



# Psychological Science

Second Canadian Edition

Michael S. Gazzaniga, Todd F. Heatherton

Steven J. Heine, Daniel C. McIntyre

**Michael S. Gazzaniga**

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

**Todd F. Heatherton**

DARTMOUTH COLLEGE

**Steven J. Heine**

UNIVERSITY OF BRITISH COLUMBIA

**Daniel C. McIntyre**

CARLETON UNIVERSITY

# Psychological Science

SECOND  
CANADIAN  
EDITION



W. W. Norton & Company  
New York • London

W. W. Norton & Company has been independent since its founding in 1923, when William Warder Norton and Mary D. Herter Norton first published lectures delivered at the People's Institute, the adult education division of New York City's Cooper Union. The Nortons soon expanded their program beyond the Institute, publishing books by celebrated academics from America and abroad. By mid-century, the two major pillars of Norton's publishing program—trade books and college texts—were firmly established. In the 1950s, the Norton family transferred control of the company to its employees, and today—with a staff of four hundred and a comparable number of trade, college, and professional titles published each year—W. W. Norton & Company stands as the largest and oldest publishing house owned wholly by its employees.

Editor: Jon Durbin  
Managing Editor, College: Marian Johnson  
Project Editors: Kim Yi and Carla L. Talmadge  
Electronic Media Editor: Denise Shanks  
Editorial Assistants: Kelly Rolf and Robert Haber  
Copy Editor: Barbara Gerr  
Director of Manufacturing, College: Roy Tedoff  
Book Designer: Rubina Yeh  
Photo Researchers: Neil Hoos, Kelly Rolf, Kelly Mitchell, and Robert Haber  
Illustrations: Frank Forney  
Composition by GGS Book Services  
Manufacturing by R. R. Donnelley

Copyright © 2007, 2006, 2003 by W. W. Norton & Company, Inc.

All rights reserved.  
Printed in China.  
Second Canadian Edition.

The text of this book is composed in Benton Modern Two with the display type in Polymer.

Library of Congress Cataloging-in-Publication Data

Psychological science/Michael S. Gazzaniga . . . [et al.].—2nd Canadian ed.

p. cm.

Includes bibliographical references and indexes.

**ISBN 13: 978-0-393-92962-1**

**ISBN 10: 0-393-92962-0**

1. Psychology—Textbooks. I. Gazzaniga, Michael S.

BF121.G393 2007

150—dc22

2006053059

W. W. Norton & Company, Inc., 500 Fifth Avenue, New York, NY 10110

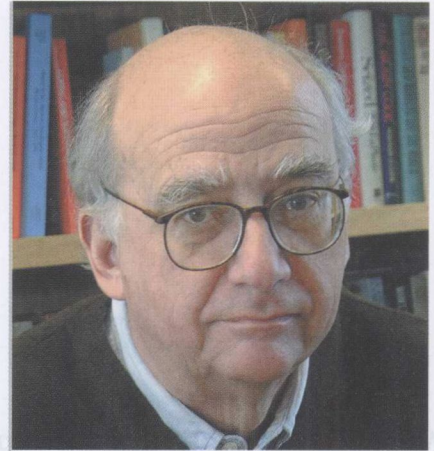
[www.wwnorton.com](http://www.wwnorton.com)

W. W. Norton & Company Ltd., Castle House, 75/76 Wells Street, London W1T 3QT

1 2 3 4 5 6 7 8 9 0

*We dedicate this book to Francesca and Zachary Gazzaniga,  
Sarah and James Heatherton, Nariko Takayanagi and Seiji Heine,  
and Jamie, Jenifer, and Tobi McIntyre.*

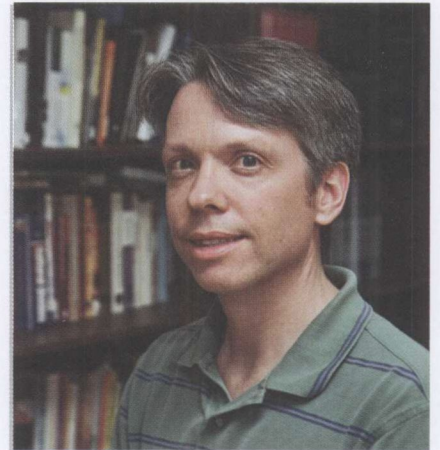
**Michael S. Gazzaniga** (Ph.D., California Institute of Technology) is Distinguished Professor and Director of the Sage Center for the Study of the Mind at the University of California, Santa Barbara. He founded and presides over the Cognitive Neuroscience Institute and is founding editor-in-chief of the *Journal of Cognitive Neuroscience*. He is President of the American Psychological Society and a member of the American Academy of Arts and Sciences. His research focuses on split-brain patients. He has held positions at the University of California, Santa Barbara; New York University; the State University of New York, Stony Brook; Cornell University Medical College; and the University of California, Davis. He has written many notable books including most recently, *The Ethical Brain*.



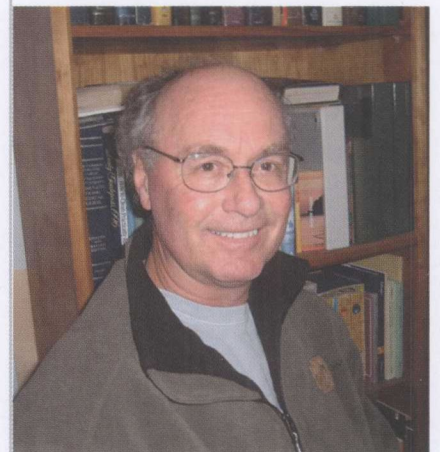
**Todd F. Heatherton** (Ph.D., University of Toronto) is the Champion International Professor of Psychological and Brain Sciences at Dartmouth College. His research examines processes related to self, in particular self-regulation, self-esteem, and self-referential processing. This research is grounded in the traditions of personality and social psychology although the guiding theories, as well as the techniques and methodologies that he uses, are strongly influenced by research in cognitive neuroscience. He has been on the executive committees of the Society of Personality and Social Psychology (SPSP), the Association of Researchers in Personality, and the International Society of Self & Identity. He is Associate Editor of the *Journal of Cognitive Neuroscience*, and on several editorial boards. He has served as Head Tutor and chair of the undergraduate program in Psychology at Harvard University and department chair at Dartmouth College. He received the Petra Shattuck Award for Teaching Excellence from the Harvard Extension School in 1994. In 2005, he received the award for Distinguished Service on Behalf of Social and Personality Psychology from SPSP for his role in creating the annual SPSP meeting.



**Steven J. Heine** (Ph.D., University of British Columbia) is Associate Professor of Psychology and Distinguished University Scholar at the University of British Columbia. His research largely focuses on cultural psychology, in particular, he has explored how cultural experiences shape the ways that people understand themselves and the world around them. He has also been on the faculty at the University of Pennsylvania, and has had visiting positions at Kyoto University and Tokyo University. He has received the Distinguished Scientist Early Career Award for Social Psychology from the American Psychological Association and the Early Career Award from the International Society of Self and Identity. He is also the author of the textbook *Cultural Psychology*, published by Norton.



**Daniel C. McIntyre** (Ph.D., University of Waterloo) is a Chancellor's Professor in Psychology in the Institute of Neuroscience at Carleton University, Ottawa, Ontario, Canada. His work on the functional anatomy of epilepsy and many related themes is principally funded by research grants from the Canadian Institutes of Health Research and the Natural Sciences and Engineering Research Council of Canada. He serves on several editorial boards, and in 2003 received the coveted American Epilepsy Society research award in basic science. Having received several teaching awards over the years, he was also voted in 2005 by TVO as one of Ontario's best lecturers.



Just over seven years ago we joined forces with W. W. Norton to create an introductory psychology textbook that would capture the excitement of twenty-first-century psychological science. Our vision for the book was bold, as we sought to break the mold of the homogenized and encyclopedic textbooks that focus on classic themes and standard topics. Thanks to an editorial team that shared our vision, the First Edition of *Psychological Science* achieved our principal goals, the most important of which was to produce a readable book that focused on cutting-edge psychological and brain sciences. This approach resonated with faculty and students alike, as it captured the excitement of contemporary research being conducted in labs around the world. Instructors were especially enthusiastic about the levels-of-analysis approach to studying human behaviour, which has become the cutting-edge way to investigate behaviour in the fields of psychology and neuroscience. It is clear that there is an eager audience for a rigorous and scientific treatment of psychology that is accessible for the majority of students.

We frankly were thrilled with the response our First Edition received. We tried a lot of new approaches and most of them worked. Many of our colleagues told us that they especially liked the declarative writing style that focused on answers to current scientific questions driving psychological research. The “ask and answer” approach that serves as the pedagogical foundation of the book captured students’ interest and kept the material engaging. It helped students take home the idea that psychological scientists are addressing big questions and making progress in solving them.

Even though the book received considerable praise, as authors we felt that some features and material didn’t quite satisfy what we were trying to achieve. For instance, we sometimes went into too much technical detail and occasionally our coverage was a bit unbalanced. As we noted in the preface to the First Edition, our greatest challenge was in deciding what not to include rather than what to include. In retrospect, we sometimes included material that was unnecessary and other topics needed to be included or covered in more depth. Our core goal for *Psychological Science* in its current and future editions is to provide students with what they really need to know to be informed about psychological science. As we prepared this revision we spent considerable time addressing that very question. We sought advice from many colleagues, even repeatedly asking some of you, “Do students really need to know this at the introductory level?” If the answer was no, we eliminated that material so that we could more thoroughly treat essential topics that required greater attention. We thank all our colleagues and reviewers who helped us sort out these issues and provided good advice on how to improve the text.

Everything we tried to do in the First Edition was first and foremost for the benefit of students, and they continue to be our primary audience in the Second Edition. In response to their comments, we now include even more vivid examples and case

histories, especially in the *Profiles in Psychological Science* units in each chapter, as well as descriptions of how psychological scientists are having an impact on their daily lives. Each chapter's *Psychological Science in Action* unit introduces students to how knowledge from psychological research is used in various professions (e.g., marketing, forensics, sports, robotics) and how it has helped answer important policy questions, such as how young children should be taught to read. In developing these units, we place psychological science in a human context by emphasizing the extent to which it applies to students' everyday lives. We have expanded the number of citations to the research literature, but we have avoided overloading the text with unnecessary citations—the focus remains on the words and ideas. We believe students will respond favourably to the changes we have made in this edition. We look forward to their responses to our efforts.

This Second Edition also includes changes that will appeal to instructors. Building on the “ask and answer” approach, we sought to have one or two broad themes drive each chapter. The themes reflect overarching questions that have played prominent roles throughout the history of psychological science, such as Chapter 3's discussion of the role of environment in gene expression, which provides new insights to longstanding questions about nature and nurture, and Chapter 4's discussion of whether psychological functions are localized in specific brain regions and which regions are involved in conscious experience. This strategy demonstrates the cumulative nature of psychological science as well as the multiple perspectives that researchers and teachers bring to the subject matter. Another good example of this occurs in Chapter 15, where we highlight the idea that people consistently underestimate the power of situations to affect human behaviour, including their own, and discuss how much social cognition occurs automatically and without conscious awareness or intent, as people quickly evaluate and categorize others. Each chapter is now more tightly conceived and unified; each has its own unique emphasis. The chapter conclusions then take up these themes to provide students with a take-home message. When students finish a chapter, they should have a clear sense of the big questions and issues driving contemporary research in that area, as well as an understanding of what is known and what remains to be discovered.

Given the popularity of our levels-of-analysis approach, we worked hard to integrate more social and cultural examples throughout the first half of the book. We have streamlined our discussion to the three essential levels (biological, individual, social), but also expanded coverage within each level. We believe that the Second Edition balances social and cultural psychology with the biological. This increased emphasis on culture throughout the book begins in Chapter 1 with a foundational discussion on how culture is adaptive and concludes with the first ever full chapter on the burgeoning field of cultural psychology in any leading introductory text. We also increased the prominence of crit-

ical thinking throughout the book. Based on reviewer and instructor suggestions, we have made it a centrepiece of the new edition. To each chapter we added a *Thinking Critically* unit that takes on a controversial topic and demonstrates the value of critical analysis. We have also added short-answer critical thinking questions in the margins of each chapter. Finally, at the end of each chapter, we introduce a study feature called Applying the Principles that asks students to answer a series of questions designed to see if they can apply the chapter concepts to the real world. Recognizing that introductory psychology is the only exposure to the subject that many students will have, we believe it to be vitally important that students understand what it means to be consumers of psychological research, including recognizing the value of good, solid science.

In response to comments by reviewers and instructors and our own sense of the strengths and weaknesses of the First Edition, we made both major and minor changes throughout the book. We scrutinized each chapter and in a few cases decided that they needed to be reconsidered altogether. The chapters on cognition (Chapter 8) and sensation and perception (Chapter 5) have been completely reconceptualized and rewritten. The material in these chapters is both more student-friendly, in terms of the level of technical detail, and more applicable to students' lives. In Chapter 4, we introduced an innovative and appealing discussion of functional neuroanatomy and how it gives rise to consciousness. This is a fresh approach that really brings the anatomy home to the students and helps them see how understanding the brain helps with understanding the mind, both when it is awake and when it is in an altered state of consciousness, such as sleep. In the previous edition there were two developmental chapters and two social chapters. In this edition we consider these as unified areas, no longer separating, for example, cognitive and social development. In each case we took the best material from the two chapters, reframed the major themes and issues, and built a more concise and integrated chapter. We now have one unified development chapter (Chapter 11), with a greater lifespan emphasis, and one unified social chapter (Chapter 15), which focuses more on how context shapes behaviour. In keeping with our levels-of-analysis approach, we moved the social chapter to the end of the book, followed by the new chapter on cultural psychology where we use them to summarize many of the accomplishments of psychological science in understanding what it means to be humans.

The new Canadian Edition builds on and expands on the strengths of the First Edition. Canadian research psychology comes from a long and rich tradition. It has made many significant contributions to the larger field, particularly in the areas of neuroscience and social psychology. The First Edition of this text seamlessly incorporated a significant amount of research and historical material from Canadian researchers in these areas and across the discipline. Canadian researchers are also at the fore-



front of the burgeoning new field of cultural psychology, which is why we have included the first ever chapter on that subject in the new Canadian Edition. In addition to this path breaking new chapter, we have also incorporated more Canadian research across the domains and have included many more Canadian popular culture examples and statistics to make the material even more interesting and relevant for Canadian students.

We noted in the preface to the First Edition that writing this book had changed us as scientists and inspired us to more fully cross levels of analysis in our own research, including collaborating on using neuroscience methods to understand the self. The cross-fertilization of our interests has continued. Mike's most recent book, *The Ethical Brain*, considers the fundamental social nature of human existence. Todd has become even more interested in understanding the neural basis of social and personality phenomena. Steve continues his exploration of the relationship between biology, cognition, and culture. Two summers ago, Steve cosponsored a summer conference at UBC, which focused on ways to integrate evolutionary and cultural approaches to the study of the human mind and behaviour. Dan continues his research on understanding the mechanisms underlying neuroplasticity as reflected in both epilepsy and learning and memory. He was also pleased to receive a 3M teaching award this past year. While continuing to keep busy on the research and administrative fronts, we truly enjoy teaching both graduate and undergraduate students. They keep us energized and teach us new ideas as we move forward with our own lives and careers. We hope that our own enthusiasm for the science of psychology inspires students to think about the big issues and questions that fascinate those of us who have dedicated our lives to understanding the mind and behaviour.

## Tour of Psychological Science

**CHAPTER 1** (*Introduction to Psychological Science*) sets the stage for the book. We introduce students to psychological science by providing engaging examples of psychological questions and answers. We continue to emphasize the four guiding themes that characterize psychological science: (1) It is a cumulative science, with principles established through incremental advances in knowledge obtained through research. (2) A biological revolution has energized psychological research. (3) The human mind is adaptive, which means that the brain has evolved to solve everyday problems and also that culture provides adaptive solutions. (4) Psychological science crosses different levels of analysis and perspectives, from the biological to the social, from genes to culture. In the new edition, we have simplified our levels-of-analysis approach so that it now focuses on three broad levels of analysis: biological, individual, and social. Our first discussion from this perspective explores the psychological aspects of music. There is also a much greater emphasis on culture through-

out the book. In this chapter, we present a foundational discussion that considers differences between how people in eastern and western cultures view and reason about the physical world. We then briefly trace the intellectual origins and historical background of psychological science and go on to describe how psychological knowledge is applied to solving real-world problems, such as treating mental disorders. We end the chapter by emphasizing the importance of critical thinking for consumers of psychological research.

In **CHAPTER 2** (*Research Methodology*), we lay the foundations for understanding the methods of psychological science. We cover the major methods in sufficient detail so that students understand the techniques and strategies used to examine psychological questions. In the new edition we place a stronger emphasis on the role of critical thinking in testing theories about the mind, brain, and behaviour. We also expand the description of how research with animals, including manipulating their genes, is an important tool for addressing fundamental psychological questions. As part of the emphasis on critical thinking, we highlight the need for researchers to pay attention to potential cultural differences when drawing conclusions about human nature. We also offer a unified presentation of the methods for assessing the working brain (i.e., electrophysiology, imaging, neuropsychology). Pulling the descriptions of these methods together will help allow students understand the full range of tools available to psychological scientists.

In **CHAPTER 3** (*Genetic and Biological Foundations*) we have substantially reconsidered the role of genes in psychological processes. For years, psychologists focused on whether people possessed certain types of genes, such as genes for psychological disorders or intelligence, with an emphasis on the extent to which human traits were hardwired. Recent cutting-edge research is emphasizing gene expression, what turns genes “on” and “off.” The major lesson is that the environment, including social factors, plays an important role in gene expression, and therefore in how the environment affects the mind, brain, and behaviour. It is as much gene expression as gene possession that makes us who we are as human beings. We provide a compelling example of how antisocial behaviour results from the interaction of genes and environment. We also describe cutting-edge research on how gene expression can be modified, such as through small RNA activity. Throughout the chapter we have reduced the level of technical difficulty by focusing on what students really need to know in order to understand basic human physiology. For example, we eliminated the in-depth description of metabotropic receptors as well as distinctions between peptide and steroid hormones. We continue to enliven the discussion of the nervous system by focusing on the influence of neurotransmission on everyday mental activity and behaviour.

**CHAPTER 4** (*The Brain and Consciousness*) has been transformed in ways that we believe will excite teachers and students alike. Rather than focusing solely on the brain, we now explore how brain activity gives rise to the unique human capacity of consciousness. After briefly discussing evolving views of the localization of function, we emphasize that mental activity results from the integrated actions of specific and localized structures that are distributed throughout the brain. We also discuss the idea that we are not conscious of much of our mental activity, with social psychologists such as Dan Wegner and John Bargh demonstrating that much of human behaviour occurs automatically and without intention. This raises interesting philosophical questions for students, such as the degree to which we are able to consciously will our actions. In keeping with the idea that the brain gives rise to conscious experience, we then discuss sleep in the context of brain activity. After all, many regions of the brain are more active when we sleep than when we are awake. Our goal with this fresh approach is to emphasize the importance of brain function to human experience.

**CHAPTER 5** (*Sensation, Perception, and Attention*) provides a foundation for understanding how the brain senses and perceives the world. This chapter has been revised substantially to make the material more accessible to students. The section on psychophysics and signal detection now emphasizes basic concepts and methodological approaches rather than mathematical equations of difference thresholds. We reorganized the discussion of the five senses, beginning with taste and building up to vision, which helps students appreciate the commonalities in the various perceptual systems. A theme that runs throughout the chapter is that perception is an active constructive process that occurs in the brain. Our goal for this chapter is to foster an appreciation for how the brain takes in ambiguous sensory information and constructs rich and meaningful experiences that allow us to navigate the world around us. Because perception is important to social interaction, we discuss face perception in this chapter. Finally, we consider how attentional processes influence how people perceive the world around them, emphasizing that the ability to selectively attend to important sensory stimuli is crucial for survival.

**CHAPTER 6** (*Learning and Reward*) covers the foundations of principles of learning and the role of learning in solving adaptive challenges. We emphasize that the study of learning has been a powerful force in psychological science for more than a century, and that the principles of classical and operant conditioning are important throughout psychology and allied sciences. This chapter provides a good demonstration of our theme that psychological science is cumulative, with researchers responding to and expanding on their predecessors to understand the complexities of learning. We have expanded the discussion of

how economic principles can inform the understanding of reinforcement as well as how learning can be passed on through cultural transmission. In keeping with our goal of limiting technical jargon, we removed the discussion of the various subcomponents of the mesolimbic dopamine pathway, instead focusing more directly on the importance of dopamine to reward. We also describe new studies that use genetic manipulation to explore how long-term potentiation works.

**CHAPTER 7** (*Memory*) continues to provide a cutting-edge treatment of how people encode, store, and retrieve different types of information. We have included new findings on emotional memory, on reconsolidation, and on H.M.'s recently discovered acquisition of new semantic knowledge. A central focus of the chapter is the neurological basis of memory, with classic and contemporary examples of how brain injury interferes with explicit recall. We also continue to emphasize the practical aspects of human memory, such as the ability to serve as eyewitnesses and the role of motivation and social context in shaping what we remember.

**CHAPTER 8** (*Thinking and Intelligence*) has been completely reconceptualized and expanded. It now incorporates a much greater emphasis on the intelligent use of information and the idea that for the most part thinking is adaptive. We present a more streamlined discussion of representational knowledge and emphasize how knowledge structures, such as scripts and schemas, guide our behaviour, often without our conscious awareness. The idea that unconscious processes play prominent roles in cognition is an important theme throughout the chapter. We have significantly modified the discussion of problem solving and decision making to emphasize more recent research on heuristic processes. We have expanded the discussion of deductive and inductive reasoning and provided more detail on how people solve problems in everyday life. We also consider at some length the idea that more thought does not necessarily make for better decisions. The revised chapter has a much more thorough discussion of what it means to be intelligent, with an increased focus on fluid intelligence and the prominent role it plays in dealing with modern society. We describe recent research on the neural and cognitive bases of intelligence and discuss the role that genes and environment play in shaping intelligence.

**CHAPTER 9** (*Motivation*) presents an overview of the factors that motivate behaviour. This chapter demonstrates the need to consider biological, psychological, and social factors in order to develop a satisfactory understanding of why people “choose” to engage in specific behaviours. We consider motivation in its adaptive context, with an interpretation based on evolutionary principles. The section on sleep, which was moved to Chapter 4, has

been replaced by expanded discussions of addiction, sexual behaviour, and the human need to belong. Each of these is considered across the multiple levels of analysis. The chapter invites students to reflect on what motivates them from day to day, how they deal with competing motives, and how setting and achieving goals can help them lead meaningful lives.

**CHAPTER 10** (*Emotions and Health*) explores how emotions influence the human experience, including where they come from and how they are experienced, as well as how people cope with stress and handle negative events. In this revised chapter, we consider behaviours that significantly influence physical health, particularly those that lead to healthy living. We also include more discussion of how stress affects the heart and the immune system. In a new section, we look at how daily behaviours, such as eating, exercising, and smoking, play an important role in the most common causes of death in our society, and we consider evidence that emotional states often encourage people to develop bad habits.

**CHAPTER 11** (*Human Development*) provides a thorough discussion of physical, cognitive, and social development. We have merged the two development chapters from the previous edition into one unified treatment of developmental issues across the life span. The driving idea behind this merger is that in looking at the factors that shape us, it is impossible to separate the cognitive from the social. We emphasize the multiple forces, from genes to culture, that interact to produce unique humans. Taking a life span approach, we consider how humans change as they grow, from infancy to old age. We now offer greater coverage of middle age and old age, examining the important roles that family and career have in our lives. The message of the final section is that, although physical and cognitive declines are an inevitable part of the aging process, contemporary research finds that older people are surprisingly satisfied with their lives.

**CHAPTER 12** (*Personality*) remains a somewhat radical departure from historical treatments of personality. Most textbooks describe the area of personality as it existed more than 40 years ago, with an emphasis on unconscious Freudian processes and social learning experiences. Yet recent research has provided compelling evidence that human personality is determined to a large extent by genetic and physiological mechanisms. This chapter focuses on research by contemporary psychologists who have made considerable strides in understanding the development and structure of human personality. We cover traditional topics, such as Freudian and trait theory, but we emphasize more current research on the cognitive and biological factors involved in personality.

**CHAPTER 13** (*Disorders of Mind and Body*) introduces students to the best-known forms of psychological disorders, especially those that we know to be of interest to students. In this revised chapter

we have streamlined the discussion of legal issues and expanded the discussion of assessment techniques, such as interviews and behavioural assessments. Following a brief review of the issues surrounding determining whether a condition reflects a psychological disorder, we describe the essential features of each major disorder and discuss various etiological theories. We provide a thorough discussion of the biological, psychological, and social factors that have been implicated in the development of schizophrenia. We describe recent evidence that some indications of schizophrenia and other forms of adult psychopathology can be observed in childhood, such as in home movies. Vivid case studies are used throughout to illustrate symptoms and assessment. We include expanded coverage of childhood disorders, such as ADHD and autism, which are typically ignored in introductory textbooks; it is our experience that students find these disorders especially interesting. The overall theme of the chapter is that to really understand psychopathology we need to recognize the social, psychological, and biological factors that contribute to the expression of mental illness in those who are susceptible.

**CHAPTER 14** (*Treating Disorders of Mind and Body*) examines the theoretical basis of psychotherapy, as well as typical treatments and outcomes. Following a discussion of treatment goals, we introduce students to the most common types of therapy. Although we mention classic psychological treatments, we emphasize the types of treatments most widely used by contemporary therapists. We consider treatments for anxiety disorders, depression, and schizophrenia in detail, with special attention to the empirical evidence for successful outcomes. One theme running through the chapter is that treatments are tailored specifically for a client with specific psychological symptoms. That is, there is no overall grand theory that guides treatment, but rather treatment is based on evidence of its effectiveness, which is established through rigorous research. Another important point is the preference for psychological treatments over pharmacological treatments when both are effective, as psychological treatments have fewer side effects and are longer lasting. We also discuss evidence that both psychological and pharmacological treatments lead to changes in brain functioning. As in the previous chapter, we include discussion of issues specifically related to children, such as how behaviour therapy can be used to treat autism. The take-home message of the chapter is that although we have a ways to go, psychological scientists have discovered a great deal about how to improve the quality of life for people with serious disorders of mind and body.

**CHAPTER 15** (*Social Psychology*) is a new chapter that merges the best sections from the two social chapters in the previous edition. An important theme that guides the chapter is that people have evolved as social animals and that much of human behaviour and experience is shaped by social context; cultural

rules and norms determine a great deal of our behaviour. Another important theme of the chapter is that people reliably underestimate the power of situations in affecting human behaviour. Numerous vivid examples, such as the prisoner abuse at Abu Ghraib, help students appreciate the effect of social context on behaviour. We also emphasize that a great deal of social cognition occurs automatically and without conscious awareness or intent, especially in how we think about others and ourselves. In this chapter we have narrowed our focus to the social self, with an increased emphasis on self-relevant motives and the extent to which these motives are true across cultures. We discuss research that crosses levels of analysis from the social to the biological, as we explore recent neuroimaging studies on the self, attitudes, and stereotyping. And we expand the section on relationships, with a greater emphasis on romantic relationships. This unified chapter describes many of the important studies that have been conducted by social psychologists and demonstrates how the principles that developed out of these studies are relevant to students' everyday lives.

**CHAPTER 16** (*Cultural Psychology*) is an exciting new chapter created for the Canadian Edition. As far as we know, it's the first ever chapter fully dedicated to cultural psychology to appear in a mainstream introductory psychology text. It serves two important purposes in the text. First, it serves as the capstone chapter for the text reinforcing the author's belief that a levels-of-analysis approach is the best way to understand human behaviour. Second, the elevation of cultural psychology to a chapter level subject reinforces our goal to present students with the most cutting-edge material possible, while showing that psychology is a dynamic research-driven field. The larger intellectual goal for the chapter is to help students understand why culture matters when we study human behaviour. As part of explaining why culture matters, we ask five basic questions: What is culture? How does culture affect the mind? What happens to people's sense of self when they move to a different culture? How does culture affect how we think and behave? How does culture influence mental health? An important theme that guides the chapter is how a person's sense of self relates to others. As we discussed in the social chapter, every person is unique with their own ideas, beliefs and goals, and yet each of us is a social creature fundamentally connected with others. Research has shown that the type of culture we belong to, either independent or interdependent, has dramatic effects on our sense of self and our thoughts and behaviours. Moreover, we are now beginning to see that this difference in self-concept underlies many of the differences in psychological processes across cultures. A second theme throughout this chapter is that both universal and culturally specific psychologies exist. People the world over share the same biology, and at some level

of analysis, the psychological experiences of people around the world are universally similar. But at other levels of analysis, we see pronounced cultural variation in psychological processes. This chapter focuses on the interesting ways that people with different cultural experiences differ in their psychological processes.

Although it may not appear as obvious to a student how the fields of cultural psychology and neuroscience can be relevant when studying the same subject, we believe that it is only through the use of integrative approaches like levels of analysis that we will truly be able to understand complex human behaviours and thoughts.

## A Pedagogical Program That Reinforces Psychological Science's Core Principles

### I. Overview

*Psychological Science's* chapters are built around four to six major principles that are addressed through the "ask and answer" approach. Each is first raised in the form of a question ("ask"). Each major section then discusses one of these questions ("answer").

**OUTLINING THE PRINCIPLES:** At one level, this feature serves as a simple outline or road map for the chapter. At another level, it clarifies the major principles that will be covered in the chapter. Major heads are questions. Minor heads are declarative statements that reveal the current state of knowledge about the larger principles and concepts.

**CHAPTER TIMELINES:** Psychological science is built on cumulative knowledge and experience. This is one of the major themes of the text. Basic principles, both new and old, inspire and guide thinking and research in the field. The timelines highlight major developments within the various domains of psychology.

**CRITICAL THINKING QUESTIONS:** These questions are designed to encourage students to think integratively and beyond the text. Appearing in the margins throughout each chapter, they selectively highlight core principles and are ideal as short-answer questions on quizzes or for discussion in small groups.

**"ASK AND ANSWER" RUNNING HEADS:** *Psychological Science's* left-hand running heads emphasize the larger topics, with the right-hand running heads repeating the questions that are explored in each section. The heads help students stay focused on the larger issue as they try to see the forest for the trees.

**REVIEWING THE PRINCIPLES:** These boxes are a critical component of the “ask and answer” approach and appear at the end of each major section. They repeat the question that governed the section and provide a basic answer that highlights key points for students to remember.

**DEFINING THE PRINCIPLES:** *Psychological Science* has a marginal glossary running throughout each chapter as well as a glossary at the end of the book and on the companion Web site. Many books highlight too many key terms for students to memorize. In keeping with this book’s focus on core principles and concepts, *Psychological Science* highlights approximately 30 key terms per chapter.

**CONCLUSION:** *Psychological Science*’s brief chapter conclusions sum up the big ideas and concepts and remind students how the book’s four key themes wove their way through the chapter.

**SUMMARIZING THE PRINCIPLES:** Designed to follow the outline for each chapter, this feature provides a detailed review. Students are reminded again of the major questions that governed each section and the key pieces of research-based knowledge that provide insight into those questions.

**APPLYING THE PRINCIPLES:** *Psychological Science* encourages students to apply core principles to real-world settings. Multiple-choice Applying the Principles questions at the end of each chapter highlight core principles students need to learn. Answers appear at the end of the section.

## II. *Psychological Science*’s Art and Citations

**A DYNAMIC ART PROGRAM:** The visual materials in *Psychological Science* add substantially to the students’ experience. The book contains a variety of visual materials, from photographs to tables and charts to drawn art. The emphasis in *Psychological Science*, however, is clearly on the drawn art. Having used many general psychology books ourselves, we wanted to take our text in a new direction. By featuring drawn art, *Psychological Science* is able to convey precisely, accurately, and meaningfully what the students need to gain from every image. This high level of precision can’t be achieved with the stock photographs common in many texts.

**SELECTIVE USE OF CITATIONS:** *Psychological Science* embraces the notion that students should be introduced to material in a narrative style that focuses on ideas, concepts, and empirical findings rather than on specific researchers. At the same time, the text includes enough citations that students can pursue topics

of interest and appreciate that psychological science is based on published empirical research. We have selected essential citations that we hope most teachers would agree are central to a first-year student’s exploration of psychological science, and we have cited them in a way that should not distract from the narrative voice.

## III. *Psychological Science*’s Special Topic Units

Special Topic Units amplify the text’s basic strengths by challenging students to think critically and to understand the impact that the field of psychology has on their lives and world. Because each unit is seamlessly integrated into the narrative rather than set off like traditional feature boxes, it remains an important part of the learning experience.

**PSYCHOLOGICAL SCIENCE IN ACTION** units highlight major areas of applied research and possible careers in fields such as organizational psychology, sports psychology, consumer psychology, forensic psychology, and clinical psychology. Among these units are “Sports Psychologists Help Athletes Find the Zone,” “Motivation on the Job,” and “Forensic Assessment and Profiling.”

**PROFILES IN PSYCHOLOGICAL SCIENCE** units focus on the human perspective, thereby broadening the book’s rich presentation of science and research. Each of these units offers an individual case study to show how people’s lives can intersect with science. Among these units are “One Boy’s Journey out of Autism’s Grasp,” “Making Marriage Last,” and “What Makes Killers Kill?”

**THINKING CRITICALLY** units contain stories from newspapers and magazines on controversial topics that enable students to formulate their own conclusions based on the information available. Among these units are “Should Drugs Be Used to Treat Adolescent Depression?” “Should Memory Be Altered by Drugs?” and “Are Self-Serving Biases Universal?”

## *Psychological Science*’s Ancillaries Focus on Research in Action



**ZAPS: The Norton Psychology Labs**  
[www.norton.com/zaps](http://www.norton.com/zaps)

**ZAPS: THE NORTON PSYCHOLOGY LABS** give students a firm understanding of fundamental concepts by allowing them

to experience psychological phenomena firsthand, taking the role of either subject or researcher in engaging, diverse experiments and demonstrations. Ideal for introductory psychology courses, these groundbreaking online labs allow students to see the significance of psychological research.

A **class results** feature allows instructors to collect aggregate ZAPS data for their class in real time.

Visit the free ZAPS demo site at [wwnorton.com/zaps](http://wwnorton.com/zaps).

## The Norton Psychology Reader edited by Gary Marcus (New York University)

0-393-92712-X / paper / 375 pages

*The Norton Psychology Reader* offers a diverse collection of popular readings (8–10 pages in length) sure to enliven classroom discussion and inform student research, most of them written in the last decade. Available alone or as an ideal complement to *Psychological Science*, Second Canadian Edition, this engaging reader highlights the most exciting ideas in the field today. Authors range from Steven Pinker to Natalie Angier, from Malcolm Gladwell to Robert Cialdini.

## Norton/Discovery Education Psychology DVD created by Patrick Carroll (University of Texas, Austin)

With over 90 minutes of video footage, this useful classroom resource illustrates the exciting possibilities of psychological research through a diverse video-clip collection of research being performed. Free to qualified adopters.

## Student Web site to accompany Psychological Science, Second Canadian Edition [wwnorton.com/psychsci](http://wwnorton.com/psychsci)

This innovative online learning tool offers a wealth of resources for study and review. In addition to timelines, vocabulary flashcards, and detailed chapter reviews, the site includes:

- **Diagnostic Quizzes** with smart feedback that allow students to pinpoint strengths and weaknesses
- **Activities**
- The **Norton Gradebook** feature, which allows students and instructors to effectively track quiz results
- **Animations** that clarify difficult psychological concepts

- **Streaming Video Exercises** that are derived from the Norton Discovery Channel Psychology DVD
- **Psychology in the News**, a unique section, updated weekly, that gathers relevant news coverage and analysis

## Study Guide to accompany Psychological Science, Second Canadian Edition

by Brett Beck and Eileen Astor-Stetson (both of Bloomsburg University), and Heather Schellinck (Dalhousie University)

Created by highly successful instructors of large lecture classes, this carefully crafted study aid offers a guide to each chapter of the textbook, with helpful study advice, completion questions, key-figure exercises, multiple-choice self-tests, and thought questions.

## Instructor's Resource Manual to accompany Psychological Science, Second Canadian Edition

by Margaret Forgie (Lethbridge University), Heather Schellinck (Dalhousie University), and George Spilich (Washington College)

Prepared by three master teachers who cultivate active learning environments in their own classrooms, the Instructor's Resource Manual provides teaching suggestions from Professors Heatherton and Gazzaniga; Chapter Overviews by Professor Heatherton; Chapter Objectives; Ticket-In, Ticket-Out Assignments; Five-Minute Lecture Launchers; Classroom Demonstrations and Activities; Discussion Topics; and a substantial Link Library. Available to all adopters.

## Test Bank

by Robert Kleck (Dartmouth College), Margaret Lynch (San Francisco State University), and Heather Schellinck (Dalhousie University)

These Test-Item Files provide over 2,000 test questions, classified by chapter topic and question type (factual, vocabulary, applied, and conceptual) in the user-friendly ExamView program. Available to all adopters.

## Norton Media Library

The Norton Media Library features Web-ready teaching materials for WebCT, Blackboard, or personal-course page formats. Ideal for both classroom learning and distance education, this comprehensive online resource offers tools for instructors such

as test-item files, problem sets, lecture outlines, PowerPoint slides of textbook art and figures, and glossaries.

## Norton Gradebook

[wwnorton.com/college/nrl/gradebook](http://wwnorton.com/college/nrl/gradebook)

The Norton Gradebook is an online resource that allows instructors and students to store and track their online quiz results effectively. Student results from each quiz are uploaded to the password-protected Gradebook, where instructors can access and sort them by section, chapter, book, student name, and date. Students can access the Gradebook to review their personal results. Registration for the Gradebook is instant and no setup is required.

## PowerPoint Lecture Outlines with “clicker” questions

These lecture PowerPoints, complete with artwork from the text, follow the book’s “ask and answer” approach. Detailed information in the notes section provides instructors with an invaluable pedagogical tool. The Applying the Principles questions from the text are included as “clicker” questions at the end of each chapter.

## WebCT ePacks and Blackboard Course Cartridges

Instructors can use as is or tailor to suit their own needs.

## Studying the Mind DVD



Filmed at Dartmouth College’s Summer Institute for Cognitive Neuroscience, and featuring original footage exclusive to Norton, this DVD was created to bring examples of current brain-science research into the introductory psychology lecture. These five-to-seven-minute segments feature such well-known neuroscientific researchers as Marcus Raichle, Robert Knight, Mark D’Esposito, Michael Gazzaniga, John Gabrieli, Elizabeth Phelps, Marcia Johnson, Morris Moscovitch, Helen Neville, Denise Parks, and Patricia Reuter-Lorenz. Free to qualified adopters.

## Norton Resource Library



[wwnorton.com/nrl](http://wwnorton.com/nrl)

A Web site designed to house all electronic *Psychological Science* resources, from the test bank to PowerPoint slides to video clips. All of these resources are readily uploadable into WebCT and Blackboard environments. Available to all adopters.

## Norton Video Library

A collection of first-rate documentary films focusing on psychological science drawn from the Films for Sciences and Humanities catalog and other fine video collections. Available to qualifying adopters.

We begin once again by thanking our families, who have put up with us spending long hours away from them for the past three years. We are both very fortunate to have unwavering family support. We also are grateful to the many colleagues who gave us constructive feedback and advice. Special acknowledgment needs to be made to six individuals: Elizabeth Phelps, for helping us develop a clear vision for the cognition chapter, Peter Tse and Howard Hughes for their suggestions for making the sensation and perception chapter clear and accessible, Jay Hull for assisting us in making hard decisions regarding how best to merge the social chapters, and Gary Marcus for pushing us to think about gene expression in new ways. We also benefited from the astute guidance of John Caccioppo, Jamie Pennebaker, Fernanda Ferreira, Tara Callaghan, Margaret Lynch, Jim Enns, Wendi Gardner, Lauretta Reeves, and many others who were willing to discuss their teaching goals for introductory psychology and their beliefs about what works and doesn't work in introductory textbooks.

Producing a psychology textbook is a team enterprise and relies on the efforts of many individuals, especially those who help with the ancillaries. We are grateful to Margaret Lynch for her work on the Applying the Principles questions and on the Test-Item File. Beginning with the First Edition, Margaret has pushed us to make sure that the book speaks clearly to the students while never taking them for granted. Robert Kleck also deserves special mention for overseeing the development of the test-item file. Our colleagues from Bloomsburg University, Brett Beck, Eileen Astor-Stetson, and Connie Schick, provided key advice about the First Edition and also developed the Study Guide. Patrick Carroll from the University of Texas, Austin, was masterful in identifying video material for the DVD that accompanies the book. Caton Roberts, from the University of Wisconsin–Madison, put together a first-rate set of Powerpoint Lecture Outlines. Heather Schellinck from Dalhousie University skillfully updated the ancillaries for the Canadian Edition, including authoring all the content for the new cultural psychology chapter. We thank Lauretta Reeves from University of Texas, Austin, for her key role in helping to develop ZAPS: The Norton Psychology Labs, Margaret Forgie from the University of Lethbridge for bringing many fresh new teaching insights to the Instructor's Manual for the Second Edition, and, finally, Gary Marcus of NYU for creating *The Norton Psychology Reader*, a wonderful new companion text for introductory psychology courses. All of these individuals have lent their talent and time to create a strong support package for the Second Edition.

Once again, many people at Norton served critical roles in supporting and publishing the Second Edition. Chief among them is Jon Durbin, editor extraordinaire. Jon brings unflagging energy and incredible focus to his books. He is building an exciting psychology list at Norton that captures trends in the field like neuroscience and culture, while pushing the envelope hard to build a strong list across the subfields of



psychology. Through his persistence and insight, Jon has become a true insider in the field. He is one in a million: the Lance Armstrong of editors.

Kim Yi and Carla Talmadge, the project editors, did a superb job of keeping the entire project on track, once again with good humour and amazing attention to detail. They both have a knack for identifying troublesome sentences, and best of all for fixing them. They sure know how to keep the authors happy and the project moving along efficiently. Barbara Gerr did a great job in copy editing the manuscript, including making sure the meaning was clear and the level of writing was consistent across chapters. Marian Johnson provided excellent advice on writing style throughout. Kelly Rolf and Robert Haber were a godsend in keeping everything organized and on schedule and also are to be recognized for their ability to find interesting photos and cartoons. Neil Hoos and Kelly Mitchell from the photo research department added a great deal in rounding out the photo program. Rubina Yeh developed a striking new design for the book that holds to our original vision for an uncluttered text in which all of the elements have strong pedagogical value. Her clean design helps students focus on what is important. It is also extremely attractive. Roy Tedoff shepherded the book very effectively through the production process. We thank Denise Shanks for taking charge of the ancillaries to make sure we have the strongest possible support package. Many of the Norton sales representatives have also been especially helpful, including Peter Ruscitti, Peter McCullough, Chris Curcio, Scott Berzon, Kym Silvasy-Neale, Jason Flippen, Andrea Haver, Gordon Lee, John Darger, John Kelly, and Annie Stewart. We also offer special thanks to Steve Dunn (Director of Sales and Marketing) and Nicole Albas (National Sales Manager) for their sound insights and unflinching support of the text through its first two editions. Finally, we continue to be grateful to Roby Harrington and Drake McFeely for their faith in us.

## Consultants and Reviewers for the Second Edition

### Consultants

Tara Callaghan, St. Francis Xavier University  
Fernanda Ferreira, Michigan State University  
James Enns, University of British Columbia  
Steven Heine, University of British Columbia  
Howard Hughes, Dartmouth College  
Jay Hull, Dartmouth College  
Margaret Lynch, San Francisco State University  
Gary Marcus, New York University

James Pennebaker, University of Texas, Austin  
Elizabeth Phelps, New York University  
Lauretta Reeves, University of Texas, Austin  
Peter Tse, Dartmouth College

### Reviewers

Rahan Ali, Pennsylvania State University  
Caroyln Barry, Loyola College  
Scott Bates, Utah State University  
Joe Bilotta, Western Kentucky University  
Tom Capo, University of Maryland  
Graham Cousens, Macalester College  
Dale Dagenbach, Wake Forest University  
Suzanne Delaney, University of Arizona  
Wendy Domjan, University of Texas, Austin  
Valerie Farmer-Dougan, Illinois State University  
Greg Feist, University of California, Davis  
Holly Filcheck, Louisiana State University  
Joseph Fitzgerald, Wayne State University  
Trisha Folds-Bennett, College of Charleston  
Margaret Forgie, University of Lethbridge  
David Funder, University of California, Riverside  
Margaret Gatz, University of Southern California  
Katherine Gibbs, University of California, Davis  
Bryan Gibson, Central Michigan University  
Laura Gonnerman, Lehigh University  
Tom Guilmette, Providence College  
Erin Hardin, Texas Tech University  
John Henderson, Michigan State University  
Sarah Hodges, University of Oregon  
Cynthia Hoffman, Indiana University  
Don Hoffman, University of California, Irvine  
Steve Joordans, University of Toronto, Scarborough  
Mark Lamaukis, San Diego State University  
Lori Lange, University of North Florida  
Ting Lei, Borough of Manhattan Community College  
Carol Lemley, Elizabethtown College  
Liang Lou, Grand Valley State  
Margaret Lynch, University of California, San Francisco  
Karl Maier, Salisbury University  
Leonard Mark, Miami University (Ohio)  
Paul Merritt, George Washington University  
Paul McCormack, St. Francis Xavier University  
David McDonald, University of Missouri Columbia  
Patricia McMullen, Dalhousie University  
Hal Miller, Brigham Young University  
Joe Morrissey, SUNY-Binghamton  
Todd Nelson, Cal State-Stanislaus  
Jackie Pope-Tarrance, Western Kentucky University