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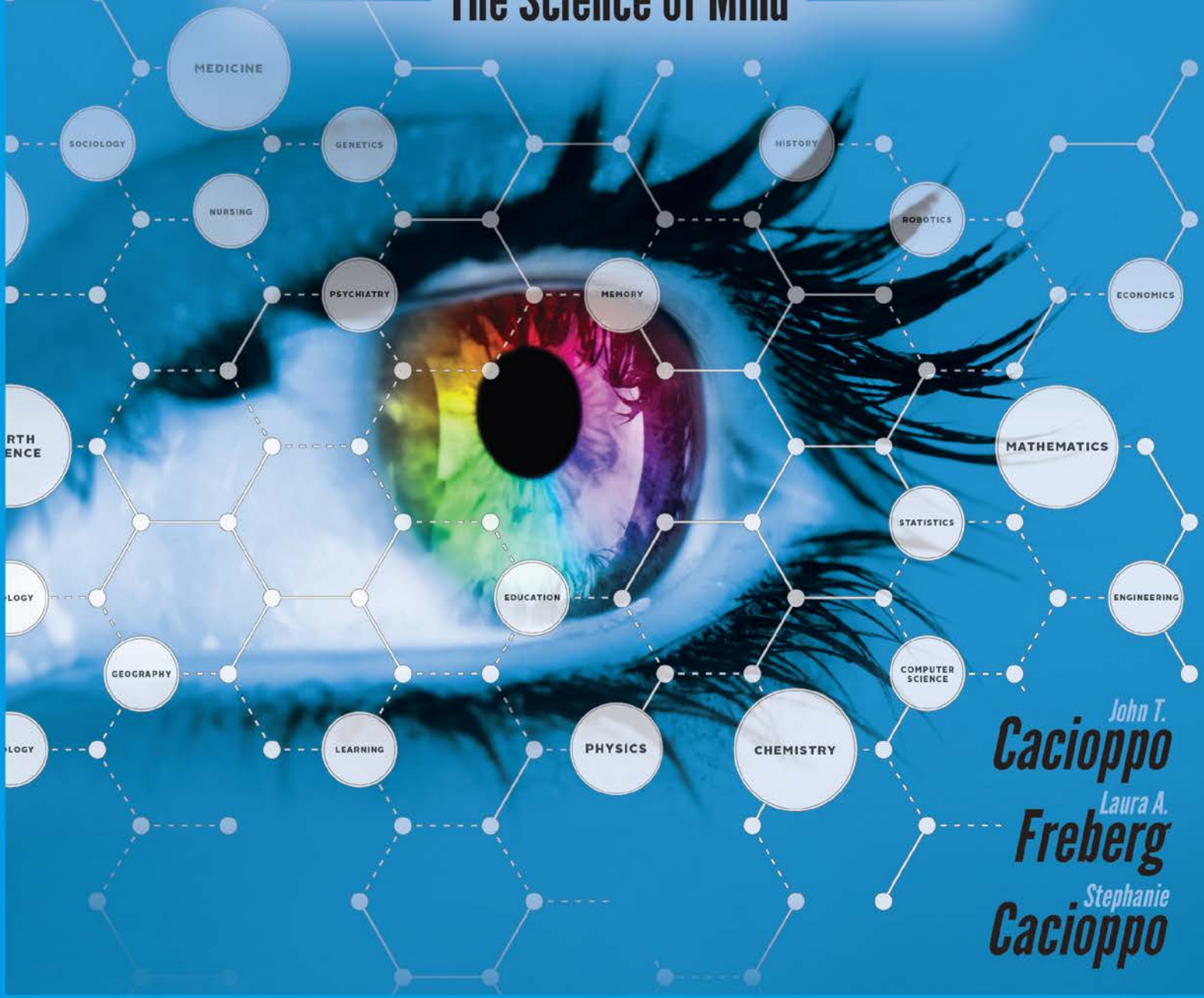
DISCOVERING PSYCHOLOGY 4E

The Science of Mind



John T. Cacioppo
Laura A. Freberg
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Discovering Psychology 4e

THE SCIENCE OF MIND

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***Discovering Psychology: The Science of Mind,* Fourth Edition**
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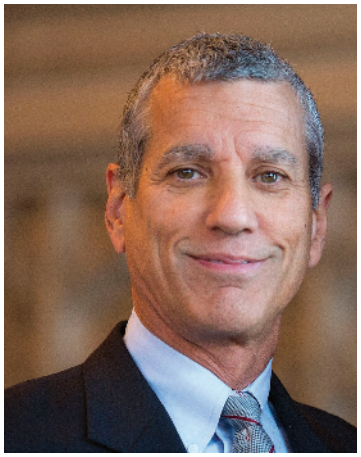
To our family and friends for their heartfelt support. In everlasting loving memory of John, Stephanie is also grateful to all of those who have expressed continuing support and love to John and our family. John's legacy will live on through his seminal theories and through all of us whose minds had the privilege of his visionary influence.

J.T.C. AND S. J. C.

To my family—Roger, Kristin, Scott, Marcus, Karen, and Karla—for their unwavering support, encouragement, and belief in my ability.

L. A. F.

About the Authors



John T. Cacioppo

John T. Cacioppo (1951–2018) was the Tiffany and Margaret Blake Distinguished Service Professor and director of the Center for Cognitive and Social Neuroscience at the University of Chicago. He was a past president of several scientific societies, including the Association for Psychological Science, the Society for Social Neuroscience, the Society for Personality and Social Psychology, and the Society for Psychophysiological Research, and a past chair of the Psychology Section of the American Association for the Advancement of Science. Among the numerous awards that he received are the Troland Award from the National Academy of Sciences, the Distinguished Scientific Contribution Award from the American Psychological Association, a Method to Extend Research in Time (MERIT) Award from the National Institutes of Health (NIH), the Scientific Impact Award from the Society of Experimental Social Psychology, the Award for Distinguished Scientific Contributions from the Society for Psychophysiological Research, and the Campbell Award and the Theoretical Innovation Prize from the Society for Personality and Social Psychology. Dr. John Cacioppo was a member of the President's Committee on the National Medal of Science during the Obama administration; the chair of the Board of Behavioral, Cognitive, and Sensory Sciences at the National Research Council; a member of the National Science Foundation Advisory Committee for the Social, Behavioral, and Economic Sciences Directorate; a former member of the Council for the NIH Center for Scientific Review; and a former member of the Council for the National Institute on Aging.

Roger Freberg

Laura A. Freberg is a professor of psychology at California Polytechnic State University, San Luis Obispo (Cal Poly SLO), where she teaches courses in introductory psychology and biological psychology. She is the author of four editions of *Discovering Behavioral Neuroscience: An Introduction to Biological Psychology* for Cengage Learning. She is the lead author for an online research methods textbook, *Research Methods for Psychological Science* (2017) and serves as Psychology Consultant to the *New York Times* InEducation program. Dr. Freberg's teaching career began more than 40 years ago, when she taught her first college course at Pasadena City College at the age of 23. She has received Faculty Member of the Year recognition from Cal Poly Disabilities Resource Center three times (1991, 1994, and 2009) for her work with students with disabilities. She enjoys experimenting with technology and social media in the classroom and collaborating with daughters Kristin Saling (systems engineering, U.S. Military Academy at West Point) and Karen Freberg (communications, University of Louisville) on a variety of research projects in crisis management and public relations, as well as in psychology. She served as president of the Western Psychological Association (WPA) in 2018–2019.

Stephanie J. Cacioppo is an Assistant Professor of Psychiatry and Behavioral Neuroscience in the University of Chicago Pritzker School of Medicine and serves as the director of the school's Brain Dynamics Laboratory. Named a "Rising Star" by the Association for Psychological Science (APS) for her innovative and "outstanding contributions to the science of psychology in the areas of research, teaching, and/or application," Dr. Steph Cacioppo is considered a world authority on emotion-driven brain dynamics and well-being. Her work focuses on the dynamics of emotions and social connections and their impact on brain health and human performance. She has a demonstrated history of working in woman's health, motivation, and neuropsychology, and with elite and everyday athletes in emotional fitness, high-performance brain dynamics, and human potential. Dr. Steph Cacioppo is also the first female president of the Society for Social Neuroscience. She has authored more than 120 scientific publications and has been interviewed by prestigious outlets like the *New York Times*, *Scientific American*, *Washington Post*, *Discover Magazine*, and *National Geographic*.

Stephanie Cacioppo

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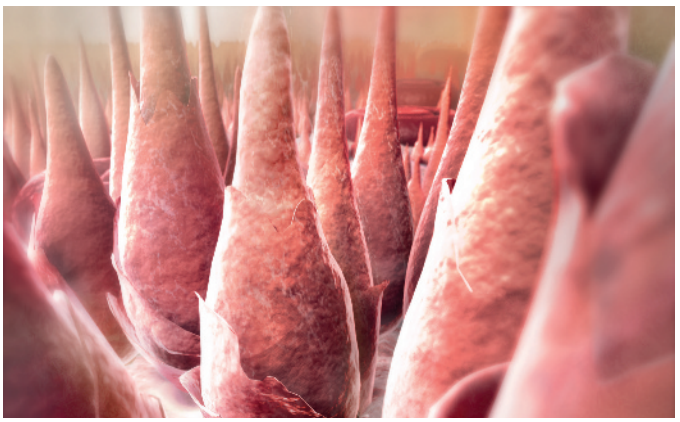

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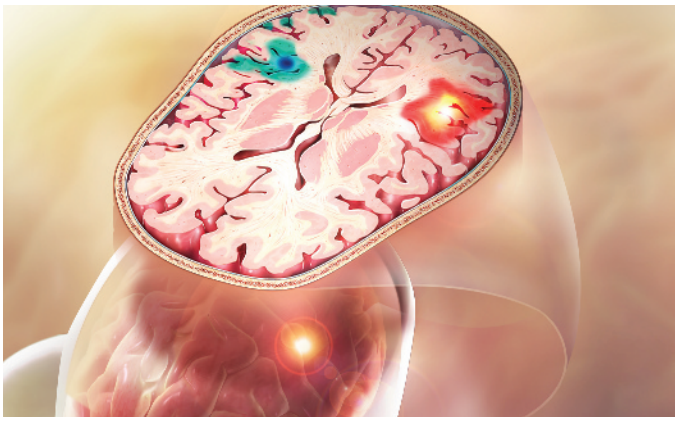

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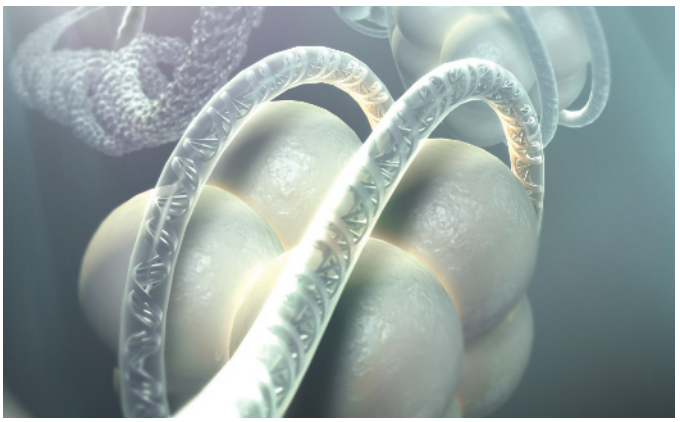

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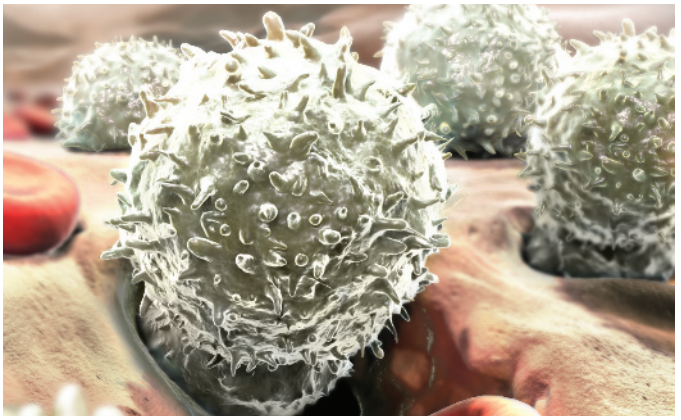

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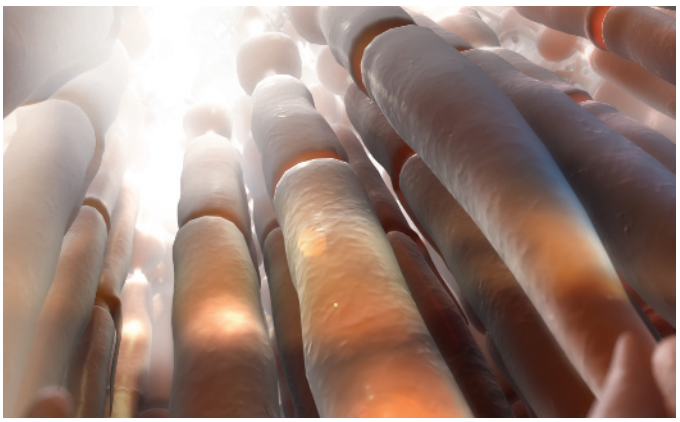

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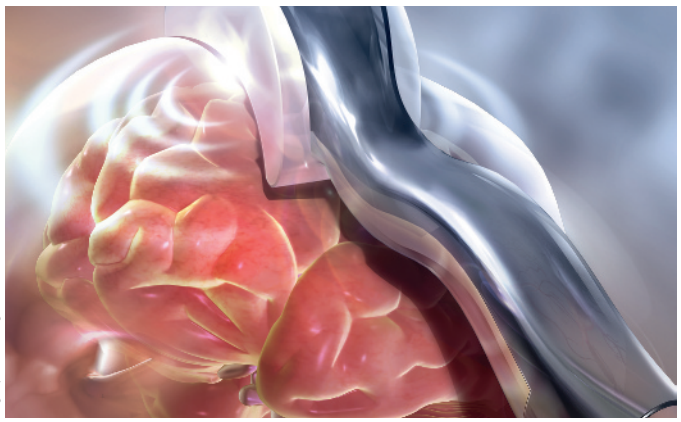

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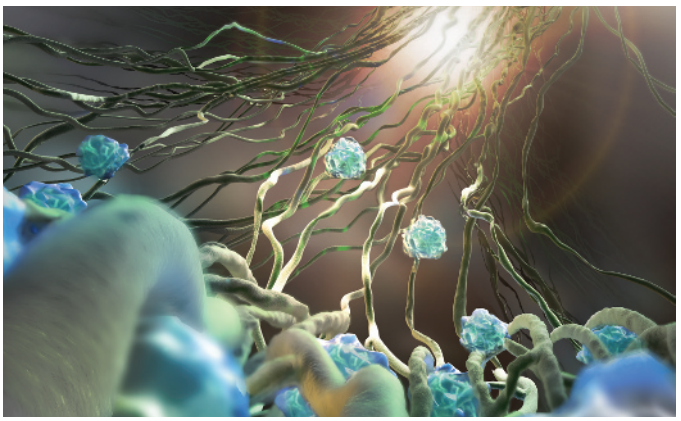

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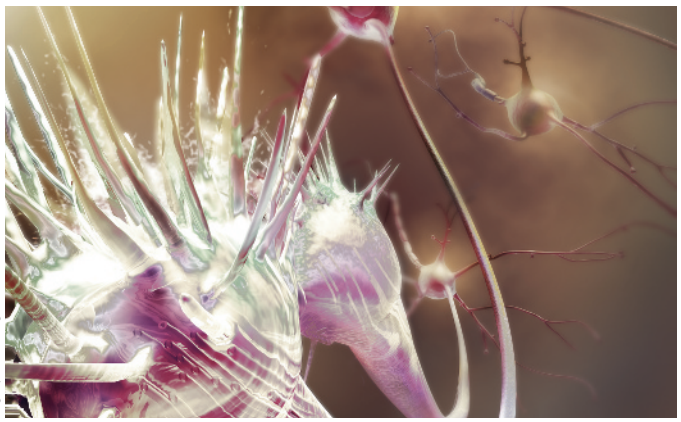

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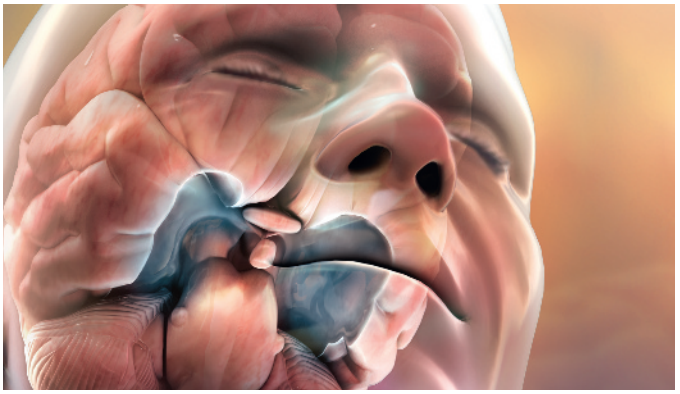

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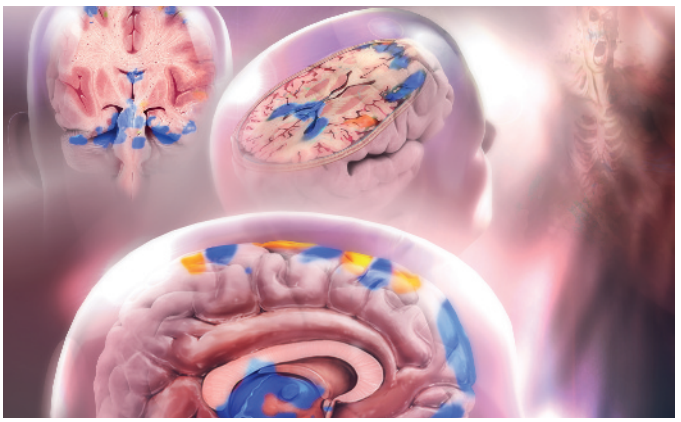

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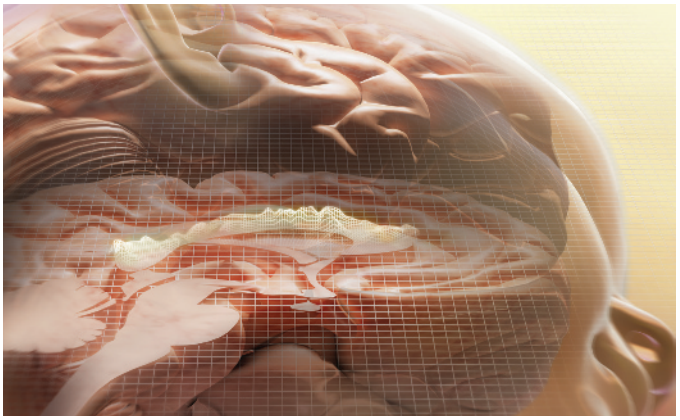

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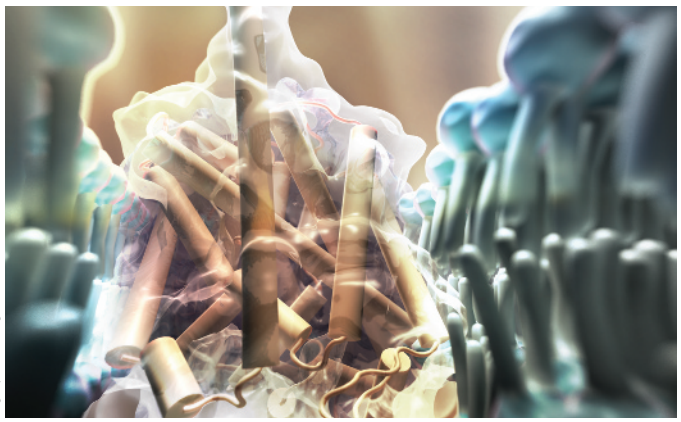

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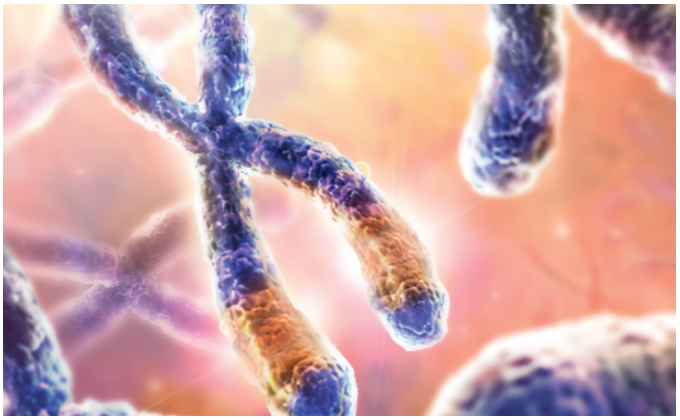

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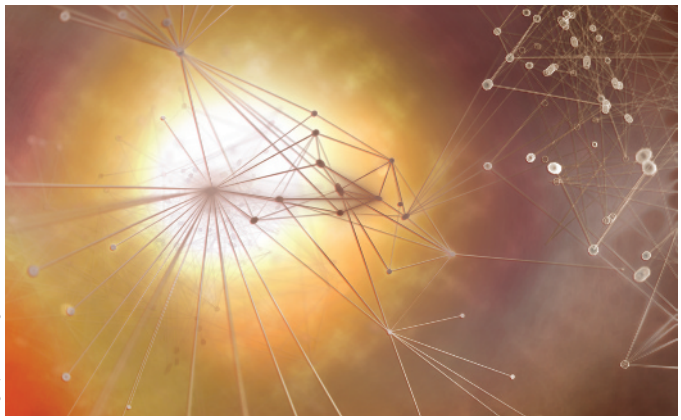

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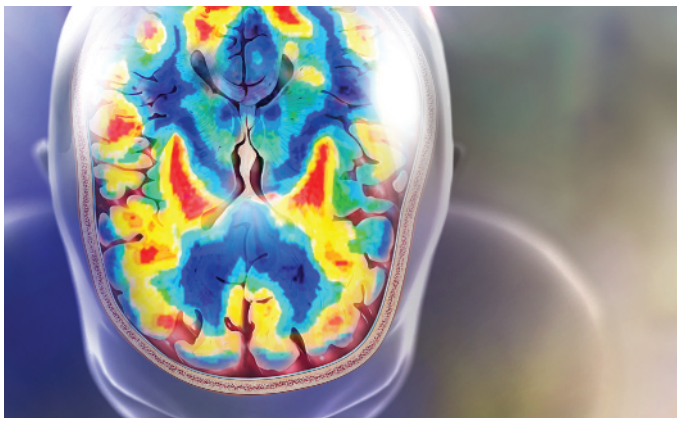

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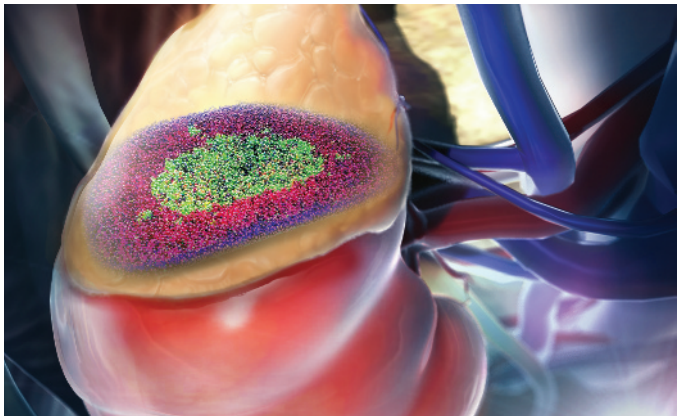

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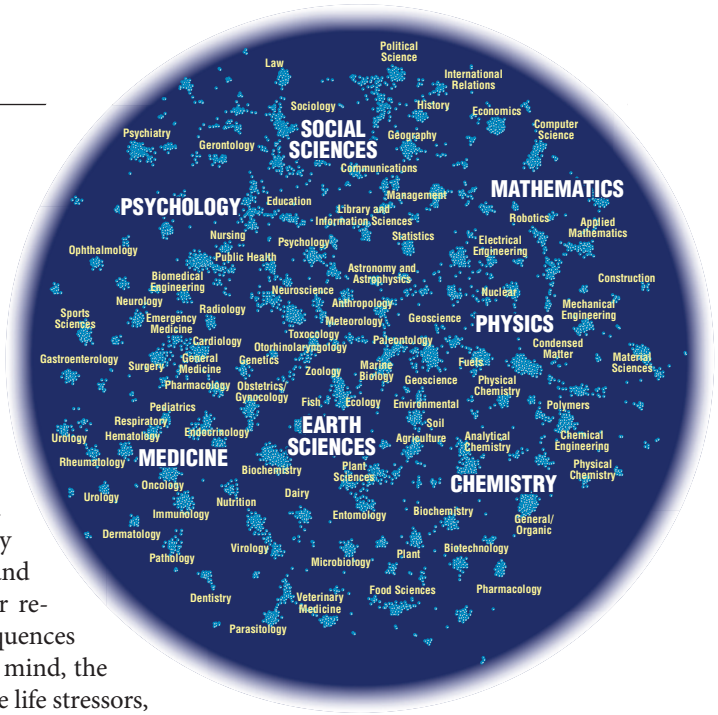
Preface



These unprecedented times call for an even better understanding of the mind than ever before. In 2020, our minds have been challenged, stressed, calmed, and stressed again. There is a need, as a society, to better comprehend the healing and connecting power of the mind to keep transforming adversity into an opportunity to grow stronger and healthier together. Over the past months, we learned that we can be physically distant yet remain emotionally connected with our friends and family—we also realized that the same situation can feel extremely friendly or extremely ostracizing—just with the power of our mind and our inner dialogue. The way we interpret a situation may drive our response to it—and in turn, our response to a situation may have consequences for our mental health and well-being. The more we understand the mind, the more we can adapt and reframe our perspectives on current and future life stressors, develop evidence-based coping mechanisms, and improve our mental well-being. This textbook offers a rare opportunity to further discover the powerful psychological science of the mind.

In line with our first edition, this fourth edition of *Discovering Psychology: The Science of Mind* is a textbook that reflects Dr. John Cacioppo's visionary mission to write a textbook as a bridge to the future. *Discovering Psychology: The Science of Mind* describes the psychological science of mind as a hub science—a discipline whose work provides foundational material for many other scientific fields and a wide range of applications from eating habits to real-world problem solving. Psychological science is also inherently interdisciplinary, and we wanted to write a textbook that presents psychology not as a series of isolated areas of inquiry, but as an integrated, holistic science of mind. Contemporary psychological science is also a global affair, and we sought to produce a textbook that draws on evidence from diverse samples of healthy participants and patients, as well as studies of animals. These goals and our implementation of them resonated with all of us: both instructors and students using our previous editions. In honor of John, we have stayed true to his mission and have attempted to expand its implementation in this, our fourth edition.

The science of psychology developed in the 20th century as a collection of loosely organized, independent subspecialties. Now, in the second decade of the 21st century, the discipline is moving rapidly toward maturity as an integrative, multidisciplinary science. Not only are psychologists forming rich collaborations with scholars in other fields, from medicine to business to education to law, but we are returning to original conceptions of psychology put forward by thinkers such as William James, who sought a complete understanding of the human mind and was not content to view psychology from narrow, isolated perspectives. We share a mutual excitement about this evolution of psychological science, and we marvel at the speed at which new developments are emerging in the theory, methods, and applications of psychological science. This fourth edition is designed to capture some of the most important developments that have emerged in recent years and to reflect the power of psychological science to help us manage the types of challenges that emerged in 2020.

For many years, the introductory psychology course has served primarily as a jumping-off point for advanced courses in the field, and the textbooks prepared to support the course have reflected this goal. Each chapter in these conventional textbooks provided a capsule of stand-alone information designed to acquaint students with the terminology and hypotheses of a single psychological perspective. Human behavior is influenced by factors across multiple perspectives, however. We see our introductory textbook as providing a unique opportunity to discuss *all* of psychology, in one place and at one time. This approach allows us to reflect on the intersections among various perspectives as they inform the whole of our understanding of the human mind. Given that most students

We see the introductory course as providing a unique opportunity to discuss all of psychology in one place and at one time.

in our introductory classes will take only this one course in the field, we have a responsibility to provide a comprehensive structure that will support their lifelong learning and understanding of human behavior.

Our goal is to engage our students in the fascinating, integrated discipline of psychological science as it exists in the 21st century, and we view the fourth edition of *Discovering Psychology: The Science of Mind* as another plank in the bridge toward this goal. The structure of the bridge is a traditional chapter organization. The piers on which the bridge rests are the foundational theories of the discipline developed in the late 19th, 20th, and early 21st centuries. The steel beams of which the bridge is composed consist of the theories and research painstakingly developed throughout the 20th century until today, and the rivets, trusses, and tie rods that hold the bridge together are integrative themes that have been reinvented in the past decade or so. Finally, the smooth roadbed that transports students across the bridge is a clear, inviting, warm, and lively writing style and visual narrative.

As active instructors in the introductory psychology classroom, we recognize the balance that busy faculty members must find between their preparation for class and their many other duties, especially while navigating an online delivery system. Our intent is to make the transition to a 21st-century textbook as seamless and effortless as possible for faculty and students alike. Our discussions of complex and emerging issues, such as epigenetics, include sufficient information and explanation to provide a sense of mastery. Clear writing, frequent examples, visual narratives, and engaging pedagogy energize students and provide the support needed for success. After completing the course, students will be able to appreciate the distinction between how laypeople and psychologists think about human behavior.

As citizens of the so-called COVID era, community leaders, influencers, and college graduates will need a firm foundation in the understanding of human behavior and critical thinking to cope with stressors and confront successfully the myriad issues of social isolation, health, privacy, free will, human dignity, public policy, and well-being that might face them again in the future. This fourth edition of *Discovering Psychology: The Science of Mind* is designed to provide that foundation.

Our Integrative and Functionalist Approach

Early writings about psychology were integrated and inclusive. Diverse elements of behavior were combined into the whole. William James (1890) cautions us about the risks of missing the big picture by breaking the phenomenon of mind into little pieces. Mental life for James was not an entity that can be "chopped up in bits" (p. 233). Despite the long-lived popularity of his dominant psychology textbook, James did not prevail. Psychology soon split into camps of scholars who viewed behavior and mental life through their own single, narrow perspectives, rarely speaking with those who held different views and producing curricula and textbooks that emphasized the parts rather than the whole. There are good reasons for specialization in science, but introductory psychology provides an opportunity to put these pieces back together. Doing so shows students how much our notions have changed regarding how the mind and behavior work, and how much this understanding can improve their lives.

As psychological science became increasingly siloed in the 20th century, its origins in the late 19th century as a unified whole were forgotten. In 20th-century introductory psychology textbooks, the writings and experiments of Wilhelm Wundt, Edward Titchener, and James are described as the discipline's prehensile tail, long ago lost and interesting only from a historical perspective. The organization of the study of mind into separate, disconnected chapters not only transformed the topics of psychology into islands without bridges, but actually built barriers to students' understanding of the connectedness among them. A memory cannot be fully understood from one isolated point of view; only when the social and personality, cognitive, biological and evolutionary, developmental, and clinical perspectives are combined can it be thoroughly grasped. James (1890, vol. 1, p. 1) warns us that when mental phenomena are

"superficially considered, their variety and complexity is such as to leave a chaotic impression on the observer." This confusion, unfortunately, is the legacy for many of our students exposed only to outdated textbooks in psychology.

Breaking from the approach of other textbooks, we reflect throughout our text on the integrative influences of the founders in our functionalist approach to the material. We seek not only to describe behavior, but also to answer questions about why a particular behavior occurs. Viewed through this lens, behavior is neither random nor unexplainable, and it shifts into focus when we consider its goals and functions. For example, people do not just experience feelings of loneliness; instead, loneliness acts as a warning signal to remind us of the importance of social connectedness.

Our book is subtitled *The Science of Mind*, and unlike other contemporary texts with their occasional references to *mind*, the word appears in each of the chapter titles, highlighting the scientific study of the nature and behavior of the theoretical construct of the mind. Throughout the book, we emphasize the relationship between rigorous scientific methods and observations, as well as the implications of these observations for competing theories about the structure and operations of the human mind.

Integration in this textbook extends in two directions, both within psychology and between psychology and other disciplines. We hope to highlight for students the many connections within the discipline of psychology, as well as its connections with other disciplines.

Implementing the Goals of Integration

Many introductory psychology textbooks are marketed as "integrated," but saying that you are integrated and actually implementing integration are two different things. We have spent a great amount of time and effort discussing ways to provide a truly integrated presentation of the science of mind.

Integration in this textbook extends in two directions, both within psychology and between psychology and other disciplines. We hope to highlight for students the many connections within the discipline of psychology, as well as its connections with other disciplines. Many introductory psychology textbooks share our goal of providing integration, but we would like to make our methods of achieving this goal explicit:

1. Within the body of each chapter, we make frequent connections to material in other chapters, forming bridges that connect subtopics. In the electronic version of the textbook, these connections will be hyperlinked for the convenience of the reader. For example, in a discussion of the causes of anxiety disorders in our chapter on psychological disorders (Chapter 14), we say:

   > A reasonable place to start looking for correlates of anxiety in brain structure and function is the fear circuit involving the amygdala, which is discussed in Chapters 4 and 7. The amygdala is particularly rich in receptors for GABA, a neurotransmitter that inhibits brain activity. As discussed in Chapter 6, drugs such as alcohol and the benzodiazepine tranquilizers (e.g., Valium) have their main anxiety-reducing effects at these GABA receptors.

2. We use frequent examples from other parts of the discipline to illustrate principles within a chapter. For example, when we discuss latent inhibition in our chapter on learning (Chapter 8), we illustrate that principle by linking to clinical research about latent inhibition, creativity, and schizophrenia and to social psychology research on prejudice.
3. We specifically identify and explore five integrative perspectives that weave the standard topics more closely together: social and personality psychology, cognition, biology and evolution, development, and clinical psychology. The need to consider major perspectives in psychology was reinforced in a report titled "Strengthening the Common Core of the Introductory Psychology Course," published in 2014 by the American Psychological Association (APA Board of Educational Affairs Working Group, 2014) and expanded upon by the APA's Introductory Psychology Initiative. In keeping with the standard organization of introductory psychology textbooks, the fundamentals of these perspectives are covered in distinct chapters, but the threads of each perspective are woven into all the chapters. These perspectives are explained in greater detail in the following section.

4. Each chapter includes eight features, which are described in more detail in a later section: Chapter Opener, Psychology as a Hub Science, Experiencing Psychology, Thinking Scientifically, Connecting to Research, Perspectives on Interpersonal Relationships, Diverse Voices in Psychology, and Psychology Takes on Real-World Problems. These features are designed to promote active learning and to increase student interest. Four of these in particular (Chapter Opener, Perspectives on Interpersonal Relationships, Psychology Takes on Real-World Problems, and Psychology as a Hub Science) also contribute to our integrative approach. In the chapter openers, we show how multiple psychological perspectives address a phenomenon by zooming in to see the biological approach and then zooming out again to gain insight from the developmental, cognitive, individual difference, social, and clinical perspectives. Each Perspectives on Interpersonal Relationships feature shows how a particular perspective colors questions about successful relationships, so by the end of the textbook, the student can see how integrating 16 approaches to a single issue enriches our understanding of a psychological phenomenon. Psychology Takes on Real-World Problems tackles the issue of the COVID-19 pandemic, highlighting research relevant to each chapter that can be applied to understanding behavior during a pandemic and developing thoughtful policy. The Psychology as a Hub Science features address the larger integration picture of where psychology stands in the context of the scientific community.

Integrative Features in Detail

Extensive literature supports the idea that an engaged and cognitively active student is more likely to master content. Although students are accustomed to textbooks, their approaches to learning have been affected by technologies that transfer information at an ever-increasing pace, with a strong emphasis on rapidly presented visual images. Consequently, it becomes all too easy to go through the motions of reading a text without really thinking about what they have read. We have incorporated the following eight features, designed to model good textbook-reading practices in students while maintaining a high level of interest and understanding.

Chapter Opener To introduce and engage interest in upcoming chapter material, many textbooks use a vignette or case study, accompanied by either a fine art piece or a photo that is not discussed further. We begin each chapter with a combination of two images—one gives the big picture, and the other gives the microview of the same topic. The chapter opener guides the student through the significance of the images. We use the terms *zoom in* and *zoom out* to emphasize the need to understand the underpinnings of a psychological phenomenon without losing the impact of its larger context. For example, in the biological psychology chapter (Chapter 4), the opening images show a woman accompanying two friends (zoom out) and a beautiful image of a white blood cell exiting bone marrow (zoom in). Does the woman feel like part of a group of friends, or does she feel left out? Depending on how she perceives her social situation, biological cascades are set in motion that prepare her immune system for fighting either the viruses found in close social contact or the bacteria that might be more of a risk when a person is solitary. The reader is drawn into the reciprocal relationships that exist between biology and behavior.

The integrative hub feature broadens the discussion of a psychological topic to include ways in which it is engaged in cooperative science with other disciplines, from medicine to the social sciences.

Psychology as a Hub Science This integrative feature broadens the discussion of a psychological topic to include ways in which psychology engages in cooperative science with other disciplines, from medicine to the social sciences. It is accompanied by a graphic adapted from a citation analysis by Boyack, Klavans, and Börner (2005) that shows psychology citations as nodes with connections to other related disciplines. Tailored to each of the 16 features, this graphic highlights the connections between psychology and the relevant disciplines of psychiatry, nursing, public health, emergency medicine, pharmacology, computer science, law, education, management, and the other social sciences. Given these connections, psychology has a central role to play in our efforts to deal with economic collapses, the spread of pandemics, energy conservation, the spread of terrorism, rising health care costs, and our crumbling educational system. For

example, cardiovascular disease is surely a medical condition, but contemporary scientists recognize that a full understanding of this killer requires consideration of psychological domains, including stress appraisal, reactivity to stressors, individual resilience, and a person's social context. Seeing the impact of psychology on many disciplines makes the introductory course relevant for students of all majors, as well as rekindling some "psych pride" in those of us in the field.

Experiencing Psychology This interactive feature provides ways for students to connect the course material to their own lives and interests. Some hands-on examples are the Epworth Sleepiness Scale in the consciousness chapter (Chapter 6), Coren's handedness scale in the biological psychology chapter (Chapter 4), the BFI-10 personality test in the chapter on personality and the self (Chapter 12), and the Hypersensitive Narcissism Scale in the chapter on psychological disorders (Chapter 14). In other cases, this feature provides longer-term opportunities for students to apply their learning, such as working to reduce the frequency of a bad habit (Chapter 8).

Thinking Scientifically This interactive feature models critical thinking skills for students by providing them with opportunities to critique the progress of science. For example, in the chapter on research methods (Chapter 2), students review the current controversies about replication in psychology. In the chapter on psychological treatments (Chapter 15), students are asked to evaluate whether autism spectrum disorder (ASD) is simply a difference or something requiring treatment.

Connecting to Research To emphasize psychology as a science, this feature explores either a classic or a contemporary study relevant to the chapter's material and comments on its significance to the field. Sections on the question, methods, ethics, results, and conclusions provide a guided introduction for the student to the essentials of the peer-reviewed literature. From Wundt's classic studies of reaction time, to the discovery of mirror neurons, to distinctions between romantic love and lust in the brain, students are given insight into what psychological scientists do.

Perspectives on Interpersonal Relationships In keeping with the integrative mission of this textbook, the goal of this feature is to demonstrate how the information in a particular chapter can be applied to a single topic—building and maintaining important relationships. This issue is personally meaningful to college students, especially first-year students, and it applies across the board—regardless of gender, race, age, ethnicity, sociocultural background, sexual orientation, or level of academic preparation. The feature has two main purposes: (1) to engage and maintain student interest throughout the text and (2) to stitch together into an integrative, thematic quilt the patchwork of traditional introductory psychology topic areas.

Diverse Voices in Psychology The American Psychological Association (APA) report on best practices for introductory psychology (Gurung et al., 2016) emphasized the inclusion of culture and diversity as a "cross-cutting theme" (p. 112). Although we concur with Trimble, Stevenson, and Worell (2003; see later discussion in this forward) regarding the need to integrate diversity across topics in an organic way, which guided all four editions of this textbook, we thought additional in-depth discussions would be useful. This feature explores timely topics such as the shooter bias (Chapter 13) and culturally competent counseling and psychotherapy with Native Americans (Chapter 15).

Psychology Takes on Real-World Problems Introductory psychology courses provide a unique opportunity to not only prepare students for continued study in psychology, but also to provide tools to majors and nonmajors alike that can be used to tackle significant human problems. Once again taking a cue from the APA's introductory psychology report, we have incorporated aspects of the "Big Problems" activity described in the report's appendix into this feature. For this fourth edition, we selected the topic of the COVID-19 pandemic, which is not only top-of-mind for today's students, but also provides opportunities to apply multiple aspects of psychological science. We provide a template for policy development, emphasizing the utility of psychological science to real-world problems. Each chapter highlights ways in which its material can be used to address the causes of and solutions to problems related to the pandemic, emphasizing the practical significance of psychological science and encouraging students to apply their learning to policy evaluation and change.

Integrative Perspectives in Detail

The separate perspectives taken by psychologists are reviewed for students in the context of the historical discussion in Chapter 1. In each subsequent chapter, we pay especially close attention to the contributions of each of the following perspectives to the topic at hand.

Social and Personality English writer and poet John Donne was correct in stating that "no man is an island." The cultural differences that are increasingly apparent as we become a more global world are a testament to how strongly social structures and processes affect the operation of factors from other perspectives. We are a social species, and much of our behavior can be understood in terms of how it maintains our social relatedness with one another. The consequences of failing to maintain connectedness are severe. For example, chronic feelings of social isolation are associated with poor mental and physical health and premature mortality, and longitudinal studies in humans and experimental studies in animals indicate that perceived isolation contributes to these outcomes. In short, feeling left out can be toxic. Behavioral systems are particularly prone to variation, and we illustrate how such variation can be regarded as a source of important data in its own right. In addition to exploring individual differences within the context of personality, we integrate this facet with other perspectives. For example, we discuss how individual differences in responses to stress are best understood by considering epigenetics, learning, and social factors.

Cognitive The human is above all else a thinking organism, and the way that we process information affects our behavior. Whether we are considering the development of behavior, learned behavior, or the aberrations of behavior that accompany psychological disorders, an understanding of how we think provides considerable insight. For example, we understand that an effective way to improve depressed people's moods is to help them restructure the way that they process information. Instead of students' thinking that flunking an exam means they are not good enough to attend college, we can encourage them to think that although flunking an exam isn't fun, it's not the end of the world either, and they can make some changes that will lead to better performance next time.

Biological and Evolutionary We believe that all introductory psychology students, even those who will never take another psychology course, will gain a better understanding of contemporary psychology in the context of the relationships between biological processes and behavior. For example, when we discuss attraction and close relationships, we mention data showing that viewing a photograph of somebody we love, as opposed to somebody we like, activates the brain's reward circuits and decreases activity in areas associated with social judgment. Not only is love somewhat socially blind, but it really does feel good. Throughout the textbook, we stress the role of evolutionary pressures in shaping both the structures and the functions of the mind. We devote a complete chapter to providing students with a foundation for understanding the interactions between genes and environment, including a basic primer on epigenetics. The importance of gene–environment interactions is woven throughout our discussion of development, but it is also highlighted in other contexts, including discussions of children's responses to being bullied.

Developmental The structures and processes of behavior, as well as behavior itself, change over time. Knowing that most children achieve a theory of mind by the age of 4 years not only is relevant to our understanding of children and their behavior, but also informs discussions of the development of language and social skills and the deficits found in individuals with autism spectrum disorder (ASD). The importance of the developmental perspective does not end in childhood either. January 1, 2011, marked the date at which the oldest of the baby boomers turned 65. From that date, about 10,000 people will turn 65 every day for the next 19 years. As a result of these demographic changes, the percentage of the U.S. population whose social role is retiree is projected to increase dramatically in the coming decades. Understanding developmental changes across the life span is therefore increasingly important.

Clinical We can understand behavior by observing what works, but it is also highly useful to see what happens when things go wrong. Just as the neuroscientist learns about normal brain function by observing changes following the damage caused by a stroke, we can learn much about behavior by observing how it changes because of a psychological disorder. For example, we consider the effects of schizophrenia on classical conditioning in the chapter on learning (Chapter 8).

Delivering Complex Content to Contemporary Learners

We were delighted to see that our first three editions were embraced by faculty working with students representing a wide range of preparation, from community colleges to elite, private universities, as well as by international faculty teaching students with first languages other than English. Our teaching philosophy rejects the common construct of a textbook "level." Instead, we believe that all students can master complex content if it is presented in the right way.

As this text goes to press, we are unsure about the direction institutions will take regarding virtual versus face-to-face instruction. As active instructors of introductory psychology, we have shared the journey of many of our colleagues as we navigate the online teaching space. One of our authors (LF) has more than ten years of experience in a completely online environment (Argosy University Online), and we have attempted to keep the needs of online students and instructors top of mind as we revise this latest edition. Many students and faculty are using electronic text resources for the first time, and we are hearing concerns about screen fatigue and other perceived challenges of this medium. Developing an electronic version of a text is not about converting a print book to pdf files. Instead, proactive strategies such as breaking material into reasonable sections and providing sufficient illustrations work for both print and electronic versions alike.

Student-Friendly Writing and Pedagogy

Our goal in writing this textbook is to provide students with the best science possible, which means that we do not avoid complex topics or dumb down the material.

To make psychological science accessible to students with wide ranges of preparation, we rely on a student-friendly writing style with supportive pedagogy. We break chapters into meaningful chunks, and we use thumbnail images of chapter photos and figures in our summary tables as a mnemonic device that students can use to recall where they read about a topic. Margin definitions and carefully selected key terms help the students focus their learning.

One of our reviewers had this to say about the first chapter of our textbook, which can be one of the most difficult to write: "I am impressed with the History of Psychology chapter in Cacioppo/Freberg. The figures, timeline, interesting AND relevant pictures, and examples throughout the text are fantastic and engaging. It is one of the best history/intro chapters I've read." This reviewer also noticed another one of our goals—to use all photos and figures as teachable moments, not just repetitions of the narrative or pretty placeholders.

Implementation of Guidelines for "Inclusive Psychology"

Today's college and university students represent a wide range of diverse demographic variables, and these variables should be reflected thoughtfully in the textbooks that they read. As this textbook goes to press, issues of diversity and fairness are especially salient in our conversations and news reports. On behalf of the APA, Trimble, Stevenson, and Worell (2003) provided considerable guidance to textbook authors and publishers regarding opportunities for including diversity content in an introductory psychology textbook. They focus on the following types of diversity: age, culture, race/ethnicity, gender, disability, language, and sexual orientation. Gurung et al. (2016, p. 112), also writing on behalf of the APA, emphasized the need to present culture and diversity as "cross-cutting themes" throughout the introductory psychology course. We have used these papers as a blueprint for incorporating the dimension of diversity in our textbook.

We adamantly concur with Trimble et al. (2003, p. 2) when they state, "Culture, race/ethnicity, gender, disability, sexual orientation, language, and age can be integrated into the main text of every textbook chapter. Highlighting these issues only in special sections or boxes fosters the continued marginalization of members of nondominant groups." We incorporate diversity issues seamlessly throughout the narrative and in illustrations and examples. For example, while

we note that Roland Fryer was the youngest African-American professor to obtain tenure at Harvard University, we do so in the context of how his childhood and youth shaped his approaches to educational incentives within a discussion of motivation. Although Trimble et al. (2003) appear to dislike feature boxes, we have found it useful to augment the discussion of culture and gender in the narrative by highlighting special topics in our *Diverse Voices in Psychology* feature. We believe that this combination represents the antithesis of the biggest concern raised by Trimble et al. (2003)—isolated, disconnected discussion of diversity in boxes alone.

Trimble et al. (2003) provide extensive, detailed suggestions for specific content, such as inclusion of stereotype threat and gender and cultural issues in eating disorders, that we have found useful. For interested faculty and students, we have a comprehensive, separate document with chapter and page references indicating how we have implemented these recommendations. Please feel free to email lfreberg@calpoly.edu to obtain a copy.

In addition, great care has been taken to adhere to APA standards on language. The illustrations feature individuals of diverse races, ethnicities, ages, abilities, and gender. When possible, they show people in a positive light (e.g., no sad older adults feeding pigeons) and avoid traditional depictions (e.g., male therapist helping female client). Large numbers of illustrations feature cross-cultural examples. Cross-cultural research is featured whenever possible, such as global studies of subjective well-being.

A Complete Course—Teaching and Learning Supplements

A rich array of supplements accompanies Cacioppo/Freberg/Cacioppo's *Discovering Psychology: The Science of Mind*, 4th edition, including several that make use of the latest technologies. These supplements are designed to make teaching and learning more effective. Many are available free to professors or students. Others can be packaged with this textbook at a discount. Contact your local sales representative for more information on any of the listed resources.

MindTap

MindTap for *Discovering Psychology: The Science of Mind* creates a unique learning path that fosters increased comprehension and efficiency. It engages students and empowers them to produce their best work—consistently. In MindTap, course material is seamlessly integrated with videos, activities, apps, and more.

For students:

- MindTap delivers real-world relevance with activities and assignments designed to help students build critical thinking and analytical skills that can be applied to other courses and to their professional lives.
- MindTap serves as a single destination for all course materials so that students can stay organized and efficient and have the necessary tools to master the content.
- MindTap shows students where they stand at all times—both individually and compared to the highest performers in the class. This information helps to motivate and empower performance.

In MindTap, instructors can do the following:

- **Control the content.** Instructors select what students see and when they see it.
- **Create a unique learning path.** In MindTap, the *Discovering Psychology: The Science of Mind* text is enhanced with multimedia and activities to encourage and motivate learning and retention, moving students up the learning taxonomy. Materials can be used as is or modified to match an instructor's syllabus.
- **Integrate their own content.** Instructors can modify the MindTap Reader using their own documents or pulling from sources like Rich Site Summary (RSS) feeds, YouTube videos, websites, Google Docs, and more.

- **Follow student progress.** Powerful analytics and reports provide a snapshot of class progress, time students spend logging into the course, and completion to help instructors assess level of engagement and identify problem areas.

The Instructor Companion Site

The Instructor Companion Site for this title includes an *Instructor's Resource Manual*, which provides a wealth of teaching tips and classroom resources; *Cengage Learning Testing Powered by Cognero* featuring questions correlated to learning objectives, Bloom's taxonomy level, and difficulty; and *PowerPoint slides* providing concept coverage with dynamic animations, photographs, and video.

Changes in the Fourth Edition

An obvious change in the fourth edition is the addition of Steph Cacioppo to our author team. Steph not only collaborated closely with John (they shared a desk), but she brings her own unique perspectives as a licensed clinician to the textbook.

Progress in psychological science continues to move forward at a blistering pace, and this fourth edition has been updated to include many new photos and figures and several hundred new references that reflect the advances in the field since the last edition went to press.

A sample of the content updates and revisions to each chapter include the following:

Chapter 1 The Science of Mind: The Discipline of Psychology

- Expands ties between the textbook and the pillars and cross-cutting themes recommended by the APA Introductory Psychology Initiative.
- Added new section explicitly outlining the advantages of studying psychology for contemporary students.
- Expanded discussion of perspectives to include APA divisions that are not typically covered in intro psychology textbooks.
- Includes a table of common myths in psychology.
- Refreshed the *Psychology Takes on Real-World Problems* feature (cyberbullying in 3e) to a discussion of pandemics. Includes specific information on policy development.

Chapter 2 The Measure of Mind: Methods of Psychology

- Updated discussion of confirmation bias.
- Added section on "truthiness" or how we can be fooled into thinking false information is true.
- Updated section on hypothesis testing and the null hypothesis.
- Expanded discussion of quasi-experiments.
- Expanded discussion of correlations and mistakes in interpretation.
- Updated discussion of descriptive statistics and central tendency with new examples.
- Updated and clarified discussion of statistical significance and effect sizes.
- Refreshed *Experiencing Psychology* feature to the use of critical thinking to evaluate popular press reports of scientific findings. The example used is a report about depression and social media use.
- Updated the *Hub Science* feature to discuss the development of factor analysis.
- The *Psychology Takes on Real-World Problems* feature discusses the application of the research methods covered in the chapter to a specific question with policy implications: Why do people wear masks in some situations and not others?

Chapter 3 The Evolving Mind: Nature and Nurture Intertwined

- Emphasized application of genetics to understanding of causes of psychological disorders and their potential treatments.
- Discussed rates of gene expression as differentiating between species, e.g. humans and other primates.
- Clarified discussion of heritability.
- Uses a study about blood type and risk of COVID-19 severity to illustrate genome-wide association studies (GWAS).
- Updated Flynn effect discussion.
- Refreshed *Experiencing Psychology* feature with an activity for identifying your cat's genome related to length of fur and fur coloring.
- Reformatted Warrior Gene *Thinking Scientifically* feature to include critical thinking questions discussed in Chapter 2.
- Refreshed *Real-World Problems* feature with a discussion of the impact of genetics on responses to social distancing recommendations.

Chapter 4 The Biological Mind: The Physical Basis of Behavior

- Refreshed *Thinking Scientifically* feature to discuss eye movement desensitization and reprocessing therapy (EMDR).
- Updated *Hub Science* feature to discuss the use of neuroscience in courts to assess "dangerousness" at parole hearings.
- Refreshed *Real-World Problems* feature to cover social distancing, loneliness, and the brain.

Chapter 5 The Perceiving Mind: Sensation and Perception

- Inclusion of ganglion cells related to circadian rhythms and sensitivity to brightness.
- Added discussion of perfect pitch and autism spectrum disorder.
- Inclusion of a "hermunculus," or an attempt to map parts of the body to the sensory cortex in females (instead of the traditional homunculus, or male version).
- Update of *Diverse Voices* feature to include new research on culture and vision.
- Perceptions of taste and culture—including crispy tarantulas!
- Refreshed *Real-World Problems* feature to look at social distancing and the perception of threat.

Chapter 6 The Aware Mind: Elements of Consciousness

- Expanded coverage of the default mode network (DMN) relative to conditions such as autism spectrum disorder.
- Update on "social jet lag."
- Update on sleep spindles, learning, and Alzheimer's disease.
- Update on screen time and insomnia.
- Update on brain death.
- Update on LSD's mode of action.
- Update on opioid epidemic.
- Refreshed *Connecting to Research* feature with discussion of the effects of psychedelics on consciousness.

- Refreshed *Thinking Scientifically* feature to discuss the potential for using hallucinogens in therapy.
- Refreshed *Real-World Problems* feature with discussion of sleep during a pandemic.

Chapter 7 The Feeling Mind: Emotion and Motivation

- Added discussion of "power posing" and its replication issues to the facial feedback section.
- Added discussion of somatic markers (without using that term, however).
- Updated section on female sexual interest.
- Updated section on genetics and sexual orientation with discussion of the important Ganna et al. (2019) GWAS study.
- Expanded discussion of achievement motivation.
- Added application of Maslow's hierarchy of needs to understanding behavior during COVID-19.
- Refreshed *Thinking Scientifically* feature with a discussion of participation trophies and motivation.
- Refreshed *Real-World Problems* feature with discussion of COVID-19 and motivational priorities.

Chapter 8 The Adaptive Mind: Learning

- Expanded discussion of operant conditioning applications to spanking practices and behavior in HOV lanes.
- Discussion of classical conditioning and opioid overdose.
- Expanded *Hub Science* feature on taste aversion and endangered species to include the marbled murrelet and the quoll in addition to the Mexican wolf.
- Refreshed *Thinking Scientifically* feature to discuss appropriate ways to praise children.
- Refreshed *Real-World Problems* feature to discuss whether people can learn to be less lonely during social distancing.

Chapter 9 The Knowing Mind: Memory

- Added discussion of reconsolidation following retrieval.
- Added discussion of caffeine and memory.
- Added discussion of interleaving to study skills recommendations.
- Refreshed *Thinking Scientifically* feature with a discussion of taking notes longhand or using a computer.
- Refreshed *Real-World Problems* feature with discussion on compliance with social distancing and working memory.

Chapter 10 The Thinking Mind: Thinking, Language, and Intelligence

- Updated discussion of neuromarketing.
- Expanded discussion of rumination in problem solving.
- Update and revision of section on heuristics.
- Added explicit best practices for decision making.
- Update and revision of section on dyslexia.
- Update and revision of section on bilingualism and multilingualism.
- Revision of section on emotional and social intelligence.
- Update and revision of section on brain structure and intelligence.

- Updated section on giftedness with discussion of acceleration effects.
- Updated *Thinking Scientifically* section on baby videos, e.g. Baby Einstein.
- Refreshed *Real-World Problems* section with a discussion of the availability heuristic and COVID-19.

Chapter 11 The Developing Mind: Life Span Development

- Update on teratogens, including acetaminophen (Tylenol/Anacin), and ADHD and autism spectrum disorder.
- Addition of research on COVID-19 effects on the fetus.
- Revision of discussion of sex chromosomes and intersex.
- Added discussion of research on infant's understanding of social power.
- Expanded discussion of attachment to include cross-cultural data and correlations with adult romantic attachments.
- Expanded discussion of indulgent parenting, which has become more common in recent years.
- Addition of other theories of moral reasoning following Kohlberg's.
- Addition of stage of emerging adulthood, with contrasts to adolescence and young adulthood.
- Update and revision of cognitive changes in later adulthood.
- Refreshed *Relationships* feature with a discussion of a "perfect" time to get married.
- Refreshed *Real-World Problems* feature with a discussion of pandemic anxiety across the lifespan.

Chapter 12 The Individual Mind: Personality and the Self

- Updated discussion of serotonin transporter gene and culture.
- Added discussion of ambiverts.
- Updated discussion of genetics, brain structure, and personality.
- Updated discussion of personality assessment to reflect changes in the most recent version of the MMPI.
- Updated discussion of gender, race/ethnicity, and self-esteem.
- Updated discussion of individualistic versus collectivistic cultures.
- Refreshed *Diverse Voices* feature with discussion of diversity and personality assessment.
- Refreshed *Real-World Problems* feature with discussion of personality and responses to a pandemic.

Chapter 13 The Connected Mind: Social Psychology

- Updated discussion of first impressions.
- Revised section on the neuroscience of cognitive dissonance.
- Added section on the neuroscience of persuasion.
- Expanded discussion of social identities.
- Expanded section on reducing prejudice.
- Updated and expanded *Hub Science* feature on social media and fake news, including explicit hints for avoiding belief in fake news stories.
- Refreshed *Thinking Scientifically* feature with a discussion of brain damage and criminal behavior.
- Refreshed *Real-World Problems* feature to discuss persuasion during a pandemic.

Chapter 14 The Troubled Mind: Psychological Disorders

- Included update on the 11th edition of ICD.
- Update of causal factors related to autism spectrum disorder.
- Expanded discussion of schizophrenia to include saccade differences.
- Added discussion of oxidative stress in bipolar disorder.
- Update of learned helplessness and major depressive disorder section to reflect Maier and Seligman's (2016) rethinking of the original experiments.
- Added discussion of genetics in height phobia.
- Update of discussion of culture in social anxiety.
- Update of biological correlates of OCD.
- Update on causal factors and PTSD.
- Update of biological correlates of antisocial personality disorder.
- Refreshed *Thinking Scientifically* feature with discussion of cannabis and psychosis.
- Refreshed *Diverse Voices* feature with discussion of culture, race, ethnicity, sexual orientation, and suicidality.
- Revised and updated *Hub Science* feature on leadership and psychopathy.
- Refreshed *Real-World Problems* feature with discussion of COVID-19 and OCD.

Chapter 15 Healing the Troubled Mind: Therapy

- Updated discussion of life coaching.
- Added discussion of transcranial direct electrical stimulation for the treatment of auditory hallucination.
- Update on research about the efficacy of antidepressant medications.
- Revised section on treatment of PTSD.
- Refreshed *Diverse Voices* feature with a discussion of psychotherapy with Native Americans.
- Refreshed *Thinking Scientifically* feature with a discussion of neurodiversity versus disorder/disability in autism spectrum disorder. This includes Simon Baron-Cohen's "4 D's": disorder, disability, difference, and disease.
- Refreshed *Real-World Problems* feature with a discussion of online therapy during COVID-19.

Chapter 16 The Healthy Mind: Stress and Coping, Health Psychology, and Positive Psychology

- Added discussion of stress and COVID-19.
- Added discussion of robotic pets as stress reducers for patients with Alzheimer's disease.
- Expanded discussion of vaping.
- Expanded discussion of loneliness interventions.
- Updated culture and health section with data regarding COVID-19.
- Expanded positive psychology section to include PERMA model.
- Revised happiness discussion with latest world happiness data.
- Expanded discussion of the "meaningful life" and happiness.
- Revised *Thinking Scientifically* feature on parenting and happiness.
- Refreshed *Real-World Problems* feature to discuss resilience during a pandemic.

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Taste buds contained in the papillae of the tongue are far more responsive to bitter tastes than to sweet tastes.

Argosy Publishing, Inc.

1

The Science of Mind

THE DISCIPLINE OF PSYCHOLOGY

LEARNING OBJECTIVES

1. Identify the five in-depth perspectives of psychology and explain how integrating these perspectives leads to a more comprehensive and accurate view of behavior and mental processes.
2. Explain why issues of diversity and ethics are important to explore across all topics in psychology.
3. Explain the contributions of philosophy and the natural sciences to our understanding of modern psychology.
4. Describe how early movements in psychology are significant for modern psychology.
5. Discuss the importance of the scientific method as a foundation for psychology.
6. Explain why psychology's role as a hub science supports applications in many academic fields, contributes to the solutions of critical contemporary problems, and informs the development of public policies.

STUDYING THE SCIENCE OF PSYCHOLOGY CAN lead you to see yourself and other people in completely new ways. Hundreds of years ago, people believed that the world was flat and the Sun and stars circled the Earth. Careful scientific research slowly dispelled these inaccurate notions. Nonetheless, we hold tightly to many equally false commonsense beliefs about the human mind and behavior. We all "know" that opposites attract, but we also "know" that birds of a feather flock together—so why do we need psychology to tell us what we already "know"? The problem is that both statements cannot be true at the same time, so the real state of affairs is neither obvious nor simple. Just as careful science was required to understand our planet's place in the universe, the same scientific techniques are providing us with a more accurate, complete view of the human mind.

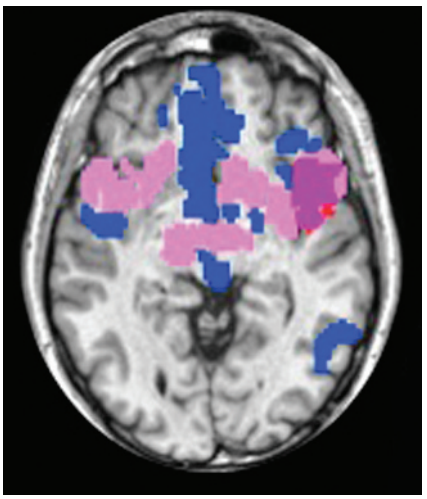
Let's begin with a seemingly simple and familiar example: our ability to taste. We know a lot about taste—what we like or dislike, the different qualities of taste, and so on. Most of us can taste sweetness in a solution made of 1 part sugar and 200 parts water. As remarkable as this sensitivity appears to be, however, people can detect 1 part bitter substance (like quinine or the chemicals in broccoli) in 2 million parts water. This contrast in taste sensitivity between sweet and bitter does not reflect the actual difference between sweet and bitter substances—that is, bitter tastes are not 10,000 times stronger than sweet tastes—but rather how we experience them. Why would we have such a vast difference in sensitivity between these types of tastes?


Masterfile

Our personal experience of taste does not help us much in answering this question, but psychological science can. As it turns out, our greater sensitivity to bitter tastes is highly adaptive: Most poisons or toxins taste bitter, and if you want to stay alive, it is more important to avoid swallowing poison than to enjoy something sweet. Being far more sensitive to tastes that are

Can you tell whether you're experiencing lust or romantic love? *Introspection* is the personal observation of our own thoughts, feelings, and behaviors. Because we are not perfect observers of the operations of our own minds, psychologists developed other methods that provide scientific insight into the mind. In this functional magnetic resonance imaging (fMRI) scan, areas of the brain that were more active when participants were feeling lust are shown in blue and areas that were more active when people are experiencing feelings of romantic love are shown in pink. Through technology, researchers can better understand complex behaviors like love and lust.

From https://news.uchicago.edu/story/researchers-find-brains-sweet-spot-love-neurological-patient



Source: University of Chicago Office of Communications

bitter is a trait that has served our species well because it helps us avoid eating things that could kill us. Psychology helps us understand why we do the things we do by providing a context for understanding the mind and behavior.

To gain that understanding, psychology addresses questions from the multiple scientific perspectives discussed in this chapter. One can think of this like the zoom feature in Google Earth. In some parts of this textbook, we will zoom in on human behaviors, like looking at the highly magnified image of the papillae on the tongue (pictured on page 2), which allow us to taste, and trace the messages about taste sent from the tongue to the brain. At other times, we'll zoom out, to take in the larger picture and better understand why the boy on the previous page is giving his bitter-tasting broccoli a skeptical look.

To begin, we can look at the little boy's reaction to his broccoli from a developmental perspective, which tells us that children are more sensitive to taste than adults. Using a biological perspective, we can trace the neural mechanisms responsible for taste sensitivity. Or, using the social perspective, we can think about social influences like culture on food preferences. Cottage cheese, enjoyed by many Americans, is viewed with disgust in some other parts of the world. Meanwhile, deep-fried tarantulas, a delicacy in Cambodia, might not be a popular item in the United States.

Although single perspectives tell us a great deal about a phenomenon like our sensitivity to bitter tastes, no one perspective gives us a complete answer. The best view comes from putting multiple perspectives together. You can learn about your house by zooming in on it in Google Earth, but when you see how your home fits into the larger context of city, state, country, and planet, that viewpoint adds something special to your understanding.

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We'll start by learning more about psychology's main perspectives, along with a little background about their origins. Our approach to these perspectives is consistent with contemporary recommendations for teaching introductory psychology

made by the American Psychological Association (e.g., Gurung et al., 2016). Once we understand these perspectives, we'll be in a better position to see how they come together to give us the big picture.

What Is Psychology?

Psychology is the scientific study of the **mind**, which includes thought, emotion, and behavior. A quick look at this textbook's table of contents will show you the variety of approaches to mind that you will encounter, such as the thinking mind (cognitive psychology) and the troubled mind (abnormal psychology).

The word *psychology* is a combination of two Greek words: *psyche* (or *psuche*), or "mind," and *logos*, meaning "the objective study of." Literally translated, therefore, **psychology** means "the objective study of the mind." Today, we define psychology as the scientific study of behavior, mental processes, and brain functions.

The phrase "behavior, mental processes, and brain functions" has undergone several changes over the history of psychology. *Behavior* refers to any action that we can observe. For many years, our definition stopped at this point. The more recent addition of *mental processes* and *brain functions* to our definition was made possible by the development of improved research methods. Early efforts to study mental processes were generally unsatisfactory because they relied on the use of **introspection**, or the personal observation of your own thoughts, feelings, and behaviors. Because it is difficult for others to confirm your introspections, this subjective approach does not lend itself well to the scientific method. If you say that you are in

mind The brain and its activities, including thought, emotion, and behavior.

psychology The scientific study of behavior, mental processes, and brain functions.

introspection A personal observation of your own thoughts, feelings, and behavior.

PSYCHOLOGY AS A HUB SCIENCE

Why Is Psychology a Hub Science?

MOST READERS OF THIS BOOK are not pursuing careers in psychology, so how will this material help you in your chosen career? Psychology is all about people, and nearly all occupations require an understanding of people and their behavior. An architect cannot design a functional space without considering how people respond to being crowded. An attorney cannot cross-examine a witness without an understanding of memory, motivation, emotion, and stress. A teacher cannot encourage students to reach their potential without an understanding of child development and learning. Business leaders and economists cannot predict the movements of markets without understanding the minds making the relevant decisions. The study of psychology, then, provides you with better insight into and understanding of many occupations and fields of study.

You probably have seen applications that allow you to map your friendship networks on social media, with shorter links indicating greater connectivity and larger bubbles indicating more overlapping friendships with another person. Kevin Boyack and his colleagues generated a similar map of the sciences (see ● Figure 1.1) but used reference lists in journal articles instead of friendship networks (Boyack et al., 2005). The resulting map shows the extent to which each of the sciences are influential and what other sciences they most influence. Boyack and colleagues referred to the most influential sciences as hub sciences. Their analysis shows that psychology is one of the seven major hub sciences, with strong connections to the medical sciences, the social sciences, and education. In the upcoming chapters of this book, we will highlight these connections with examples that are relevant to each particular chapter. ■

FIGURE 1.1

Psychology as a Hub Science. This map of science was generated by comparing citations from more than 1 million papers published in more than 7,000 journals since 2000. Psychology appears among the seven major areas of science, indicated in the map by a different font. The other six major areas are social sciences, mathematics, physics, chemistry, earth sciences, and medicine.
Source: Adapted from K. W. Boyack, et al. (2005). "Mapping the Backbone of Science," *Scientometrics, 64*(3), 351–374. With kind permission from Springer Science1Business Media.

love, how can anyone else know whether your observation is accurate? In addition, your mind and behavior are governed by many processes of which you are unaware. Fortunately, innovations in the methods used to investigate brain activity and behavior, such as brain imaging technologies, have allowed psychologists to revisit the question of mental processes and brain functions with greater objectivity and success.

Why Do We Study Psychology?

The empiricist philosophers had a profound influence on the foundations of American political thought—that all of us are created equal. For generations, Europe had been ruled by people who were born into positions of power instead of earning the privilege of leading through hard work and education. If knowledge is not innate or inborn, any of us can learn enough to grow up to be president.

You have plenty of company while taking this course. Between 1.2 and 1.8 million undergraduates in the United States enroll in introductory psychology each year, not to mention the 30% of high school graduates who have already completed a psychology course (American Psychological Association [APA], 2019; Gurung et al., 2016). Increasing numbers of students outside the United States share your journey. Today, the United States is home to only 21 to 24% of the world's psychologists, down sharply from 80% in the 1980s (Takooshian et al., 2016).

What do all of these people hope to gain by studying psychological science? We recognize that introductory psychology is often a required course, but we hope that before too long, you will see many benefits more important than the ability to check a box:

- Among the many advantages of studying psychology is a deeper understanding of ourselves as individuals and of the people around us. One of the major themes of this textbook is the social nature of the human species and the importance of social connectivity to our health and well-being. We can all benefit from improved self-knowledge and social skills.
- Psychology provides many opportunities to improve your critical thinking skills, a necessity in an era of "fake news" and a highly prized skill among employers.
- As you will see in our chapter sections on real-world problems, psychology can make contributions to the understanding of and solutions to many pressing contemporary issues, from pandemics and social justice to poverty and climate change.
- Psychology can answer many questions that we ask out of simple curiosity. People behave in interesting ways, and we often find ourselves asking, "Why?" What questions do you have about human behavior?

Many students mistakenly believe that they don't "need" a course in psychology, because they already have a good understanding of human behavior. We are not saying that your understanding of others is poor, but by studying psychological science, all of us can improve our knowledge. See how many of the common myths listed in Table 1.1 you or others you know believe.

Have you ever wondered why people in elevators stand facing the doors and watching the numbers? Psychologists explain this behavior in terms of personal space, or the imaginary bubbles we keep around ourselves that strangers should not invade. When our personal space is violated by necessity, as in a crowded elevator, we cope by pretending nobody else is really there.

Air Images/Shutterstock.com

TABLE 1.1

Ten Common Myths about Human Behavior
1. We only use 10% of our brains.
2. Some people are left-brained while others are right-brained.
3. Playing Mozart to infants makes them more intelligent.
4. Hypnosis improves your memory.
5. Students learn better when instruction matches their individual learning styles.
6. Lie detector (polygraph) tests are accurate.
7. Low self-esteem is a major source of personal and societal problems.
8. The teen years are typically disruptive.
9. Memory for traumatic events is usually poor.
10. In romantic relationships, opposites attract.

Lilienfeld, S. O., Lynn, S. J., Ruscio, J., & Beyerstein, B. L. (2009). *50 great myths of popular psychology.* Hoboken, NJ: Wiley-Blackwell.

Where Did Psychology Originate?

Psychology is a relatively young discipline, dating only to the 1870s. However, topics that interest modern psychologists go back much farther in the history of human thought. People living as long ago as 6000 to 5000 BCE in Assyria described their dreams (Restak, 1988). Among these accounts are descriptions of being chased, which are still among the most common dreams that people experience (Nielsen et al., 2003). See ● Figure 1.2 for common dream themes.

The psychology family tree is a hybrid with two major roots: **philosophy** and the **natural sciences**. Psychologists answer questions traditionally posed by philosophers using scientific research methods of the natural sciences, described in more detail in Chapter 2.

philosophy The discipline that systematically examines basic concepts, including the source of knowledge.

natural sciences Sciences that study the physical and biological events that occur in nature.

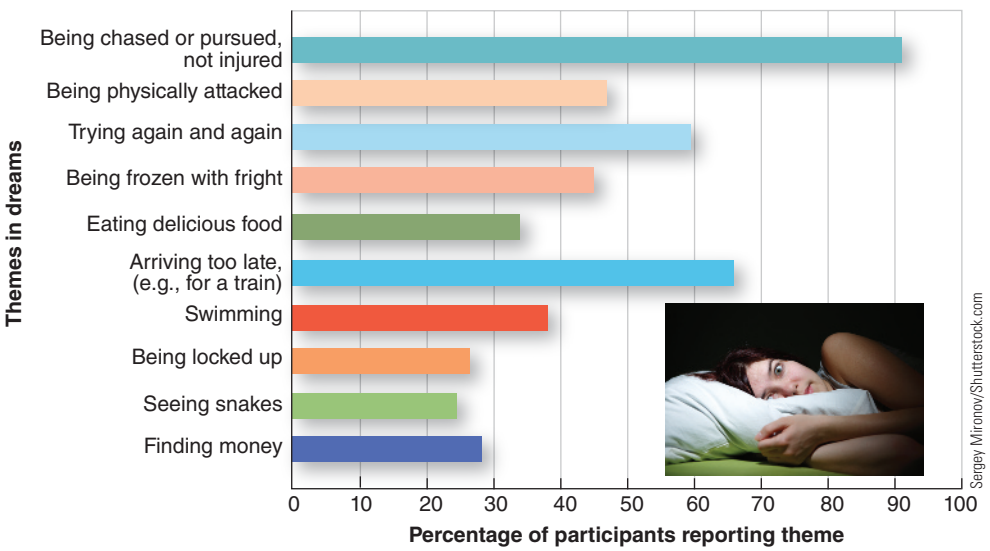
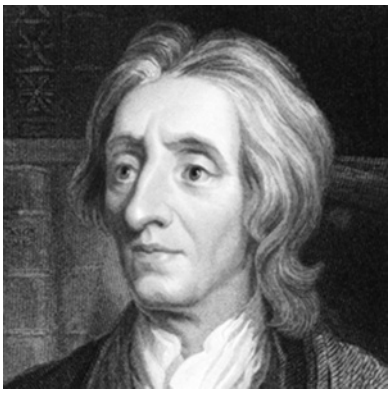


FIGURE 1.2

Many People Report Dreams with the Same Themes. Although we don't understand why we dream about certain things, many people report similar themes in their dreams.
Source: Adapted from T. A. Nielsen, et al. (2003). "The Typical Dreams of Canadian University Students," *Dreaming, 13*, 211–235. doi: 10.1023/B:DREM.0000003144.40929.0b

(a) www.BibleLandPictures.com/Alamy Stock Photo



(b) Georgios Kollidas/Shutterstock.com

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One of the most significant questions shared by philosophy and psychology asks whether the mind is inborn or is formed through experience. (a) Philosophers beginning with Aristotle (384–322 BCE) believed that all knowledge is gained through sensory experience. (b) Beginning in the 17th century, this idea flourished in the British philosophical school of *empiricism*. Empiricists, like John Locke, viewed the mind as a "blank slate" at birth, which then was filled with ideas gained by observing the world. (c) Contemporary psychologists believe that experience interacts with inborn characteristics to shape the mind. Intelligence, for example, is influenced by both genetics and experience. During the 1970s, Romanian orphans adopted at young ages recovered from the effects of their seriously deprived social circumstances, but those who endured years of deprivation had more severe cognitive deficits (Ames, 1997).

New York Public Library/Science Source

Ancient people might have attempted to cure headaches, seizures, or psychological disorders by drilling holes in the skull. Bone growth around the hole indicates that some patients survived the procedure. Surprisingly, some people today engage in DIY trepanation, a practice that obviously concerns the medical community ("Doctors warn of the dangers of trepanning," 2000).

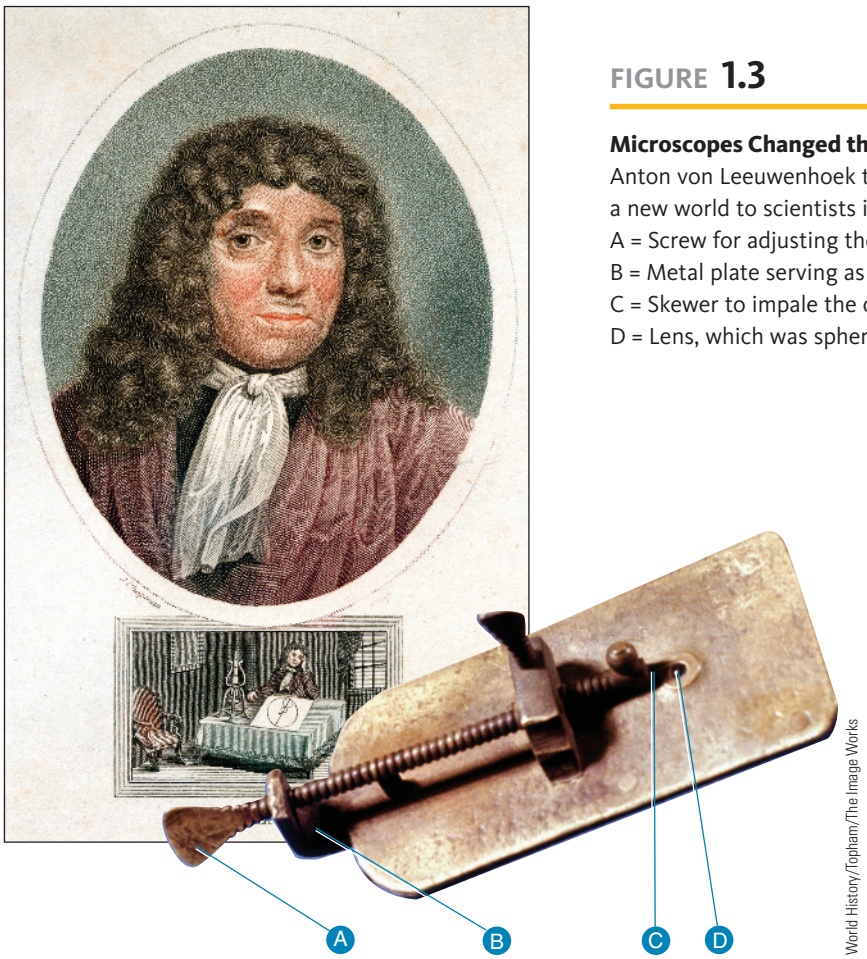
What Are Psychology's Philosophical Roots?

Philosophers and psychologists share an interest in questions regarding the nature of the self, the effects of early experience, the existence of free will, and the origin of knowledge. Both disciplines consider the relative balance of biological factors (nature) and environmental factors (nurture) in the resulting human behavior. Both attempt to determine the relationships between self-interest and community welfare, between body and mind, and between humans and other species with which we share the planet. Although we typically consider questions of the unconscious mind and abnormal behavior to be the realm of the psychologist, philosophers investigated these issues thousands of years before the first psychologist was born.

What Are Psychology's Natural Sciences Roots?

While philosophers tackled these difficult questions, physicians were laying the foundation of our knowledge of the brain and nervous system, discussed in detail in Chapter 4. During this pursuit, physicians helped develop the scientific methods that would become central to psychology and previewed the application of scientific knowledge to the improvement of individual well-being.

Beginning in the 17th and 18th centuries, scientists armed with new technologies, including the light microscope (see ● Figure 1.3), made important discoveries that established the mind as physical rather than magical. For example, they demonstrated that a single sensory nerve carried one type of information instead of multiple types. You might have already duplicated this research yourself while rubbing your sleepy eyes—you see a flash of light. The nerves serving the retina of the eye do not know how to process information about touch or pressure. When stimulated, they are capable of only one type of message—light. Hermann von Helmholtz (1821–1894) asked his participants to push a button as soon as they felt a touch. When a thigh was touched, participants reacted faster than when a toe was touched. Because



Mary Evans Picture Library/The Image Works

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FIGURE 1.3

Microscopes Changed the World of Science. This light microscope was used by Anton von Leeuwenhoek to discover red blood cells in 1676. Microscopes opened a new world to scientists interested in living things.
A = Screw for adjusting the height of the object being examined
B = Metal plate serving as the body
C = Skewer to impale the object and rotate it
D = Lens, which was spherical

the toe is farther from the brain than the thigh, signals from the toe required more time to reach the brain. These types of discoveries convinced scientists that the mind was not supernatural and could be studied scientifically.

The Two Disciplines Merge to Create a New Science

Philosophers began to incorporate physiological and psychological concepts into their work, and natural scientists began to explore the questions asked by philosophers. The gradual merger of these approaches resulted in a series of experiments that looked increasingly like contemporary psychology. Gustav Fechner (1801–1889) was curious to know how soft a sound a person could hear. He randomly presented sounds of different intensities to which a participant would respond "yes" or "no." When the "yes" responses passed 50%, or better than chance, Fechner concluded that the sound was within the range that the human ear could detect (see Chapter 5). Although Fechner's research seems very similar to von Helmholtz's, note the importance of "mental processes" in Fechner's work, as opposed to the simple measurement of physiology in von Helmholtz's experiment. The stage was set for a modern science of psychology.

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The work of Hermann von Helmholtz (1821–1894) on reaction time helped establish the mind as something that could be studied scientifically.