items, many of which have been class-tested by instructors and students to determine their effectiveness. The second test item file, prepared by Victor Broderick of Ferris State University, will be available in early 1995. The second test item file includes nearly 2,500 brand new multiple-choice test items. Items in both test item files are keyed to the text and to learning objectives. Each item is designated as factual, conceptual, or applied, based on the first three levels of Benjamin Bloom's *Taxonomy of Educational Objectives* (1956).

The questions in the Test Item Files are available on **MicroTest III**, a powerful but easy-to-use test-generating program by Chariot Software Group. Micro Test is available for DOS, Windows, and Macintosh. With Micro Test, you can easily select questions from the Test Item File and print a test and an answer key. You can customize questions, headings, and instructions, you can add or import questions of your own, and you can print your test in a choice of fonts

if your printer supports them. You can obtain a copy of Micro Test III by contacting your local Brown & Benchmark sales representative or by phoning Educational Resources at 1-800-338-5371.

The **Student Study Guide** was written by Steven A. Schneider of Pima Community College. For each chapter of the text, the student is provided with a chapter overview, learning objectives, matching exercises for key terms, guided review, a concept check, and multiple-choice practice test items with instructional feedback.

A **Language Enhancement Guide** prepared by Janet A. Simons, of Central Iowa Psychological Services and The University of Iowa, is available to help students who want extra help mastering the psychological and English language vocabulary in *Psychology: An Introduction*. It contains quizzes, definitions of idioms, and information on the roots of complex words throughout the book.

Also available for students, the second edition of **The Critical Thinker**, written by Richard Mayer and Fiona Goodchild of the University of California, Santa Barbara, uses excerpts from introductory psychology textbooks to show students how to think critically about psychology. It is available at no charge to first-year adopters of the textbook or can be purchased separately.

The Psychology Disk is a set of 10 interactive exercises and activities for introductory psychology. It comes on either a 5.25" disk for IBM PC and compatible computers or on a 3.5" disk for IBM PS/2 and compatibles. It can be purchased by students as a separate item or shrink-wrapped with the textbooks for a small additional cost.

The AIDS Booklet, Third Edition, by Frank D. Cox of Santa Barbara City College is a brief but comprehensive introduction to the Acquired Immune Deficiency Syndrome which is caused by HIV (Human Immunodeficiency Virus) and related viruses.

To help instructors in the classroom, we offer the **Brown & Benchmark's Introductory Psychology Transparency/Slide Set** of 139 acetate transparencies or slides, most in full color. This set includes graphics from the text and outside sources. These transparencies have been expressly created to help in classroom teaching and organizing lectures. They have been designed to provide comprehensive coverage of all major topics generally covered in introductory psychology.

A **Book-Specific Transparency or Slide Set** is also available to adopters, containing 60 key images from the fifth edition of *Psychology: An Introduction*.

In addition, a **Customized Transparency Program** is available to adopters, based on the number of textbooks ordered. Consult your Brown & Benchmark representative for ordering policies.

MicroGuide is a computerized interactive version of the study guide, designed to assist students in studying, reviewing, and testing their comprehension of the text material. *MicroGuide* consists of four sections for each chapter of the text: Learning Objectives, Chapter Review, Key Terms, and Quiz Questions. *MicroGuide* is available in either DOS or Macintosh versions (3.5 inch disk size only). It can be purchased by students as a separate item, or shrinkwrapped with the text book for a small additional cost.

The **Human Development Interactive Videodisc Set** produced by Roger Ray of Rollins College, vividly introduces life-span development with instant access to over 30 brief video segments from the highly acclaimed *Seasons of Life* series. The two-disc set can be used alone for selecting and sequencing excerpts or in tandem with a Macintosh computer to add interactive commentary capability, as well as extra video and search options. Consult your Brown & Benchmark sales representative for details.

The Brain Modules on Videodisc, created by WNET New York, Antenne 2 TV/France, the Annenberg/CPB Foundation, and Professor Frank J. Vattano of Colorado State University, is based on the Peabody award-winning series "The Brain." Thirty segments, averaging 6 minutes each, illustrate an array of psychology topics. Consult your Brown & Benchmark sales representative for details.

A large selection of **Videotapes** is also available to adopters based on the number of textbooks ordered directly from Brown & Benchmark by your bookstore.

Reference Diskettes are available to all adopters and include over 15,000 references categorized into 178 separate files. Though the files contain many classic references, the vast majority are from the past decade. The files are intended to aid you in finding material for enriching lecture and class discussion or as a useful source of readings to assign to students. The complete set of four disks is available in either IBM 5.25" or 3.5" sizes.

Our **Custom Publishing Service** also allows you to have journal or magazine articles, or your own notes, handouts, or other classroom materials printed and bound very inexpensively for your course use, either as part of your custom-designed textbook or separately. Contact your Brown & Benchmark representative for details.

How the Book Works

This book contains several learning devices, each of which is designed to accomplish five things:

1. To focus your attention on the subject of the chapter.
2. To give you an advance overall view of what you are about to learn.
3. To show you how each fact and concept is related to the overall subject matter of the chapter.
4. To help you review what you have just learned to be sure that you have gotten it all and to strengthen the newly formed memories.
5. To help you think critically about the new information that you have learned and relate it to your own life.

These five goals must be accomplished if you are going to learn about psychology in a meaningful way, rather than just blindly memorizing facts and definitions. Let me show you how each feature of the book contributes to these five goals.

1. CHAPTER OUTLINE

Each chapter begins with an outline that organizes the key ideas of the chapter. Examine the outline carefully to see what topics will be studied, but notice also how the topics are arranged. The major topics are called A heads; they define the breadth of coverage in each chapter. Subsumed under each A head are B and C heads; these heads (indented and in smaller type) reveal the depth and detail of coverage. Studying the outline for a few minutes will give you an advance look at the content of the chapter and show you how topics are related to one another. When you read a chapter, you may wish to refer to the outline from time to time. It will reinforce the relationship among topics and help you understand the structure of the chapter.

CHAPTER

2

Biological Foundations of Behavior

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2. KEY TERMS

A list of the most important terms you will encounter in the chapter are presented on the same page as the chapter outline. You can use these key terms to focus and check your learning. Because learning new vocabulary is half the battle in psychology, be sure you understand the meaning of each of these terms by the time you have finished studying a chapter. They will help you make sure you have learned the most important terms when you are reviewing for a test. Page references help you locate definitions while studying.

3. PROLOGUE

Following the chapter outline and key terms is a short section designed to focus your attention on the theme of the chapter. It is a high-interest essay that introduces a bit of research or history to prepare you for the content of the chapter. No specialized knowledge is needed to understand the prologue, but if you reread it after you have studied the chapter, you will see it in a different light.

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Where do you live? We don't think about it much, but the thinking, feeling, and acting part of you cannot live apart from your body. Psychological life depends on biological life for its existence. The ways we behave are even determined in part by the nature of the body. If humans did not have hands that grasp, we would never have learned to write, paint, or play racquetball. If we did not have eyes that could see color, we would see a world that exists only in shades of black and white.

Some parts of the body are more intimately linked to psychological life than others. An experience of Canadian brain surgeon Wilder Penfield in the late 1950s dramatically revealed the essential role played by the brain. Dr. Penfield was conducting surgery on the surface layer of the brain known as the cerebral cortex. The patient, who was awake under local anesthesia, had consented to be part of a brief experiment that was conducted during surgery. When Penfield placed a small rod that carried a mild electric current against the brain, there were astonishing results. The patient felt no pain, but instead she apparently began to recall in vivid detail an incident from years before. She was in her kitchen, listening to the voice of her little boy playing in the yard in the background; she could hear the noises of the neighborhood, the cars passing in the street. Penfield was amazed to discover that stimulation of particular spots on the brain could produce flashbacks recalled by the patient in cinematic detail. One young man recalled a small-town baseball game that



included a boy trying to crawl under a fence. Another woman recalled a melody each time a certain point on the cortex was stimulated. Penfield tried to fool her by stimulating other points in alternation with the one that produced the melody, claiming

he was stimulating one point when in fact he was stimulating another. Still, each time the rod touched the same point on the cortex, the woman heard the melody. It is not clear if Penfield's probe stimulated the recall of actual memories or the

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4. CHAPTER PREVIEW

The chapter preview is perhaps the single most useful learning aid in the book. It highlights the most important concepts and facts that will be covered in the chapter. Along with the chapter outline, it allows you to see what the chapter is going to be about before you attempt to read and understand the details. A great deal of research suggests that having a general understanding of what is going to be learned will improve learning and memory of the new material. The preview will help you understand what you are learning, which is better than rote memorization of details.

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imaginary creation of new ones, but the lesson is the same either way—the brain and our psychological lives are intimately connected.

The importance of the brain in behavior has also been dramatized in another way by legal controversies surrounding the issue of "brain

death." When is a person considered legally dead? There is no doubt that a person is dead when the heart stops beating, breathing stops, and all behavior ceases. But many states now allow a physician to declare a patient dead even though the heart and lungs are still working if those

parts of the brain involved in thinking, feeling, and acting are no longer alive. When these parts of the brain are dead, psychological life is gone and the person is considered dead. To understand behavior, we must understand the workings of the brain and other biological organs. ■

PREVIEW

are psychological beings living in biological machines. Our psychological existence depends on the healthy functioning of the body, and our behavior is limited and influenced by the nature of that body. All parts of our biological selves are involved in one way or another with behavior, but the nervous system, endocrine glands, and genetic mechanisms are the bodily structures that most intimately relate to what we experience and do.

Just as electronic machines are built from wires, transistors, and other components, the nervous system is built from specialized cells called neurons. Billions of neurons in your nervous system transmit messages to one another in complex ways that make the nervous system both the computer and communication system of the body. The biological control center of the nervous system is the brain. The brain has many parts that carry out different functions but operate together in an integrated way. It

communicates to the body through an intricate network of neurons that fan out to every part of the body.

In terms of functions, the nervous system can be thought of as two largely separate systems. The somatic nervous system is involved in conscious actions and awareness. The autonomic nervous system regulates the internal body organs and activates motivation and emotion more or less automatically. The fact that the autonomic nervous system performs three functions helps explain why our emotions, motives, and internal organs so often get churned up at the same time. Similarly, it is partly because thought and emotion operate in separate nervous systems that we often have difficulty logically controlling our feelings.

The communication function of the nervous system is implemented in part by the endocrine glands. Under the control of the brain, these glands secrete chemical messengers called hormones into the bloodstream. These hormones

regulate the functions of the body and also indirectly influence our behavior and experience.

Heredity exerts its influence on behavior through genes in the nucleus of the body's cells. These genes contain the codes that allow heredity to influence the development of our bodies and behavior. We do not inherit behavior directly like we do eye color, but inheritance is one of the factors that controls the development of the brain, endocrine glands, and other body structures that, in turn, influence broad dimensions of our behavior.

This chapter was written to help you understand psychology better. We'll discuss only those aspects of human biology that are directly relevant to understanding behavior: the brain and nervous system, endocrine glands, and genetic mechanisms. Without these biological systems, human life could not exist. They provide the basis for and place limits on our behavior and mental processes. ■

Biological Foundations of Behavior

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5. MARGINAL GLOSSARY

A running glossary with pronunciation guides defines new terms and shows you how to pronounce those that may be difficult. You will find these definitions and pronunciations along the outside margin of the text near the new terms that appear in boldface type within the text. They provide a convenient way of learning definitions without disrupting your reading.

6. SECTION REVIEWS

Within each chapter are three to seven major sections. These are self-contained in the sense that they can be understood without an extensive understanding of the sections that precede or follow them. This will allow your instructor to assign sections to be read when the need arises instead of an entire chapter. This helps promote easy mastery.

Following each major section is a brief review that summarizes the main ideas introduced in that section. Again, this will help you keep the overall organization of the new material in mind as you study the details.

7. CRITICAL THINKING QUESTIONS

Questions designed to stimulate critical thinking appear at the end of each section. Although I have found that few students passively and uncritically accept all that they learn about psychology, these questions will further your critical thinking if you let them involve you actively in the process of learning. Hopefully, you will find that the few minutes of thought that each question provokes will help personalize your new knowledge of psychology, making it “your own” to keep and use over your lifetime. Directly following this “tour” of the book is a short section titled “Critical Thinking.” Taking the time to read it now can help you get more out of the critical thinking questions in the rest of the book.

8. CHECK YOUR LEARNING QUESTIONS

At the end of each section, you will also find “Check Your Learning” questions. These multiple-choice questions give you a chance to see if you have mastered the material in that section before moving on. The answers are provided to give you immediate feedback on the correctness of your own answers. If you give an incorrect answer, use the page number provided with each question to guide you to the page or pages you should review.

Figure 2.2

Short sections of an axon illustrating neural transmission. (a) When an axon is in its resting state, there is a balance between the number of positively and negatively charged ions along the membrane. (b) When the axon is sufficiently stimulated, the membrane allows positively charged sodium ions to pass into the cell, increasing that spot on the membrane. (c) This depolarization disturbs the adjacent section of membrane, allowing sodium ions to flow in again, while sodium ions are being pumped back out of the first section. (d) This process continues as the sailing storm of depolarization continues to the end of the axon.

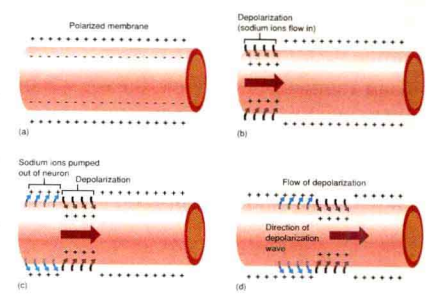
cell membrane
The covering of a neuron or other cell.

semipermeable
(sem-i-per-mi-ah-q'l)
A surface that allows some, but not all, particles to pass through.

polarized state
(pō-lar-ī-z'd)
The resting state of a neuron, when mostly negative ions are inside and mostly positive ions are outside the cell membrane.

depolarization
The process during which positively charged ions flow into the axon, making it less negatively charged inside.

myelin sheath
(mi-e-lin)
The protective fatty covering wrapped around part of the neuron.



of the cell membrane becomes cloaked in positive ions, particularly sodium (Na^+). In the resting state, there are ten times as many positively charged sodium ions outside the membrane of the neuron than inside. This is the source of the neuron's electrical energy—it is electrically positive on one side of the membrane and negative on the other.

Many ions are able to move freely through the **cell membrane** of the neuron, but other ions cannot. For this reason, the membrane is said to be **semipermeable**—only some chemicals can permeate or pass through “holes” in the membrane. When the neuron is in its normal resting state, the membrane is semipermeable and does not let positive ions into the cell. Therefore, a balance exists between the mostly negative ions on the inside and the mostly positive ions on the outside. In this condition, the neuron is said to be electrically **polarized** (see fig. 2.2).

When the membrane is stimulated by an adjacent neuron, however, the semipermeability of the membrane is changed. Positively charged ions, including the important sodium ions, are then allowed to enter the neuron, making the inside less negative. This process is termed **depolarization**. If sufficient depolarization occurs, it causes the neural membrane near the spot where the axon emerges from the cell body to become more permeable. This change in permeability results in a rapid and massive influx of positive sodium ions, which strongly depolarizes that part of the axon. Very quickly, however, the membrane regains its semipermeability and “pumps” the positive sodium ions back out, reestablishing its polarization. This tiny electrical storm of sodium ions flowing in and out of the membrane—which lasts approximately one-thousandth of a second—does not stop there, however. It disturbs the adjacent section of the membrane of the axon so that it depolarizes, which in turn disturbs the next section of the membrane, and so on. Thus, the neural impulse—a flowing storm of ions rushing in and out—travels the length of the axon.

Local anesthetics, such as the Novocain that your dentist injects, stop pain by chemically interrupting this flowing process of depolarization in the axons of nerves that carry pain messages to the brain.

Many axons are encased in a white fatty coating called the **myelin sheath**. This sheath, which is wrapped around the axon like the layers of a jelly roll, provides insulation to the axon

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Introduction

6

Thinking Critically About Psychology

- How would He be different if human beings had a lower absolute threshold for the sense of touch? How about a higher absolute threshold for taste?
- What is the difference between sensation and perception? Can you have a perception without a sensation?

Review

The world is known to us only indirectly because our brains are not in direct contact with the outside world. But sensory receptor cells have the ability to transduce physical energy into coded neural messages that are sent to the brain (sensations) where they are interpreted (perceptions). Not all forms of physical energy can become part of our perception of the world. We must have sensory receptor cells that can transduce that form of energy; the stimulation must be strong enough to exceed the sensory threshold. Our perception of external reality is complicated because there is no simple and direct relationship between the properties of physical stimuli and our conscious sensations. For example, a small change in the intensity of a stereo is not audible when the stereo is being played softly, but the same size change would go unnoticed if the stereo were at high volume. The complicated relationship between physical stimuli and conscious sensations is the subject matter of psychophysics.

Check Your Learning

- To be sure that you have learned the key points from the preceding section, cover the answers below and try to answer each question. If you give an incorrect answer to any question, return to the page given next to the correct answer to see why your answer was incorrect. Remember that these questions cover only some of the important information in this section. It is important that you make up your own questions to check your learning of other facts and concepts.
- The _____ is the smallest magnitude of a stimulus that can be detected half the time.
 - absolute threshold
 - visual threshold
 - difference threshold
 - relative threshold
 - When a stimulus is continuously present or repeated at short intervals, the sensation gradually becomes weaker. This is termed:
 - sensory adaptation
 - psychophysics
 - desensitization
 - threshold variation
 - According to _____, the amount of change in a stimulus needed to be detected half the time is almost always in direct proportion to the intensity of the original stimulus.
 - psychophysical dualism
 - McGurk's law
 - Weber's law
 - threshold variation
 - The specialty area within the field of psychology that studies sensory limits, sensory adaptation, and related topics is called _____.
 - psychophysics
 - psychology
 - psychology
 - psychology

Correct Answers

9. HUMAN DIVERSITY FEATURES

Human diversity features give special emphasis to one of the major themes of this book, the importance of recognizing and respecting the differences among people and learning about the sociocultural factors that can contribute to the exciting variety among individuals. You'll find a human diversity feature in most chapters.

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HUMAN DIVERSITY

Culture and Pain

In this chapter, we examine the ways in which neural impulses from the sense organs are experienced as sensations and perceptions. Although much of this process is determined by the biological nature of the sense organs and neurons, learning experiences in our cultures apparently can influence even basic sensations such as pain. On page 600 of this chapter, we described the *book-binding ceremony* practiced in some areas of India, in which a faithful "celebrant" is hoisted on a crane by ropes attached to hooks that are pushed through the skin and muscles of his back. He is then taken from village to village where he blesses each child and farm. In our culture, such an experience would be excruciatingly painful, but the celebrant either experiences little pain or is able to withstand it gracefully. Perhaps the religious importance of this ceremony in his culture influences his perception of pain (Melzack, 1975). The neural pathways are the same in everyone, but perhaps cultural context can dictate different psychological responses.

Let's consider another example of the possible impact of culture on the perception of pain. Members of the Bariba society in Benin, West Africa, appear to be able to tolerate pain more easily than members of most cultures. Bariba folklore includes many examples of honored people who showed strength in the face of pain, and this calm response to pain is seen as an integral part of Bariba pride (Sargent, 1984). For example, pregnant women are expected not to let the fact that they are experiencing labor pains show to others. When labor becomes advanced, they leave the company of others to go through labor and childbirth alone, only calling for help with cutting the umbilical cord.

To the Bariba, letting other people see that they are in pain is cause for great shame. When discussing pain, many Bariba quote a Bariba proverb that translates to, "Between death and shame, death has the greater beauty." According to a Bariba physician, an individual who displays pain lacks courage, and cowardice is the essence of shame. Rather than live in shame, a Bariba would literally rather die (Sargent, 1984). In this cultural context, one would do everything possible to avoid displaying signs of pain.

Do Bariba women who are in labor actually experience less pain than women in other cultures, or have they simply learned not to let the pain show?

It is difficult to answer such questions, partly because of the difficulties involved in describing pain to another person. Because pain is a private experience, language must be used to communicate the experience to others, and language is shaped by culture. It is not surprising that there is a limited vocabulary for describing pain in the Bariba language than in most other languages. When the Bariba discuss the experience of pain, therefore, it is difficult to know how much their description is influenced by their language.

But, there is some reason to believe that the cultural emphasis on not showing reactions to pain might actually reduce the amount of pain that the Bariba experience. As noted on page 600 of this chapter, there is evidence that facial expressions are an important part of the experience of pain (Lizard, 1977). Apparently, sensory feedback to the brain from facial muscles supplies part of the neural input for the perception of pain (along with input from the part of the body that is cramped or injured). Indeed, persons given electrical shocks report less pain when they were told to make no facial reactions than when they let their emotions show in their faces (O'Leary, Lanzetta, & Kleck, 1977). Maybe the calm face of a Bariba woman in labor results in the experience of less pain than the agonized grimace of women in other cultures.

According to Linda Garro (1990), it is important for medical professionals who work with persons in pain to understand the impact of culture on the expression of pain. If culture is not taken into account, the physician may overestimate or underestimate the amount of pain experienced by the patient. On the other hand, it is important to remember that all members of a culture are not the same. As in all other aspects of human diversity, it is important to be aware of variation within cultures.

What did you learn about pain in your own culture? Were you taught to minimize pain because it is important to be tough? Did you learn that no one will pay attention to your pain unless you exaggerate it? How do you respond when your parent or friends are in pain? Such questions will help you think about cultural influences on perception.

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Awareness

10. APPLICATIONS OF PSYCHOLOGY

These features appear near the end of every chapter and are designed to tie together the information in the chapter and to help you understand how your new knowledge of psychology can be used in your own life.

10



APPLICATION OF PSYCHOLOGY

Visual Perception, Illusion, and Art

During the Winter of 1993, I went to New York with my best friend in an amazing collection of paintings, drawings, and sculpture by Henri Matisse at the Museum of Modern Art. The works were arranged in chronological order, showing the progression in his art from his first paintings to the collages that he assembled on his death bed. The sheer beauty and emotional impact of these works was amazing! But, ever being the psychologist, I sometimes found myself thinking about his paintings in terms of the monocular cues to depth perception.

Now, I have never said, nor will I ever say, that the study of depth perception for its own sake is more than just barely interesting. I know that depth perception is important to understand, but it is just not very interesting. On the other hand, the paintings of Matisse and other great artists are extremely interesting! And, as I thought about it, I found that the way that Matisse used monocular cues of depth perception in his art was pretty interesting too. Maybe looking at some paintings from this perspective will add to our appreciation of the visual art and teach us something about depth perception at the same time.

Painting and Depth Cues: Art Appreciation

When you think about it, the artist who paints a landscape, a still life, or a portrait of a person is creating a visual illusion. He or she uses what is known about the monocular cues of depth perception to create the illusion of a three-dimensional object (one with height, width, and depth) on a two-dimensional canvas (one with height and width only). No part of the flat canvas is farther away from the viewer than any other part, but the artist creates the illusion of depth—the impression that some parts of the painting are farther away than others—using the cues of texture gradient, linear perspective, superposition, shadowing, and aerial perspective. Cues based on the way in which the eyes focus on objects that are different distances from the eye and the binocular cues that are based on differences in the alignment of the two eyes cannot be used by the artist, but artists often achieve striking illusions of depth with the few cues at their disposal.

Before we turn to the art of Matisse, look at the striking illusions of depth created in two paintings. The painting in figure 3.40 by the Spanish painter Diego Velazquez (*Las Meninas*, 1656) uses four depth perception cues to suggest depth very effectively. Notice that the man standing in the doorway is smaller than the man standing on the left (a self-portrait of the artist) and even smaller than the young blonde child who appears to be standing in the front of the painting.



Figure 3.40
"Las Meninas" (1656) by Diego Velazquez.
Excerpt/Library of Science, NY

Note also that the wall on the right is painted on the canvas as if it is shorter at the rear of the room than in the front of the room. These are uses of the monocular cue of *linear perspective*, and they give a powerful illusion of depth to the room. Notice also that the persons that Velazquez wishes us to perceive as being in the front of the room partially cover the persons portrayed as being at the rear of the room (the cue of *superposition*). The detailed texture of the clothing of the persons in the front of the room is also clearer than that of persons at the rear of the room (the cue of *texture gradient*). Velazquez also uses shadowing effectively to create an illusion of depth, but let's study this cue in the even more effective example by Artemisia Gentileschi on page 152.

A more subtle, but wonderfully effective illusion of depth has been created in this extraordinary self-portrait. She gives us an amazingly three-dimensional view of herself partly by using linear perspective (notice, for example, that her right hand appears to be farther away from us partly because it is smaller on the canvas than her left hand, which seems to be very close to us. In addition, her face partially

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