

FIFTH EDITION

Essentials of Understanding Psychology

Robert S. Feldman

W / In Psych CD



fifth edition

Essentials of Understanding Psychology

Robert S. Feldman

University of Massachusetts—Amherst



Boston Burr Ridge, IL Dubuque, IA Madison, WI New York San Francisco St. Louis
Bangkok Bogotá Caracas Kuala Lumpur Lisbon London Madrid Mexico City
Milan Montreal New Delhi Santiago Seoul Singapore Sydney Taipei Toronto

McGraw-Hill Higher Education

A Division of The McGraw-Hill Companies

ESSENTIALS OF UNDERSTANDING PSYCHOLOGY FIFTH EDITION

Published by McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY 10020. Copyright © 2003, 2000, 1997, 1994, 1989 by The McGraw-Hill Companies, Inc. All rights reserved. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written consent of The McGraw-Hill Companies, Inc., including, but not limited to, in any network or other electronic storage or transmission, or broadcast for distance learning.

Some ancillaries, including electronic and print components, may not be available to customers outside the United States.

This book is printed on acid-free paper.

2 3 4 5 6 7 8 9 0 QPD/QPD 0 9 8 7 6 5 4 3 2

ISBN 0-07-249426-3

Vice president and editor-in-chief: *Thalia Dorwick*
Publisher: *Stephen D. Rutter*
Senior sponsoring editor: *Melissa Mashburn*
Developmental editor: *Cheri Dellelo*
Senior marketing manager: *Chris Hall*
Project manager: *Vicki Krug*
Production supervisor: *Enboge Chong*
Coordinator of freelance design: *Michelle D. Whitaker*
Cover/interior designer: *Christopher Reese*
Cover images: *ibid.*
Lead photo research coordinator: *Carrie K. Burger*
Photo research: *Toni Michaels/PhotoFind, LLC*
Supplement producer: *David A. Welsh*
Media technology senior producer: *Sean Crowley*
Compositor: *GTS Graphics, Inc.*
Typeface: *10/12 Times Roman*
Printer: *Quebecor World Dubuque, IA*

The credits section for this book begins on page AK.1 and is considered an extension of the copyright page.

Library of Congress Control Number: 2002100215

www.mhhe.com

Preface

Estella Ramirez gained a better understanding of her mother's lifelong battle with major depression after learning about its possible causes in her introductory psychology course. She also developed a new appreciation for the struggles her mother faced in coping with this disorder.

* * *

As a new father, Phil Westport realized that he didn't know very much about infants, including his own daughter. He decided to take introductory psychology in part to learn more about child development. Applying what he learned in the course, Phil gained new insights into his daughter's behavior and more confidence in his ability to be a good parent.

* * *

Although he enrolled in introductory psychology because it was the only class that fit conveniently into his schedule, Jacob Rakovitch found himself increasingly interested in the subject matter. He became fascinated by the relationship between the brain and behavior, and by the end of the term he was seriously thinking about majoring in psychology.

* * *

Joanne Chu is planning to become a special education teacher after graduating from college. Her aspirations have been fueled by studying how people learn and how psychologists explain variations in intelligence in her introductory psychology course.

Psychology speaks with many voices to the diversity of students that we teach, offering a personal message to each one. To some, the discipline is a vehicle that can provide a better understanding of others' behavior; for others it is a pathway to self-understanding. To some, psychology offers the potential of a future career; others are drawn to psychology because it gives them an opportunity for intellectual discovery.

Essentials of Understanding Psychology, fifth edition, is designed to present the discipline of psychology in a way that engages and excites students about the field of psychology—no matter what led them to take the introductory course or what level of motivation they initially bring to the course. It is designed to draw them into its way of looking at the world and to inform their understanding of psychological issues. The book provides a broad introduction to the essentials of the field of psychology, covering basic theories and research findings, as well as highlighting current applications outside the laboratory.

In revising *Essentials of Understanding Psychology*, I had four major goals:

1. To provide broad coverage of the field of psychology, introducing the theories, research, and applications that constitute the discipline.
2. To impel readers to think critically about psychological phenomena, particularly those that have an impact on their everyday lives.
3. To illustrate the substantial diversity both within the field of psychology and in society as a whole by presenting material that reflects the discipline's increasing concern with cultural, gender, racial, and ethnic issues.
4. To arouse intellectual curiosity and build an appreciation of how psychology can increase students' understanding of the world around them.

In short, *Essentials of Understanding Psychology* is meant not only to expose readers to the content—and promise—of psychology, but also to do so in a way that will bring

to life basic concepts and research findings, and sustain interest in the discipline long after they have completed their first encounter with the field.

The Scope and Structure of *Essentials of Understanding Psychology*

Essentials of Understanding Psychology is based on the sixth edition of *Understanding Psychology*, a broad and comprehensive introduction to the field of psychology. Like the book from which it is derived, *Essentials of Understanding Psychology* includes coverage of the traditional topical areas of psychology—such as the biological foundations of behavior, sensation and perception, learning, cognition, development, personality, abnormal behavior, and the social psychological foundations of behavior.

Unlike its predecessor, however, *Essentials of Understanding Psychology* is a briefer, 14-chapter volume. It focuses on the essence of psychology, providing a broad introduction to the field. The book also shows how the field's theories and research have an impact on readers' everyday lives by emphasizing the applications of psychology.

The flexibility of the book's organizational structure, a hallmark of this text, is considerable. Each chapter is divided into three or four manageable, self-contained units, allowing instructors to choose and omit sections in accordance with their syllabus.

Building on its strong tradition of facilitating student learning, the fifth edition of *Essentials of Understanding Psychology* contains several new and improved features:

- **The option of using a systematic study strategy built into the book—the *P.O.W.E.R. Learning* system.** The new edition of *Essentials of Understanding Psychology* provides students with the option of using *P.O.W.E.R. Learning*, a systematic approach to learning and studying based on five key steps (**P**repare, **O**rganize, **W**ork, **E**valuate, and **R**ethink). Based on empirical research, *P.O.W.E.R. Learning* systematizes the acquisition of new material by providing a learning framework. The system stresses the importance of learning objectives, self-evaluation, and critical thinking. The elements of the *P.O.W.E.R. Learning* can also be used in conjunction with other learning systems, such as *SQ3R*. (A more detailed description of the use of the *P.O.W.E.R. Learning* system follows in the Student Guide section of the Preface.)
- **Fine-tuning of definitions.** Definitions of key terms and concepts introduced in the text, which appear in the margins and in the end-of-book glossary, have been revised and made more precise.
- **Inclusion of additional thought-provoking examples.** Great care has been taken to select relevant and high-interest examples that motivate students to read as well as to explain key concepts.
- **Addition of Web-based exercises.** New to this edition, every chapter includes several exercises that require students to use the World Wide Web to identify and research information related to psychology.
- **Addressing diverse student learning styles.** Our prepublication research revealed that an increasing number of instructors find that the presentation of material in multiple modalities facilitates student mastery of material. Consequently, this edition includes several features that speak to the diverse learning styles of students. For example, there are more, and improved, figures. Each figure has been drawn to maximize clarity and pedagogical value, and many include annotations that draw attention to major points in the illustrations. Furthermore, there are additional photos, with captions that directly support learning. Photos have been carefully chosen to support the learning of key concepts, as well as for their visual impact. Captions have been improved and expanded, and many now include questions designed to promote critical thinking.

This edition incorporates a significant amount of new and updated information, reflecting the advances in the field and the suggestions of reviewers. *Overall, more than a thousand new citations have been added, with most of those from articles and books published within the last three years.*

For instance, advances in such areas as evolutionary perspectives, brain and behavior, mapping the human genome, cognition, emotions, and cultural approaches to psychological phenomena receive expanded and new coverage. In addition to the extensive updating, a broad range of new topics have been incorporated. The following sample of new and revised topics featured in this edition provides a good indication of the currency of the revision:

- Evolutionary perspectives (Chapter 1)
- The Human Genome Project and behavioral genetics (Chapter 2)
- Cochlear implants (Chapter 3)
- PET scan data and psychoanalytic explanations of dreaming (Chapter 4)
- "Date rape" drugs (Chapter 4)
- Effects of violent video games (Chapter 5)
- Spreading activation and associative memory models (Chapter 6)
- Being too smart for a job (Chapter 7)
- Intrinsic motivation (Chapter 8)
- Gene therapy (Chapter 9)
- Teratogens (Chapter 9)
- Estrogen replacement therapy (Chapter 9)
- Self-efficacy (Chapter 10)
- Well-being and happiness (Chapter 11)
- Depression and ADHD (Chapter 12)
- Virtual therapy and St. John's wort (Chapter 13)
- Industrial/organizational psychology (Chapter 14)
- Psychographics (Chapter 14)

Despite the extensive changes in this edition of *Essentials of Understanding Psychology*, one constant remains: the basic student-friendliness of the text. *Essentials of Understanding Psychology*, fifth edition, remains a textbook devoted to student success. In aiding students' efforts to master the body of material that the field of psychology encompasses, the book is designed to nurture students' excitement about psychology and keep that excitement alive throughout their lives.

The Learning Features of *Essentials of Understanding Psychology*

Essentials of Understanding Psychology, fifth edition, contains many features designed to help students learn, study, and master the text's content. These include the following:

- **Prologue.** Each chapter starts with an account of a real-life situation that demonstrates the relevance of basic principles and concepts of psychology to pertinent issues and problems. These prologues depict well-known people and events, such as the terrorist attack on the World Trade Center in New York, Michael J. Fox's fight against Parkinson's disease, and Lance Armstrong's motivation to win in the Tour de France.
- **Looking Ahead.** These sections follow each *Prologue*, expressing the key themes and issues discussed within the chapter.
- **Prepare and Organize.** Each major section of the chapter incorporates the first two steps of the optional *P.O.W.E.R. Learning* system: *Prepare* and *Organize*. The *Prepare* section includes several broad questions designed to orient students to the major topics of the chapter. The *Organize* section provides an outline of the material. Together, they offer a framework for conceptualizing and organizing the material that follows.
- **Applying Psychology in the 21st Century.** These boxes—which highlight the relevance of psychology—illustrate applications of current psychological theory and research findings to real-world problems, focusing on current advances and future

possibilities. For example, these discussions explore such topics as the use of brain waves to command computers, the consequences of playing violent video games on actual aggressive behavior, cloning and gene therapy, and Internet addiction.

- **Psychology at Work.** These interviews provide biographical sketches of people working in professions that make use of the findings of psychology. Some of the individuals profiled are psychologists, some work in other fields; all of them draw on psychological principles on a daily basis. For example, there are interviews with a preschool teacher, a psychologist who works for the Secret Service evaluating threats against the president of the United States, and an advertising executive.
- **Exploring Diversity.** In addition to a substantial amount of material relevant to diversity integrated throughout the text, every chapter also includes a special section devoted to an aspect of racial, ethnic, gender, or cultural diversity. These sections highlight how psychology informs (and is informed by) issues relating to the increasing multiculturalism of our global society. The *Exploring Diversity* topics include cross-cultural differences in memory, cultural perspectives on female circumcision, and the use of race to establish test norms.
- **PsychLinks.** *PsychLinks* are marginal icons providing brief descriptions and Web addresses of relevant websites. Each *PsychLink* has a corresponding hot-link on the *Essentials of Understanding Psychology* website at <http://www.mhhe.com/feldmaness5>.
- **Becoming an Informed Consumer of Psychology.** Each chapter includes material designed to make readers more informed consumers of psychological information by giving them the ability to evaluate critically what the field of psychology offers. These discussions also provide sound, useful guidance concerning common problems. For example, these unique sections discuss such topics as how to assess research claims, identify drug and alcohol problems, lose weight successfully, assess personality assessments, and choose a therapist.
- **Evaluate and Rethink.** Every major chapter section concludes with an *Evaluate* and *Rethink* section as part of the *P.O.W.E.R. Learning* system. The *Evaluate* sections test recall of the material, assessing the degree of initial learning. The *Rethink* sections provide thought-provoking questions designed to provoke critical thinking about the material.
- **Running Glossary.** Key terms are highlighted in boldface type within the text where they are introduced and are defined in the margin of the page, with pronunciation guides for difficult words. There is also an end-of-book glossary.
- **Looking Back.** To facilitate both review and synthesis of the information covered, a number of end-of-chapter features reinforce student learning. First, a chapter summary emphasizes the key points of the chapter and is organized according to the *Prepare* questions posed at the beginning of every major section. Second, a list of *Key Terms and Concepts*, including the page numbers where they are introduced, encourages student review. Third, *Psychology on the Web* takes students online to analyze psychological issues relevant to the chapter content. Fourth, the *OLC Preview* suggests that students visit the book website for self quizzes, activities, and additional information.
- **Epilogue.** Each chapter ends with an *Epilogue* that incorporates critical thinking questions relating to the *Prologue* at the opening of the chapter. These thought-provoking questions provide a way to tie the chapter together and illustrate how the concepts addressed in the chapter apply to the real-world situation described in the *Prologue*.

Supplements Package

A complete, integrated multimedia package supports the fifth edition of *Essentials of Understanding Psychology*.

FOR THE INSTRUCTOR

Instructor's Manual (ISBN 0-07-249427-1)

By Sandra K. Ciccarelli, Gulf Coast Community College, Florida

This thoroughly revised manual provides instructors of introductory psychology with all the tools and resources they need to present and enhance their course. The Instructor's Manual includes detailed chapter outlines, learning objectives, ideas for lectures, activities, and student projects, ready-to-use handouts, overhead masters, and multimedia references. Fully integrated with the *P.O.W.E.R. Learning* system, this manual has tips and activities that have a usefulness beyond any particular teaching approach.

Test Bank (ISBN 0-07-249430-1)

By Shirley Cassarà, Bunker Hill Community College, Massachusetts

The Test Bank has been thoroughly upgraded to reflect the new content in *Essentials of Understanding Psychology*, fifth edition. The Test Bank contains more than 2,000 testing items, classified by cognitive type and level of difficulty, and keyed to the appropriate learning objective and section in the textbook. Items that test knowledge of material in the textbook's boxes are indicated for easy reference. Grading suggestions make the Test Bank easy to use.

Computerized Test Bank (ISBN 0-07-249432-8)

Available in a cross-platform format, this CD-ROM makes all the items from the Test Bank easily available to instructors to create their own tests. The test-generating program facilitates the selection of questions from the Test Bank and the printing of tests and answer keys, and also allows instructors to import questions from other sources.

Online Learning Center (ISBN 0-07-249435-2)

The Online Learning Center for Instructors houses downloadable versions of the Instructor's Manual and PowerPoint slides, a variety of other text-specific instructor resources, including a bank of 145 images and a newsletter written by Robert Feldman, and access to our acclaimed customized website creation tool, PageOut! Instructors in need of assistance can contact their McGraw-Hill sales representative via e-mail from the Online Learning Center. Visit us at <http://www.mhhe.com/feldmaness5>.

Instructor's Resource CD-ROM (ISBN 0-07-253103-7)

The CD-ROM contains every key instructor's resource in one flexible format. The Instructor's Manual, the Test Bank, PowerPoint presentations, and 145-item Image Bank are included along with an easy-to-use interface for the design and delivery of multimedia classroom presentations.

Image Bank

Over 145 illustrations can be downloaded from the Image Bank on the Online Learning Center and used on your course website or in PowerPoint presentations.

In-Class Activities Manual for Instructors of Introductory Psychology (ISBN 0-07-238431-X)

By Patricia A. Jarvis, Cynthia R. Nordstrom, and Karen B. Williams, Illinois State University
Geared to instructors of large introductory psychology courses, this activities manual covers every major topic in introductory psychology. Nineteen chapters include 58 separate activities, all of which have been used successfully in the authors' classes in introductory psychology. Each activity includes a short description of the demonstration, the approximate time needed to complete the activity, the materials needed, step-by-step procedures, practical tips, and suggested readings related to the activity. The manual also includes advice and syllabus, what to consider when structuring your large section, how to select and manage a teaching assistant, and other key topics.

Annual Editions Online: Psychology (ISBN 0-07-234602-7)

By Karen G. Duffy, SUNY at Geneseo, New York

With Annual Editions Online: Psychology, you'll have online access to current, carefully selected articles from the public press. The abridged version contains 20 online readings that are supported with well-researched links of interest and built-in assessment in the form of online quizzes and article reviews. An online search engine to connect with additional articles and an online Instructor's Resource Guide are also included. If you are interested in packaging Annual Editions Online with a McGraw-Hill textbook, contact your sales representative for details.

Annual Editions: Psychology 01/02, 31/e (ISBN 0-07-243377-9)

By Karen G. Duffy, SUNY at Geneseo, New York

This reader of public press articles explores the science of psychology; biological bases of behavior; perceptual processes; learning and remembering; cognitive processes; emotion and motivation; development; personality processes; social processes; psychological disorders; and psychological treatments. Annual Editions is supported by Dushkin Online (www.dushkin.com/online/), a student website that provides study support tools and links to related websites.

Taking Sides: Clashing Views on Controversial Psychological Issues, 11/e (ISBN 0-07-237142-0)

By Brent Slife, Brigham Young University, Utah

This debate reader is designed to introduce students to controversies in psychology. The readings, which represent the arguments of leading psychologists and commentators, reflect a variety of viewpoints and have been selected for their liveliness and substance and because of their value in a debate framework. By requiring students to analyze opposing viewpoints and reach considered judgments, *Taking Sides* actively develops critical thinking skills.

Sources: Notable Sections in Psychology, 3/e (ISBN 0-07-303187-9)

By Terry F. Pettijohn, Ohio State University—Marion

This volume contains approximately 40 selections of enduring intellectual value—classic articles, book excerpts, and research studies—that have shaped the study of psychology and our contemporary understanding of it.

FOR THE STUDENT**Study Guide (ISBN 0-07-2494298)**

By Barbara L. Radigan, Community College of Allegheny County, Pennsylvania

The Study Guide integrates the *P.O.W.E.R. Learning* system into a comprehensive review of the text material. Multiple-choice practice tests and essay questions allow students to gauge their understanding of the material. An answer key provides answers to all of the chapter's exercises, including feedback for all multiple-choice items. A list of activities and projects that encourage students to apply psychology to their daily lives is also included. New to this edition is additional information that is designed to help non-native speakers of English understand and retain key course information.

Online Learning Center (ISBN 0-07-2494352)

The Student Online Learning Center houses an array of chapter-by-chapter study tools, including detailed chapter outlines, concepts and learning objectives, key words, self-quizzes, essay questions, activities and projects, explanations of American idiomatic expressions for ESL students, answers to *Epilogue* questions in the textbook, crossword puzzles, interesting Web links, and interactive exercises. Visit us at <http://www.mhhe.com/feldmaness5>.

Making the Grade CD-ROM (ISBN 0-07-249434-4)

Packaged free with each copy of the text, this CD-ROM is designed to help students perform at their best. It contains practice quizzes for each text chapter, a learning styles assessment, study skills primer, guide to electronic research, and link to the text website.

New! In-Psych Student CD-ROM (ISBN 0-07-249428-X)

In-Psych sets a new standard for introductory psychology multimedia. The CD-ROM is organized according to the textbook chapter outlines and features over 60 interactive exercises chosen to illustrate especially difficult core introductory psychology concepts. Each exercise showcases one of three types of media assets—an audio clip, a video clip, or a simulation—and includes a pretest, follow-up assignments, and Web resources. In-Psych also includes chapter quizzes, a student research guide, and an interactive timeline that puts events, key figures, and research in psychology in historical perspective. A learning styles assessment tool helps students identify what kind of learners they are—kinesthetic, auditory, or visual—and then provides them with study tips tailored to their own particular learning style.

WebQuester: Psychology (ISBN 0-07-240850-2)

By Terry F. Pettijohn, Ohio State University–Marion

WebQuester is a series of online interactive exercises covering approximately 20 core topics in psychology. Each website includes 1 to 3 multiple-choice questions, short-answer questions, and essay questions. A 150-page Guidebook to the Web provides practical information and tips; topic areas include Searching the Web, Evaluating Information, Thinking Critically in the World of Information, and Computer Ethics.

Acknowledgments

One of the most important features of *Essentials of Understanding Psychology* is the involvement of both professionals and students in the review process. The fifth edition of *Essentials of Understanding Psychology* has relied heavily on—and profited substantially from—the advice of instructors and students from a wide range of backgrounds.

First, the manuscript was evaluated by traditional academic reviewers, who served in their capacity as content experts and teachers of psychology. These reviewers helped ensure that the coverage and presentation was accurate, incorporated state-of-the-art research findings, and remained focused on the diverse needs of introductory psychology courses. They include the following:

Richard Baiardo

Evergreen Valley College, California

Manolya Bayar

Harford Community College, Maryland

Kathleen Bey

*Palm Beach Community College, Central Campus,
Florida*

Theresa Botts

Eastern Kentucky University

Dominic Brucato

*Miami-Dade Community College—North Campus,
Florida*

Linda Chaparro

Oxnard College, California

Carolyn Cohen

Massachusetts Bay Community College

Bob Conkright

Austin Community College, Cypress Campus, Texas

Natividad DeAnda

Los Medanos College, Pittsburg, California

Giselle Diaz

Palm Beach Community College, Florida

Karen Douglas

San Antonio College, Texas

Todd Farrar

Virginia College, Alabama

Aaron Fielder

Virginia College, Alabama

Stanley Fitch

El Camino College, California

Classie Foat

Skyline College, California

Tracy Forte

Potomac College, District of Columbia

Christopher Frost

Southwest Texas State University

Rod Gillis

University of Miami, Florida

Anthony Gordon

Contra Costa College, California

Joseph Hanak

Corning Community College, New York

Sarah Harrison

Evergreen Valley College, California

Milton Hatcher

Arkansas State University

Toni Haynes

*Palm Beach Community College, South Campus,
Florida*

Alylene Hegar

Eastfield College, Texas

Kerry Hinkel

Valdosta State University, Georgia

Wayne Hren

Los Angeles Pierce College, California

Robert Hutchinson

Modesto Junior College, California

Shirin Khosropour

Austin Community College, Pinnacle Campus, Texas

Barbara Lusk

Collin County Community College, Texas

Leslie Martin

La Sierra University, California

Michael T. Miles

*Palm Beach Community College, Central Campus,
Florida*

Gwen Murdock

Missouri Southern State College

Glen Musgrove

Broward Community College, Central Campus, Florida

Glenda Nichols

Tarrant County Junior College, South Campus, Texas

Sonya Nieves

Broward Community College, South Campus, Florida

Carol Ponday

Los Angeles Pierce College, California

Ben Price

San Jose City College, California

Kimberly Rector

Academy of Business College, Arizona

George Riday

Citrus College, California

MaryLou Robbins

San Jacinto College South Campus, Texas

Harry Saterfield

Foothill College, California

Bishop Scott

College of Alameda, California

Sharon Scott

South Plains College, Texas

Elizabeth Shaw

Texarkana College, Texas

Charlotte Simon

Montgomery College—Rockville, Maryland

Jean Spaulding

Northwest College HCC, Texas

Mary Helen Spear

Prince George's Community College, Maryland

Brian Spillane

Antelope Valley College, California

Patricia Stephenson

*Miami-Dade Community College—Kendall Campus,
Florida*

Janet Stubbs

Salem State College, Massachusetts

Robert Templeton

*Palm Beach Community College, Central Campus,
Florida*

Donald Thompson

Troy State University—Montgomery, Alabama

Joe Tinnin

Richland College, Texas

Richard Townsend

*Miami-Dade Community College, South Campus,
Florida*

Barbara Turner

Pasadena City College, California

Robin Vallacher

Florida Atlantic University, Florida

Jean Volckmann

Pasadena City College, California

Gwen Walker

Los Angeles Mission College, California

Sandra Wilcox

*California State University—Dominguez Hills,
California*

Stephen Wurst

State University of New York at Oswego

Andrea Zabel

Midland College, Texas

Several people also gave us their input in reviews and interviews about the ancillary package. I am grateful to the following teachers of psychology:

Marilyn Andrews

Hartnell College, California

Richard Baiardo

Evergreen Valley College, California

Louis Banderet

Northeastern University, Massachusetts

Carol Batt

Sacred Heart University, Connecticut

Steven L. Berman

Florida International University, Florida

Kathleen Bey

Palm Beach Atlantic University, Florida

David Bjorklund

Florida Atlantic University, Florida

Don Borden

Corning Community College, New York

Deb Brihl

Valdosta State University, Georgia

Richard Cavasina

California University of Pennsylvania

Natividad DeAnda

Los Mendosa College, California

Karen T. Douglas

San Antonion College, Texas

Stanley K. Fitch

El Camino College, California

Linda Flickinger

St. Clair County Community College, Michigan

Dave Harrison

*Virginia Polytechnic Institute and State University,
Virginia*

Sara Hart Harrison

Evergreen Valley College, California

Lisa M. Henry

Loyola Marymount University, California

Judith M. Horowitz

Medaille College, New York

Loreen Huffman

Missouri Southern State College

Robert Hynes

Limestone College, South Carolina

Robert Jensen

California State University—Sacramento

Norman E. Kinney

Southeast Missouri State University

W. Richard Krall

Gateway Community College, Arizona

Len Larsen

Eastfield College, Texas

Joe Manganello

Gloucester County College, New Jersey

Michael R. Markham

Florida International University, Florida

Leslie R. Martin

La Sierra University, California

John Mastenbrook

Del Mar College, Texas

Dorothy L. Mercer

Eastern Kentucky University

Michael Miles

Palm Beach Community College, Florida

Richard Miller

Navarro College, Texas

Mindy Miserendino

Sacred Heart University, Connecticut

Glenn J. Musgrove
Broward Community College, Central Campus, Florida

Jerry Newell
Citrus Community College, California

Geri Olson
Sonoma State University, California

Dan Quinn
Northeastern University, Massachusetts

Barbara Radigan
Community College of Allegheny County,
Pennsylvania

Christopher K. Randall
Troy State University—Montgomery, Alabama

Karen Pitts Saenz
Houston Community College—Southeast, Texas

Nicole Schnopp-Wyatt
Pikeville College, Kentucky

Norman Schorr
Montgomery College—Rockville, Maryland

Sharon Scott
South Plains College, Texas

Ann Shaver
Fairmont State College, West Virginia

Debjani Sinha
University of Cincinnati, Ohio

Nathan Slaughter
Merritt College, California

Jeanne Spaulding
Houston Community College, Texas

William Vasquez
Palo Alto College, California

Charles Verschoor
Miami-Dade Community College, Florida

Sandra G. Wilcox
California State University—Dominguez Hills

Matthew P. Winslow
Eastern Kentucky University

Andrea Zabel
Midland College, Texas

Another group of reviewers consisted of a panel of students who had used *Understanding Psychology* in their introductory psychology class. Over the course of a subsequent semester, they reviewed the entire book, literally line-by-line. Their insights, suggestions, and sometimes all-too-enthusiastic criticism were invaluable to me as I prepared this revision. The student review panel consisted of Cherilyn Johnson, Louis Meunier, Stacey Whitbourne, and Phil Zeyte.

Finally, dozens of students read parts of the manuscript to ensure that the material was clear and engaging. Their suggestions are incorporated throughout the text. I am grateful to all of these reviewers who provided their time and expertise to help ensure that *Essentials of Understanding Psychology* reflects the best that psychology has to offer.

I also owe a great deal to numerous others. My thinking has been shaped by many teachers along my educational path. I was introduced to psychology at Wesleyan University, where several committed and inspiring teachers—in particular Karl Scheibe—conveyed their sense of excitement about the field and made its relevance clear to me. Karl epitomizes the teacher-scholar combination to which I aspire, and I continue to marvel at my fortune in having such a role model.

By the time I left Wesleyan I could envision no other career for myself but that of psychologist. Although the University of Wisconsin, where I did my graduate work, could not have been more different from the much smaller Wesleyan, the excitement and inspiration were similar. Once again, a cadre of excellent teachers—led, especially, by the late Vernon Allen—molded my thinking and taught me to appreciate the beauty and science of the discipline of psychology.

My colleagues and students at the University of Massachusetts at Amherst provide ongoing intellectual stimulation, and I thank them for making the University a fine place to work. Several people also provided extraordinary research and editorial help. In particular, I am grateful to my superb students, past and present, including Erik Coats, Sara Levine, Jim Forrest, Darren Spielman, Dan Hrubes, Jim Tyler, Brent Weiss, and Christopher Poirier. Chris, in particular, provided a good deal of help and advice on this edition of the book. Edward Murphy helped in a variety of important ways, providing highly useful and intelligent editorial input and advice. Finally, I am extremely grateful to John Graiff, whose hard work and dedication helped immeasurably on just about everything involving this book.

I also offer thanks to the McGraw-Hill editorial team. I especially thank President Steve Debow, Vice President and Editor-in-Chief Thalia Dorwick, and Publisher Steve Rutter, whose hands-on interest in the project helped it along at critical junctures. Melissa Mashburn, sponsoring editor, brought a thoughtful, creative energy and strong commitment to the book, and I am very grateful for her support. Cheri Dellelo also provided editorial support, and I thank her. Finally, every reader of this book owes a debt to Rhona Robbin, developmental editor on prior editions of *Essentials of Understanding Psychology*. Her relentless pursuit of excellence helped form this book, and she taught me a great deal about the craft and art of writing.

Other people at McGraw-Hill were central to the design, production, and marketing process, especially Project Manager Vicki Krug and Designer Michelle Whitaker. Thanks, also, to Merrily Mazza, who directs this superb team. I am also appreciative of marketing manager Chris Hall, whose expertise and savvy I count on. I am proud to be a part of this world-class team.

Finally, I remain completely indebted to my family. My parents, Leah Brochstein and the late Saul D. Feldman, provided a lifetime foundation of love and support, and I continue to see their influence in every corner of my life. My extended family also plays a central role in my life. They include, more or less in order of age, my nieces and nephews, my brother, assorted brothers- and sisters-in-law, Ethel Radler, and Harry Brochstein. Finally, my mother-in-law, the late Mary Evans Vorwerk, had an important influence on this book, and I remain ever grateful to her.

Ultimately, my children, Jonathan, Joshua, and Sarah, and my wife, Katherine, remain the focal point of my life. I thank them, with immense love.

Robert S. Feldman
Amherst, Massachusetts



The student review panel, who reviewed the material in this book in depth, consisted of Phil Zeyte, Cherilyn Johnson, Louis Meunier, and Stacey Whitbourne.

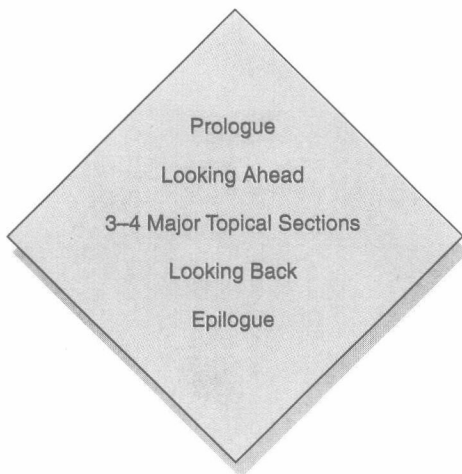
Using *Essentials of Understanding Psychology*: A Guide for Students

If you're reading this passage, you're probably taking an introductory psychology course. Maybe you're studying psychology because you've always been interested in what makes people tick. Or perhaps you've had a friend or family member who has sought assistance for a psychological disorder. Or maybe you have no idea of what psychology is all about, but you know that taking an introductory psychology course would fulfill a degree requirement.

Whatever your motivation for taking the course and reading this book, here's my commitment to you: by the time you finish this text, you will have a better understanding of why people—including you—behave the way they do. You will know how, and why, psychologists conduct research, and you'll have an understanding of the theories that guide their research. You will become acquainted with the breadth of the field, and you'll obtain practical, useful information. In short, you'll gain a wealth of knowledge that hopefully will excite your curiosity and increase your understanding of people's behavior.

To meet this commitment, *Essentials of Understanding Psychology* has been written with you, the reader, in mind. At every step in the development of the book, students and instructors have been consulted extensively in an effort to identify the combination of learning tools that would maximize readers' ability to learn and retain the subject matter of psychology. The result is a book that contains features that will not only help you to understand psychology, but also make it the discipline that is a part of your life.

Now it's your turn; you'll need to take several steps to maximize the effectiveness of the learning tools in this book. These steps include familiarizing yourself with the scope and structure of the book, using the built-in learning aids, and employing a systematic study strategy.



Familiarize Yourself with the Scope and Organization of *Essentials of Understanding Psychology*

Begin by reading the list of chapters and skimming the detailed Contents pages. From this you will get a sense of the topics covered and the logic of the sequence of chapters. Then take some time to flip through the book. Choose a chapter that sounds particularly interesting to you, skim it, and see for yourself how it is laid out. Note that every chapter follows the same diamond-shaped pattern.

The heart of each chapter consists of several self-contained units that provide logical starting and stopping points for reading and studying. You can plan your studying around the three or four major sections of each chapter. For instance, if your instructor assigns a chapter to read over the course of a week, you might plan to read and study one major section each day, using later days in the week to review the material.

Use the Built-in Learning Aids

Prologue

The Fight of His Life

Michael J. Fox simply could not get out of the limousine. He and actress wife Tracy Pollan had just pulled up to the Beverly Hilton for the Golden Globe Awards last January, and the actor realized he was in serious trouble. Outside, reporters and photographers stood poised to greet the star of ABC's hit sitcom *Spin City*, but Fox, 37, was in no shape to greet them. Like so many times before, his left arm and leg were shaking uncontrollably. Behind the limo's darkened windows, Pollan began squeezing Fox's hand and massaging his foot. But she could provide only temporary relief. For the tremors to fully subside, the couple would have to wait for his medication to kick in. Fox asked the driver to circle the block once. Then a second time. And a third. "He probably thought I was nuts," says Fox with a faint smile. "But I just couldn't get out of the car and let my arm go, or mumble, or shuffle." (Schneider & Gold, 1998, p. 136)

Michael J. Fox is freed of the worst symptoms of Parkinson's following an operation called a thalamotomy.

Once you have acquired a broad overview of *Essentials of Understanding Psychology*, you are ready to begin reading and learning about psychology. Each chapter contains learning aids that will help you master the material. In addition, the book incorporates the *P.O.W.E.R. Learning* system. As we'll discuss in further detail later, the *P.O.W.E.R. Learning* system is based on a series of five steps: **Prepare**, **Organize**, **Work**, **Evaluate**, and **Rethink**. Each major section of a chapter starts with a **Prepare** and **Organize** segment, and—after you do the **Work** of reading the section—ends with an **Evaluate** and **Rethink** segment. Making use of the *P.O.W.E.R. Learning* system and the other built-in features will help you study more easily and effectively.

• Prologue and Epilogue

Each chapter begins with a *Prologue* and ends with an *Epilogue*. The *Prologue* sets the stage for the chapter, providing a brief account of a real-life event that is relevant to the chapter content, and demonstrating why the material in the chapter is important. The *Epilogue* refers back to the *Prologue*, seeking to place it in the context of the chapter subject matter and asking questions designed to encourage you to think critically about what you've read.

Chapter Two

resting state (p. 44)
action potential (p. 45)
synapse (p. 46)
neurotransmitters (p. 46)
excitatory message (p. 46)
inhibitory message (p. 46)
reuptake (p. 46)
central nervous system (CNS) (p. 50)
spinal cord (p. 50)
reflexes (p. 50)
sensory (afferent) neurons (p. 50)
motor (efferent) neurons (p. 50)
interneurons (p. 50)
peripheral nervous system (p. 50)
somatic division (p. 51)
autonomic division (p. 51)
sympathetic division (p. 52)
parasympathetic division (p. 52)
evolutionary psychology (p. 52)

behavioral genetics (p. 52)
central core (p. 56)
cerebellum (p. 56)
reticular formation (p. 57)
thalamus (p. 57)
hypothalamus (p. 58)
limbic system (p. 58)
cerebral cortex (p. 58)
lobes (p. 60)
motor area (p. 60)
sensory area (p. 61)
association areas (p. 62)
hemispheres (p. 64)
lateralization (p. 64)
split-brain patient (p. 66)
endocrine system (p. 66)
hormones (p. 66)
pituitary gland (p. 67)
biofeedback (p. 68)

Psychology on the Web

1. Biofeedback research is continuously changing and being applied to new areas of human functioning. Find at least two websites that discuss recent research on biofeedback and summarize the research and any findings it has produced. Include in your summary your own best estimate of future applications of this technique.
2. Find one or more websites on Parkinson's disease and learn more about this topic. Specifically, find reports of new treatments for Parkinson's that do not involve the use of fetal tissue. Write a summary of your findings.

Epilogue

This chapter has traced the ways in which biological structures and functions of the body affect behavior. Starting with neurons, we considered each of the components of the nervous system, culminating in an examination of how the brain permits us to think, reason, speak, recall, and experience emotions—the hallmarks of being human. Before we proceed to the next chapter, where we put our knowledge of the biology of behavior to use in a look at sensation and perception, turn back for a moment to the prologue of this chapter, involving television and movie star Michael J. Fox. Consider the following questions.

1. Using what you now know about brain structures and functioning, can you explain what might have produced Fox's Parkinson's disease in the first place?
2. The operation used to treat Fox's disorder destroyed certain cells of his brain. Speculate about what part of the brain the operation might have involved.
3. Do you think biofeedback techniques could be used to control the symptoms of Parkinson's disease? Why or why not?

• Looking Ahead

The *Looking Ahead* section, which follows the *Prologue*, identifies the key themes and issues addressed in the chapter. It alerts you to what you'll have learned after reading and studying the chapter.

• PsychLinks

These marginal icons provide a brief description and Web address of a web site relevant to the material being discussed in the text. For your convenience, each *PsychLink* has a corresponding link on the *Essentials of Understanding Psychology* website (<http://www.mhhe.com/feldmaness5>) that takes you directly to the site.

• Prepare and Organize segments

The *Prepare* section consists of learning objectives to help focus your thinking about the chapter content. (The same questions are used to organize the chapter summary at the end of the chapter.) The *Organize* section provides an outline of the material to orient you to the topics that will be covered.

Chapter Three

Looking Ahead

Amy Ecklund is the beneficiary of a new generation of technological devices that offer the promise of restored hearing to the tens of thousands of people with hearing impairments. Still, no technological substitute has reached the ultimate level of sophistication of the human ear, or, for that matter, any of our other sense organs. In fact, our ability to sense the stimuli in our environment is remarkable, enabling us to feel the gentlest of breezes, see flickering lights miles away, and hear the soft murmuring of distant songbirds.

In this chapter we focus on the field of psychology that is concerned with the nature of the information our body takes in through its senses and with the way we interpret such information. We will explore both sensation and perception. Sensation encompasses the processes by which our sense organs receive information from the environment. Perception is the sorting out, interpretation, analysis, and integration of stimuli involving our sense organs and brain.

To a psychologist interested in understanding the causes of behavior, sensation and perception are fundamental topics, because so much of our behavior is a reflection of how we react to and interpret stimuli from the world around us. Questions ranging from "What processes enable us to see and hear?" to "How do we distinguish one person from another?" fall into the realm of sensation and perception.

Although perception clearly represents a step beyond sensation, in practice it is sometimes difficult to find the precise boundary between the two. The primary difference is that sensation can be thought of as an organism's first encounter with a new sensory stimulus, whereas perception is the process by which the stimulus is interpreted, analyzed, and integrated with other sensory information. For example, if we were considering sensation, we might ask about the loudness of a ringing fire alarm. If we were considering perception, we might ask whether someone recognizes the ringing sound as an alarm and identifies its meaning. But both sensation and perception are necessary for transforming the physical world into our psychological reality.

This chapter begins with a discussion of the relationship between the characteristics of a physical stimulus and the kinds of sensory responses it produces. We then examine several of the major senses, including vision, hearing, balance, smell, taste, and the skin senses, which include touch and the experience of pain.

Next, the chapter explains how we organize the stimuli to which our sense organs are exposed. For instance, we consider a number of issues relating to perception, such as how we are able to perceive the world in three dimensions when our eyes are capable only of sensing two-dimensional images. Finally, we examine visual illusions, which provide us with important clues for understanding general perceptual mechanisms. As we explore these issues, we'll see how the senses work together to provide us with an integrated view and understanding of the world.

Sensing the World Around Us

As Isabel sat down to Thanksgiving dinner, her father carried the turkey in on a tray and placed it squarely in the center of the table. The noise level, already high from the talking and laughter of family members, grew louder still. As Isabel picked up her fork, the smell of the turkey reached her and she felt her stomach growl hungrily. The sight and sound of her family around the table, along with the smells and tastes of the holiday meal, made Isabel feel more relaxed than she had since starting school in the fall.

Put yourself in this setting and consider how different it might be if any one of your senses was not functioning. What if you were blind and unable to see the faces of your family or the welcome shape of the golden-brown turkey? What if you had no sense of hearing and could not listen to the conversations of family members, or if you were unable to feel your stomach

PsychLink
Perception demonstrations
www.mhhe.com/feldmaness5-03links

Sensation: The processes by which our sense organs receive information from the environment.
Perception: The sorting out, interpretation, analysis, and integration of stimuli involving our sense organs and brain.


Prepare
What is sensation, and how do psychologists study it?
What is the relationship between a physical stimulus and the kinds of sensory responses that result from it?

Organize
Sensing the World Around Us
Absolute Thresholds
Difference Thresholds
Sensory Adaptation

Learning 171

Applying Psychology in the 21st Century

Does Culture Influence How We Learn?



previously would have repelled us now produces little emotional response. Our sense of the pain and suffering brought about by aggression might be diminished (Berkowitz, 1993; Berkowitz & LePage, 1996; Huesmann & Moise, 1996).

Of course, the media are not the only source of aggressive models. For example, many computer and video games involve a significant amount of graphic violence. Does exposure to such violence affect players? For an answer, consider the research findings described in the *Applying Psychology in the 21st Century* box.

EXPLORING DIVERSITY

Does Culture Influence How We Learn?

When a member of the Chilocot Indian tribe teaches her daughter to prepare salmon, at first she only allows the daughter to observe the entire process. A little later, she permits her child to try out some basic parts of the task. Her response to questions is noteworthy. For example, when the daughter asks about how to do "the backbone part," the mother's response is to repeat the entire process with another fish. The reason? The mother feels that one cannot learn the individual parts of the task apart from the context of preparing the whole fish. (Tharp, 1989)

• Applying Psychology in the 21st Century

These boxes describe psychological research that is being applied to everyday problems. Read them to understand how psychology promises to improve the human condition, in ways ranging from new approaches to treating psychological disorders to using brain waves to overcome physical disabilities.

• Exploring Diversity

Each chapter includes a section devoted to an aspect of racial, ethnic, gender, or cultural diversity. These features illustrate the contributions of psychology to a better understanding of multicultural issues that are so central a part of our global society.

Psychology at Work

Chapter Theme

Parsons have long known that the senses of taste and smell are developed in the first months of a child's life, and that infants have strong positive and negative reactions to certain tastes and smells soon after birth. But recent research has shown that taste and smell preferences can start even earlier—while a child is still in its mother's womb.

According to research conducted by psychologist Julia A. Menonella of the Monell Chemical Senses Center, a research laboratory in Philadelphia, the ability to detect certain tastes is present even before birth.

Research has found that taste buds are functioning by the second trimester of pregnancy, and a child is born with a rich population of taste receptors," she noted. Furthermore, the flavor mothers consume prior to the birth of their babies affects children's preferences later in life. Menonella notes, "We found that babies who experienced a particular flavor in the amniotic fluid or, later, in their mother's milk, prefer that flavor when they start to eat solid foods."

One reason cultures favor certain kinds of diets and foods is due to the development of taste and smell at the earliest stages of life, according to Menonella.

"One of the most enduring characteristics of people around the world are their food habits," Menonella said. "The food that a mother eats is one of the first mechanisms by which a baby learns about the food of a culture." She adds, "Mother's milk is like a flavor bridge that is enhancing the flavor experience before the child eats food from the table. Food is a celebration of a culture, and the baby is learning this even before tasting solid foods."

some degree by the joyful nature of the situation. On the other hand, even a minor stimulus can produce the perception of strong pain if accompanied by anxiety (like a visit to the dentist). Clearly, then, pain is a perceptual response that depends heavily on our emotions and thoughts (Turk, 1994; Eccleston & Crombez, 1999; Gatchel & Weisberg, 2000).

According to the **gate-control theory of pain**, particular nerve receptors in the spinal cord lead to specific areas of the brain related to pain. When those receptors are activated because of some injury or problem with a part of the body, a "gate" to the brain is opened, allowing us to experience the sensation of pain.

However, another set of neural receptors is able, when stimulated, to close the "gate" to the brain, thereby reducing the experience of pain. The gate can be shut in two different ways. First, other impulses can overwhelm the nerve pathways relating to pain, which are spread throughout the brain. In this case, nonpainful stimuli compete with and sometimes displace the neuronal message of pain, thereby shutting off the painful stimulus. This explains why hugging the skin around an injury helps reduce pain. The competing stimuli from the rubbing can overpower the painful ones (Wall & Melzack, 1989; Kakigi, Matsuda, & Kuroda, 1993).

Psychological factors account for the second way a gate can be shut. Depending on an individual's current emotions, interpretation of events, and previous experience, the brain can close a gate by sending a message down the spinal cord to an injured area, producing a reduction in or relief from pain. Thus soldiers who are injured in battle might experience no pain—the surprising situation in more than half of all combat injuries. The lack of pain probably occurs because a soldier experiences such relief at still being alive that the brain sends a signal to the injury site to shut down the pain gate (Turk, 1994; Gatchel & Weisberg, 2000).

Gate-control theory suggests that the lack of pain is due to a message from the participant's brain, which shuts down

gate-control theory of pain: The theory that particular nerve receptors lead to specific areas of the brain related to pain



The ancient practice of acupuncture is still used in the 21st century. How does the gate-control theory of pain explain how acupuncture works?

• Psychology at Work

These boxes present brief interviews with psychologists and other professionals who draw on psychological principles and findings in their work. These biographical sketches provide a glimpse of the broad range of professions that use psychology. They can help answer your questions on how to use your knowledge of psychology as you follow your own career path.

• Running Glossary

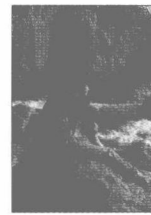
When a key term or concept appears in the text, it appears either in boldface or italics. Boldfaced words are of primary importance; italicized words are of secondary importance. Terms and concepts in bold are defined in the text where they are introduced and in the text margins, and in the end-of-book glossary. In addition, boldfaced terms are included in the page-referenced list of *Key Terms and Concepts* at the end of every chapter. You might want to highlight these terms with a marker.

• Becoming an Informed Consumer of Psychology

One of the major goals of *Essentials of Understanding Psychology* is to make readers more informed, critical consumers of information relating to psychological issues. These discussions, found in every chapter, give you the tools to evaluate information concerning human behavior that you might hear or read about in the media or on the Web.

126

Chapter Four



Daydreams are fantasies that people construct while they are awake. What are the similarities and differences between daydreams and night dreams?

daydreams: Fantasies that people construct while awake

affective disorder, a form of severe depression in which feelings of despair and hopelessness increase during the winter and lift during the rest of the year. The disorder appears to be a result of the brevity and gloom of winter days. Psychologists have found that several hours of daily exposure to bright lights is sometimes sufficient to improve the mood of those with the disorder (Sack et al., 1990; Roush, 1995; Oren & Terman, 1998).

Circadian rhythms explain the difficulty people have in flying through multiple time zones—the phenomenon of *jet lag*. Pilots, as well as others who must work on constantly changing time shifts (police officers and physicians), must fight their internal clocks. The result can be fatigue, irritability, and, even worse, outright error. In fact, an analysis of major disasters caused by human error finds that many, such as the Exxon Valdez oil spill in Alaska and the Chernobyl nuclear reactor accident, occurred late at night (Mayes, 1990; Moore-Ede, 1993).

Daydreams: Dreams Without Sleep

It is the stuff of magic: Our past mistakes can be wiped out and the future filled with noteworthy accomplishments. Fame, happiness, and wealth can be ours. In the next moment, though, the most horrible of tragedies can occur, leaving us devastated, alone, and penniless.

The source of these scenarios is **daydreams**, fantasies that people construct while awake. Unlike dreaming that occurs while sleeping, daydreams are more under people's control. Therefore their content is often more closely related to immediate events in the environment than is the content of the dreams that occur during sleep. Although they might include sexual content, daydreams also pertain to other activities or events that are relevant to a person's life.

Daydreams are a typical part of waking consciousness, even though our awareness of the environment around us declines while we are daydreaming. People vary considerably in the amount of daydreaming they do. For example, around 2 to 4 percent of the population spend at least half their free time fantasizing. Although most people daydream much less frequently, almost everyone fantasizes to some degree. Studies that ask people to identify what they are doing at random times during the day have shown that they are daydreaming about 10 percent of the time. As for the content of fantasies, most concern such mundane, ordinary events as paying the telephone bill, picking up the groceries, or solving a romantic problem (Singer, 1975; Lynn & Rhue, 1988; Lynn et al., 1996).

Frequent daydreaming might seem to suggest psychological difficulties, but there appears to be little relationship between psychological disturbance and daydreaming. Except in those rare cases in which a daydreamer is unable to distinguish a fantasy from reality (a mark of serious problems, as we discuss in Chapter 12), daydreaming seems to be a normal part of waking consciousness. Indeed, fantasy can contribute to the psychological well-being of some people by enhancing their creativity and by permitting them to use their imagination to understand what other people are experiencing (Lynn & Rhue, 1988; Pöhlgen, Gidycz, & Lynn, 1993; Lynn et al., 1996).

BECOMING AN INFORMED CONSUMER OF PSYCHOLOGY

Sleeping Better

Do you have trouble sleeping? You're not alone—almost 40 million people in the United States have chronic difficulty sleeping, and 30 million others have occasional sleep problems. For those of us who spend hours tossing and turning in bed, psychologists studying sleep disturbances have a number of suggestions for overcoming insomnia (National Institutes of Health, 1996b; Kupfer & Reynolds, 1997; Scharf, 1999), including these:

- Exercise during the day (at least six hours before bedtime) and avoid naps. Not surprisingly, it helps to be tired before going to sleep! Moreover, learning