

# PSYCHOLOGY

BERNSTEIN

RC



KENS



SECOND EDITION

*Second Edition*

# PSYCHOLOGY

*Douglas A. Bernstein*

*Edward J. Roy*

*Thomas K. Srull*

*Christopher D. Wickens*

UNIVERSITY OF ILLINOIS AT  
URBANA-CHAMPAIGN

HOUGHTON MIFFLIN COMPANY    BOSTON  
DALLAS   GENEVA, ILLINOIS   PALO ALTO   PRINCETON, NEW JERSEY

*To the researchers, past and present,  
whose work embodies psychology today,  
and to the students who will follow  
in their footsteps to shape the psychology  
of tomorrow.*

**Cover photograph by Ralph Mercer Photography**

**Anatomical illustrations by Joel Ito**

**Charts and Graphs by Boston Graphics, Inc.**

**Illustrations by Steven Moore on pages 35, 47, 85, 95 (top), 106, 139 (bottom), 145, 166, 194, 206, 209, 258, 268, 277, 292 (left), 346, 351, 358, 361, 373, 442, 477, 481, and 484.**

#### **Credits**

**Chapter opening photos:** p. 1: Jean-Francois Podevin/The Image Bank p. 31: Michael Quackenbush/The Image Bank p. 83: Mieke Maas/The Image Bank p. 125: Lawrence Manning/West Light p. 171: Peter Hendrie/The Image Bank p. 215: John Wagner, Jr./The Image Bank p. 255: Don Klumpp/The Image Bank p. 299: Louis Jawitz/The Image Bank p. 341: Garry Gay/The Image Bank p. 389: Bill Varie/The Image Bank p. 431: John P. Kelly/The Image Bank p. 469: Owen Franken/Stock, Boston p. 499: Jack Elness/Comstock p. 535: Cary Wolinsky/Stock, Boston p. 575: Rene Burri/Magnum p. 623: Michael deCamp/The Image Bank p. 665: Dag Sundberg/The Image Bank p. 701: Joe Viesti/Viesti Associates.

(Credits continue following references.)

**Copyright © 1991 by Houghton Mifflin Company.**

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or by any information storage or retrieval system without the prior written permission of Houghton Mifflin Company unless such copying is expressly permitted by federal copyright law. Address inquiries to College Permissions, Houghton Mifflin Company, One Beacon Street, Boston, MA 02108

Printed in the U.S.A.

Library of Congress Catalog Card Number: 90-83278

ISBN: 0-395-43246-4

BCDEFGHIJ—VH—987654321

In revising *Psychology* we have rededicated ourselves to the goals we pursued when we wrote the First Edition:

- To explore the full range of psychology, from cell to society, in an eclectic manner as free as possible from theoretical bias.
- To balance our need to explain the content of psychology with an emphasis on the doing of psychology, through a blend of conceptual discussion and description of research studies.
- To foster scientific attitudes and to help our readers learn to think critically by examining the ways that psychologists have solved, or failed to solve, fascinating puzzles of behavior and mental processes.
- To produce a text that, without oversimplifying psychology, is clear, accessible, and enjoyable for students to read—even spiced now and again with humor.
- To demonstrate that, in spite of its diversity, psychology is a notably integrated discipline in which each subfield is linked to other subfields by common interests and overarching research questions. The productive cross-fertilization among social, clinical, and biological psychologists in researching health and illness is just one recent example of how different types of psychologists benefit from and build on one another's work.

Responses from faculty and students who used the First Edition indicate that we achieved what we set out to do. In preparing the Second Edition we sought new ways to do justice to our goals.

We sought to respond to the needs of instructors who wanted us to reduce or expand coverage of various topics. For example, many instructors asked us to expand our coverage of adolescent and adult development in Chapter 2. We did so, and a more rounded picture of life-span development was the result.

We also sought to strike an ideal balance between classic and current research. The important historic findings of psychological research are here, but so is coverage of much recent work. More than a third of the research citations are new to the Second Edition, and we have added the latest information on such topics as:

- Day care (Chapter 2)
- Alzheimer's disease, Parkinson's disease, and mood disorders (Chapter 3)
- Biological effects of alcohol (Chapter 5)
- The role of emotion in forgetting, and the biological bases of memory (Chapter 8)
- Artificial intelligence (Chapter 9)
- Neural networks (Chapter 9)
- Creativity (Chapter 10)
- Panic and fear (Chapter 11)
- The "big five" theory of personality (Chapter 14)
- Cognitive behavior therapy (Chapter 16)
- The cognitive bases of prejudice (Chapter 17)

We wanted as well to present research findings as conclusions drawn from studies that are not infallible. Part of teaching students to think critically is to have them examine the limitations and flaws in the studies presented to them by authorities, and on this point we did not compromise.

We have also taken pains to draw attention to ethical considerations in psychology. These considerations are introduced in Chapter 1, and examined at other points throughout the text. One example occurs in Chapter 16, on Treatment of Psychological Disorders, where we discuss patients' rights; another is found in Chapter 18, in relation to Milgram's obedience research.

We have incorporated in the text frequent references to practical applications of psychological research. For example, in Chapter 5, on perception, we discuss psychology's contribution to aviation safety and present new material on the design of traffic circles. In a new discussion in Chapter 7 we examine the learning of everyday skills, such as driving a car or operating a computer. Chapter 8, Memory, proved an appropriate context for the discussion of courtroom behavior as well as an opportunity for students to improve their study skills and exam-taking techniques.

As in the First Edition, we have placed most of our discussion of historical events and trends into the chapter contexts where they are relevant, rather than attempting detailed coverage of psychology's history in Chapter 1.

## Organization of the Text

No consensus exists on exactly what chapter sequence will present psychology to students in the most logical and comprehensible manner. Like other teachers, we have a preferred outline, and it is reflected in our table of contents. Rather than impose our sequence on your teaching, however, we have refrained from grouping the chapters into sections. Indeed, we designed each chapter to be a freestanding unit so that you may assign chapters in any order you wish.

We begin in Chapter 1 with an overview of the nature of psychology, a summary of the research and other activities associated with the various subfields within psychology, and a description of some of the research methods psychologists use. Then, to begin surveying the field, we move to Chapter 2, Human Development, where we show the reader how the principles and

processes studied in each subfield come together across the human being's life span. Many instructors who followed our chapter organization in the First Edition found, as we have, that preceding physiology with human development had a salutary effect on their students. Again, however, if you wish to assign the development chapter out of sequence you may do so comfortably.

Other notable aspects of the text's organization:

- Unlike some other texts, we devote separate chapters to motivation; emotion; and stress, coping, and health (Chapters 11, 12, and 13). This enables us to cover these areas in the depth they deserve and, in particular, to present a detailed discussion of stress, one of the major subjects of psychological research during the past decade.
- We devote two separate but related chapters to social psychology (Chapters 17 and 18).
- We cover the methods of psychological research initially in Chapter 1, and we deepen that coverage with a statistics appendix that covers inferential as well as descriptive statistics. The appendix facilitates the learning of difficult concepts by focusing on a single research study throughout.

Users of the First Edition may wish to note that we have not changed the sequencing of chapters, or added or deleted chapters, in this revision. We have, however, improved the internal organization of several chapters in the book, including

- Chapter 2 on human development, where, for example, we have presented Piaget's developmental stages in a more coherent form.
- Chapter 7 on learning, in which we have added a new section on teaching and training of human skills.
- Chapters 17 and 18, the first of which is now focused on social cognition and the second on social interaction.

## Special Features

*Psychology* contains a number of special features designed to promote efficient learning and students' mastery of the material. Some of the features from the First Edition have been revised and enhanced in the Second Edition, and some are new.

## Linkages

We have built into the book an integrating tool called Linkages, which highlights some of the relationships among the various subfields in psychology. In the Second Edition, this tool has been considerably improved for ease and efficiency of use. It consists of four parts:

1. In the first few pages of each chapter, a linkage diagram (Linkages: An Overview), reconceived for the Second Edition, illustrates ways that the chapter sheds light on questions arising in other chapters and how material in other chapters helps illuminate questions raised in the current one. Each diagram carries a caption that discusses some of these linkages. The page numbers following each linking question direct the student to pages that carry further discussion of that question. (An appendix that carried these page numbers in the First Edition has been dropped from this edition.)



2. To further reinforce the linkages concept as the student reads through each chapter, each linking question is repeated in the margin of the page where the discussion appears.
3. One such discussion always appears near the end of the chapter in a linkages section that addresses at length a particularly timely or provocative question previously raised in that chapter's linkage diagram.
4. Also new to the Second Edition, each chapter contains at least one captioned photo that illustrates how the content of the chapter is related to that of another chapter.

By establishing ties between chapters, the Linkages material combines with the text narrative to highlight the network of relationships among psychology's subareas. However, the Linkages program does not require that you follow our text's chapter sequence.

### ***Highlights***

We have chosen not to employ any "boxed" material in the text. When we wish to emphasize a topic, we have placed it in a Highlight, a section that follows logically and directly from the narrative. These Highlights, analogous to a magnifying glass placed over particular topics in each chapter, allow the reader to examine selected topics in detail without being distracted from the chapter's narrative flow.

### ***Thinking Critically***

A new section in each chapter is called Thinking Critically. We try throughout the book to describe research on psychological phenomena in a way that reveals the logic of the scientific enterprise, that identifies possible flaws in design or interpretation, and that leaves room for more questions and further research. In other words, we try to display critical thinking processes. The Thinking Critically sections are designed to make these processes more explicit and accessible by providing a framework for analyzing evidence before drawing conclusions. The framework is built around five questions that the reader should find useful in analyzing not only studies in psychology but other forms of communication as well. These questions, first introduced when we discuss the importance of critical thinking in Chapter 1, are

1. What am I being asked to believe or accept?
2. What evidence is available to support the assertion?
3. Are there alternative ways of interpreting the evidence?
4. What additional evidence would help to evaluate the alternatives?
5. What conclusions are most reasonable?

Thinking Critically sections examine, for example, whether day care harms the emotional development of infants (Chapter 2), whether people can perceive what cannot be sensed (Chapter 5), whether IQ tests are unfairly biased against certain groups (Chapter 10), and other controversial issues. Like the Highlights, these sections are not boxed off from the main narrative.

### ***In Review Charts***

Also new to the Second Edition, In Review charts summarize key information in a convenient tabular format. We have placed two or three In Review charts strategically in each chapter to help students synthesize and assimilate large

chunks of information—for example, on drug effects, key elements of personality theories, and stress responses and mediators.

### ***Future Directions***

Each chapter concludes with Future Directions, a section intended to excite and inform students about new trends. Here we offer our views on the directions that theory, research, and applications will take in future years. We also suggest courses that an interested student could take in psychology and other disciplines to learn more about the chapter's topic.

### ***Chapter Summaries***

These summaries have been reconfigured in the Second Edition to reflect more clearly the heading structure of each chapter. The chapters' key terms are now integrated into the summaries rather than set off as a separate list. These terms are defined in the glossary.

### ***Ancillary Package***

Accompanying this book are, among other ancillaries, a *Test Bank*, an *Instructor's Resource Manual*, and a *Study Guide*. Because these items were prepared by the lead author and his colleagues in the University of Illinois psychology department, you will find an especially high level of coordination between the textbook and these supplements. All three are additionally unified in the Second Edition by a shared set of learning objectives.

#### ***Test Bank (by Graeme McGufficke, Sandra S. Goss, and Douglas A. Bernstein)***

The *Test Bank* contains more than 3,000 multiple-choice items (165 per chapter plus 35 on statistics) and three to five essay questions for each chapter of the text. All multiple-choice items are keyed to the learning objectives listed in the *Instructor's Resource Manual* and *Study Guide*. Approximately 1,000 questions have already been class-tested and are accompanied by graphs indicating the question's discriminative power, level of difficulty, the percentage of students who chose each response, and the relationship between students' performance on a given item and their overall performance on the test in which the item appeared.

#### ***Instructor's Resource Manual (by Sandra S. Goss and Douglas A. Bernstein)***

The *Instructor's Resource Manual* contains a complete set of lecture outlines and learning objectives. The revised version of this manual contains nearly one hundred specific teaching aids—most of them new to the Second Edition—including handouts, demonstrations, and classroom exercises. It also contains other material that will be useful to teachers of large introductory courses, such as a section on classroom management and administration of large multisection courses, and a discussion of careers in psychology that instructors may want to distribute to students.



### ***Study Guide (by Bridget Schoppert, Marcia Graber, and Douglas A. Bernstein)***

The *Study Guide* employs numerous techniques that help students to learn. Each chapter contains a detailed outline, a key terms section that presents fresh examples and aids to remembering, learning objectives, and a "Concepts and Exercises" section that shows students how to apply their knowledge of psychology to everyday issues and concerns. In addition, each chapter concludes with a two-part self-quiz consisting of thirty multiple-choice questions. An answer key tells the student not only which response is correct but also why each of the other choices is wrong. The revised *Study Guide* also includes a write-in quiz for each chapter.

### ***Other Ancillaries Available to Adopters***

The *Test Bank*, *Instructor's Resource Manual*, and *Study Guide* are also available to adopters on disk for use on microcomputers.

The computerized *Test Bank* allows instructors to generate exams and to integrate their own test items with those on the disk.

The detailed lecture outlines that appear in the *Instructor's Resource Manual* are also available on disk in a generic ASCII-code version. This format allows instructors to use standard word-processing software to integrate their own lecture notes and ideas into the text lectures.

The computerized *Study Guide* is an interactive program that gives students feedback on incorrect as well as on correct answers.

These additional software items are available to adopters:

- Computer simulations that illustrate intriguing phenomena and recreate important experiments
- *Linkages*, HyperCard-based software that allows students to explore the linked sections of the textbook systematically and efficiently
- *Flash Card*, a new ancillary that helps students to master the technical vocabulary of psychology

Also offered to adopters are two sets of transparencies, available as well in slide form. One set contains more than 100 images from the text, most in full color; the other set provides 50 images from outside the text. Finally, a range of videocassettes containing films on topics in psychology is available on adoption of a minimum number of books.

### **Acknowledgments**

Many people provided us with the help, criticism, and encouragement we needed, first to write, and then to revise, this book.

We first wish to thank Alison Clarke-Stewart (University of California, Irvine) for revising her chapter on human development. Professor Clarke-Stewart's skills as a writer are evident throughout the chapter, as is her command of the important themes and issues in development.

We are indebted to Michael T. Nietzel (University of Kentucky) for his expert assistance in the revision of Chapters 14, 15, and 16, on personality, psychological disorders, and treatment of psychological disorders.

Thanks are also due to the Department of Psychology at the University of Illinois at Urbana-Champaign, especially to its head, Emanuel Donchin, who has continued to provide us with a firm base of support. We are especially grateful to Diane Weidner for coordinating communication between the authors and Houghton Mifflin. Her unselfish devotion to helping us assumed heroic proportions at times; we thank you very much, Diane. Thanks also go to Helen Watson and Patsie Petrie, of the Susan Stout Memorial Library, for their unfailing help and endless patience in response to our many complex and obscure requests for references. Cathy Stein contributed material on psychological testing to the chapter on mental abilities, and we appreciate her help. Illinois students, friends, and associates who evaluated parts of the Second Edition manuscript include Adriana Alcantara, Marie Banich, May Berenbaum, George M. McConkie, Richard Rowlison, and Ellen Wartella.

We owe a special debt to the colleagues listed below, who provided prerevision evaluations of or reviewed the manuscript for the Second Edition as it was being developed. Their advice and suggestions for improvements were responsible for many of the good qualities you will find in the book. If you have any criticisms, they probably involve areas these people warned us about.

C. Berkeley Adams, Jamestown Community College  
Lewis R. Aiken, Pepperdine University  
Judith Allen, Drake University  
Eileen Astor-Stetson, Bloomsburg University  
James Averill, University of Massachusetts, Amherst  
Gregory F. Ball, Boston College  
William A. Barnard, University of Northern Colorado  
Byron L. Barrington, University of Wisconsin, Marathon Center  
Lt. Col. Johnston Beach, The United States Military Academy  
Kenneth A. Benson, Hinds Junior College  
Terry D. Blumenthal, Wake Forest University  
James F. Calhoun, University of Georgia  
Paul Concepcion, Chemeketa Community College  
Vernon R. Dorschner, Brainerd Community College  
Karen Grover Duffy, State University of New York, Geneseo  
William O. Dwyer, Memphis State University  
Linda E. Flickinger, St. Clair County Community College  
Robert E. Franken, University of Calgary  
David Funder, University of California, Riverside  
Theodore Gessner, George Mason University  
William C. Gordon, University of New Mexico  
Albrecht Werner Inhoff, State University of New York, Binghamton  
Thomas T. Jackson, Fort Hays State University  
Timothy D. Johnston, University of North Carolina, Greensboro  
Kevin Jordan, San Jose State University  
Andrew Kinney, Mohawk Community College  
Jack Kirschenbaum, Fullerton College  
John S. Klein, Castleton State University  
Stephen B. Klein, Fort Hays State University  
Ronald A. Kleinknecht, Western Washington University  
Juliana Rasic Lachenmeyer, Fairleigh Dickinson University  
Janet Landman, University of Michigan  
S. David Leonard, University of Georgia  
Bradley Lown, Buffalo State College  
Hamish Macleod, University of Edinburgh

James Martinez, Mercy College of Detroit  
Dale McAdam, University of Rochester  
W. Hugh McGinley, University of Wyoming  
Peter Moshein, University of Pittsburgh  
Carol Pandey, Los Angeles Pierce College  
Denis Parker, University of Aberdeen  
Jim H. Patton, Baylor University  
Patricia L. Phillips, Illinois State University  
Robert R. Prochnow, St. Cloud State University  
David A. Schroeder, University of Arkansas, Fayetteville  
David Shwalb, Westminster College of Salt Lake City  
Mark Siegel, University of the District of Columbia  
Frank Sjursen, Shoreline Community College  
Chris Spatz, Hendrix College  
Linda Spear, State University of New York at Binghamton  
A. H. Teich, University of Pittsburgh, Johnstown  
Rod T. Todorovich, Honolulu Community College  
Michael Trout, Champaign, Illinois  
Benjamin Wallace, Cleveland State University  
Janet Weigel-Bruno, Black Hawk College  
Paul J. Wellman, Texas A & M University

We thank once again the reviewers of the First Edition, who helped us to shape and refine the foundation on which the Second Edition was built:

Paul Abramson, University of California, Los Angeles  
Elizabeth Allgeier, Bowling Green State University  
Craig A. Anderson, University of Missouri  
Ruth L. Ault, Davidson College  
James R. Averill, University of Massachusetts, Amherst  
Lewis M. Barker, Baylor University  
Deborah Belle, Boston University  
Michael Best, Southern Methodist University  
Robert C. Bolles, University of Washington  
Nathan Brody, Wesleyan University  
Rosalind Dymond Cartwright, Rush Medical College  
Charles Cofer, University of North Carolina, Chapel Hill  
Ellen Marie Cooper, Pennsylvania State University, University Park  
Paul Cornwell, Pennsylvania State University, University Park  
Xenia Coulter, Empire State College  
Frank DaPolito, University of Dayton  
Richard B. Day, McMaster University  
Randy L. Diehl, University of Texas, Austin  
Halford H. Fairchild, Association of Black Psychologists  
J. Gregor Fetterman, Arizona State University  
Jeffrey D. Fisher, University of Connecticut, Storrs  
Randy D. Fisher, University of Central Florida  
Robert A. Frank, University of Cincinnati  
Irene Hanson Frieze, University of Pittsburgh  
Adrienne Gans, New York University  
Don Gawley, Indiana University, Bloomington  
Sandra S. Goss, University of Illinois, Urbana-Champaign  
Richard A. Griggs, University of Florida  
Carlos V. Grijalva, University of California, Los Angeles

Robert W. Grossman, Kalamazoo College  
Ruben C. Gur, University of Pennsylvania  
Anne Harris, Arizona State University  
Robert B. Hays, George Washington University  
Steven R. Heyman, University of Wyoming  
Deborah L. Holmes, Loyola University of Chicago  
Ralph W. Hood, Jr., University of Tennessee, Chattanooga  
Jeffrey A. Howard, Eckerd College  
Earl Hunt, University of Washington  
Janet Shibley Hyde, University of Wisconsin, Madison  
Cynthia E. Jayne, Temple University School of Medicine  
James D. Kestenbaum, Rochester Institute of Technology  
David L. Kohfield, Southern Illinois University, Edwardsville  
Marcy Lansman, University of North Carolina, Chapel Hill  
Arnold A. Lazarus, Rutgers, The State University  
Richard L. Leavy, Ohio Wesleyan University  
Marc S. Lewis, University of Texas, Austin  
Lewis R. Lieberman, Columbus College  
Sanford Lopater, Christopher Newport College  
Steven Lopez, University of Southern California  
James Luginbuhl, North Carolina State University  
Joseph G. Malpeli, University of Illinois, Urbana-Champaign  
Margaret W. Matlin, State University of New York, Geneseo  
Donald H. McBurney, University of Pittsburgh  
Gerald A. Mendelsohn, University of California, Berkeley  
Donald H. Mershon, North Carolina State University  
Lawrence S. Meyers, California State University, Sacramento  
Peter M. Milner, McGill University  
James S. Nairne, University of Texas, Arlington  
Patricia Parmelee, Philadelphia Geriatric Center  
Anne C. Petersen, Pennsylvania State University, University Park  
Terry F. Pettijohn, The Ohio State University, Marion  
James O. Prochaska, University of Rhode Island  
Kathryn Quina, University of Rhode Island  
Stephen K. Reed, Florida Atlantic University  
Janet Morgan Riggs, Gettysburg College  
Richard J. Sanders, University of North Carolina, Wilmington  
Timothy Schallert, University of Texas, Austin  
Janet Ward Schofield, University of Pittsburgh  
Bridget Schoppert, University of Illinois, Urbana-Champaign  
David A. Schroeder, University of Arkansas, Fayetteville  
Marian Schwartz, University of Wisconsin, Madison  
Michael B. Sewall, Mohawk Valley Community College  
Michael D. Spiegler, Providence College  
Charles D. Spielberger, University of South Florida  
Valerie N. Stratton, Pennsylvania State University, Altoona  
Thomas K. Tutko, San Jose State University  
Ryan D. Tweney, Bowling Green State University  
Benjamin Wallace, Cleveland State University  
Michael J. Watkins, Rice University  
Paul J. Wellman, Texas A & M University  
Ben A. Williams, University of Southern California  
Sharon Wolf, California State University, Long Beach  
William R. Wooten, Brown University

We also want to thank Katie Steele, who got this project off the ground by encouraging us to stop talking about this book and start writing it. We were consistently delighted by the caring, the enthusiasm, and the professionalism of everyone we had dealings with in Houghton Mifflin's College Division. The debt of gratitude we owe for their unwavering support and their commitment to this project can never be repaid.

Finally, we want to express our deepest appreciation to our families and friends. Their love saw us through an exhilarating but demanding period of our lives. They endured our hours at the computer, missed meals, postponed vacations, and occasional irritability during the creation of the first edition of this book, and they had to suffer all over again during the lengthy process of revision. Their faith in us is more important than they realize, and it will be cherished forever.



*Left to right: Christopher D. Wickens,  
Edward J. Roy, Thomas K. Srull,  
Douglas A. Bernstein*

*Doug Bernstein*  
*Ed Roy*  
*Thomas Srull*  
*Chris Wick*

# B R I E F   C O N T E N T S

*Preface*    xv

- 1 The World of Psychology    1
- 2 Human Development    31
- 3 Biological Aspects of Psychology    83
- 4 Sensation    125
- 5 Perception    171
- 6 Consciousness    215
- 7 Learning    255
- 8 Memory    299
- 9 Thought and Language    341
- 10 Mental Abilities    389
- 11 Motivation    431
- 12 Emotion    469
- 13 Stress, Coping, and Health    499
- 14 Personality    535
- 15 Psychological Disorders    575
- 16 Treatment of Psychological Disorders    623
- 17 Social Cognition    665
- 18 Interpersonal Behavior and Group Influences    701

*Appendix: Statistics in Psychological*

*Research*    A-1

*Glossary*    A-12

*References*    A-35

*Credits*    A-89

*Name Index*    A-95

*Subject Index*    A-111

# C O N T E N T S

Preface xv

## 1

### The World of Psychology

1

#### From Cell to Society: The Scope of Psychology 1

- Subfields of Psychology 2
- Approaches to Psychology 6
- Unity Within Diversity 8

#### The Goals of Research 11

- Description 12
- Prediction 12
- Highlight:* Correlation: The Foundation of Prediction 12
- Control 15
- Explanation 16

#### Methods of Research 17

- Surveys 18
- Case Studies 18
- Naturalistic Observation 19
- Experiments 20
- Highlight:* Ethical Guidelines for Psychologists 23

#### Thinking Critically About Psychology (or Anything Else) 25

#### Future Directions 26

#### Summary and Key Terms 29

## 2

### Human Development

by Alison Clarke-Stewart

31

#### The Study of Development 33

- Philosophical Roots 33
- Scientific Approaches 34
- Nature and Nurture 36

#### Beginnings 37

- Genetic Building Blocks 37
- Prenatal Development 39



- Birth 41
- Capacities of the Newborn 41

#### Infancy and Childhood: Cognitive Development 43

- The Development of Knowledge: Piaget's Theory 43
- Modifying Piaget's Theory 47
- Information Processing 48
- Variations in the Pace of Cognitive Development 49

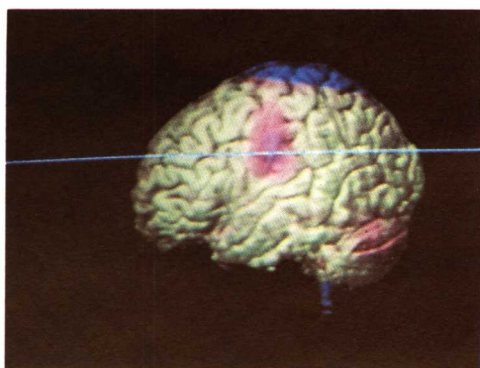
#### Infancy and Childhood: Social and Emotional Development 51

- Early Social Interaction 51
- Individual Temperament 52
- The Infant Grows Attached 53
- Thinking Critically:* Does Day Care Harm the Emotional Development of Infants? 54
- Relationships with Parents 55
- Highlight:* Child Abuse: Socialization Gone Awry 57
- Relationships with Other Children 58
- Social Skills and Understanding 59

#### Adolescence 61

- The Big Shakeup 61
- Parents and Peers 62
- Highlight:* Sex and Babies 63
- Identity 64





|                                               |    |
|-----------------------------------------------|----|
| Abstract Thought and Moral Reasoning          | 66 |
| Adulthood                                     | 69 |
| The Aging Body                                | 70 |
| The Experienced Mind                          | 71 |
| Social and Psychological Changes              | 72 |
| <i>Highlight: Love, Marriage, and Divorce</i> | 74 |
| Death and Dying                               | 76 |

### Linkages: Human Development and Personality 77

### Future Directions 78

### Summary and Key Terms 79

## 3

## Biological Aspects of Psychology

83

### The Nervous System: An Overview 85

### Communication in the Nervous System 87

|                                                |    |
|------------------------------------------------|----|
| Neurons: The Basic Units of the Nervous System | 87 |
| Interactions Between Neurons                   | 91 |

### The Central Nervous System: Organization and Functions 92

|                                              |     |
|----------------------------------------------|-----|
| Relating Structure to Function               | 94  |
| <i>Highlight: Recovery from Brain Damage</i> | 96  |
| The Spinal Cord                              | 98  |
| The Brain                                    | 99  |
| The Cerebral Cortex                          | 102 |
| The Divided Brain in a Unified Self          | 103 |

### The Chemistry of Psychology 107

|                                                   |     |
|---------------------------------------------------|-----|
| Seven Major Neurotransmitters                     | 107 |
| Drugs, Neurotransmitters, and Behavior            | 111 |
| <i>Highlight: Naloxone and the Placebo Effect</i> | 113 |

### Endocrine Systems 114

|                                                        |     |
|--------------------------------------------------------|-----|
| <i>Thinking Critically: Is PMS a Hormonal Problem?</i> | 116 |
|--------------------------------------------------------|-----|

### Linkages: Biological Psychology and Human Development 119

### Future Directions 120

### Summary and Key Terms 122

## 4

## Sensation

125

### Sensory Systems 127

|                       |     |
|-----------------------|-----|
| Steps in Sensation    | 127 |
| The Problem of Coding | 128 |
| Representing Stimuli  | 129 |

### Hearing 130

|                                       |     |
|---------------------------------------|-----|
| Sound                                 | 130 |
| The Ear                               | 132 |
| Coding of Intensity and Frequency     | 133 |
| Auditory Pathways and Representations | 135 |

### Vision 137

|                                                   |     |
|---------------------------------------------------|-----|
| Light                                             | 137 |
| Focusing Light: Accessory Structures of the Eye   | 138 |
| Converting Light into Images: Visual Transduction | 138 |
| Seeing Color                                      | 143 |
| Visual Pathways and Representations               | 148 |

### The Chemical Senses: Smell and Taste 153

|                                                      |     |
|------------------------------------------------------|-----|
| Olfaction                                            | 153 |
| <i>Highlight: The Special Significance of Smells</i> | 154 |
| Gustation                                            | 155 |
| Smell, Taste, and Flavor                             | 156 |

### Somatic Senses and the Vestibular System 156

|                                                                                     |     |
|-------------------------------------------------------------------------------------|-----|
| Touch and Temperature                                                               | 156 |
| Pain                                                                                | 158 |
| <i>Thinking Critically: Does Acupuncture Relieve Pain Through Physical Effects?</i> | 162 |
| Proprioception                                                                      | 164 |

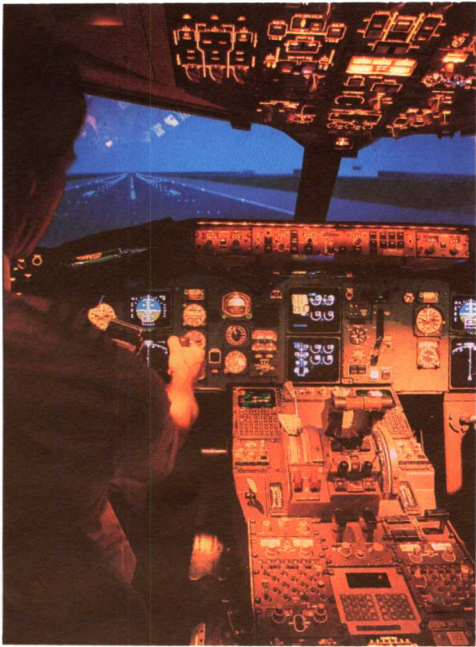
### Linkages: Sensation and Motivation 165

### Future Directions 167

### Summary and Key Terms 167







# 5

## Perception

171

### From Sensing to Perceiving: An Overview

173

- Six Features of Perception 173
- Approaches to Perception 174

### Psychophysics 176

- Absolute Thresholds: Is Something Out There? 176
- Going Beyond the Threshold: Signal-Detection Theory 178
- Judging Differences Between Stimuli: Weber's Law 180
- Judging Stimulus Magnitude: Fechner's and Stevens's Laws 181
- Thinking Critically:* Can People Perceive What Cannot Be Sensed? 181

### Organizing the Perceptual World 183

- Principles of Perceptual Organization 183
- Perceptual Constancy 185
- Depth Perception 187
- The Perception of Motion 191
- Perceptual Illusions 192

### Recognizing the Perceptual World 196

- Feature Analysis 196
- Models of Object Recognition 197
- Top-Down Processing 198
- Top-Down and Bottom-Up Processes Together 200

### Attention 202

- Selective Attention 202
- Focused and Divided Attention 202
- Highlight:* Attention and the Brain 205

### Applications of Research on Perception 206

- Aviation Psychology 206
- Reading 207

### Linkages: Perception and Human Development 208

### Future Directions 210

### Summary and Key Terms 211

# 6

## Consciousness

215

### Analyzing Consciousness 217

- The Study of Consciousness 217
- Highlight:* Time and Consciousness 218
- Consciousness and the Cognitive Unconscious 219
- Thinking Critically:* Can You Be Influenced by Subliminal Perceptions? 220
- States of Consciousness 222

### Daydreaming 223

### Sleeping and Dreaming 224

- Stages of Sleep 224
- Sleep Disorders 226
- Why Do People Sleep? 228
- Highlight:* Confusing the Biological Clock 229
- Dreams and Dreaming 232

### Hypnosis 234

- Experiencing Hypnosis 234
- Who Can Be Hypnotized? 235
- Explaining Hypnosis 236
- Some Uses of Hypnosis 238

### Meditation 239

### Psychoactive Drugs 240

- The Varying Effects of Drugs 240
- Depressants 242
- Stimulants 244
- Narcotics 246
- Psychedelics 246

### Linkages: Consciousness and Learning 250

### Future Directions 251

### Summary and Key Terms 252

# 7

## Learning

255

### Classical Conditioning 257

- Pavlov's Discovery 258
- Establishing a Conditioned Response 259
- Highlight:* The Special Case of Taste-Aversion Learning 261
- What Is Learned in Classical Conditioning? 263
- Conditioned Responses over Time 264
- Classical Conditioning of Human Behavior 265