Sixth Canadian Edition

PSYCHOLOGY

Frontiers and Applications

PASSER | SMITH | ATKINSON | MITCHELL

PSYCHOLOGY

FRONTIERS AND APPLICATIONS

SIXTH CANADIAN EDITION

MICHAEL W. PASSER

University of Washington

RONALD E. SMITH

University of Washington

MICHAEL L. ATKINSON

Western University

JOHN B. MITCHELL

Brescia University College, Western University

Mc Graw Hill Education

PSYCHOLOGY: FRONTIERS AND APPLICATIONS, SIXTH CANADIAN EDITION

ISBN-13: 978-1-25-936942-1
ISBN-10: 1-025-936942-0

1 2 3 4 5 6 7 8 9 TCP 1 2 3 4 5 6 0 9 8 7

Printed and bound in Canada.

Portfolio and Prorgam Manager: *Karen Fozard*
Product Manager: *Scott Hardie*
Executive Marketing Manager: *Kelli Legros*
Product Developer: Brianna McIlwain
Senior Product Team Associate: *Marina Seguin*
Supervising Editor: *Jeanette McCurdy*
Photo/Permissions Research: *Derek Capitaine*
Copy Editor: *Valerie Adams*
Plant Production Coordinators: *Sarah Strynatka*
Manufacturing Production Coordinator: *Sheryl McAdam*
Cover Design: *Liz Harasymczuk*
Cover Image: © *Jordan Siemens/Getty Images*
Interior Design: *Liz Harasymczuk*
Page Layout: *MPS Limited*
Printer: *Transcontinental Printing Group*

ABOUT THE AUTHORS

MICHAEL W. PASSER, PH.D.

Michael Passer coordinates the introductory psychology program at the University of Washington, which enrolls about 2500 students per year, and also is the faculty coordinator of training for new teaching assistants (TAs). He received his bachelor's degree from the University of Rochester and his Ph.D. in Psychology from the University of California, Los Angeles, with a specialization in social psychology. Dr. Passer has been a faculty member at the University of Washington since 1977. A former Danforth Foundation Fellow and University of Washington Distinguished Teaching Award finalist, Dr. Passer has had a career-long love of teaching. Each academic year he teaches introductory psychology twice and a required pre-major course in research methods. Dr. Passer developed and teaches a graduate course on the Teaching of Psychology, which prepares students for careers in the college classroom, and has also taught courses in social psychology and attribution theory. He has published more than 20 scientific articles and chapters, primarily in the areas of attribution, stress, and anxiety, and has taught the introductory psychology course for almost 20 years.

RONALD E. SMITH, PH.D.

Ronald E. Smith is Professor of Psychology and Director of Clinical Psychology Training at the University of Washington, where he also has served as Area Head of the Social Psychology and Personality area. He received his bachelor's degree from Marquette University and his Ph.D. from Southern Illinois University, where he had dual specializations in clinical and physiological psychology. His major research interests are in anxiety, stress, and coping, and in performance enhancement research and intervention. Dr. Smith is a Fellow of the American Psychological Association. He received a Distinguished Alumnus Award from the UCLA Neuropsychiatric Institute for his contributions to the field of mental health. He has published more than 200 scientific articles and book chapters in his areas of interest and has authored or co-authored 29 books on introductory psychology, human performance enhancement, and personality, including *Introduction to Personality: Toward an Integration,* with Walter Mischel and Yuichi Shoda (Wiley, 2004). An award-winning teacher, he has more than 15 years of experience in teaching the introductory psychology course.

MICHAEL L. ATKINSON, PH.D.

Mike Atkinson is Associate Professor of Psychology at Western University in London, Ontario. Dr. Atkinson received his B.Sc. from Dalhousie University in 1975 and his M.Sc. (1978) and Ph.D. (1982) from the University of Wisconsin, Madison. Dr. Atkinson's training is in social psychology, but his research and teaching interests place him more in the field of educational psychology. "Dr. Mike," as he is known to his students, has been featured in *Maclean's* magazine, *Media Television,* and The *Globe and Mail.* He has also received numerous teaching awards, including Western University's Professor of the Year award six times, as well as the Student's Council/Alumni Western Teaching Award of Excellence, and the Pleva Award for Excellence in Teaching. He has also received the 3M Canada Teaching Fellowship for his pioneering work in large-scale multimedia instruction, the "Superclass," and is a certified ISW trainer.

JOHN B. MITCHELL, PH.D.

John B. Mitchell is the Associate Academic Dean at Brescia University College, Western University. Dr. Mitchell received his B.A. and M.A. from Queen's University and his Ph.D. from Concordia University. Following completion of his Ph.D., he did post-doctoral research at the Douglas Hospital Research Centre in Montreal and at the University of Colorado Health Sciences Center in Denver. Dr. Mitchell has taught Introduction to Psychology at Boston College, Brescia University College, and Western University in classes that have ranged in size from 50 to 500 students. He has also taught courses in behavioural neuroscience, psychopharmacology, memory, research methods, and, more recently, educational psychology. In 2006, Dr. Mitchell received the Brescia University College Award for Teaching Excellence and is a certified ISW trainer. In 2016, Dr. Mitchell founded the Advanced Learning and Teaching Centre (the ALT Centre) at Brescia University College.

BRIEF CONTENTS

CONTENTS

CHAPTER 16

CHAPTER 17

PREFACE

There is nothing more fascinating than the study of the mind and behaviour. But we didn't recognize this when we entered university. In fact, the study of psychology wasn't even on our radar screens. Some of us had planned careers in the "hard" sciences (M.P., M.A.) and others were focused on the "softer" side (R.S.). One of us (J.M.) was pretty sure he would pursue psychology, although philosophy was an attractive alternative. Then something unexpected occurred. Each of us took an introductory psychology course, and suddenly our life paths changed. Because of instructors who brought psychology to life, we were hooked, and that initial enthusiasm has never left us.

Now, through this textbook, we have the pleasure and privilege of sharing our enthusiasm with today's instructors and a new generation of students. We've endeavoured to create a thoughtfully integrated book and multimedia package that strikes just the right balance between student friendliness and scientific integrity—a teaching tool that introduces students to psychology as a science, while highlighting its relevance to their lives and society. We want students to experience, as we did, the intellectual excitement of studying the mind and behaviour. We also seek to help students sharpen their critical thinking skills, dispelling some commonly held myths. We have used clear prose, careful explanations, engaging examples, and supporting artwork to make the book and multimedia accessible to a wide range of students. All of this is done within a conceptual framework that emphasizes relations between biological, psychological, and environmental levels of analysis.

We are excited about the unique way in which our text is integrated with its pedagogy. This integration results in a learning package that "uses science to teach science." Specifically, we are impressed with research (e.g., Moreland et al., 1997; Pauk & Fiore, 2000) showing that recall of textual material is significantly enhanced by specific focus questions and learning objectives that serve as retrieval cues and help students identify important information and assess their mastery of the material. In addition, the opening vignettes are presented as Problem-Based Learning (PBL) case studies. PBL generates a deeper understanding of material and provides the student with critical problem-solving skills (see Aspy et al., 1993; Vernon & Blake, 1993). It is for precisely this reason that PBL is used in the curriculum of so many medical schools. Over the years, our students have profited from these pedagogical tools; consequently, we have retained these popular features from previous editions.

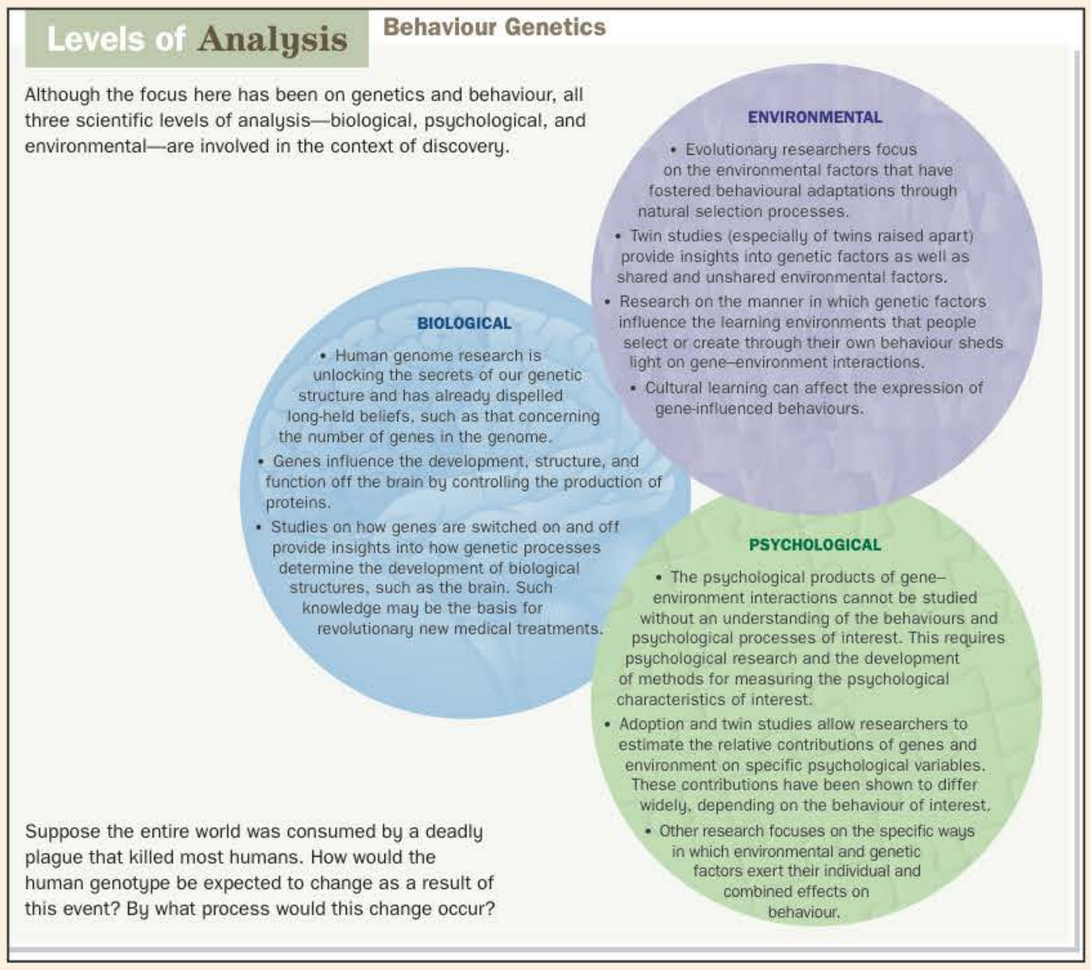
One of the fastest-evolving areas in psychology is neuroscience, particularly in the use of neuroimaging. By some estimates, published studies involving some aspect of neuroimaging have increased by 3000 percent over the past decade! We are now able to examine the neural substrates for most topics in psychology, including attitude change, fabricated memory, and psychological disorders, in addition to the more traditional topics of brain function and sensory processing. In an effort to embrace this fast-moving area of research, we continue to include a *Focus on Neuroscience* boxed feature in each chapter, which examines how neuroimaging provides a much more detailed understanding of how the mind and brain work.

Let's take a look at the features of our sixth Canadian edition.

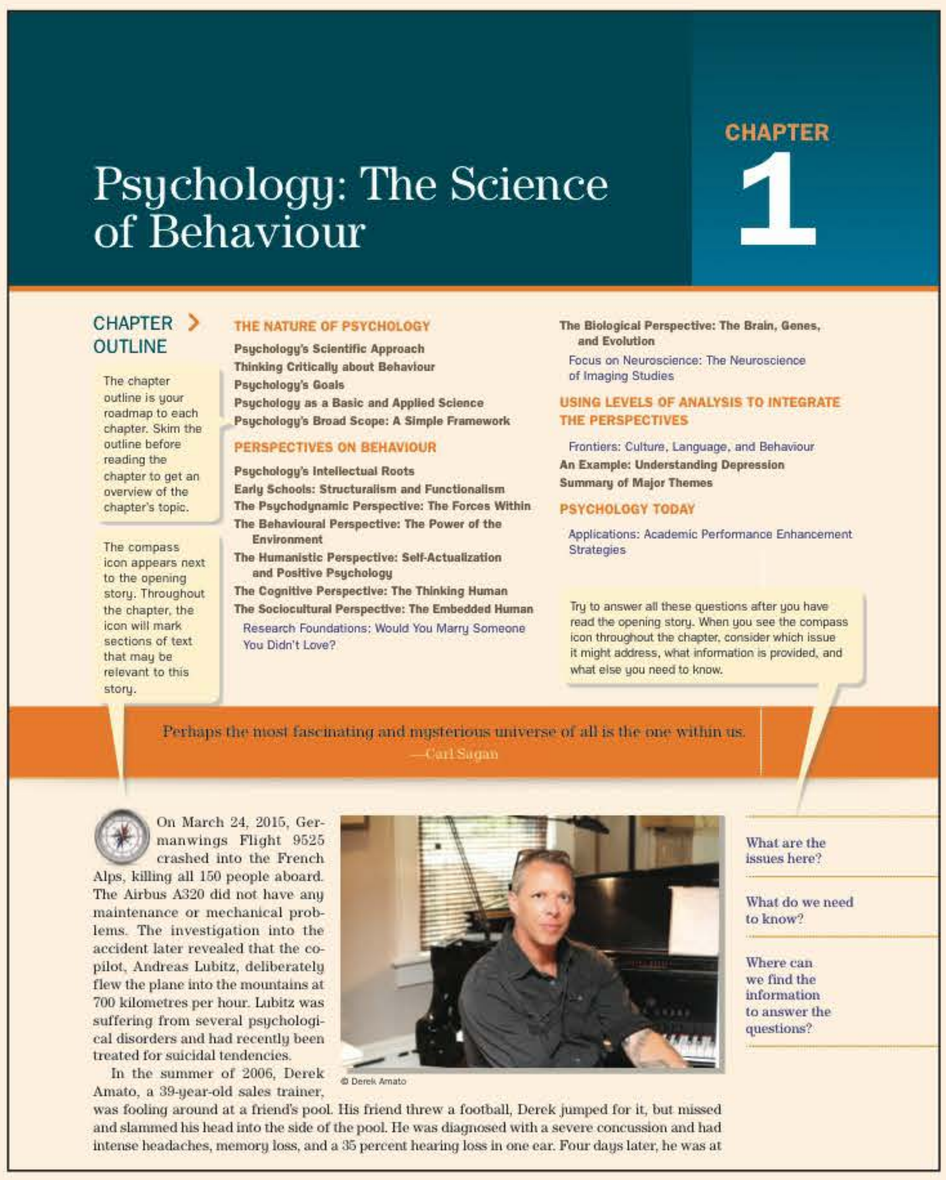
OVERVIEW OF FEATURES

- **Problem-Based Learning:** Each chapter is structured around a set of tools to help students interact with the material at a level that exceeds reading alone. These tools include the chapter-opening vignette, which presents a real-world case related to the chapter topic; a margin icon throughout the chapter, which indicates when the discussion relates back to the case introduced in the vignette; and the *Gaining Direction* feature at the end of the chapter, which revisits the vignette and suggests some answers to the questions it poses. Together, these tools encourage students to apply the concepts they are learning to real-world situations.
- **Focus on Scientific Psychology:** Throughout the book, psychology is portrayed as a contemporary science without becoming excessively formal or terminological. The text focuses both on principles derived from research and on the methods by which good research is conducted.
- **Focus on Relations between Basic Science and Applications:** Whether in the context of students' personal lives or larger societal issues, many questions studied from a basic science perspective are inspired by real-world questions and issues, and basic research findings often guide solutions to social and individual problems. In this way, students can be guided by their knowledge in other aspects of their lives.

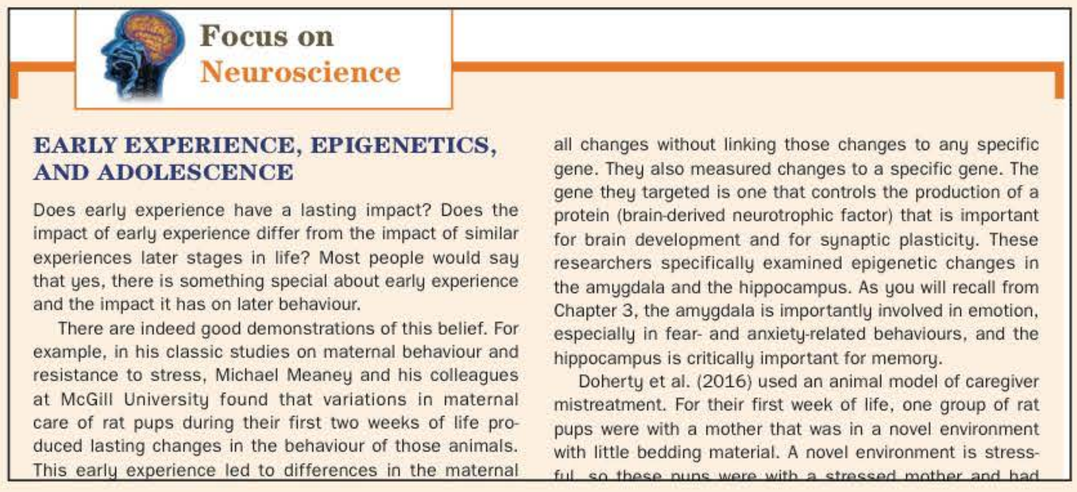
- **Levels of Analysis** emphasize how psychologists examine the interplay of biological, psychological, and environmental factors in their quest to understand behaviour. Topics explored include "Behaviour Genetics" (Chapter 4), "Aggression" (Chapter 13), and "Stress and Resilience" (Chapter 15).



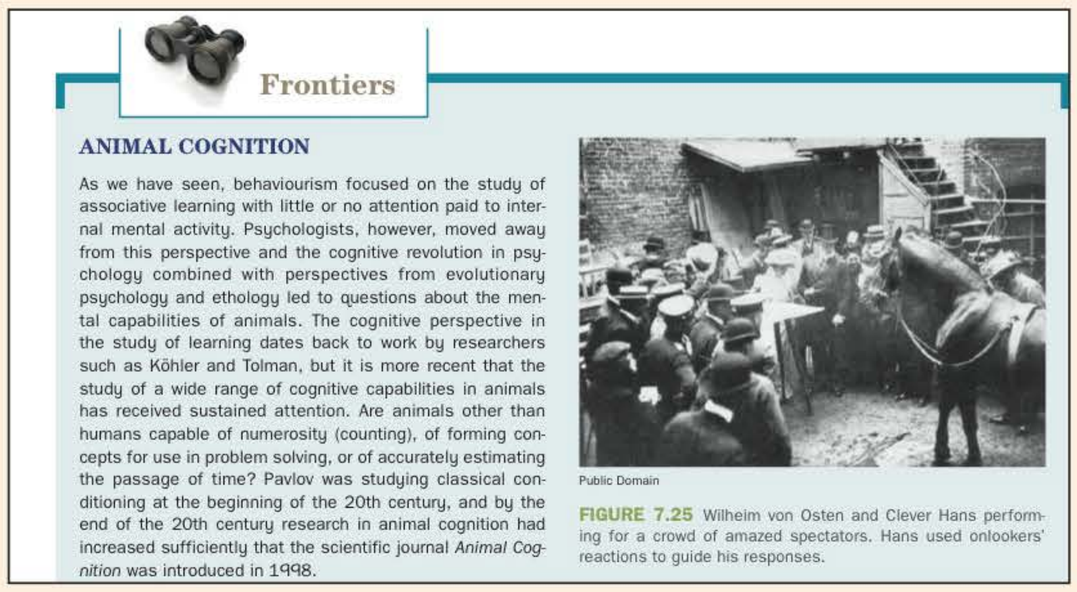
- To familiarize students with the text's pedagogical features, Chapter 1 includes a **Reader's Guide**—annotations written by the authors to draw attention to specific features and explain why they have been incorporated in the text.



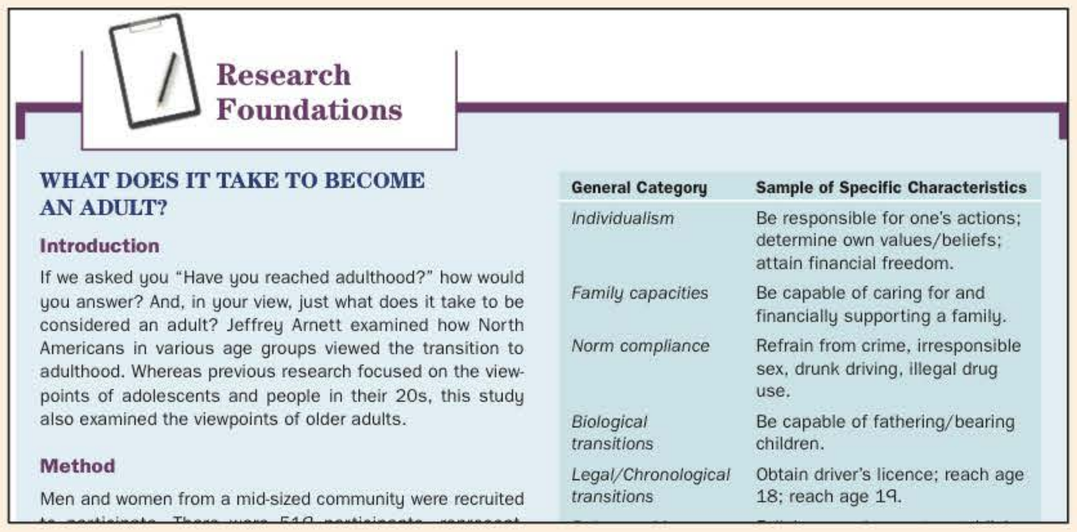
- **Focus on Neuroscience** features highlight how rapidly developing cutting-edge technology is paving the way for groundbreaking imaging studies that give new insights into the workings of the human brain and its relationship to behaviour.



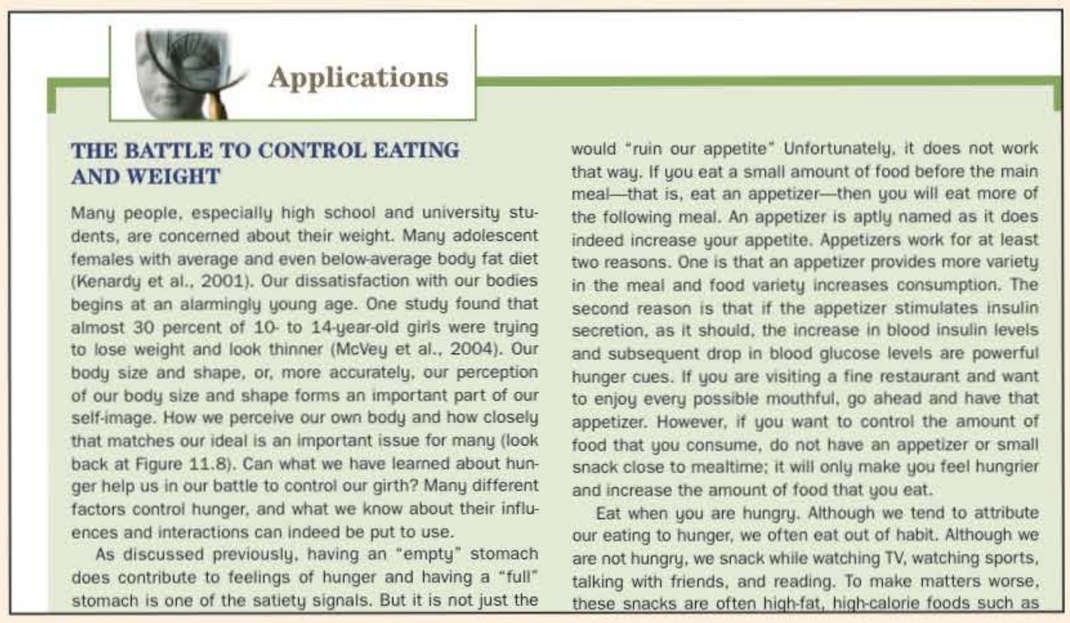
- **Frontiers** features highlight current and future directions in psychological theory and research, illustrating the dynamic nature of psychological science and the ways in which it can promote human development. New to the sixth Canadian edition are topics such as "Mirror Neurons and Autism Spectrum Disorder" (Chapter 3) and "Social Media and Social Development" (Chapter 12).



- **Research Foundations** features describe and critically evaluate a classic, high-interest study. Presented in a simplified journal format (introduction, method, results, discussion), the studies represent a diversity of research methods to help students learn the process of critical thinking. **Research Design** diagrams illustrate the research question, type of study, and variables for the study described in the *Research Foundations* feature.



- **Applications** features demonstrate how principles from basic psychological research can be applied to everyday life. Many of these features focus on important skills that can enhance students' learning and performance. Topics include "The Battle to Control Eating and Weight" (Chapter 11) and "How to Be Happy" (Chapter 15).



Applications

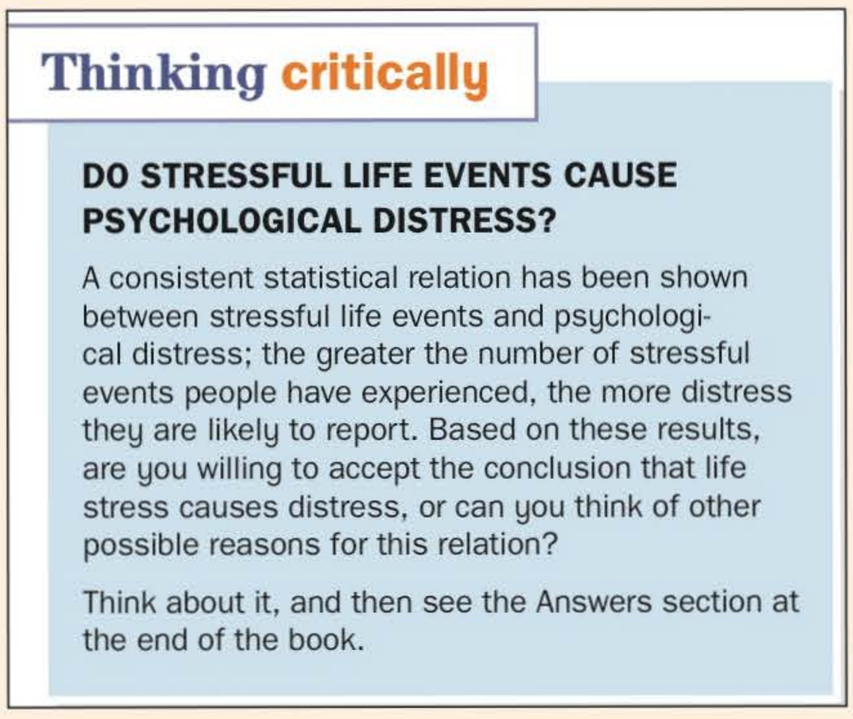
THE BATTLE TO CONTROL EATING AND WEIGHT

Many people, especially high school and university students, are concerned about their weight. Many adolescent females with average and even below-average body fat diet (Kenardy et al., 2001). Our dissatisfaction with our bodies begins at an alarmingly young age. One study found that almost 30 percent of 10- to 14-year-old girls were trying to lose weight and look thinner (McVey et al., 2004). Our body size and shape, or, more accurately, our perception of our body size and shape forms an important part of our self-image. How we perceive our own body and how closely that matches our ideal is an important issue for many (look back at Figure 11.8). Can what we have learned about hunger help us in our battle to control our girth? Many different factors control hunger, and what we know about their influences and interactions can indeed be put to use.

As discussed previously, having an "empty" stomach does contribute to feelings of hunger and having a "full" stomach is one of the satiety signals. But it is not just the would "ruin our appetite" Unfortunately, it does not work that way. If you eat a small amount of food before the main meal—that is, eat an appetizer—then you will eat more of the following meal. An appetizer is aptly named as it does indeed increase your appetite. Appetizers work for at least two reasons. One is that an appetizer provides more variety in the meal and food variety increases consumption. The second reason is that if the appetizer stimulates insulin secretion, as it should, the increase in blood insulin levels and subsequent drop in blood glucose levels are powerful hunger cues. If you are visiting a fine restaurant and want to enjoy every possible mouthful, go ahead and have that appetizer. However, if you want to control the amount of food that you consume, do not have an appetizer or small snack close to mealtime; it will only make you feel hungrier and increase the amount of food that you eat.

Eat when you are hungry. Although we tend to attribute our eating to hunger, we often eat out of habit. Although we are not hungry, we snack while watching TV, watching sports, talking with friends, and reading. To make matters worse, these snacks are often high-fat, high-calorie foods such as

- **Thinking Critically** activities question a belief or information presented in the text, or pose a situation that requires analysis, and then ask students to construct an answer using their critical-examination skills. Students can then compare their answer to one provided on at the end of the book.



Thinking critically

DO STRESSFUL LIFE EVENTS CAUSE PSYCHOLOGICAL DISTRESS?

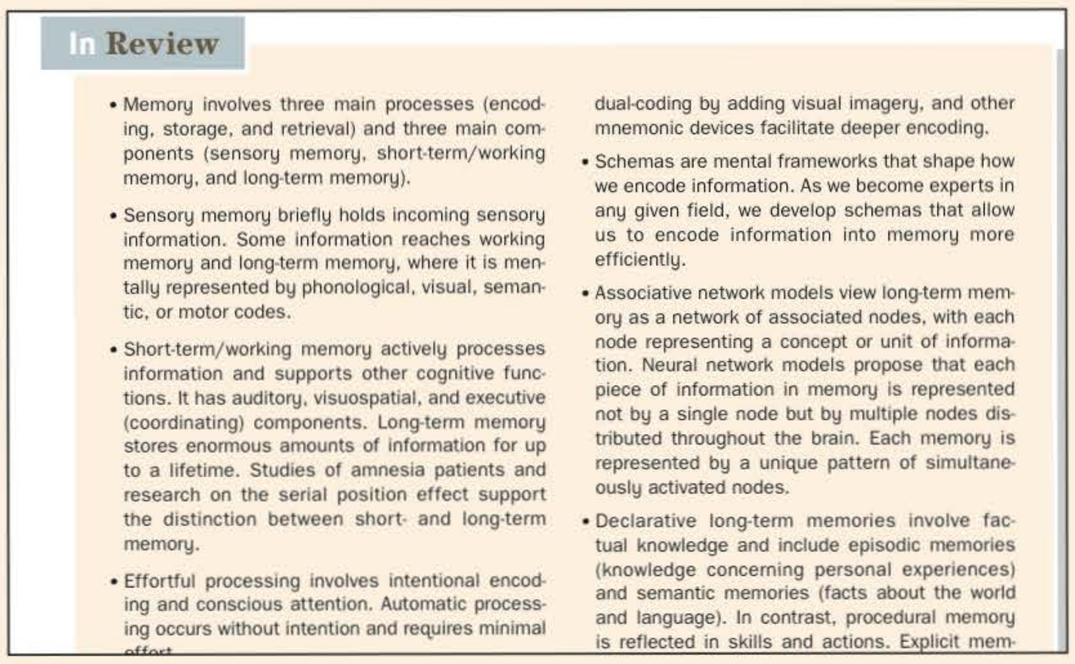
A consistent statistical relation has been shown between stressful life events and psychological distress; the greater the number of stressful events people have experienced, the more distress they are likely to report. Based on these results, are you willing to accept the conclusion that life stress causes distress, or can you think of other possible reasons for this relation?

Think about it, and then see the Answers section at the end of the book.

- **Directed Questions** appear in the margins of the text adjacent to important material. Students are to read the question before reading the material, and then answer the question after reading the material. The Directed Questions enhance concept mastery, serve as retrieval clues during study, and act as a performance feedback measure.

4. What are perspectives on behaviour? Cite four ways in which they can influence psychological science.

- Each major section ends with **In Review,** a bulleted interim summary that breaks the key content from each chapter into manageable segments.



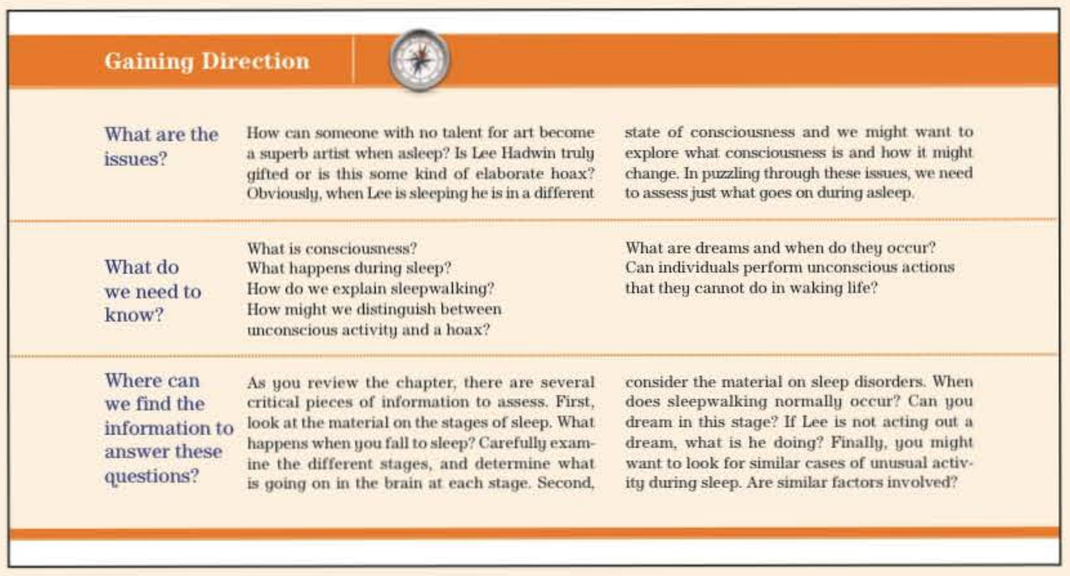
In Review

- Memory involves three main processes (encoding, storage, and retrieval) and three main components (sensory memory, short-term/working memory, and long-term memory).
- Sensory memory briefly holds incoming sensory information. Some information reaches working memory and long-term memory, where it is mentally represented by phonological, visual, semantic, or motor codes.
- Short-term/working memory actively processes information and supports other cognitive functions. It has auditory, visuospatial, and executive (coordinating) components. Long-term memory stores enormous amounts of information for up to a lifetime. Studies of amnesia patients and research on the serial position effect support the distinction between short- and long-term memory.
- Effortful processing involves intentional encoding and conscious attention. Automatic processing occurs without intention and requires minimal effort.

dual-coding by adding visual imagery, and other mnemonic devices facilitate deeper encoding.

- Schemas are mental frameworks that shape how we encode information. As we become experts in any given field, we develop schemas that allow us to encode information into memory more efficiently.
- Associative network models view long-term memory as a network of associated nodes, with each node representing a concept or unit of information. Neural network models propose that each piece of information in memory is represented not by a single node but by multiple nodes distributed throughout the brain. Each memory is represented by a unique pattern of simultaneously activated nodes.
- Declarative long-term memories involve factual knowledge and include episodic memories (knowledge concerning personal experiences) and semantic memories (facts about the world and language). In contrast, procedural memory is reflected in skills and actions. Explicit mem-

- At the end of each chapter, **Gaining Direction** features suggest some possible answers to the questions posed in the opening vignette. In the spirit of PBL, these answers are not definitive but merely suggest a set of issues to be explored and some sources of information. This feature helps students apply the newly learned material to real-world situations, thus enhancing their understanding of the text content and the use of psychology in real life.



Gaining Direction

What are the issues?	How can someone with no talent for art become a superb artist when asleep? Is Lee Hadwin truly gifted or is this some kind of elaborate hoax? Obviously, when Lee is sleeping he is in a different	state of consciousness and we might want to explore what consciousness is and how it might change. In puzzling through these issues, we need to assess just what goes on during asleep.
What do we need to know?	What is consciousness? What happens during sleep? How do we explain sleepwalking? How might we distinguish between unconscious activity and a hoax?	What are dreams and when do they occur? Can individuals perform unconscious actions that they cannot do in waking life?
Where can we find the information to answer these questions?	As you review the chapter, there are several critical pieces of information to assess. First, look at the material on the stages of sleep. What happens when you fall to sleep? Carefully examine the different stages, and determine what is going on in the brain at each stage. Second,	consider the material on sleep disorders. When does sleepwalking normally occur? Can you dream in this stage? If Lee is not acting out a dream, what is he doing? Finally, you might want to look for similar cases of unusual activity during sleep. Are similar factors involved?

- **Additional Pedagogical Features:** A textbook should inspire students and help them master the material at hand. To accomplish these goals, our book incorporates chapter outlines, boldfaced key terms, and a full end-of-text glossary.
- **Canadian Content:** Times have changed and work that once was considered classic is now performed in labs all across North America. Thus, we have included a large number of studies by both Canadian and U.S. authors. Bringing psychology to life for students, the text includes examples that are relatable for students, statistics that reflect the Canadian and North American context, and stories and vignettes that occur in Canadian locations.

MARKET LEADING TECHNOLOGY

LEARN WITHOUT LIMITS

McGraw-Hill Connect® is an award-winning digital teaching and learning platform that gives students the means to better connect with their coursework, with their instructors, and with the important concepts that they will need to know for success now and in the future. With Connect, instructors can take advantage of McGraw-Hill's trusted content to seamlessly deliver assignments, quizzes and tests online. McGraw-Hill Connect is a learning platform that continually adapts to each student, delivering precisely what they need, when they need it, so class time is more engaging and effective. Connect makes teaching and learning personal, easy, and proven.

CONNECT KEY FEATURES:

SmartBook®

As the first and only adaptive reading experience, SmartBook is changing the way students read and learn. SmartBook creates a personalized reading experience by highlighting the most important concepts a student needs to learn at that moment in time. As a student engages with SmartBook, the reading experience continuously adapts by highlighting content based on what each student knows and doesn't know. This ensures that he or she is focused on the content needed to close specific knowledge gaps, while it simultaneously promotes long-term learning.

Connect Insight®

Connect Insight is Connect's new one-of-a-kind visual analytics dashboard—now available for instructors—that provides at-a-glance information regarding student performance, which is immediately actionable. By presenting assignment, assessment, and topical performance results together with a time metric that is easily visible for aggregate or individual results, Connect Insight gives instructors the ability to take a just-in-time approach to teaching and learning, which was never before available. Connect Insight presents data that helps instructors improve class performance in a way that is efficient and effective.

Simple Assignment Management

With Connect, creating assignments is easier than ever, so instructors can spend more time teaching and less time managing.

- Assign SmartBook learning modules.
- Instructors can edit existing questions and create their own questions.
- Draw from a variety of text-specific questions, resources, and test bank material to assign online.
- Streamline lesson planning, student progress reporting, and assignment grading to make classroom management more efficient than ever.

Smart Grading

When it comes to studying, time is precious. Connect helps students learn more efficiently by providing feedback and practice material when they need it, where they need it.

- Automatically score assignments, giving students immediate feedback on their work and comparisons with correct answers.
- Access and review each response; manually change grades or leave comments for students to review.
- Track individual student performance—by question, assignment, or in relation to the class overall—with detailed grade reports.
- Reinforce classroom concepts with practice tests and instant quizzes.
- Integrate grade reports easily with Learning Management Systems including Blackboard, D2L, and Moodle.

Instructor Library

The Connect Instructor Library is a repository for additional resources to improve student engagement in and out of the class. It provides all the critical resources instructors need to build their course.

- Access Instructor resources.
- View assignments and resources created for past sections.
- Post your own resources for students to use.

INSTRUCTOR RESOURCES

- Instructor's Manual
- Validated Test Bank
- Alternate Test Bank
- Conceptual Test Bank
- Microsoft® PowerPoint® Lecture Slides

Superior Learning Solutions and Support

The McGraw-Hill Education team is ready to help instructors assess and integrate any of our products, technology, and services into your course for optimal teaching and learning performance. Whether it's helping your students improve their grades, or putting your entire course online, the McGraw-Hill Education team is here to help you do it. Contact your Learning Solutions Consultant today to learn how to maximize all of McGraw-Hill Education's resources.

For more information, please visit us online: http://www.mheducation.ca/he/solutions

ACKNOWLEDGMENTS

Every book, large or small, owes a great deal to the people behind the scenes. They keep the project going, offer support and assistance, and provide sage advice to the authors.

Thanks to Corey Isaacs for his dedicated work assisting with research and references, and making valuable content recommendations at the outset of the project. Thanks also to Lesley Atkinson and Debra Jared—your support keeps us sane.

Our heartfelt thanks to all the people at McGraw-Hill Ryerson who have nurtured this book over the past year: Scott Hardie (Product Manager); Jeanette McCurdy (Supervising Editor); Kelli Legros (Marketing Manager); Valerie Adams (Copy Editor); and Denise Foote (Group Product Development Manager).

And finally, a special thanks to Brianna McIlwain (Product Developer). You kept us on track, on time, and in focus. We simply could not have done this without you.

We also owe special thanks to our distinguished colleagues who recommended changes for the sixth Canadian edition of *Psychology: Frontiers and Applications*. We appreciate the time and effort graciously contributed by the following instructors:

Cheryl Wartman, *University of Prince Edward Island*
Kathy Foxall, *Wilfrid Laurier University*
Jason Leboe-McGowan, *University of Manitoba*
Jennifer Steeves, *York University*
Karsten Loepelmann, *University of Alberta*
Sally Walters, *Capilano University*
Joanne Lee, *Wilfrid Laurier University*

M.A. & J.M.

CHAPTER 1

Psychology: The Science of Behaviour

CHAPTER OUTLINE

The chapter outline is your roadmap to each chapter. Skim the outline before reading the chapter to get an overview of the chapter's topic.

The compass icon appears next to the opening story. Throughout the chapter, the icon will mark sections of text that may be relevant to this story.

Try to answer all these questions after you have read the opening story. When you see the compass icon throughout the chapter, consider which issue it might address, what information is provided, and what else you need to know.

> Perhaps the most fascinating and mysterious universe of all is the one within us.
>
> —Carl Sagan

On March 24, 2015, Germanwings Flight 9525 crashed into the French Alps, killing all 150 people aboard. The Airbus A320 did not have any maintenance or mechanical problems. The investigation into the accident later revealed that the co-pilot, Andreas Lubitz, deliberately flew the plane into the mountains at 700 kilometres per hour. Lubitz was suffering from several psychological disorders and had recently been treated for suicidal tendencies.

© Derek Amato

In the summer of 2006, Derek Amato, a 39-year-old sales trainer, was fooling around at a friend's pool. His friend threw a football, Derek jumped for it, but missed and slammed his head into the side of the pool. He was diagnosed with a severe concussion and had intense headaches, memory loss, and a 35 percent hearing loss in one ear. Four days later, he was at

What are the issues here?

What do we need to know?

Where can we find the information to answer the questions?

his friend's place drifting in and out of consciousness. His friend had a small music studio and as Derek was sitting there he picked up a keyboard and started to play. Although he had no musical training at all, he played like a professional. His friend was stunned. Derek continued to play and compose music. He has written over 2500 pieces, composed scores for documentaries, and published a book. He's working on his third album and is preparing to go on tour.

Canadian biologist Anne Adams was suffering from a severe case of frontotemporal lobe dementia. She lost her ability to speak, but surprisingly, became an artistic genius. Her seminal work, *Unravelling Bolero*, is considered a forceful example of mathematics and art.

Let's begin our exploration of psychology with a quick exercise. Please read the paragraph below, unscrambling the words as you proceed.

Aoccdrnig to rscheearch at Cmabrigde uinervtisy, it deosn't mttaer waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is taht the frist and lsat ltteres are at the rghit pclae. The rset can be a tatol mses, and you can sitll raed it wouthit a porbelm. Tihs is bcuseae we do not raed ervey lteter by istlef but the wrod as a wlohe.

Terms in boldface indicate new or important concepts. These terms are defined in the Glossary.

Type "jumbled words," "jumbled paragraph," or "scrambled letters" into a web browser. Dig around in the search results, and you'll find multiple sites and blogs about this paragraph. In 2003, it was all the rage. The paragraph spread across the Internet and reached countless email inboxes as people—amazed by how easily they could read it—passed it along. When we showed the paragraph to our students, most breezed through it, although some struggled (if you had trouble, that's okay; see the unscrambled version at the end of this chapter). Show the paragraph to some people you know and see how they do.

1. Define psychology and indicate what kinds of behaviours it studies.

Directed questions appear throughout each chapter. Read the question before you read the material in the text. After reading the material, try to answer the question.

Do you accept the claim that if the first and last letters of a word remain intact "the rset can be a tatol mses and you can sitll raed it wouthit a porbelm"? From the paragraph's immense popularity, we speculate that many people do accept this statement. After all, the evidence is concrete; it's right before our eyes. Well, whether or not you accept it, take this challenge: Can you think of reasons why this particular jumbled paragraph is easy to read? Even better, can you create a short jumbled paragraph—keeping the first and last letters of words intact—that people find difficult to read? We'll return to this challenge later in the chapter.

So what does a jumbled paragraph have to do with psychology? If you personally view psychology as synonymous with *therapy*, *shrinks*, or *couches*, then your answer might be "not much." But as we'll see, psychologists study a tremendous diversity of topics—including language and how we recognize words (Mousikou et al., 2010).

The jumbled paragraph raises other key psychological issues, such as how we acquire knowledge and form beliefs about our world, which we'll discuss in the conclusion of this chapter. Among the countless beliefs we hold and the claims we hear about human nature and behaviour, how do we separate fact from fiction and myth from reality? The science of psychology leads us to engage these questions.

THE NATURE OF PSYCHOLOGY

Psychology is the scientific study of behaviour and the mind. The term *behaviour* refers to actions and responses that we can directly observe, whereas the term *mind* refers to internal states and processes, such as thoughts and feelings, that cannot be seen directly and that must be inferred from observable, measurable responses. For example, we cannot directly see a person's feeling of love or admiration for someone else, but we can infer how the person feels based on observable verbal statements (e.g., "I love you"; "I really admire you").

When people hear the word *psychologist,* the first image that comes to their minds is often that of a therapist. This reaction is understandable, as a large number of psychologists work in a subfield called **clinical psychology:** the study and treatment of mental disorders. Many clinical psychologists diagnose and treat people with psychological problems in clinics, hospitals, and private practice. In addition, some are scientists who conduct research on the causes of mental disorders and the effectiveness of various treatments. Yet many psychologists have no connection with therapy and instead conduct research in other subfields (Figure 1.1). For example, **cognitive psychology** specializes in

(top) © StockTrek/Getty Images; (middle) © Gabe Palmer/Corbis; (bottom) © Royalty-Free/Corbis

FIGURE 1.1 Psychologists study diverse topics. Subfields that may not immediately occur to you include aviation and space psychology, educational psychology, and the law.

the study of mental processes, especially from a model that views the mind as an information processor. Cognitive psychologists examine such topics as consciousness, attention, memory, decision making, and problem solving. An area within cognitive psychology, called *psycholinguistics,* focuses on the psychology of language. The jumbled-word exercise relates directly to psycholinguistics.

To illustrate psychology's diversity, here a few other subfields:

- **Biopsychology/neuroscience** focuses on the biological underpinnings of behaviour. Biopsychologists examine how brain processes, genes, and hormones influence our actions, thoughts, and feelings. Some biopsychologists seek to explain how evolution has shaped our psychological capabilities (e.g., our capacity for advanced thinking and language) and behavioural tendencies (e.g., to act aggressively or altruistically).
- **Developmental psychology** examines human physical, psychological, and social development across the lifespan. For example, some developmental psychologists explore the emotional world of infants, while others study how different parenting styles psychologically affect children or how our mental abilities change during adolescence and adulthood.
- **Experimental psychology** focuses on such basic processes as learning, sensory systems (e.g., vision, hearing), perception, and motivational states (e.g., sexual motivation, hunger, thirst). Most research in this subfield involves laboratory experiments, often with nonhuman animals. Although this subfield is called *experimental* psychology, be aware that researchers in many psychological subfields conduct experiments.
- **Industrial-organizational (I/O) psychology** examines people's behaviour in the workplace. I/O psychologists study leadership, teamwork, and factors that influence employees' job satisfaction, work motivation, and performance. They develop tests to help employers identify the best job applicants and design systems that companies use to evaluate employee performance.
- **Personality psychology** focuses on the study of human personality. Personality psychologists seek to identify core personality traits and how different traits relate to one another and influence behaviour. They also develop tests to measure personality.

Material in tables and figures can be just as important as the text. Be sure you read these sections.

FIGURE 1.2 Psychology as a scientific hub. Psychology links with and overlaps many sciences.

- **Social psychology** examines people's thoughts, feelings, and behaviour pertaining to the social world: the world of other people. Social psychologists study how people influence one another, behave in groups, and form impressions and attitudes. They study social relationships involving attraction and love, prejudice and discrimination, helping, and aggression.

Note that topics studied in different subfields often overlap. Consider decision making, which is examined in all of the areas above. For example, a cognitive psychologist might study how wording the same information in different ways affects people's decisions; a social psychologist might study decision making in groups; and a developmental psychologist could examine how children's decision-making strategies change with age (Josyln et al., 2009; Toma & Butera, 2009). Moreover, many psychologists have interests that bridge different subfields. Thus, a clinical psychologist might be interested in the biological bases of how adolescents with anxiety disorders make decisions. She could have adolescents who do and who don't have an anxiety disorder perform decision-making tasks, and use brain-imaging techniques to compare the neural activity of the two groups (Krain et al., 2008).

We'll encounter other branches of psychology throughout the chapter, but we hope you already get the picture. Psychologists do study the causes of mental disorders, provide therapy, and evaluate therapy effectiveness, but their interests and research span the entire realm of behaviour. Indeed, the scope of modern psychology stretches from the borders of medicine and the biological sciences to those of the social sciences (Figure 1.2).

Psychology's Scientific Approach

Across psychology's diverse subfields, researchers share a common underlying scientific approach to studying behaviour. *Science* is a process that involves systematically gathering and evaluating empirical evidence to answer questions and test beliefs about the natural world. *Empirical evidence* is evidence gained through experience and observation, and this includes evidence from manipulating or "tinkering around" with things and then observing what happens (this is the essence of experimentation). For example, if we want to know how people's intellectual abilities change as they age, we don't rely on intuition, pure reasoning, or folk wisdom to obtain an answer. Rather, we collect empirical data by exposing people to intellectual tasks and observing how they perform. Moreover, in science these observations need to be *systematic* (i.e., performed according to a system of rules or conditions) so that they will be as objective and precise as possible (Shaugnessy et al., 2010).

Understanding Behaviour: Some Pitfalls of Everyday Approaches

Science is only one of many ways that we learn about human behaviour. Family and friends, great works of literature, secular and religious teachings, and the Internet and popular media all provide us with messages about human nature. Mix in our own intuitions (i.e., the knowledge that each of us acquires from years of personal experience interacting with people) and so-called "conventional" or "folk" wisdom, and we have potent ingredients for generating our personal beliefs about what makes people tick.

Unfortunately, in everyday life there are many ways in which these sources can end up promoting misconceptions. Other people—via conversations, books, the Internet, and other popular media—may provide us with information and insights that they believe to be accurate but really are not. Even personal experiences can

lead us to form inaccurate beliefs. Although our experiences and everyday observations provide us with empirical information, unlike scientific observations, everyday observation usually is casual rather than systematic. Our own experiences also may be atypical and not representative of what most people experience.

As we'll explore in Chapter 9, misconceptions can also result from our own faulty thinking. For example, consider the following:

- We often take *mental shortcuts* when forming judgments—shortcuts that sometimes serve us poorly (White, 2009). Judging someone's personality based solely on stereotypes about his or her physical appearance would be an example of a mental shortcut (e.g., Kleider et al., 2012).
- Because many factors in real life may operate simultaneously to influence behaviour, we may *fail to consider alternative explanations* for why a behaviour has occurred and assume that one factor has caused it, when in fact some less obvious factor was the true cause (Elek et al., 2012; Lassiter et al., 2007).
- Once our beliefs are established, we often fail to test them further. In this vein, we tend to display a *confirmation bias* by selectively paying attention to information that is consistent with our beliefs and downplaying or ignoring information that is inconsistent with them (Mendel et al., 2011; Hart et al., 2009).

Using Science to Minimize Everyday Pitfalls

Yes, scientists are human too, and they may fall victim to all these pitfalls and to others that we'll discuss in the next chapter. But by adopting a scientific approach, psychologists can take concrete steps to avoid or at least minimize biases and problems that can lead to inaccurate conclusions. For example, rather than relying on imprecise casual observations, psychologists use various instruments (e.g., video recorders, questionnaires, brain-imaging devices) to objectively and precisely record people's responses. When directly watching people, several researchers can independently observe the same behaviours and compare their findings to ensure that their observations were reliable. To avoid perceiving illusory correlations, psychologists typically use statistics to analyze their data. To minimize drawing erroneous conclusions about what has caused what, psychologists often are able to examine behaviour under highly controlled experimental conditions in which they intentionally manipulate one factor, try to keep other factors constant, and see how the manipulated factor influences behaviour.

Science also is a public affair, as psychologists do publish their findings. Publication enables scientists to scrutinize and challenge each other's findings if they wish. This collective approach reduces the risk of confirmation bias. As new studies are conducted, the original findings are put to the test and may be contradicted, forcing scientists to modify their beliefs and conduct further research to sort out contradictory results.

To be sure, science has limitations and its own pitfalls. It is ideally suited to examining testable questions about the natural world. Psychologists can study such questions as "Do happy people differ from unhappy people in their degree of religiousness or spirituality?" and "What do people believe gives their life meaning?" But science cannot answer such questions as "Does God exist?" and "What is the meaning of life?" The former is a question of faith that is beyond scientific measurement; the latter is a question answered by personal values. As for pitfalls, poorly designed or poorly executed studies can produce misleading data that result in invalid conclusions.

Even when studies are designed well and conducted properly, "false starts" can occur in which other researchers later are unable to duplicate the original researchers' findings. Additionally, over time, new research often modifies or completely overturns existing scientific beliefs. But it's important to realize that these aren't weaknesses of the scientific approach. Rather, they reveal one of its great strengths: *In principle, science ultimately is a self-correcting process.* At any point in history, scientific knowledge represents a best estimate of how the world operates. As better or more complete information is gathered, that best estimate may continue to be supported or it may need to be changed. Understandably, to many people such change can be frustrating or confusing, as illustrated by the public uproar in 2009, when an expert medical panel issued new breast-cancer screening guidelines (Kolata, 2009). The panel stated that most women should start having regular mammogram tests at age 50, not at age 40 as recommended by prior, long-standing guidelines. Similarly, researchers in the Czech Republic reported that eating only two larger meals per day rather than multiple small meals actually leads to greater weight loss (Kahleova et al., 2012). To scientists, however, such changes represent an evolution of knowledge called *scientific progress.*

TABLE 1.1 Widely Held Beliefs about Behaviour: Fact or Fiction?

Directions: Decide whether each statement is true or false.

1. Most people with exceptionally high IQs are well adjusted in other areas of their lives.
2. In romantic relationships, opposites usually attract.
3. Overall, married adults are less happy than adults who aren't married.
4. Graphology (handwriting analysis) is a valid method for measuring people's personality.
5. A person who is innocent of a crime has nothing to fear from a lie detector test.
6. People who commit suicide usually have signalled to others their intention to do so.
7. When you negatively reinforce someone's behaviour, the person becomes more likely to behave that way.
8. On some types of mental tasks, people perform as well or better when they are 70 years old than when they are 20 years old.
9. Usually, it is safe to awaken someone who is sleepwalking.
10. A schizophrenic is a person who has two or more distinct personalities, hence the term *split personality*.

Answers: Items 1, 6, 8, and 9 are supported by psychological research. Item 7 is true by definition. The remaining items are false. (If you correctly answered 9 or 10 of these items, you've done significantly better than random guessing.)

The compass icon indicates that the material here may help us understand the opening story.

Thinking Critically about Behaviour

Because behaviour is so complex, its scientific study poses special challenges. As you become familiar with the kinds of evidence necessary to validate scientific conclusions, you will become a better-informed consumer of the many claims made in the name of psychology. For one thing, this course will teach you that many widely held beliefs about behaviour are inaccurate. Can you distinguish the valid claims from the invalid ones in Table 1.1?

Perhaps more important than the concepts you learn in this course will be the habits of thought that you acquire—habits that involve *critical thinking*. Critical thinking involves taking an active role in understanding the world around you rather than merely receiving information. It's important to reflect on what that information means, how it fits in with your experiences, and its implications for your life and society (Franco, Butler, & Halpern, 2015). Critical thinking also means evaluating the validity of something presented to you as fact (Levy, 2010; Vaughn, 2016). For example, when someone makes a claim or asserts a new "fact," ask yourself the following questions, just as a scientist would:

- What, exactly, is the claim or assertion?
- Who is making the claim? Is the source credible and trustworthy?
- What's the evidence, and how good is it?
- Are other explanations possible? Can I evaluate them?
- What is the most appropriate conclusion?

The Jumbled-Word Challenge

Let's think critically about the jumbled-word paragraph presented earlier. First, *what's the claim?* There are three, actually: (1) that people can read jumbled words without a problem as long as the first and last letters stay in place, (2) that people have no problems because we read words as a whole rather than as individual letters, and (3) that this finding is based on research at Cambridge University.

Second, *who is making the claim?* The jumbled paragraph's author is anonymous, which is *caution flag 1.* We can't evaluate the author's credibility and trustworthiness.

Third, *what's the evidence, and how good is it?* The evidence begins with an unsubstantiated claim that research was conducted at Cambridge. No reference information (researchers' names, publisher location, date) is given, which is *caution flag 2.* Indeed, scientists did no such research at Cambridge, although unpublished research at another university may have been the source (Davis, 2003; Rawlinson, 1999).

There's also the dramatic evidence of your own experience: reading the jumbled paragraph easily. But this is only one short paragraph. Also, overall, the transposition (i.e., switched ordering) of letters is minimal, which is *caution flag 3,* leading to the next question.

Fourth, *are other explanations possible* for why the paragraph is easy to read? We'll discuss reading more fully in Chapter 9. For now, consider the following:

- Of the words in the paragraph, 65 percent either aren't jumbled (because they have only one to three letters), or—with four-letter

words—are "jumbled" only in that their second and third letters are switched (because there is only one possible transposition), which makes unscrambling them easy.

- Of words with five or six letters, in all but one case, the transposition is minor because only a single letter is out of sequence (e.g., for *mttaer,* only the *a* is out of order).
- Thus, in total, 83 percent of the words are either unjumbled or have only minor transpositions. This preserves much of the way the words sound when we read them. Further, these words provide contextual information in the sentence that makes it easier to anticipate the meaning of some of the few longer scrambled words.

In everyday life, you're unlikely to conduct a scientific study to test these alternative explanations, but you can gather additional evidence by constructing sentences with longer words and more complex transpositions and having some people try to read them. Try reading the following paragraph (the unjumbled version is revealed at the end of the chapter), and see if it changes your belief about the ease of reading jumbled words.

> A plciaiiotn dieend the mtnaalueghsr of a clgaloeue, but was coincetvd and dlepoeelvd sreeve macedil cdointonis in posirn, wrhee he deid. Arnodiistitman of agctannloauit dgurs ptttnaioeed the eefctfs of atehonr durg, and rprsoiearty frliaue rleeutsd.

Lastly, *what is the most appropriate conclusion?* The claim that it's relatively easy to read words as long as the first and last letters are intact appears to be too broad and absolute. Stated as such, it's clearly wrong. Stated in qualified terms of "under some conditions" the claim has support, although one study found that even minor transpositions of interior letters slowed reading speed by 11 percent (Rayner, White, Johnson, & Liversedge, 2006). In some languages, however, such interior transpositions may make words very difficult, if not impossible, to read (Davis, 2003).

Of Astrology and Asstrology: Potential Costs of Uncritical Thinking

Suppose someone swallows the bait of the original jumbled-word paragraph and now erroneously believes that it's always easy to read words with transposed letters. Unless it's a smart-aleck student or worker who plans to turn in "jumbled" school papers or work reports (citing "scientific justification" for doing so), what's the harm in holding this little false belief? Perhaps the immediate personal consequences are minimal, but misconceptions can add up and contribute to an increasingly misguided view of how the world operates.

Unfortunately, people uncritically accept many misconceptions that do have concrete harmful consequences. For example, in the hope of making their babies smarter, consumers have shelled out about $200 million annually for *Baby Einstein* videos that the Walt Disney Company advertised as educational, despite a lack of scientific support for its claim (Zimmerman et al., 2007). Under government and consumer group pressure, Disney eventually dropped the *educational* label and later agreed to partially refund consumers (Lewin, 2009).

Despite a lack of scientific evidence, people spend untold amounts of their hard-earned money to have their personalities analyzed and their futures forecasted by astrologers, graphologists (i.e., handwriting analyzers), tea-leaf readers, and other so-called "fortune tellers"—including rumpologists (sometimes referred to as *asstrologers*) who "read" people's buttocks to obtain their presumed psychic insights (Wyman & Vyse, 2008). Money aside, it's impossible to estimate how many people may have made major life decisions based on fortune tellers' bogus advice. It's also hard to know how many people have not only wasted money on bogus therapies for ailments, diseases, and mental disorders, but also experienced needless continued distress or further bodily harm by failing to employ scientifically validated treatments. Unfortunately, *pseudoscience*—a field that incorporates astrology, graphology, rumpology, and so on—is dressed up to look like science and it attracts many believers, despite its lack of credible scientific evidence (Figure 1.3). Critical scrutiny is important for all scientific claims, as

FIGURE 1.3 The popularity of pseudoscience.

illustrated by Bem's recent article claiming support for extrasensory perception (Bem, 2011). Daryl Bem is a highly respected researcher and the article was published in a prestigious journal. However, many other authors (e.g., Francis, 2012; LeBel et al., 2011) claimed that the data simply do not support the conclusions.

Psychology's Goals

2. What are the four goals of psychology? How are these goals linked to one another?

As a science, psychology has four central goals:

1. To *describe* how people and other animals behave
2. To *explain and understand* the causes of these behaviours
3. To *predict* how people and animals will behave under certain conditions
4. To *influence or control* behaviour through knowledge and control of its causes to enhance human welfare

As you will learn in Chapter 2, the scientific goals of understanding, prediction, and control are linked in the following manner: If we understand the causes of a behaviour and know when the causal factors are present or absent, then we should be able to successfully predict when the behaviour will occur. Moreover, if we can control the causes, then we should be able to control the behaviour. For scientists, successful prediction and control are the best ways for us to know whether we truly understand the causes of behaviour. We should also note, however, that prediction can have important practical uses that do not require a complete understanding of why some behaviour occurs. For example, a psychologist might find that scores on a personality test dependably predict school drop-out rates, without fully understanding the psychological processes involved.

Psychology as a Basic and Applied Science

3. How do the goals of basic research and applied research differ?

As scientists, psychologists employ a variety of research methods for developing and testing theories about behaviour and its causes. A distinction is sometimes made between **basic research,** the quest for knowledge purely for its own sake, and **applied research,** which is designed to solve specific practical problems. In psychology, the goals of basic research are to describe how people behave and to identify the factors that influence or cause a particular type of behaviour. Such research may be carried out in the laboratory or in real-world settings. Applied research often uses principles discovered through basic research to solve practical problems. Research methods will be discussed more fully in Chapter 2, but five research articles have been listed below to help you understand the difference between basic and applied research. These actual titles of articles appeared in psychological journals. Can you identify whether each study represents basic or applied research?

1. Two Forms of Spatial Imagery: Neuroimaging Evidence
2. The Prevention of Depressive Symptoms in Low-Income, Minority Children: Two-Year Follow-up
3. Increasing Seat Belt Use on a College Campus: An Evaluation of Two Prompting Procedures
4. Facial Structure Is a Reliable Cue of Aggressive Behaviour
5. Recognizing Speech under a Processing Load: Dissociating Energetic from Informational Factors

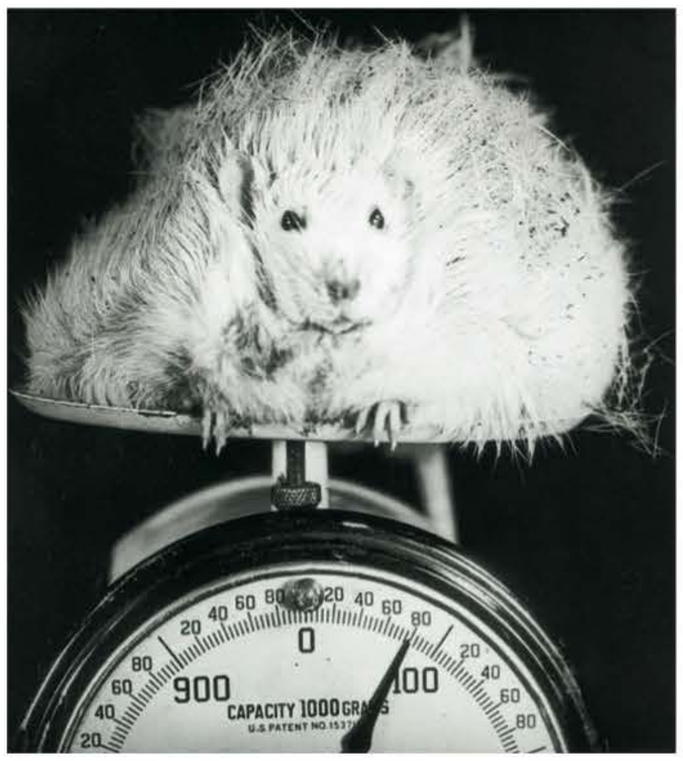
Check your answers at the end of the chapter.

Psychology's Broad Scope: A Simple Framework

Because we are biological creatures, living in a complex social world, psychologists study an amazing array of factors to understand why people behave, think, and feel as they do. At times, this diversity of factors may seem a bit overwhelming, but we would like to provide you with a framework that will greatly simplify matters. We call it **levels of analysis:** Behaviour and its causes can be examined at the *biological level* (e.g., brain processes, genetic influences), the *psychological level* (e.g., our thoughts, feelings, and motives), and the *environmental level* (e.g., past and current physical and social environments to which we are exposed).

Here is a brief example of how the framework can be applied. Consider a behaviour that you engage in every day: eating (Figure 1.4). At the biological level, various chemicals, neural circuits, and structures in your brain respond to bodily signals and help to regulate whether you feel hungry or full. At the psychological level, your moods, food preferences, and motives affect eating. Do you ever eat when you're not hungry—perhaps because you feel stressed or bored? The environmental level of analysis calls attention to specific stimuli (such as the appearance or aroma of different foods) that may trigger eating and to cultural customs that influence our food preferences.

The Biological Level



The Psychological Level

The Environmental Level

(left) Courtesy of Neal E. Miller; (centre) © Phanie/Photo Researchers, Inc.; (right) © Michael Freeman/Corbis

FIGURE 1.4 *Biological level* (left). This rat weighs about triple the weight of a normal rat. As we (or rats) eat, hunger decreases as certain brain regions regulate the sensation of becoming full. Those regions in this rat's brain have been damaged, causing it to overeat and become obese. *Psychological level* (centre). At times, we may eat out of habit, stress, or boredom. With a chocolate bar in hand and other candies lined up, this student is ready for some autopilot munching. *Environmental level* (right). Does a plateful of insect-topped crackers sound appetizing to you? Cultural norms influence food preferences.

Does the aroma of freshly baked treats ever make your stomach growl? How about the sight of duck feet or a mound of fish gills on a plate? To most Westerners, duck feet and fish gills may not be appetizing, but during a stay in China, we discovered that our hosts considered them delicious.

Mind–Body and Nature–Nurture Interactions

Form a mental picture of a favourite food, and you may trigger a hunger pang. Focus on positive thoughts when facing a challenging situation, and you may keep your bodily arousal in check. Dwell instead on negative thoughts, and you can rapidly stimulate the release of stress hormones (Borod, 2000). These examples illustrate what traditionally have been called *mind–body interactions*—the relations between mental processes in the brain and the functioning of other bodily systems. Mind–body interactions focus our attention on the fascinating interplay between the psychological and biological levels of analysis. This topic has a long history within psychology, and, as you will see throughout the textbook, it remains one of psychology's most exciting frontiers.

The levels-of-analysis framework also addresses an issue that has been debated since antiquity: Is our behaviour primarily shaped by nature (our biological endowment) or nurture (our environment and learning history)? The pendulum has swung toward one end or the other at different times in history, but today, growing interest in cultural influences and advances in genetics and brain research keep the nature–nurture pendulum in a more balanced position (e.g., Eagly & Wood, 2013; Rutter, 2014; Salvatore & Dick, 2015).

Perhaps most important, modern research increasingly reveals that nature and nurture interact (Masterpasqua, 2009; Moffitt et al., 2006). Just as our biological capacities affect how we behave and experience the world, our experiences influence our biological capacities. For humans and rats alike, continually depriving a newborn of physical contact, or providing a newborn with an enriched environment in which to grow, can influence its brain functioning and biological development (Rosenzweig, 1984). Thus, while it may be tempting to take sides, "Nature *or* nurture?" usually is the wrong question. As the levels-of-analysis framework implies, nature, nurture, and psychological factors must all be taken into account to gain the fullest understanding of behaviour. Later in the chapter, we'll provide a more detailed example of how looking at behaviour from multiple levels enhances our understanding.

In Review

- Psychology is the scientific study of behaviour and the mind. The term *behaviour* refers to actions and responses that we can directly observe, whereas the term *mind* refers to internal states and processes, such as thoughts and feelings, that cannot be seen directly and that must be inferred from observable, measurable responses.
- The primary goals of psychological science are to describe, explain, predict, and influence behaviour and to apply psychological knowledge to enhance human welfare.
- Basic research is the quest for knowledge for its own sake, whereas applied research involves the application of knowledge derived from basic research to solve practical problems.

PERSPECTIVES ON BEHAVIOUR

Psychologists' focus on biological, psychological, and environmental factors that influence behaviour is not new; this focus has been an integral part of psychology's history. But just how did psychology's scope become so broad? In part, it happened because psychology has roots in such varied disciplines as philosophy, medicine, and the biological and physical sciences. As a result, different ways of viewing people, called **perspectives,** became part of psychology's intellectual traditions (Figure 1.5).

4. What are perspectives on behaviour? Cite four ways in which they can influence psychological science.

FIGURE 1.5 Youth and beauty . . . or maturity and wisdom? What we perceive depends on our perspective. When you examine this drawing, you will see either a young woman or an old one. Now try changing your perspective. The ear and necklace of the young woman are the left eye and mouth of the old woman.

Source: Public Domain. "My wife and my mother-in-law. They are both in this picture - find them" by W.E. Hill.

In science, new perspectives are engines of progress. Advances occur as existing beliefs are challenged, a debate ensues, and scientists seek new evidence to resolve the debate. Sometimes, the best-supported elements of contrasting perspectives are merged into a new framework, which in turn will be challenged by still newer viewpoints.

If you have ever met someone who views the world differently from the way you do, then you know that perspectives matter. Similarly, perspectives serve as lenses through which psychologists examine and interpret behaviour. To illustrate this point, let's consider the case of Ray, who was a shy student when he first entered university. Ray knew he was shy, especially around women, yet he wasn't sure why. He had been nervous on the few dates he had gone on in high school. During his first term at university, Ray met some women he liked but was afraid to ask them out. He didn't make male friends either. By winter, he was depressed and his schoolwork suffered. After a good spring break visit with his family, Ray turned things around. He studied hard, did well in class, and made friends with some guys in the dorm. His mood improved and soon thereafter he met Kira. Kira was attracted to Ray but sensed his shyness, so she asked Ray out. They've been dating for a year and Ray is happy. He and Kira have even discussed marriage.

Soon we'll briefly look at Ray's case through the lens of six psychological perspectives. But first, to better understand how these perspectives evolved, let's examine psychology's roots and two of its earliest schools of thought.

Psychology's Intellectual Roots

Humans have long sought to understand themselves, and for ages the *mind–body problem* has occupied the centre of this quest. Is the mind—the inner agent of consciousness and

thought—a spiritual entity separate from the body, or is it part of the body's activities?

Many early philosophers held a position of **mind–body dualism,** the belief that the mind is a spiritual entity not subject to physical laws that govern the body. But if the mind is not composed of physical matter, how could it become aware of bodily sensations, and how could its thoughts exert control over bodily functions? French philosopher and scientist René Descartes (1596–1650) proposed that the mind and body interact through the brain's tiny pineal gland. Although Descartes placed the mind within the brain, he maintained that the mind was a spiritual, nonmaterial entity. *Dualism* implies that no amount of research on the physical body (including the brain) could ever hope to unravel the mysteries of the nonphysical mind.

Another view, **monism** (from the Greek word *monos,* meaning "one"), holds that mind and body are one and that the mind is not a separate spiritual entity. To monists, mental events correspond to physical events in the brain, a position advocated by English philosopher Thomas Hobbes (1588–1679). Monism helped set the stage for psychology because it implied that the mind could be studied by measuring physical processes within the brain. The stage was further set by John Locke (1632–1704) and other philosophers from the school of **British empiricism,** which held that all ideas and knowledge are gained empirically—that is, through the senses. According to empiricists, observation is a more valid approach to knowledge than is pure reason, because reason is fraught with the potential for error. This idea bolstered the development of modern science, whose methods are rooted in empirical observation.

Discoveries in physiology (an area of biology that examines bodily functioning) and medicine also paved the way for psychology's emergence. By 1870, European researchers were electrically stimulating the brains of laboratory animals and mapping the surface areas that controlled various body movements. Additionally, medical reports were linking damage in different areas of patients' brains with various behavioural and mental impairments. This mounting evidence of the relation between brain and behaviour supported the view that empirical methods of the natural sciences could be used to study mental processes. Indeed, in the mid-1800s German scientists had already established a new field called *psychophysics,* the study of how psychologically experienced sensations depend on the characteristics of physical stimuli (e.g., how the perceived loudness of a sound changes as its physical intensity increases).

Around this time, Charles Darwin's (1809–1882) theory of evolution was generating societal shock waves. Opponents attacked his theory because it seemed to contradict philosophical and religious beliefs about the exalted nature of human beings. Evolution implied that the mind was not a spiritual entity, but rather the product of biological continuity between humans and other species. Darwin's theory also implied that scientists might gain insight about human behaviour by studying other species. By the late 1800s, a convergence of intellectual forces provided the impetus for psychology's birth.

5. Contrast the positions of dualism and monism as they apply to the "mind–body" problem.

Early Schools: Structuralism and Functionalism

The infant science of psychology emerged in 1879, when Wilhelm Wundt (1832–1920) established the first experimental psychology laboratory at the University of Leipzig in Germany (Figure 1.6). There he helped train the first generation of scientific psychologists. Among these were August Kirschmann and James Baldwin, both of whom were founding members of the Department of Psychology at the University of Toronto, and George Humphrey, who began the tradition of research in experimental psychology at Queen's University in Kingston, Ontario (Wright & Myers, 1982). One of Wundt's graduate students, Englishman Edward Titchener (1867–1927), later established a psychology laboratory in the United States at Cornell University. Wundt and Titchener believed that the mind could be studied by breaking it down into its basic components, as a chemist might break down a complex chemical compound. Their approach came to be known as **structuralism,** the analysis of the mind in terms of its basic elements.

© Archives of the History of American Psychology—The University of Akron

FIGURE 1.6 At the University of Leipzig in 1879, Wilhelm Wundt established the first laboratory of experimental psychology to study the structure of the mind.

In their experiments, structuralists used the method of *introspection* ("looking within") to study sensations, which they considered the basic elements of consciousness. They exposed participants to all sorts of sensory stimuli—lights, sounds, tastes—and trained them to describe their inner experiences. Although this method of studying the mind was criticized as being too subjective, and it died out after a few decades, the structuralists left an important mark by establishing a scientific tradition for studying cognitive processes.

In the United States, structuralism eventually gave way to **functionalism,** which held that psychology should study the functions of consciousness rather than its structure. Here's a rough analogy to explain the difference between

6. Compare the goals of structuralism and functionalism.