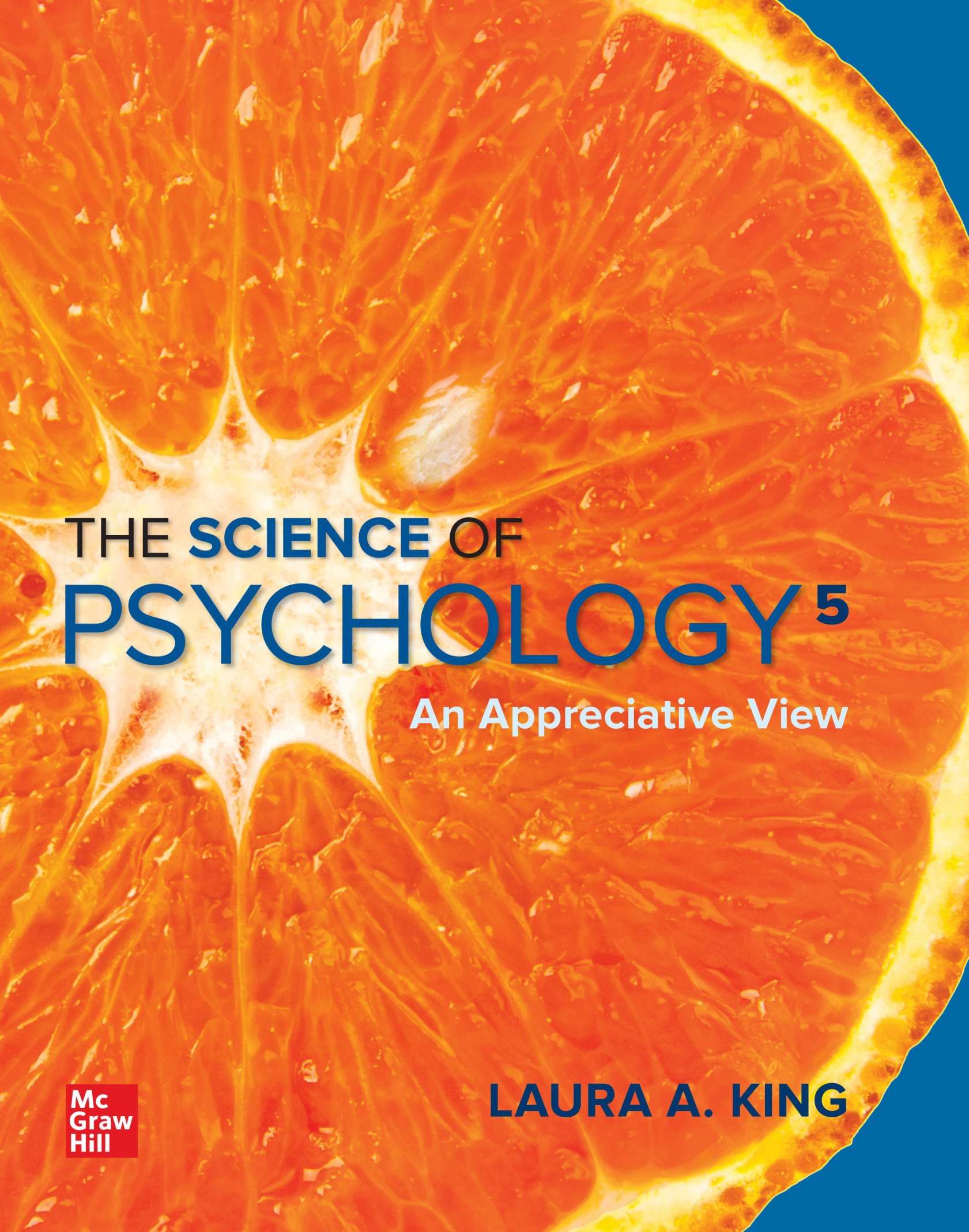
THE SCIENCE OF
PSYCHOLOGY 5
An Appreciative View
LAURA A. KING
Mc
Graw
Hill

THE SCIENCE OF PSYCHOLOGY 5

An Appreciative View

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University of Missouri, Columbia

Mc Graw Hill

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for *Sam*

LAURA A. KING

Laura King did her undergraduate work at Kenyon College, where, already an English major, she declared a second major in psychology during the second semester of her junior year. She completed her AB in English with high honors and distinction and in psychology with distinction in 1986. Laura then did graduate work at Michigan State University and the University of California, Davis, receiving her PhD in personality psychology in 1991.

Laura began her career at Southern Methodist University in Dallas, moving to the University of Missouri in 2001, where she is now a Curators' Professor of Psychological Science. In addition to seminars in the development of character, social psychology, and personality psychology, she has taught undergraduate lecture courses in introductory psychology, introduction to personality psychology, and social psychology. At SMU, she received six different teaching awards, including the "M" award for "sustained excellence" in 1999. At the University of Missouri, she received the Chancellor's Award for Outstanding Research and Creative Activity in 2004.

Her research, which has been funded by the National Institute of Mental Health and the National Science Foundation, has focused on a variety of topics relevant to the question of what it is that makes for a good life. She has studied goals, life stories, happiness, well-being, and meaning in life. In general, her work reflects an enduring interest in studying what is good and healthy in people. In 2001, she earned recognition for her research accomplishments with a Templeton Prize in Positive Psychology. In 2011, she received the Ed and Carol Diener Award for Distinguished Contributions to Personality Psychology. In 2015, she received the Society for Personality and Social Psychology Award for service to the field, in part for her efforts in bringing the science of psychology to students. In 2019, she received the Jack Block Award for distinguished contributions to personality psychology. Laura's research (often in collaboration with undergraduate and graduate students) has been published in *American Psychologist,* the *Journal of Personality and Social Psychology, Psychological Bulletin,* and *Psychological Science.*

Laura has held numerous editorial positions. She is currently the editor of *Perspectives on Psychological Science*. She was editor-in-chief of the Personality and Individual Differences section of the *Journal of Personality and Social Psychology* and the *Journal of Research in Personality* and associate editor for the *Journal of Personality and Social Psychology* and *Personality and Social Psychology Bulletin,* as well as on numerous grant panels. She has edited or coedited special sections of the *Journal of Personality* and *American Psychologist*.

In "real life," Laura is an accomplished cook and enjoys hosting lavish dinner parties, listening to music (mostly jazz vocalists and singer-songwriters), running with her faithful dogs Bill and John, and swimming and debating with her son Sam.

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PREFACE

When Things Go Right for Students... Things Go Right for Instructors

Focusing on why things go right, *The Science of Psychology: An Appreciative View,* Fifth Edition, helps students understand and appreciate psychology as a science and as an integrated whole. Informed by student data, the fifth edition's program extends these themes and enhances their pedagogical value by supporting student understanding of the topics they find the most challenging and then offering learning resources to help students master them.

Appreciating Student Learning

Students today are as different from the learners of the last generation as the current discipline of psychology is from the field 40 years ago. Students now learn in multiple modalities; rather than sitting down and reading traditional printed chapters from beginning to end, their work preferences tend to be more visual and interactive. They like to access information in multiple ways and expect their course material to be engaging and personalized. *The Science of Psychology: An Appreciative View* supports learning by presenting content clearly with engaging examples, presenting key concepts in various ways, providing assignable assessments through Connect Psychology®, and showing students what they know and do not know through the SmartBook 2.0® adaptive reading experience.

McGraw-Hill Education Connect® is a digital assignment and assessment platform that strengthens the link between faculty, students, and coursework, helping everyone accomplish more in less time. Connect Psychology includes assignable and assessable videos, quizzes, exercises, and interactivities, all associated with learning objectives for *The Science of Psychology: An Appreciative View*. Interactive assignments and videos allow students to experience and apply their understanding of psychology to the world with fun and stimulating activities.

A Personalized Experience that Leads to Improved Learning and Results

Students study more effectively with Connect and SmartBook 2.0. How many students think they know everything about introductory psychology, but struggle on the first exam?

SmartBook helps students study more efficiently by highlighting what to focus on in the chapter, asking review questions, and directing them to resources until they understand. SmartBook creates a personalized study path customized to individual student needs, continually adapting to pinpoint knowledge gaps and focus learning on concepts requiring additional study. By taking the guesswork out of what to study, SmartBook fosters more productive learning and helps students better prepare for class.

Connect reports deliver information regarding performance, study behavior, and effort so instructors can quickly identify students who are having issues or focus on material that the class hasn't mastered.

More than nine years ago, backed by the belief that we could unlock the potential of every type of student with the power of learning science, we embarked on a journey to create a unique educational experience. Spanning over 90+ disciplines and serving multiple educational markets around the world, SmartBook has emerged as the leader in adaptive learning.

Today, SmartBook 2.0 builds on our market-leading technology with enhanced capabilities that deliver a more personalized, efficient, and accessible learning experience for students and instructors. Some of the enhancements include:

- **Mobile and offline reading**—SmartBook 2.0 is available for mobile use on smart devices using McGraw-Hill's ReadAnywhere App. Content can also be downloaded so students and instructors can access their materials anytime and anywhere, whether online or offline.
- **Greater flexibility**—With SmartBook 2.0, instructors can now assign readings down to the sub-topic level (rather than only to the topic level). This provides even greater control and alignment with their syllabus.
- **Accessibility**—SmartBook 2.0 was built from the ground up with accessibility in mind to account for appropriate color contrast, keyboard navigation, and screen reader usability, better supporting students with accessibility needs.

THE HEAT MAP STORY

APPRECIATING THE POWER OF STUDENT DATA

STEP 1. Over the course of three years, data points showing concepts that caused students the most difficulty were anonymously collected from Connect Psychology's SmartBook for *The Science of Psychology*, 4e.

STEP 2. The data from ***SmartBook*** was provided to the author in the form of a **Heat Map**, which graphically illustrated "hot spots" in the text that impacted student learning.

STEP 3. Laura King used the ***Heat Map*** data to refine the content and reinforce student comprehension in the new edition. Additional quiz questions and assignable activities were created for use in Connect Psychology to further support student success.

RESULT: With empirically-based feedback at the paragraph and even sentence level, Laura King developed the new edition using precise student data to pinpoint concepts that caused students to struggle.

Better Data, Smarter Revision, Improved Results

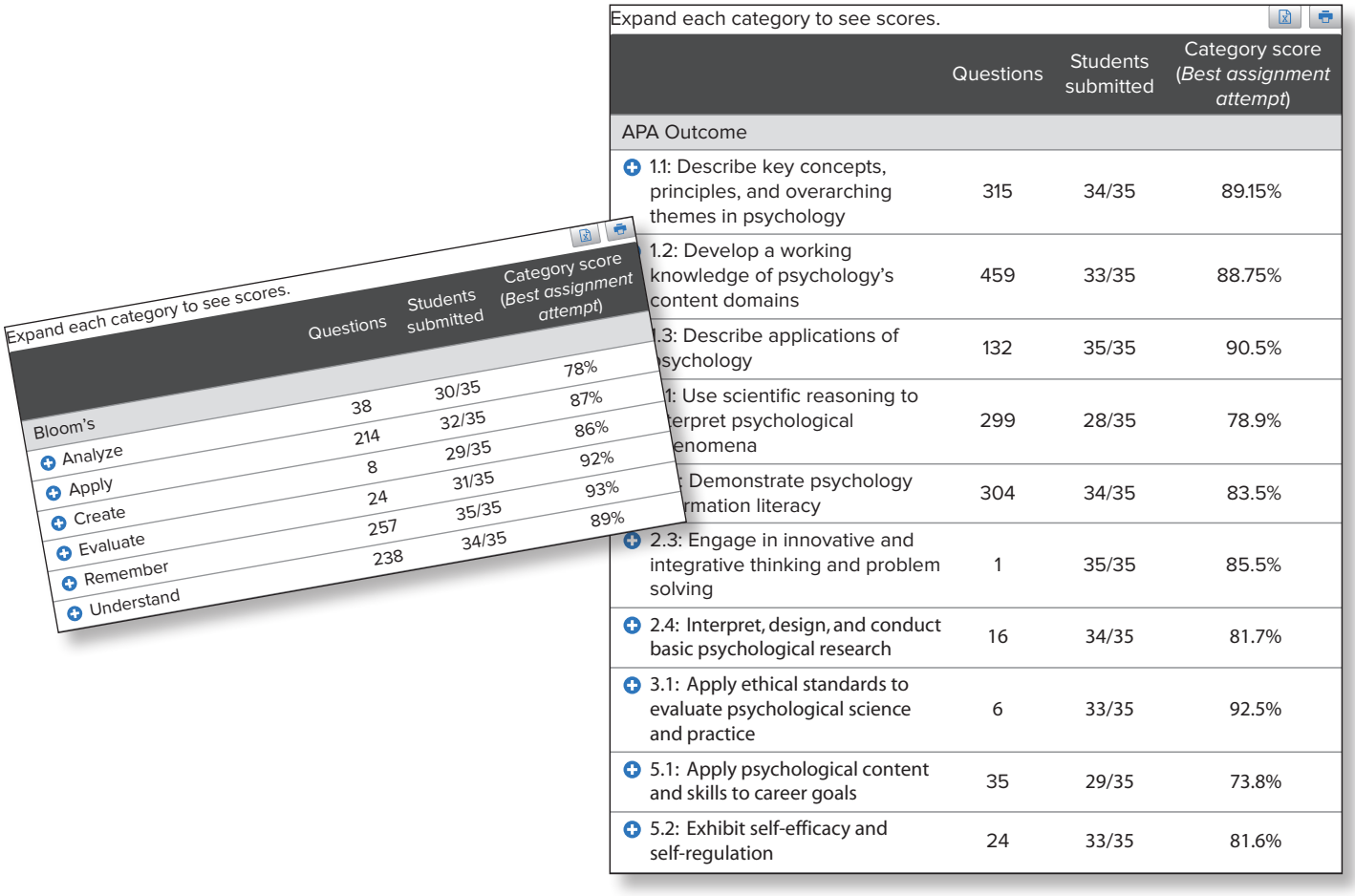
For this new edition, data were analyzed to identify the concepts students found to be the most difficult, allowing for expansion upon the discussion, practice, and assessment of challenging topics. The revision process for a new edition used to begin with gathering information from instructors about what they would change and what they would keep. Experts in the field were asked to provide comments that pointed out new material to add and dated material to review. Using all these reviews, authors would revise the material. But today a new tool has revolutionized that model.

McGraw-Hill Education authors now have access to student performance data to analyze and inform their revisions. These data are anonymously collected from the many students who use SmartBook, the adaptive learning system that provides students with individualized assessment of their own progress. Because virtually every text paragraph is tied to several questions that students answer while using SmartBook, the specific concepts with which students are having the most difficulty are easily pinpointed through empirical data in the form of a "heat map" report.

Powerful Reporting

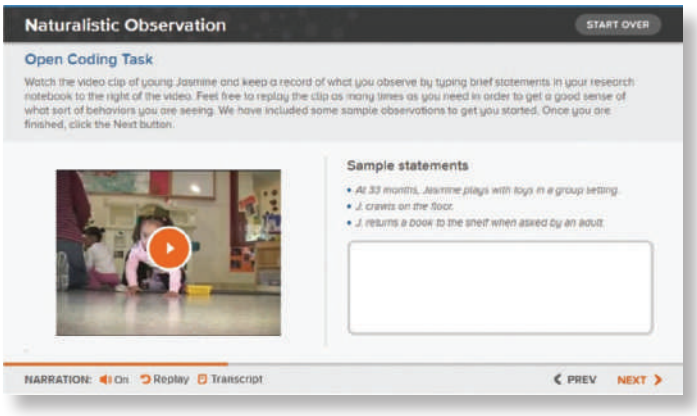
Whether a class is face-to-face, hybrid, or entirely online, McGraw-Hill Connect provides the tools needed to reduce the amount of time and energy instructors spend administering their courses. Easy-to-use course management tools allow instructors to spend less time administering and more time teaching, while reports allow students to monitor their progress and optimize their study time.

- The **At-Risk Student Report** provides instructors with one-click access to a dashboard that identifies students who are at risk of dropping out of the course due to low engagement levels.
- The **Category Analysis Report** details student performance relative to specific learning objectives and goals, including APA learning goals and outcomes and levels of Bloom's taxonomy.
- **Connect Insight** is a one-of-a-kind visual analytics dashboard—now available for both instructors and student—that provides at-a-glance information regarding student performance.
- **The SmartBook 2.0 Reports** allow instructors and students to easily monitor progress and poinpoint areas of weakness, giving each student a personalized study plan to achieve success.



Informing and Engaging Students on Psychological Concepts

Using Connect Psychology, students can learn the course material more deeply and study more effectively than ever before.



At the Remember and Understand levels of Bloom's taxonomy, **Concept Clips**, help students break down key themes and difficult concepts in psychology. Using easy-to-understand analogies, visual cues, and colorful animation, Concept Clips make psychology meaningful to everyday life. New Concept Clips in the fifth edition include Attraction, Sexual Attraction and Mate Selection, and Replication of Research.

At the Understand and Apply levels of Bloom's taxonomy, **Interactivities**, assignable through Connect, engage students with content through experiential activities. New activities include Sexually Transmitted Infections, Sexual Anatomy, Explicit and Implicit Biases, Cognitive Dissonance, Heuristics, Gardner's Theory of Multiple Intelligences, Personality Assessment, and First Impressions and Attraction.

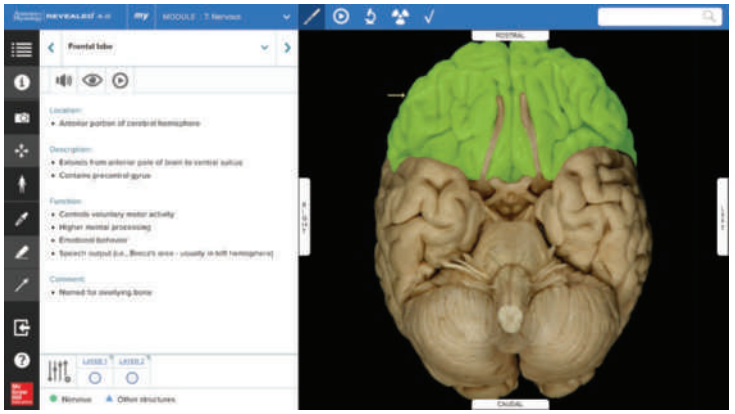
At the Understand and Apply levels of Bloom's taxonomy, **NewsFlash** exercises, powered by Connect, tie current news stories to key psychological principles and learning objectives. After interacting with a contemporary news story, students are assessed on their ability to make the connection between real life and research findings.

At the Apply level of Bloom's taxonomy, new **Application-Based Activities** provide a means for experiential learning. These are highly interactive, automatically graded, online learn-by-doing exercises that offer students a safe space to apply their knowledge and problem-solving skills to real-world scenarios. Each scenario addresses key concepts and skills that students must use to work through and solve course-specific problems, resulting in improved critical thinking and development of relevant workplace skills.

At the Apply and Analyze levels of Bloom's taxonomy, **Power of Process** guides students through the process of critical reading and analysis. Faculty can select or upload content, such as journal articles, and assign guiding questions to gain insight into students' understanding of the scientific method while helping them improve upon their information literacy skills.

At the Apply and Analyze levels of Bloom's taxonomy, **Scientific Reasoning Exercises** offer in-depth arguments to sharpen students' critical thinking skills and prepare them to be more discerning consumers of psychology in their everyday lives. For each chapter, there are multiple sets of arguments accompanied by auto-graded assessments requiring students to think critically about claims presented as facts. These exercises can also be used in Connect as group activities or for discussion.

Connecting Anatomy and Physiology to the Science of Psychology



Two interactive tools allow for the exploration of the connection between biology and behavior.

Lab Activities: McGraw Hill presents assignments in Connect that walk students through topic-based, real-life scenarios that relate behavior to biology, with illustrated animations, real-life imagery of the nervous system, cells, CT scans, X-ray imaging and histology.

Touring the Brain and Touring the Senses: Two digital components, **Touring the Brain and Nervous System** and **Touring the Senses,** offer detailed digital overlays of key structures. These tours provide students with practice in grasping key biological structures and processes that are essential to an appreciation of the role of science in psychology and success in the course. These are available with the instructor's resources and embedded in the ebooks.

Appreciating Why Things Go Right

The Science of Psychology: An Appreciative View continues to emphasize function before dysfunction. Rather than focusing on why things go wrong, the focus is first on *why things go right.*

One of the challenges of this alternative focus is that it goes against human nature. Research in psychology itself tells us that the negative captures our attention more readily than the positive. There is no question that bad news makes headlines. A terrorist attack, a global recession, disturbing climate changes, political scandals, and the everyday demands of juggling work, family, and finances–these and other issues loom large for us all. We strive and struggle to find balance and to sculpt a happy life. The science of psychology has much to offer in terms of helping us understand the choices we make and the implications of these choices for ourselves and for others around the world.

The Science of Psychology: An Appreciative View communicates the nature and breadth of psychology–and its value as a science–with an appreciative perspective. Its primary goal is to help students think like psychological scientists.

INTERSECTION

Health Psychology and Social Psychology: Can Difference-oriented Interventions Buffer the Stress of Coming to College?

Do I belong here? Do I have what it takes to succeed? The way new college students answer these questions can have important implications not only for their academic success but also their psychological and physical health (Adelman & others, 2017; Jury & others, 2017). Coming to college can be especially challenging for first-generation college students (those whose parents never attended college). These students can experience a mix of emotions—from excitement and pride to homesickness and worry (Fisher, O'Donnell, & Oyserman, 2017). If people feel that they differ in important ways from everyone around them, they can begin to feel uncertain about their answers to that question, "Do I belong here?" (Destin, Rheinschmidt-Same, & Richeson, 2017). Sometimes, such concerns lead students to dedicate themselves to academic success while sacrificing their physical health (Destin, 2018). Is there a way to succeed academically without harming physical health?

How do you answer the question "Do I belong here?"

Many universities have instituted orientation programs to ease the transition to college for first-generation students (Harackiewicz & Priniski, 2018; Zuo & others, 2018). At one school, new students listened for an hour as seniors shared stories about coming to college and learning how to be successful. In this "difference-education" program, the stories highlighted students' diverse backgrounds and how these experiences influenced their college life, both as weaknesses and as strengths. Sounds inspiring, but can something as minor as an hour in an orientation program really have an impact on how students adjust to college over the long haul?

A team of psychologists decided to answer this question. Two years after this orientation experience, the researchers recruited students who had taken part in the difference-education experience as well as students who had participated in an orientation program that addressed the transition to college but did not highlight diverse backgrounds (Stephens & others, 2015). The students came to the lab and were asked to complete a series of stressful tasks, including giving a speech about themselves and completing standardized tests. Their bodily responses to the stressful tasks were measured, and the results of the study were striking: Even two years later, participants who had received the difference-education orientation were more likely to talk about their own diverse backgrounds as strengths in their speeches. In addition, first-generation students who had received difference education were more physiologically balanced during the stressful tasks. The difference-education orientation experience led their bodies to respond better under stress. These results speak to the enduring power of a simple experience to help students recognize that they do have what it takes to succeed in college.

Certainly, for all of us, entering a new and unfamiliar situation can lead us to feel uncertain about our skills, abilities, and even our very identities. Our expectations for others and ourselves, our identities, roles, and group memberships can influence us in profound ways throughout our lives. Our answers to the question, "Do I belong here?" guide us in and out of situations every day, and we always take our bodies with us.

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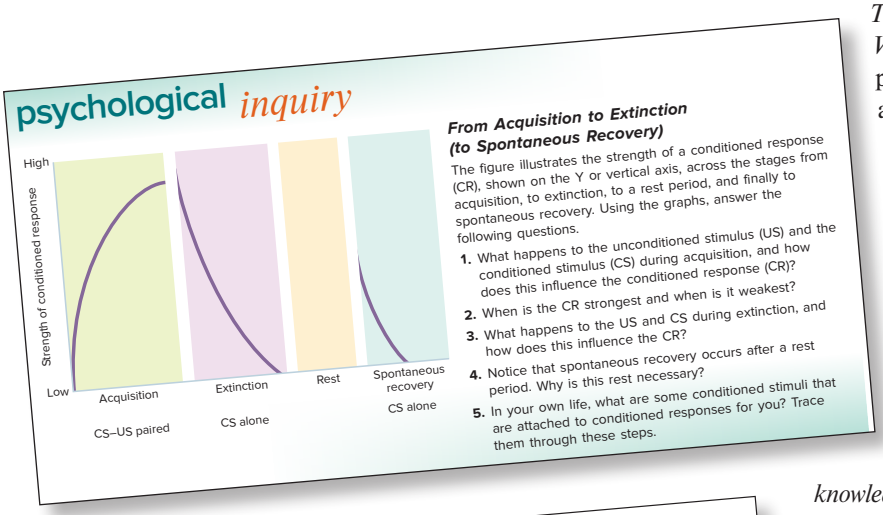
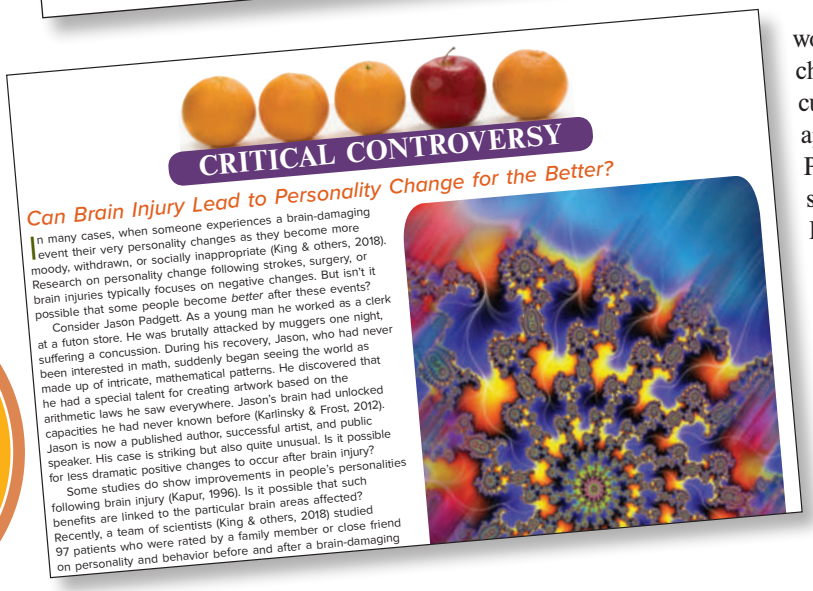
Appreciating Psychology as an Integrated Whole

As with the previous editions, the continuing goal of *The Science of Psychology: An Appreciative View* is to present psychology as an integrated field in which the whole is greater than the sum of its parts, but the parts are essential to the whole. Accordingly, this fifth edition illuminates many areas where specialized subfields overlap and where research findings in one subfield support important studies and exciting discoveries in another. Students come to appreciate, for example, how neuroscientific findings inform social psychology and how discoveries in personality psychology relate to leadership in organizational settings. **Intersection** features showcase research at the crossroads of at least two areas and shed light on these intriguing connections.

The fifth edition includes many new Intersections showing the influence of work in one field of psychology on another. For example, the Intersection in the chapter "Health Psychology" links work in personality psychology with health psychology and social psychology to explore the topic "Can Economic Stress Age the Immune System?"

Appreciating Psychology as a Science





The Science of Psychology: An Appreciative View communicates the nature and breadth of psychology and its value as a science from an appreciative perspective. Its primary goal is to help students think like psychological scientists, which includes asking them questions about their own life experiences. Throughout, students' curiosity is nurtured through timely, applied examples and a focus on what psychological science means for people going about their daily lives.

The fifth edition's attention to function before dysfunction, up-to-date coverage, and broad scope reflect the field of psychology *today*. These qualities underscore psychology's vital and ongoing role as a *science that ever advances knowledge* about ourselves and our interactions in the world. Psychology is a vigorous young science and one that changes quickly. The text narrative interweaves the most current research with classic findings to give students an appreciation of this vitality. In the chapter "Social Psychology", for instance, the treatment of Milgram's classic study on obedience is complemented by an analysis of Burger's more recent attempts to recreate the study.

The **Psychological Inquiry** feature stimulates students' analytical thinking about psychology's practical applications. The selections reinforce student understanding of central aspects of research design, such as the difference between correlational and experimental studies and the concepts of independent and dependent variables. The selections in each chapter guide students' analysis of a figure, graph, or other illustration and include a set of critical thinking questions. For example, one of the Psychological Inquiry features in

the chapter "Learning" prompts students to analyze graphical schedules of reinforcement and different patterns of responding to them.

In conjunction with creating current and contemporary course materials, *The Science of Psychology: An Appreciative View* includes citations that bring the most important recent and ongoing research into the text. These updated references give students and instructors the very latest that psychology has to offer on each topic.

Appreciating science also means appreciating disagreements in the field. Each chapter contains a **Critical Controversy** feature highlighting current psychological debates and posing thought-provoking questions that encourage students to examine the evidence on both sides. For example, the Critical Controversy in the chapter "Psychology's Scientific Method" examines how we know research participants are who they say they are, and this feature in the chapter "Learning" explores whether machines can *truly* learn.

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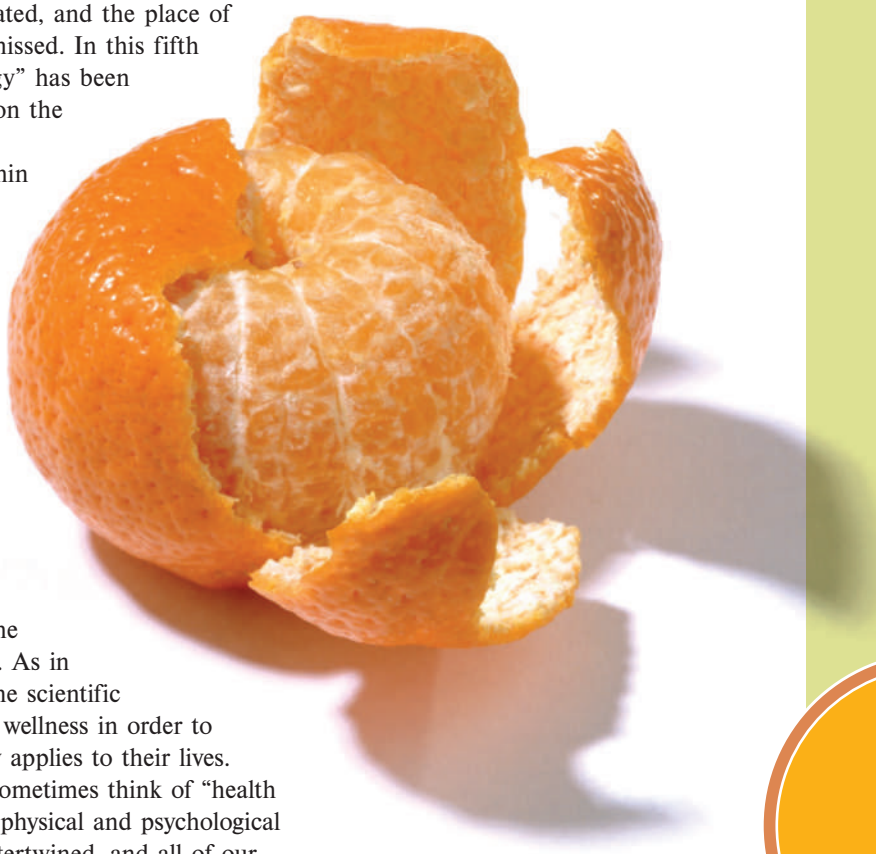
Appreciating Psychology in the Workplace

Because *The Science of Psychology: An Appreciative View* is dedicated to connecting the science of psychology to students' everyday lives and their aspirations, it is only natural to include a chapter on the psychology of work. Nearly all students—some 95 percent—will one day hold a job. Sharing what psychologists have learned about practical matters—such as where employers find new hires, how employees can be fairly evaluated, and the place of work in the good life—is an opportunity that should not be missed. In this fifth edition, the chapter "Industrial and Organizational Psychology" has been updated with new features, including a Critical Controversy on the challenge of work–life balance.

Psychology at Work videos, assignable and assessable within McGraw-Hill Connect, highlight careers in which knowledge of psychology is beneficial. Each video introduces a person at work in his or her job, who specifies how knowledge gained from taking introductory psychology in college is applied to the work environment.



Appreciating Psychology's Role in Health and Wellness

This fifth edition of *The Science of Psychology: An Appreciative View* continues to emphasize the relevance of psychology to the health and well-being of students and the people in their lives. As in prior editions, substantial discussion and examples focus on the scientific understanding of human strengths and capacities, health, and wellness in order to cultivate students' appreciation for how extensively psychology applies to their lives. These sections are crafted around the idea that although we sometimes think of "health behaviors" as a separate category of activities associated with physical and psychological wellness, the truth is that our bodies and minds are always intertwined, and all of our behaviors are relevant to our capacity to function.

Appreciating the Course You Want to Teach

Supporting Instructors with Technology

With McGraw-Hill Education, you can develop and tailor the course you want to teach.

MCGRAW-HILL CAMPUS McGraw-Hill Campus (www.mhcampus.com) provides faculty with true single sign-on access to all of McGraw-Hill's course content, digital tools, and other high-quality learning resources from any learning management system. This innovative offering allows for secure and deep integration enabling seamless access for faculty and students to any of McGraw-Hill's course solutions such as McGraw-Hill Connect (all-digital teaching and learning platform), McGraw-Hill Create (state-of-the-art custom-publishing platform), McGraw-Hill LearnSmart (online adaptive study tool), and Tegrity (a fully searchable lecture-capture service).

McGraw-Hill Campus includes access to McGraw-Hill's entire content library, including eBooks, assessment tools, presentation slides, and multimedia content, among other resources, providing faculty with open, unlimited access to prepare for class, create tests/quizzes, develop lecture material, integrate interactive content, and more.

TEGRITY With Tegrity, you can capture lessons and lectures in a searchable format and use them in traditional, hybrid, "flipped classes," and online courses. With Tegrity's personalized learning features, you can make study time efficient. Its ability to affordably scale brings this benefit to every student on campus. Patented search technology and real-time learning management system (LMS) integrations make Tegrity the market-leading solution and service.

CREATE Easily rearrange chapters, combine material from other content sources, and quickly upload content you have written, such as your course syllabus or teaching notes, using McGraw-Hill Education's Create. Find the content you need by searching through thousands of leading McGraw-Hill Education textbooks. Arrange your book to fit your teaching style. Create even allows you to personalize your book's appearance by selecting the cover and adding your name, school, and course information. Order a Create book and you will receive a complimentary print review copy in three to five business days or a complimentary electronic review copy via e-mail in about an hour. Experience how McGraw-Hill Education empowers you to teach *your* students *your* way. http://create.mheducation.com

Trusted Service and Support

McGraw-Hill Education's Connect offers comprehensive service, support, and training throughout every phase of your implementation. If you're looking for some guidance on how to use Connect or want to learn tips and tricks from super users, you can find tutorials as you work. Our Digital Faculty Consultants and Student Ambassadors offer insight into how to achieve the results you want with Connect.

Integration with Your Learning Management System

McGraw-Hill integrates your digital products from McGraw-Hill Education with your school LMS for quick and easy access to best-in-class content and learning tools. Build an effective digital course, enroll students with ease, and discover how powerful digital teaching can be.

Available with Connect, integration is a pairing between an institution's learning management system (LMS) and Connect at the assignment level. It shares assignment information, grades, and calendar items from Connect into the LMS automatically, creating an easy-to-manage course for instructors and simple navigation for students. Our assignment-level integration is available with **Blackboard Learn**, **Canvas by Instructure**, and **Brightspace by D2L**, giving you access to registration, attendance, assignments, grades, and course resources in real time, at one location.

Instructor Supplements

INSTRUCTOR'S MANUAL The Instructor's Manual provides a wide variety of tools and resources for presenting the course, including learning objectives, ideas for lectures and discussions, and handouts.

TEST BANK By increasing the rigor of the Test Bank development process, McGraw-Hill Education has raised the bar for student assessment. A coordinated team of subject-matter experts prepared over 3,000 questions. The team methodically vetted each question and set of possible answers for accuracy, clarity, effectiveness, and accessibility; each question has been annotated for level of difficulty, Bloom's taxonomy, APA learning outcomes, and corresponding coverage in the text. Organized by chapter, the questions are designed to test factual, conceptual, and applied understanding. All test questions are available within Test Builder. Test Builder, available in Connect, is a cloud-based tool that enables instructors to format tests that can be printed or administered within a LMS.

POWERPOINT PRESENTATIONS The PowerPoint Presentations, available in dynamic, lecture-ready, and accessible WCAG-compliant versions, highlight the key points of the chapter and include supporting visuals. All of the slides can be modified to meet individual needs.

IMAGE GALLERY The Image Gallery features the complete set of downloadable figures and tables from the text. These can be easily embedded by instructors into their own PowerPoint slides.

Appreciating Our Dynamic Field: Chapter-by-Chapter Changes

The fifth edition was revised in response to student "heat map" data that pinpointed the topics and concepts where students struggled the most. Based on this information, feedback from instructors, and changes in the field, the following content revisions have been made.

CHAPTER 1: WHAT IS PSYCHOLOGY?

- New Critical Controversy: Does Birth Order Matter to Personality?
- New coverage of Mary Whiton Calkin's contribution to the field of psychology
- New coverage of Charles Henry Turner's contribution to the field of psychology
- New Intersection: Health Psychology and Social Psychology: Can Difference-Oriented Interventions Buffer the Stress of Coming to College?

CHAPTER 2: PSYCHOLOGY'S SCIENTIFIC METHOD

- New metanalysis example on random acts of kindness
- New Intersection: Emotion and Social Psychology: Why Not Say "Thanks"?
- New examples of quasi-experiments
- Expanded discussion of experimenter bias
- New Critical Controversy: How Do We Know Participants Are Who They Say They Are?
- New coverage of the replication crisis
- New coverage of p-hacking in relation to the replication crisis

CHAPTER 3: BIOLOGICAL FOUNDATIONS OF BEHAVIOR

- Revised coverage of plasticity
- Expanded explanation of action potential
- Revised coverage of glial cells
- Expanded coverage of face processing
- New Critical Controversy: Can Brain Injury Lead to Personality Change for the Better?
- New Intersection: Neuroscience and Language: What Is a Word to a Dog?

CHAPTER 4: SENSATION AND PERCEPTION

- New explanation and examples of how senses interact
- New Intersection: Sensation and Neuroscience: How Does the Brain Respond when Senses Disagree?
- Expanded coverage of how the brain processes sensory signals
- New research examples on the influence of texting on driving safety
- Expanded discussion of parallel processing and serial processing
- New Critical Controversy: Can We Read Two Words at Once?
- Revised coverage of the primate retina
- Expanded discussion of gender differences in pain

CHAPTER 5: STATES OF CONSCIOUSNESS

- Expanded discussion of the brain and consciousness
- New Intersection: Consciousness and Comparative Cognition: Do Marmosets Recognize the Minds of Others?
- Expanded coverage of opioids
- Expanded coverage of the impact of THC on the brain
- Expanded coverage of marijuana
- Critical Controversy: Does Legalized Medical Marijuana Reduce Opioid Abuse and Overdoses?

CHAPTER 6: LEARNING

- New coverage of AI and machine learning
- New Critical Controversy: Can Machines *Truly* Learn?
- New coverage of conditioned immune responses in transplant patients
- New Intersection: Psychology of Learning and Rehabilitation: Can Limbs Relearn Reflexes After Spinal Cord Injury?

CHAPTER 7: MEMORY

- Updated coverage of the brain and memory
- New Critical Controversy: When Is Your First Memory?
- Expanded exploration of elaboration
- New Intersection: Neuroscience, Cognition, and Emotion: How Can We Explain Déjà Vu?
- Removed emphasis on behavioral priming studies

CHAPTER 8: THINKING, INTELLIGENCE, AND LANGUAGE

- Revised presentation of the Cognitive Revolution in Psychology
- Expanded explanation of loss aversion
- New Intersection: Cognitive Psychology and Developmental Psychology: Can Young Children Be More Rational than Adults?
- New Critical Controversy: How Does Open-Minded Thinking Relate to Views of Climate Change?
- Revised discussion of heritability and intelligence
- Revised discussion of environmental influences on childhood IQ
- New discussion of intellectual disability as involving functional impairment
- New extended example of child to demonstrate role of environment in language development
- New critical analysis of classic study on the influence of environment on language acquisition

CHAPTER 9: HUMAN DEVELOPMENT

- New Critical Controversy: Can an Unpredictable Childhood Predict Better Cognitive Function?
- New Intersection: Developmental Psychology and Cognitive Neuroscience: Are Brain Differences the Cause or Effect of Developmental Dyslexia?
- New research on replicability of sticky mittens study

CHAPTER 10: MOTIVATION AND EMOTION

- Removed coverage of questionable research on eating
- New Intersection: Perception and Eating: Can Portion Information Affect Eating?
- New discussion of controversy around Maslow's hierarchy of needs related to its original source
- New Critical Controversy: Does It Matter How Long a Child Waits for That Second Marshmallow?
- New coverage of the Family Tree Model of Positive Emotion

CHAPTER 11: GENDER, SEX, AND SEXUALITY

- Updated coverage of Gender Identity
- New Critical Controversy: Isn't Gender "Really" Binary?
- New coverage of Transitioning as a Transgender Person
- Revised coverage of Gender Roles
- Revised coverage of Cognitive Ability
- New Intersection: Psychology of Gender and Social Psychology: Do You "Match" the Scientist Category?
- New cover of the Gender Similarity Hypothesis
- New coverage of Pansexuality
- New coverage of Asexuality
- New coverage of Intersectionality
- New discussion of Frequency of Sexual Activity
- Revised coverage of Pedophilic Disorder
- Revised and expanded coverage of Types and Causes of Sexually Transmitted Infections

CHAPTER 12: PERSONALITY

- Expanded coverage of Reaction Formation
- Expanded description of the Big Five traits
- New Intersection: Personality and Sleep Science: Are You a Morning Person or an Evening Person – and Does It Matter?
- New Critical Controversy: Are There Personality Types?

CHAPTER 13: SOCIAL PSCYHOLOGY

- Expanded coverage of Fundamental Attribution Error
- Revised coverage of Altruism
- New Intersection: Social Psychology and Neuroscience: What Can the Brain Reveal About Empathy and Extraordinary Altruism?
- New coverage of Personality as a Factor in Prosocial Behavior
- Revised coverage of Neurobiological Factors and Aggression
- Updated coverage on Video Game Exposure and Aggression
- Revised coverage of Biological Factors in Conformity
- New Critical Controversy: What Happened in the Stanford Prison Experiment?
- Expanded coverage of Explicit and Implicit Prejudice
- Expanded coverage of Social Isolation and Loneliness

CHAPTER 14: INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY

- Updated coverage of Interviews
- New Critical Controversy: Are the Extremely Rich Happier than Those Who Are Very Rich?
- New Intersection: Psychology of Consciousness and I/O Psychology: How Does Leader Mindfulness Affect Employee Well-Being?
- Updated coverage of Transformational Leadership

CHAPTER 15: PSYCHOLOGICAL DISORDERS

- New section discussing common terms in abnormal psychology
- New major section on Neurodevelopmental Disorders (ASD and ADHD)
- New Critical Controversy: Could Birth Month Predict ADHD Diagnosis?
- Post-Traumatic Stress Disorder and Dissociative Disorders moved to the section on Trauma and Stress-Related Disorders
- Revised discussion of Biological Factors of Depression including evaluation of the role of the serotonin transporter gene
- Expanded treatment of psychosis and first psychotic episode
- Revised discussion of Antisocial Personality Disorder
- Revised coverage of Death by Suicide
- New Intersection: Clinical Psychology and Social Psychology: How Does the Stigma of Mental Illness Affect Social Interactions?

CHAPTER 16: THERAPIES

- Updated coverage of prescription privileges
- Expanded coverage of the Therapeutic Alliance
- New coverage of cultural humility
- New Intersection: Clinical Psychology and Neuroscience: How Does Dialectic Behavior Therapy Affect the Brain?
- New Critical Controversy: Who Should Decide What Treatment Is Best for a Person?

CHAPTER 17: HEALTH PSYCHOLOGY

- New table that lists Health Psychology-related topics covered in previous chapters
- Revised presentation of Motivation in relation to resources for effective life change
- New Intersection: Health Psychology and Social Psychology: Can Economic Stress Age the Immune System?
- Revised Critical Controversy: How Powerful Is the Power of Positive Thinking?
- New coverage of Vaping

ACKNOWLEDGMENTS

APPRECIATING VALUABLE INSTRUCTOR AND STUDENT FEEDBACK

The quality of *The Science of Psychology: An Appreciative View,* Fifth Edition, is a testament to the skills and abilities of so many people, and I am tremendously grateful to the following individuals for their insightful contributions during the project's development and production.

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Nathan Gandy, *Crowder College*
Rene Hernandez, *North Central Texas College*
Richard Sheridan, *William Carey University*
Terry Booth, *Horry-Georgetown Technical College*

Since the publication of the first edition, I have met hundreds of faculty members across the country, and I continue to be awestruck by the hard work, dedication, and enthusiasm of introductory psychology instructors. So, I wanted to say thank you. You all continue to inspire me—to be a better teacher myself, to develop the best learning solutions for the introductory psychology course, and to make our field relevant, accessible, and fun to today's students. I appreciate you!

Thanks as well to the manuscript reviewers whom I have not met in person. Your critical and thoughtful appraisals of the book will benefit students in innumerable ways. I thank you for sharing your expertise with me.

PERSONAL ACKNOWLEDGMENTS

I would like to extend my deepest appreciation to the many energetic and talented individuals at McGraw-Hill who have contributed so much to this work. Certainly, I owe a debt of gratitude to the amazing sales representatives whose hard work allowed the previous editions of *The Science of Psychology* to be such successes. In addition, I thank Nancy Welcher and Mike Ryan for their encouragement throughout the process of this fifth edition. Thanks also to Dawn Groundwater for wonderful ideas and contributions along the way, as well as to A. J. Laferrera and Olivia Kaiser for finding ways to "let me be me" in the service of the book.

Readers of this fifth edition will benefit from the conscientious efforts of senior product developer Cara Labell, who added her personal energies and gifts to make this edition a special and exciting new introduction to psychology. Cara was extraordinarily helpful in navigating the data from the LearnSmart heat maps, identifying places where the students needed more or different material. It allowed me to "hear" students' needs in a way that was truly invaluable. A very special thanks to copyeditor Janet Tilden for her attention to detail. Her thoughtfulness, her "ear" for the written word, and her willingness to take on responsibilities have been incredible. This fifth edition is better for her efforts. And I am grateful to Content Project Manager Sandy Wille for her deep well of professionalism and skill. Thanks also to Designer David Hash, Content Licensing Specialists Ann Marie Jannette, and Buyer Laura Fuller for their hard work on this project.

Thanks as well to my graduate students, Jake Womick and Chris Sanders. I appreciate how they have patiently managed to build scholarly careers while their advisor has juggled her writing, editing, and teaching.

Finally, I thank my family for their love, support, patience, and encouragement. The last few years have not been easy, but I have been fortunate beyond words to have you on my side.

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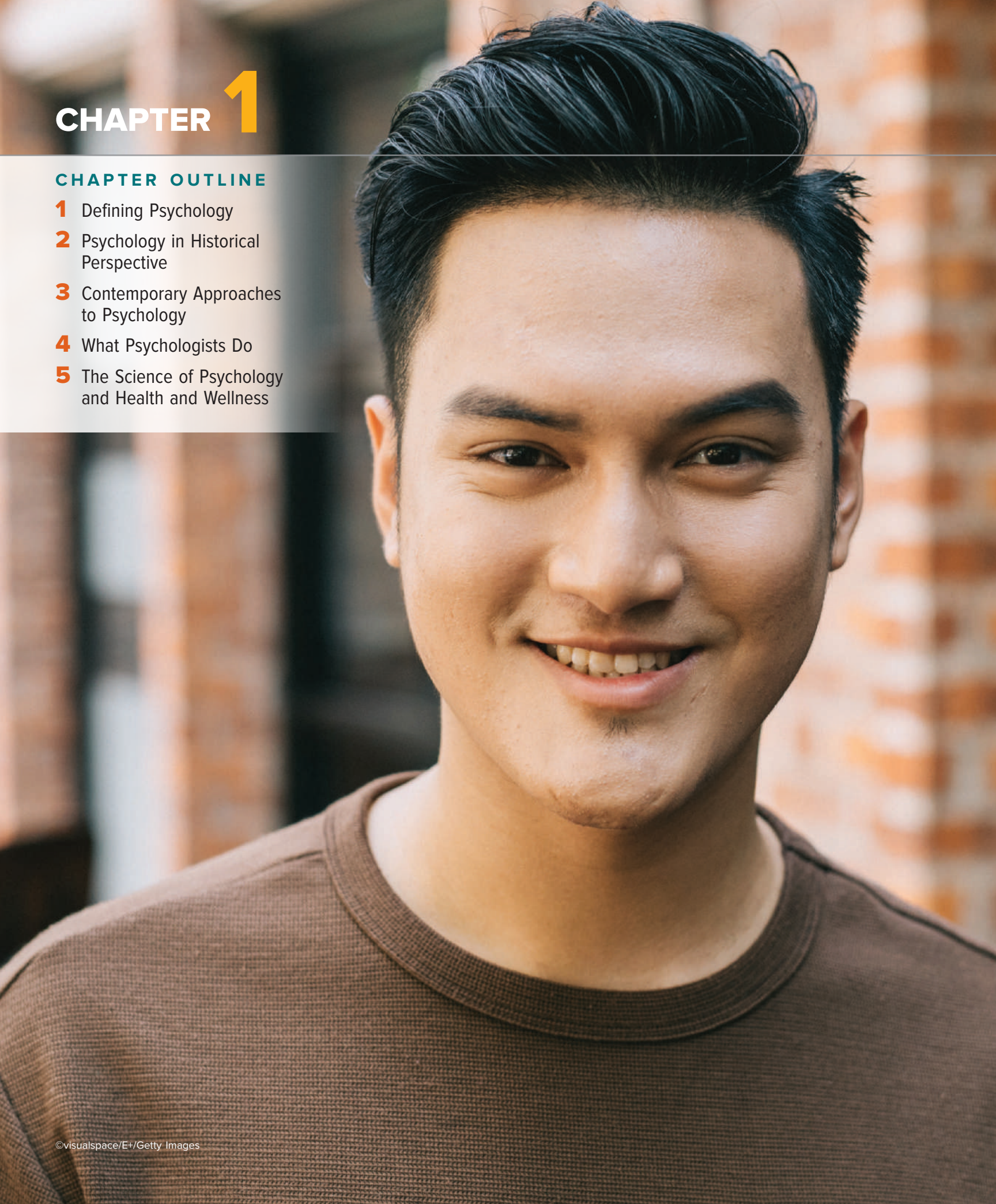
CHAPTER 1

CHAPTER OUTLINE

1 Defining Psychology
2 Psychology in Historical Perspective
3 Contemporary Approaches to Psychology
4 What Psychologists Do
5 The Science of Psychology and Health and Wellness



What Is Psychology?

Unlocking the Secrets of Heroism

In a restaurant in Olathe, Kansas, in February of 2017, two men, Srinivas Kuchibhotla and Alok Madasani, both engineers and immigrants to the U.S. from India, were enjoying their regular after-work hangout. A man began harassing the friends with ethnic slurs, telling them they did not belong in America. The man was asked to leave the restaurant but soon returned with a gun. He opened fire on the two men, killing Srinivas and injuring Alok. Twenty-four-year-old Ian Grillot was in the restaurant that evening and took action. Thinking the gunman had run out of bullets, he rushed toward him to prevent his escape. However, Ian had miscalculated and was shot himself, through the chest and hand. The entire nation of India hailed Ian Grillot as a hero. The Indian community in Kansas, though heartbroken over the loss of life, took up a collection for the young hero and presented him with $100,000 (Victor, 2017). After accepting the check, Ian said he could not have lived with himself if he had not taken action.

As you reflect on this incident, many questions may come to mind. How can we understand such courageous behavior? Why did others in the restaurant not intervene? What motivated the gunman to open fire on two strangers? How can a person be so motivated by hate? These are the kinds of questions psychologists might ask about this remarkable act of heroism.

Although psychologists are interested in extraordinary moments like this one, they are also interested in everyday experiences. The science of psychology is about *all* of human behavior. In fact, ordinary human behavior can become extraordinary when viewed in the right light, with a close lens. Scientists, including psychologists, look at the world with just such a lens. Right now, dedicated scientists are studying things about you that you might never have considered, like how your eyes adjust to a sunny day. There is not a single thing about you that is not fascinating to some psychologist somewhere. Psychologists are passionate about what they study—and what they study is you.

PREVIEW

This introductory chapter begins by formally defining psychology and then gives context to that definition by reviewing the history and the intellectual underpinnings of the field. We next examine a number of contemporary approaches to the subject. We explore what psychologists do—including research, teaching, and therapeutic practice—and consider the areas of specialization within psychology. Our introduction to this dynamic field closes with a look at how understanding and applying psychological findings can positively influence human health and wellness.

1. DEFINING PSYCHOLOGY

- **psychology** The scientific study of behavior and mental processes.
- **science** The use of systematic methods to observe the natural world and to draw conclusions.

When you think of the word *psychology,* what first comes to mind? Formally defined, **psychology** is the scientific study of behavior and mental processes. Let's consider the three key terms in this definition: *science, behavior,* and *mental processes*.

As a **science**, psychology uses systematic methods to observe human behavior and draw conclusions. The goals of psychological science are to describe, predict, and explain behavior. In addition, psychologists are often interested in controlling or changing behavior. They use scientific methods to examine interventions that might help—for example, techniques that might reduce violence or promote happiness.

Researchers might be interested in knowing whether individuals will help a stranger who has fallen down. The investigators could devise a study in which they observe people walking past a person who needs help. Through many observations, the researchers could come to *describe* helping behavior by counting how many times it occurs in particular circumstances. They may also try to *predict* who will help, and when, by examining characteristics of the individuals studied. Are happy people more likely to help? Are women or men more likely to help? After psychologists have analyzed their data, they also will want to *explain* why helping behavior occurred when it did. Finally, these investigators might be interested in changing helping behavior by devising strategies to increase helping.

A baby's interactions with its mother and the infant's crying are examples of behavior because they are observable. The feelings underlying the baby's crying are an example of a mental process that is not observable.

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Behavior is everything we do that can be directly observed—two people kissing, a baby crying, a college student riding a motorcycle to campus. **Mental processes** are the thoughts, feelings, and motives that each of us experiences privately but that cannot be observed directly. Although we cannot see thoughts and feelings, they are nonetheless real. They include *thinking* about kissing someone, a baby's *feelings* when its mother leaves the room, and a student's *memory* of a motorcycle trip.

The Psychological Frame of Mind

What makes for a good job, a good marriage, or a good life? Although there are a variety of ways to answer the big questions of life, psychologists approach these questions as scientists. This scientific approach means that psychologists test assumptions and rely on objective evidence to solve these puzzles. Psychologists conduct research and rely on that research to provide the bases for their conclusions. They examine the available evidence about some aspect of mind and behavior, evaluate how strongly the data (information) support their hunches, analyze disconfirming evidence, and carefully consider whether they have explored all of the possible factors and explanations. At the core of this scientific approach are four attitudes: critical thinking, skepticism, objectivity, and curiosity.

Like all scientists, psychologists are critical thinkers. **Critical thinking** is the process of reflecting deeply and actively, asking questions, and evaluating the evidence (Lanagan-Leitzel & Diller, 2018). Thinking critically means asking ourselves *how* we know something. Critical thinkers question and test what some people say are facts. They examine research to see if it soundly supports an idea (Kozak, 2018; Shrout & Rodgers, 2018).

Critical thinking reduces the likelihood that conclusions will be based on unreliable personal beliefs, opinions, and emotions. Thinking critically will be very important as you read *The Science of Psychology.* Some of the things you read will fit with your current beliefs, and some will challenge you to reconsider your assumptions. Actively engaging in critical thinking is vital to making the most of psychology. As you read, think about how what you are learning relates to your life experiences and to your assumptions about others.

In addition, scientists are characterized by *skepticism*. Skeptical people challenge whether a supposed fact is really true. Being skeptical can mean questioning what "everybody knows." There was a time when "everybody knew" that women were morally inferior to men, that race could influence a person's IQ, and that the earth was flat. Psychologists, like all scientists, look at such assumptions in new and questioning ways and with a skeptical eye. You might use scientific skepticism the next time you encounter an infomercial about the latest diet craze that promises to help you lose weight "without diet or exercise." A skeptic knows that if something sounds too good to be true, it probably is.

Related to critical thinking and skepticism is the distinction between science and pseudoscience. *Pseudo* means "fake," and *pseudoscience* refers to information that is couched in scientific terminology but is not supported by sound scientific research. Astrology is an example of a pseudoscience. Although astrologers may present detailed information about an individual, supposedly based on when that person was born, no scientific evidence supports these assumptions and predictions. One way to tell that an explanation is pseudoscientific rather than scientific is to look at how readily proponents of the explanation will accept evidence to the contrary.

Being open to the evidence means thinking *objectively*. To achieve this goal, scientists apply the empirical method to learn about the world. Using the **empirical method** means gaining knowledge through the observation of events, the collection of data, and logical reasoning. Being objective involves seeing things as they really are, *not as we would like them to be*. Objectivity means waiting to see what the evidence tells us rather than going with our hunches. Does the latest herbal supplement truly help relieve depression? An objective thinker knows that we must have sound evidence before answering that question.

Last, scientists are *curious*. Scientists notice things in the world (a star in the sky, an insect, a hero in a bar) and want to know what it is and why it is that way. Science involves asking questions, even very big questions, such as where did the earth come from, and how does love between two people endure for 50 years? Thinking like a psychologist means opening your mind and imagination to wondering why things are the way they are. Once you begin to think like a psychologist, you might notice that the world looks like a different place. Easy answers and simple assumptions will not do.

As you can probably imagine, psychologists have many different opinions about many different things, and psychology, like any science, is filled with debate and controversy. Throughout this book, we will survey areas of debate in psychology in a feature called Critical Controversy. As the first example, check out this chapter's Critical Controversy concerning the relationship between birth order and personality.

Debate and controversy are a natural part of thinking like a psychologist. Psychology has advanced as a field *because* psychologists do not always agree with one another about why the mind and behavior work as they do. Psychologists have reached a more accurate understanding of human behavior *because* psychology fosters controversies and *because* psychologists think deeply and reflectively and examine the evidence on all sides. A good place to try out your critical thinking skills is by revisiting the definition of psychology.

- **behavior** Everything we do that can be directly observed.
- **mental processes** The thoughts, feelings, and motives that each of us experiences privately but that cannot be observed directly.
- **critical thinking** The process of reflecting deeply and actively, asking questions, and evaluating the evidence.
- **empirical method** Gaining knowledge through the observation of events, the collection of data, and logical reasoning.

Psychology as the Science of All Human Behavior

As you consider the definition of psychology as the science of human behavior, you might be thinking, okay, where's the couch? Where's the mental illness? Psychology certainly does include the study of therapy and psychological disorders. *Clinical*

CRITICAL CONTROVERSY

Does Birth Order Matter to Personality?

When you think of all the experiences siblings share, it may seem odd that people have been fascinated by the potential effects of one difference among them: their birth order. Yet, common beliefs tell us that being born first, second, or last in our family matters in important ways to who we are as people. There is no question that when we find out someone is, say, the baby of the family, we often think we know some things about that person. Is there evidence for birth order's effects on personality?

Impressive contemporary research examining the relationship between birth order and personality characteristics has surveyed very large samples: nearly 400,000 U.S. teenagers (Damian & Roberts, 2015a), as well as over 5,000 U.S. adults, nearly 5,000 British adults, and over 10,000 German teens and adults (Rohrer, Egloff, & Schmukle, 2015). In each study, participants rated their personality characteristics. Additional information was collected about birth order, family size, socioeconomic status, and a range of other things that might matter to their personalities. In addition, the studies compared individuals across different families (for example, comparing all firstborns to all secondborns) as well as within families (comparing siblings to each other).

Because the research used very large samples, accounted for a number of factors that might affect the relationship between birth order and personality, and employed the most sophisticated analytical tools, the investigators were very well positioned to find links between birth order and personality, if those links existed. The results? For all of the samples, the relationship between birth order and personality was, essentially, zero. Birth order was unrelated to personality characteristics. For example, firstborns were no more likely to have leadership traits than their younger siblings were, nor were they more responsible (Damian & Roberts, 2015a; Rohrer, Egloff, & Schmukle, 2015). The lack of associations held as well across genders: Whether older brothers or sisters were compared to younger brothers and sisters, no systematic differences in personality characteristics were found.

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These studies tell us that birth order has very little to do with personality. There might be some characteristics that are related to birth order, and psychologists have continued to examine a range of these in explaining important life outcomes, ranging from sexual orientation (Bailey, 2018; Bartlett & Hurd, 2018) to managerial skill (Black, Grönqvist, & Öckert, 2018). Nevertheless, the bulk of evidence indicates that birth order is not as influential as common beliefs might hold. Perhaps a more interesting question might be why we have those common beliefs in the first place.

WHAT DO YOU THINK?

- Are you convinced that birth order bears no relationship to personality? Why or why not?
- Where do your beliefs about personality and birth order originate?

psychologists in particular specialize in studying and treating psychological disorders. By definition, though, psychology is a much more *general* science. Surely, psychological disorders are very interesting, and the media often portray psychologists as therapists. Yet the view of psychology as the science of what is wrong with people started long before television was invented. So how did we end up with the idea that psychology is only about mental illness?

When they think about psychology, many people think of Sigmund Freud (1856–1939). Freud believed that most of human behavior is caused by dark, unpleasant, unconscious impulses clamoring for expression. For Freud, even the average person on the street is a mysterious well of unconscious desires. Certainly, Freud's theories have had a lasting impact on psychology and on society. You have probably heard of a "Freudian slip." A Freudian slip means someone makes an error in speech that seems to be full of unintentional meaning (like wanting to say "Sigmund Freud" and instead saying "Sigmund

Fraud"). Consider, though, that Freud based his ideas about human nature on the patients whom he saw in his clinical practice—individuals who were struggling with psychological problems. His experiences with these clients, as well as his analysis of himself, colored his outlook on all of humanity. Freud once wrote, "I have found little that is 'good' about human beings on the whole. In my experience most of them are trash" (Freud, [1918] 1963).

Freud's view of human nature has crept into general perceptions of what psychology is all about. Imagine, for example, that you are seated on a plane, having a pleasant conversation with a stranger sitting next to you. At some point you ask your seatmate what she does for a living, and she informs you she is a psychologist. You might think to yourself, "Uh oh. What have I already told this person? What secrets does she know about me that I don't know about myself? Has she been analyzing me this whole time?" Would you be surprised to discover that this psychologist studies happiness? Or intelligence? Or the processes related to the experience of vision? The study of psychological disorders is a very important aspect of psychology, but it represents only one part of the science of psychology.

It is very likely that you yourself have thought about a number of the puzzles of life that interest psychologists. For example, have you ever wondered if having siblings or being an only child can affect a person's personality? Many people have opinions on this issue. Think of all the common beliefs people hold about birth order: Firstborns are natural leaders; "babies of the family" are indulged; middle children are neglected (like Jan Brady). Ask yourself, what is the typical firstborn, middle, or youngest child like? Chances are, if you have siblings (and even if you do not), you have some ideas about the way birth order relates to personality. Do these naive theories have a kernel of truth? The answer to that question might surprise you. The Critical Controversy takes a look at what scientists have to say about this topic.

Psychology seeks to understand the truths of human life in *all* its dimensions, including people's best and worst experiences. Psychologists acknowledge that sometimes an individual's best moments emerge amid the most difficult circumstances. Research on the human capacity for forgiveness demonstrates this point (Riek & DeWit, 2018). Forgiveness is the act of letting go of our anger and resentment toward someone who has harmed us. Through forgiveness we cease seeking revenge or avoiding the person who did us harm, and we might even wish that person well.

One such example is a tragic event from October 2006. Charles Carl Roberts held 10 young Amish girls hostage in a one-room schoolhouse in Pennsylvania, eventually murdering 5 of them and wounding 5 others before killing himself. The grief-stricken Amish community focused not on hatred and revenge but on forgiveness. In addition to raising money for the victims' families, the Amish insisted on establishing a fund for the murderer's family. As they prepared simple funerals for the dead girls, the community invited the killer's wife to attend. The science of psychology has much to offer in expanding our understanding of not only the perpetrator's violence but also the victims' capacity for forgiveness.

The willingness of the Amish community to forgive this horrible crime is both remarkable and puzzling. Can we scientifically understand the human ability to forgive even what might seem to be unforgivable? Psychologists have taken up the topic of forgiveness in research and clinical practice (Akhtar & Barlow, 2018; Wade & others, 2018). Researchers have explored the relationship between religious commitment and forgiveness (Braun & others, 2018), how forgiveness affects memory (Robertson & Swickert, 2018), the cognitive skills required for forgiveness (Karremans, Pronk, & van der Wal, 2015), and the potential dark side of forgiveness, which might emerge, for example, when forgiveness leads an abusive spouse to feel free to continue a harmful behavior (McNulty, 2011). Recent research has examined how individuals can come to forgive themselves (Cornish & others, 2018).

Some argue that psychology has focused too much on the negative while neglecting qualities that reflect the best of humanity (Seligman & Csikszentmihalyi, 2000). From these criticisms positive psychology has emerged. **Positive psychology** is a branch of psychology that emphasizes human strengths. Research in positive psychology centers on

● **positive psychology** A branch of psychology that emphasizes human strengths.

test yourself

1. What makes psychology a science? What are the goals of psychological scientists?
2. What four attitudes are at the core of the scientific approach?
3. Which particular Freudian views of human nature have influenced general perceptions of what psychology is all about?

topics such as hope, optimism, happiness, and gratitude (Brazeau & Davis, 2018; Kushlev & others, 2018; Rostalski, Muehlan, & Schmidt, 2018). One goal of positive psychology is to bring a greater balance to the field by moving beyond focusing on how and why things go wrong in life to understanding how and why things go right (Dunn, 2018). Positive psychology is not without its own critics, though. Indeed, some psychologists insist that human weaknesses are the most important topics to study (Lazarus, 2003; Lee, 2018).

To be a truly general science of human behavior, psychology must address *all* sides of human experience. Surely, controversy—such as that concerning positive psychology—is a part of any science. The healthy debate that characterizes the field of psychology can give rise to new psychological perspectives, and this is a sign of a lively discipline.

2. PSYCHOLOGY IN HISTORICAL PERSPECTIVE

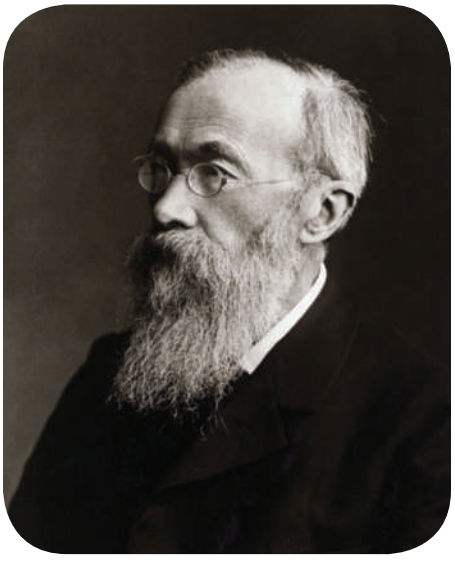
Psychology seeks to answer questions that people have been asking for thousands of years—for example:

- How do we learn?
- What is memory?
- Why does one person grow and flourish while another struggles?

It is a relatively new idea that such questions might be answered through scientific inquiry. From the time human language included the word *why* and became rich enough to enable people to talk about the past, people have created folklore to explain why things are the way they are. Ancient myths attributed most important events to the pleasure or displeasure of the gods. When a volcano erupted, the gods were angry; if two people fell in love, they had been struck by Cupid's arrows. Gradually, myths gave way to *philosophy*—the rational investigation of the underlying principles of being and knowledge—and people began trying to explain events in terms of natural rather than supernatural causes.

Western philosophy came of age in ancient Greece in the fifth and fourth centuries B.C.E. Socrates, Plato, Aristotle, and others debated the nature of thought and behavior, including the possible link between the mind and the body. Later philosophers, especially René Descartes, argued that the mind and body were completely separate, and they focused their attention on the mind. Psychology grew out of this tradition of thinking about the mind and body. The influence of philosophy on contemporary psychology persists today, as researchers who study emotion still talk about Descartes, and scientists who study happiness often refer to Aristotle (Homan, 2018; Schmitter, 2017).

In addition to philosophy, psychology also has roots in the natural sciences of biology and physiology. Read on to trace how the modern field of psychology developed.



Wilhelm Wundt (1832–1920) *Wundt founded the first psychology laboratory (with his coworkers) in 1879 at the University of Leipzig.*

Wundt's Structuralism and James's Functionalism

Wilhelm Wundt (1832–1920), a German philosopher-physician, integrated philosophy and the natural sciences to create the academic discipline of psychology. Some historians say that modern psychology was born in December 1879 at the University of Leipzig when Wundt and his students performed an experiment to measure the time lag between the instant a person heard a sound and the moment he or she pressed a telegraph key to signal having heard it. What was so special about this experiment? Wundt's study was about the workings of the brain: he was trying to measure the time it took the human brain and nervous system to translate information into action. At the heart of this experiment was the idea that mental processes could be measured. This notion ushered in the new science of psychology.

Wundt and his collaborators concentrated on discovering the basic elements, or "structures," of mental processes. Their approach was thus called **structuralism** because it focused on identifying the structures of the human mind. These structures were explored through *introspection,* a process of looking inside our own minds by focusing on our own thoughts (literally, "looking inside"). For this type of research, a person in Wundt's lab would be asked to think (introspect) about what was going on mentally as various events took place. For example, the individual might be subjected to a sharp, repetitive clicking sound and then asked to report whatever conscious thoughts and feelings the clicking produced. Introspection relies entirely on the person's conscious reflection. What made this method scientific was the systematic, detailed self-report required of the person in the controlled laboratory setting.

Although Wundt is most often regarded as the founding father of modern psychology, it was psychologist and philosopher William James (1842–1910), perhaps more than anyone else, who gave the field an American stamp. From James's perspective, the key question for psychology is not so much what the mind *is* (that is, its structures) as what it *is for* (its purposes or functions). James's view was eventually named *functionalism.*

In contrast to structuralism, which emphasized the components of the mind, **functionalism** probed the functions and purposes of the mind and behavior in the individual's adaptation to the environment. Whereas structuralists were looking inside the mind and searching for its structures, functionalists focused on human interactions with the outside world and the purpose of thoughts. If structuralism is about the "what" of the mind, functionalism is about the "why." Unlike Wundt, James did not believe in the existence of rigid structures in the mind. Instead, James saw the mind as flexible and fluid, characterized by constant change in response to a continuous flow of information from the world. James called this natural flow of thought a "stream of consciousness."

A core question in functionalism is "Why is human thought *adaptive*—that is, why are people better off because they can think than they would be otherwise?" When we talk about whether a characteristic is adaptive, we are focusing on how it makes an organism better able to survive. As we will see next, functionalism fit well with the theory of evolution through natural selection proposed by British naturalist Charles Darwin (1809–1882).

William James (1842–1910) *James's approach became known as functionalism.*

● **structuralism** Wundt's approach to discovering the basic elements, or structures, of mental processes; so called because of its focus on identifying the structures of the human mind.

● **functionalism** James's approach to mental processes, emphasizing the functions and purposes of the mind and behavior in the individual's adaptation to the environment.

Darwin's Natural Selection

In 1859, Darwin published his ideas in *On the Origin of Species* (1979). A centerpiece of his theory was the principle of **natural selection**, an evolutionary process in which organisms that are better adapted to their environment will survive and, importantly, produce more offspring.

● **natural selection** Darwin's principle of an evolutionary process in which organisms that are better adapted to their environment will survive and produce more offspring.

Darwin noted that the members of any species are often locked in competition for scarce resources such as food and shelter. Natural selection is the process by which the environment determines who wins that competition. Darwin asserted that organisms with biological features that led to survival and reproduction would be better represented in subsequent generations. Over many generations, organisms with these characteristics would constitute a larger percentage of the population. Eventually, this process could change an entire species.

Importantly, a characteristic cannot be passed from one generation to the next unless it is recorded in the *genes,* those collections of molecules that are responsible for heredity. Genetic characteristics that are associated with survival and reproduction are passed down over generations. According to evolutionary theory, species change through random genetic mutation. That means that, essentially by accident, some members of a species are born with genetic characteristics that make them different from other members. If these changes are adaptive (if they help those members compete for food, survive, and reproduce), they become more common in the species. If environmental conditions were to change, however, other characteristics might become favored by natural selection, moving the process in a different direction.

Evolutionary theory implies that the way we are, at least in part, is the way that is best suited to survival in our environment. The Psychological Inquiry feature lets you critically apply the principles of Darwin's theory of evolution.

psychological *inquiry*

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Explore Evolution from Giraffes to Human Beings

Evolution through natural selection and genetic mutation is a slow process. Darwin developed his theory of evolution by observing the tremendous variety of natural phenomena in the world.

Let's take a look at one of these creatures—the giraffe. Giraffes are the tallest mammals on earth, with some reaching a soaring height of 19 feet. Much of that height comes from the giraffe's very long neck. That neck poses a mystery that fascinates scientists: Why does the giraffe have such a long neck? Critically explore some possible reasons below, and answer the questions that accompany each explanation.

1. An evolutionary explanation for the giraffe's neck would begin by assuming that, ages ago, some giraffes were genetically predisposed to have longer necks, and others were genetically predisposed to have shorter necks. Take this evolutionary argument one step further: Why do we now see *only* giraffes with long necks?
2. You might reasonably guess that giraffes have long necks in order to reach leaves growing on tall trees—in other words, so that they can eat and survive. However, giraffes often prefer to eat from bushes and relatively low tree branches. Instead, male giraffes use their long necks in fights with other giraffes as they compete over mates. The males that win the fights are more likely to reproduce. Over time, were the winners those with the longer necks or the shorter necks? Explain.
3. The process of evolution sheds light on why members of a particular species share common characteristics. If you were to apply evolutionary theory to human beings, what kinds of characteristics would you focus on and why? Choose one human characteristic and apply the same kinds of questions you considered about the giraffe's long neck. Why are we humans the way we are?

Mary Whiton Calkins (1863–1930) *Calkins was the first female president in the American Psychological Association*

Darwin's theory continues to influence psychologists today because it is strongly supported by observation. We can make such observations every day. Right now, for example, in your kitchen sink, various bacteria are locked in competition for scarce resources in the form of those tempting food particles from your last meal. When you use an antibacterial cleaner, you are playing a role in natural selection, because you are effectively killing off the bacteria that cannot survive the cleaning agents. However, you are also letting the bacteria that are genetically adapted to survive that cleanser to take over the sink. The same principle applies to taking an antibiotic medication at the first sign of a sore throat or an earache. By killing off the bacteria that may be causing the illness, you are creating an environment in which their competitors (so-called antibiotic-resistant bacteria) may flourish. These observations powerfully demonstrate Darwinian selection in action.

If structuralism won the battle to be the birthplace of psychology, functionalism won the war. To this day, psychologists continue to talk about the adaptive nature of human characteristics, although they have branched out to study more aspects of human behavior than Wundt and James would ever have imagined.

Wundt and James are rightfully recognized as the twin founders of psychological science. Everyone who holds a PhD in psychology today can trace his or her intellectual family tree back to one of these two men. However, it is important to bear in mind that women and people of color also contributed to psychology, despite facing great discrimination as they sought to pursue the science of human behavior. For example, Mary Whiton Calkins studied psychology with William James at Harvard. She completed all the degree requirements for a PhD but Harvard refused to award her the degree because

she was a woman. Nevertheless, she contributed to the early science of psychology, writing four books and over a hundred scholarly articles in her career. She also became the first female president of the American Psychological Association in 1905 (APA, 2018). Racism prevented many talented people of color from contributing to psychology in its early days. Charles Henry Turner, who received a PhD in zoology in 1907, is often recognized as the first African American to conduct psychological research. He was interested in insect behavior and learning, especially the perceptual capacities of honey bees. He published 70 scholarly articles (Abramson, 2009). Sadly, this brilliant scholar was never able to secure a faculty position in a research-oriented university. Creating a truly diverse and representative science is a continuing goal in psychology. Because psychologists are interested in complex, difficult questions, it is vital that everyone with something to contribute—regardless of gender, gender identity, race/ethnicity, disability, or sexual orientation—has a place at the table. Everyone has something to offer to psychology.

Since the early days of psychology, the field has defined itself as the science of human behavior. The question of what exactly counts as human behavior, however, has fueled debate throughout the history of the field. For some psychologists, behavior has meant only observable actions; for others, it has included thoughts and feelings; for still others, unconscious processes have been the focal point. Traces of this debate can be seen today in the various contemporary approaches to the science of psychology that we will consider next.

Charles Henry Turner (1867–1923) *Turner is often recognized as the first African American to conduct psychological research.*

3. CONTEMPORARY APPROACHES TO PSYCHOLOGY

In this section we survey seven different approaches that represent the intellectual backdrop of psychological science: biological, behavioral, psychodynamic, humanistic, cognitive, evolutionary, and sociocultural.

test yourself

1. What is structuralism? How does functionalism contrast with structuralism?
2. What is meant when we say that a particular characteristic of an organism is adaptive?
3. In what ways is Darwin's work relevant to psychology?

The Biological Approach

Some psychologists examine behavior and mental processes through the **biological approach**, which focuses on the body, especially the brain and nervous system. For example, researchers might investigate the way your heart races when you are afraid or how your hands sweat when you tell a lie. Although a number of physiological systems may be involved in thoughts and feelings, the emergence of neuroscience has perhaps contributed the most to physiological psychology (Cacioppo, Cacioppo, & Petty, 2018; Shallice & Cipolotti, 2018).

- **biological approach** An approach to psychology focusing on the body, especially the brain and nervous system.

Neuroscience is the scientific study of the structure, function, development, genetics, and biochemistry of the nervous system. Neuroscience emphasizes that the brain and nervous system are central to understanding behavior, thought, and emotion. Neuroscientists believe that thoughts and emotions have a physical basis in the brain. Electrical impulses zoom throughout the brain's cells, releasing chemical substances that enable us to think, feel, and behave. Our remarkable human capabilities would not be possible without the brain and nervous system, which constitute the most complex, intricate, and elegant system imaginable.

- **neuroscience** The scientific study of the structure, function, development, genetics, and biochemistry of the nervous system, emphasizing that the brain and nervous system are central to understanding behavior, thought, and emotion.

Although neuroscience is perhaps most often linked with research on human thought, it has spread to many research areas. Today, psychologists from diverse perspectives study topics such as behavioral neuroscience, developmental neuroscience, social neuroscience, and so forth. Although biological approaches might sometimes seem to reduce complex human experience to simple physical structures, developments in neuroscience have allowed psychologists to understand the brain as an amazingly complex organ, perhaps just as complex as the psychological processes linked to its functioning (Brascamp & others, 2018; Le Bihan, 2016).

B. F. Skinner was a tinkerer who liked to make new gadgets. Deborah, the younger of his two daughters, was raised in Skinner's enclosed Air-Crib. Some critics accused Skinner of monstrous experimentation with his children; however, the early controlled environment has not had any noticeable harmful effects. Deborah, shown here as a child with her parents, is today a successful artist whose work strongly reflects her unique early childhood experience.

The Behavioral Approach

The **behavioral approach** emphasizes the scientific study of observable behavioral responses and their environmental determinants. It focuses on an organism's visible interactions with the environment—that is, behaviors, not thoughts or feelings. The principles of the behavioral approach have been widely applied to help people change their behavior for the better (Baum, 2017; Larson & others, 2018; Moore, 2017). The psychologists who adopt this approach are called *behaviorists.* Under the intellectual leadership of John B. Watson (1878–1958) and B. F. Skinner (1904–1990), behaviorism dominated psychological research during the first half of the twentieth century.

Skinner (1938) emphasized that psychology should be about what people do—their actions and behaviors—and should not concern itself with things that cannot be seen, such as thoughts, feelings, and goals. He believed that rewards and punishments determine our behavior. For example, a child might behave in a well-mannered fashion because her parents have previously rewarded this behavior. We do the things we do, behaviorists say, because of the environmental conditions we have experienced and continue to experience.

Contemporary behaviorists still emphasize the importance of observing behavior to gain understanding of an individual, and they use rigorous methods advocated by Watson and Skinner (Kettering & others, 2018; Miller & Grace, 2013). However, not every behaviorist today accepts the earlier behaviorists' rejection of thought processes, which are often called *cognition*.

The Psychodynamic Approach

The **psychodynamic approach** emphasizes unconscious thought, the conflict between biological drives (such as the drive for sex) and society's demands, and early childhood family experiences (Barber & Sharpless, 2015; Guntrip, 2018; Marmor, 2018). Practitioners of this approach believe that sexual and aggressive impulses buried deep within the unconscious mind influence the way people think, feel, and behave.

Sigmund Freud, the founding father of the psychodynamic approach, theorized that early relationships with parents shape an individual's personality. Freud's (1924) theory was the basis for the therapeutic technique that he called *psychoanalysis,* which involves an analyst's unlocking a person's unconscious conflicts by talking with the individual about his or her childhood memories, as well as the individual's dreams, thoughts, and feelings. Certainly, Freud's views have been controversial, but they remain a part of contemporary psychology. Today's psychodynamic theories tend to place less emphasis on sexual drives and more on cultural and social experiences as determinants of behavior.

Sigmund Freud (1856–1939) *Freud was the founding father of the psychodynamic approach.*

The Humanistic Approach

The **humanistic approach** emphasizes a person's positive qualities, the capacity for positive growth, and the freedom to choose one's destiny. Humanistic psychologists stress that people have the ability to control their lives and are not simply controlled by the environment (Maslow, 1971; Rogers, 1961). They theorize that rather than being driven by unconscious impulses (as the psychodynamic approach dictates) or by external rewards (as the behavioral approach emphasizes), people can choose to live by higher human values such as *altruism*—unselfish concern for other people's well-being—and free will. Many aspects of this optimistic approach appear in research on motivation, emotion, health, and personality psychology (Anderson, 2018; Hancox & others, 2018; Vansteenkiste & others, 2018).

● **behavioral approach** An approach to psychology focusing on the scientific study of observable behavioral responses and their environmental determinants.

The Cognitive Approach

According to cognitive psychologists, the human brain houses a "mind" whose mental processes allow us to remember, make decisions, plan, set goals, and be creative (Dai, Pleskac, & Pachur, 2018; Engle, 2018; Fox & Christoff, 2018). The **cognitive approach**, then, emphasizes the mental processes involved in knowing: how we direct our attention, perceive, remember, think, and solve problems. Many scientists who adopt this approach focus on *information processing,* the ways that the human mind interprets incoming information, weighs it, stores it, and applies it to decision making. Cognitive psychologists seek answers to questions such as how we solve math problems, why we remember some things for only a short time but others for a lifetime, and how we use our imagination to plan for the future.

Cognitive psychologists view the mind as an active and aware problem-solving system (Pezzuti & others, 2014). This view contrasts with the behavioral view, which portrays behavior as governed by external environmental forces. In the cognitive view, an individual's mental processes control behavior through memories, perceptions, images, and thinking.

According to humanistic psychologists, warm, supportive behavior toward others helps us to realize our capacity for self-understanding.
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The Evolutionary Approach

Although arguably all of psychology emerges out of evolutionary theory, some psychologists emphasize an **evolutionary approach** that uses evolutionary ideas such as adaptation, reproduction, and natural selection as the basis for explaining specific human behaviors. Evolutionary inquiries sometimes involve examining the behavior of nonhuman primates to look for clues for the origins of human behavior (Masterton & others, 2018). David Buss (2015; 2018; Lewis & others, 2017) argues that just as evolution molds our physical features, such as body shape, it also influences our decision making, level of aggressiveness, fears, and mating patterns. Thus, evolutionary psychologists argue, the way we adapt is traceable to problems early humans faced in adapting to their environment (McDermott & Hatemi, 2018).

Evolutionary psychologists believe their approach provides an umbrella that unifies the diverse fields of psychology (Frankenhuis & Tiokhin, 2018; Jost, Sapolsky, & Nam, 2018; Saad, 2017). Not all psychologists agree with this conclusion, however. For example, some critics stress that the evolutionary approach inaccurately explains why men and women have different social roles and does not adequately account for cultural diversity and experiences (Bosak & others, 2018; Eagly & Wood, 2013; 2017). Yet, even psychologists who disagree with applying the evolutionary approach to psychological characteristics still agree with the general principles of evolutionary theory.

The Sociocultural Approach

The **sociocultural approach** examines the ways in which social and cultural environments influence behavior. Socioculturalists argue that understanding a person's behavior requires knowing about the cultural context in which the behavior occurs (Matsumoto & Juang, 2017; Ott & Michailova, 2018; Steel & others, 2018b). Researchers who focus on sociocultural influences might compare people from different cultures to see whether they are similar or different in important ways.

The sociocultural view focuses not only on comparisons of behavior across countries but also on the behavior of individuals from different ethnic and cultural groups within a country. Rising cultural diversity in the United States in recent years has prompted increasing interest in the lives of ethnic minority groups, especially the factors that have

- **psychodynamic approach** An approach to psychology focusing on unconscious thought, the conflict between biological drives (such as the drive for sex) and society's demands, and early childhood family experiences.
- **humanistic approach** An approach to psychology focusing on a person's positive qualities, the capacity for positive growth, and the freedom to choose one's destiny.
- **cognitive approach** An approach to psychology focusing on the mental processes involved in knowing: how we direct our attention, perceive, remember, think, and solve problems.
- **evolutionary approach** An approach to psychology focusing on evolutionary ideas such as adaptation, reproduction, and natural selection as the basis for explaining specific human behaviors.
- **sociocultural approach** An approach to psychology focusing on the ways in which social and cultural environments influence behavior.

restricted or enhanced their ability to adapt and cope with living in a predominantly non-Latino White society. Further, as the nations of the world grow increasingly economically interdependent, it becomes especially important to understand cultural influences on human interaction. For example, psychologists are interested in studying how psychological characteristics may help or hinder negotiations among individuals from different cultures (Adler & Aycan, 2018).

Summing Up the Seven Contemporary Approaches

These seven psychological approaches provide different views of the same behavior, and all of them may offer valuable insights that the other perspectives miss. Think about the simple experience of seeing a cute puppy. Looking at that puppy involves physical processes in the eyes, nervous system, and brain—the focus of the biological approach to psychology. The moment you spot that puppy, though, you might smile without thinking and reach down to pet the little guy. That reaction might be a response based on your past learning with your own dog (behavioral perspective), or on unconscious memories of a childhood dog (psychodynamic perspective), or on conscious memories that you especially like this dog breed (cognitive perspective), or even on evolutionary processes that promoted cuteness to help offspring survive (evolutionary approach). You might find yourself striking up a conversation with the puppy's owner, based on your shared love of dogs (humanistic perspective). Further, sociocultural factors might play a role in your decision about whether to ask the owner if you could touch the puppy, whether you share those warm feelings about the puppy with others, or whether the puppy is likely to be viewed as a family member, a worker, or nuisance.

test yourself

1. What are two differences between the cognitive and psychodynamic approaches to psychology?
2. How are the biological and evolutionary perspectives on psychology similar and how are they different?
3. What specific ideas did B. F. Skinner's behaviorist approach emphasize?

4. WHAT PSYCHOLOGISTS DO

People who think of themselves as psychologists work in a wide range of settings and engage in many different activities. Figure 1 shows the various settings in which psychologists practice their profession. In this section we look at what psychologists do, and then we zoom in on the areas of specialization.

Careers in Psychology

Individuals with undergraduate training in psychology might use their expertise in occupations ranging from human resources and business consulting to doing casework for individuals struggling with psychological disorders. Those with graduate training in psychology might work as therapists and counselors, researchers and teachers in universities, or as business consultants or marketing researchers.

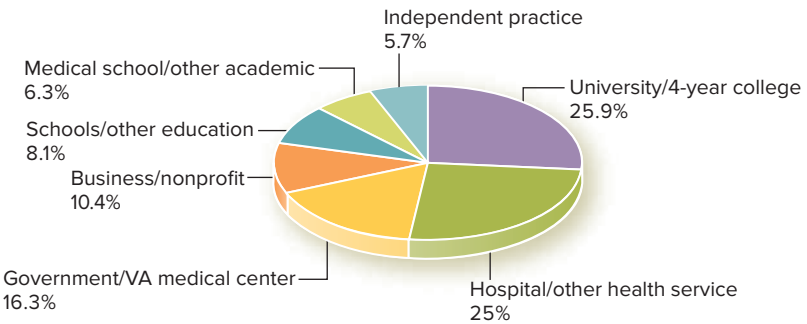


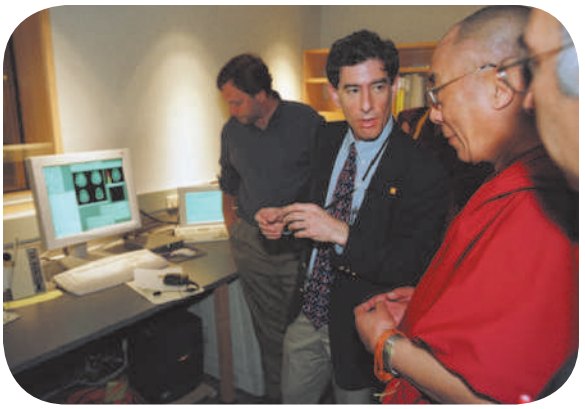
FIGURE 1 **Settings in Which Psychologists Work** This figure shows where individuals who have recent Ph.D.s in psychology work. As you can see, many are employed in higher education and medical contexts. Source: Michalski, Kohout, Wicherski, & Hart (2011).

Individuals who are primarily engaged in helping others are often called *practitioners* of psychology. They spend most of their time in clinical practice, seeing clients and offering them guidance as they work through problems. However, even psychologists who are primarily concerned with clinical practice pay attention to scientific research. For these individuals, rigorous research guides their therapeutic practice and their efforts to make improvements in the lives of their patients. Increasingly, psychologists who primarily provide therapy engage in *evidence-based practice*—that is, they use therapeutic tools whose effectiveness is supported by empirical research (Dobson & Dobson, 2018).

An important distinction that is often not well understood is the difference between a clinical psychologist and a psychiatrist. A clinical psychologist typically has a doctoral degree in psychology, which requires approximately four to five years of graduate work and one year of internship in a mental health facility. In contrast, a psychiatrist is a physician with a medical degree who subsequently specializes in abnormal behavior and psychotherapy. Another difference between a clinical psychologist and a psychiatrist is that a psychiatrist can prescribe drugs, whereas a clinical psychologist generally cannot. Despite these differences, clinical psychologists and psychiatrists are alike in sharing an interest in improving the lives of people with mental health problems.

Many psychologists who are employed at universities divide their time between teaching and doing research. Research in psychology creates the knowledge that is presented in this book and that you will be learning about in your introductory psychology course.

Human behavior is a vast, complex topic. Most psychologists specialize in a particular area of study, as we consider next.



Richard J. Davidson of the University of Wisconsin, Madison, shown with the Dalai Lama, is a leading researcher in behavioral neuroscience.

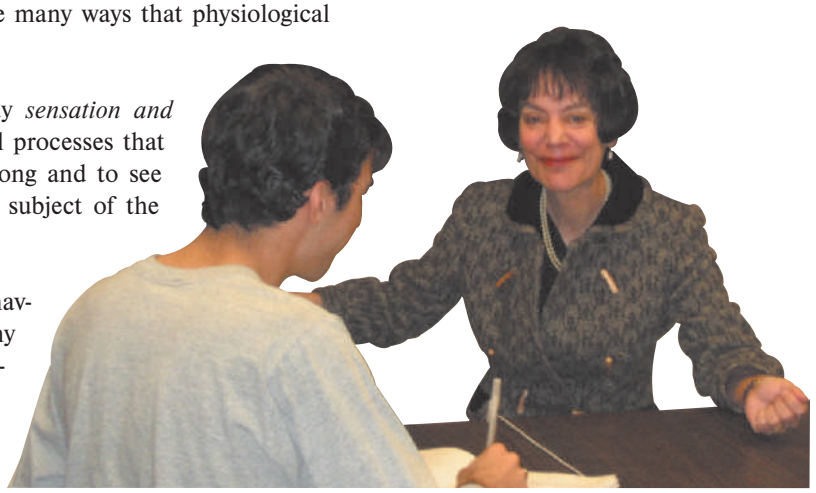
Areas of Specialization

Psychology has many areas of specialization. Currently, there are 56 divisions in the American Psychological Association, each focusing on a specific subfield of psychology. Division 1, the Society for General Psychology, seeks to provide a coherent integration of the vast science of psychology. Division 2, the Society for the Teaching of Psychology, is dedicated to devising the best ways to help students learn about this fascinating science. The other main specializations in the field of psychology include the following.

Physiological Psychology and Behavioral Neuroscience Researchers who study *physiological psychology* are interested in the physical processes that underlie mental operations such as thinking and memory. Physiological psychologists may use animal models (that is, they may employ animals, such as rats, to study processes that are difficult or impossible to study in the same way in humans) to examine such topics as the development of the nervous system. The field of *behavioral neuroscience* focuses on biological processes, especially the brain's role in behavior. Researchers are engaging in behavioral neuroscience when they track how brain processes reflect behavior. In the chapter "Biological Foundations of Behavior", we will examine the many ways that physiological processes relate to psychological experience.

Sensation and Perception Researchers who study *sensation and perception* focus on the physical systems and psychological processes that allow us to experience the world—to listen to a favorite song and to see the beauty of a sunset. These complex processes are the subject of the chapter "Sensation and Perception".

Learning *Learning* is the intricate process by which behavior changes in response to changing circumstances. Many researchers study the basic principles of learning using animals such as rats and pigeons. Learning has been addressed from behavioral and cognitive perspectives. This topic is covered in the chapter "Learning".



The research of Carol S. Dweck of Stanford University spans developmental and social psychology. Her influential work looks at how our ideas of self affect our motivation, self-regulation, and achievement.

Courtesy of Carol S. Dweck, Stanford University

Cognitive Psychology *Cognitive psychology* (explored in the chapter "Memory" and the chapter "Thinking, Intelligence, and Language") is the broad name given to the field of psychology that examines attention, consciousness, information processing, and memory. Cognitive psychologists are also interested in skills and abilities such as problem solving, decision making, expertise, and

intelligence, topics covered in the chapter "Thinking, Intelligence, and Language". Researchers in cognitive psychology and sensation perception are sometimes called *experimental psychologists.*

Developmental Psychology *Developmental psychology* is concerned with how people become who they are, from conception to death. In particular, developmental psychologists concentrate on the biological and environmental factors that contribute to human development. Developmentalists study child development but also adult development and aging. Their inquiries span the biological, cognitive, and social domains of life. The chapter "Human Development" reviews the key findings in this fascinating area.

Motivation and Emotion Researchers from a variety of specializations are interested in *motivation and emotion,* two important aspects of experience. Scientists who study motivation address research questions such as how individuals persist to attain a difficult goal and how rewards affect the experience of motivation. Emotion researchers delve into topics including the physiological and brain processes that underlie emotional experience, the role of emotional expression in health, and the possibility that emotions are universal. These fascinating questions are examined in the chapter "Motivation and Emotion".

Psychology of Women and Gender Researchers who study the *psychology of women* consider the psychological, social, and cultural influences on women's development and behavior. This field stresses the integration of information about women with current psychological knowledge and beliefs and applies that information to society and its institutions. Psychologists are also interested in understanding the broad topic of *gender* and the way in which our biological sex influences our ideas about ourselves as men and women. We consider these important topics in the chapter "Gender, Sex, and Sexuality".





Social psychologists explore the powerful influence of groups (such as, clockwise, Chinese Americans, members of motorcycle clubs, gay Americans, inner-city youths, and military families) on individuals' attitudes, thinking, and behavior.

(first) ©McGraw-Hill Education/John Flournoy, photographer; (second) ©Chip Somodevilla/Getty Images; (third) ©McGraw-Hill Education/Jill Braaten, photographer; (fourth) ©David McNew/Getty Images; (fifth) ©Sam Edwards/Getty Images

Personality Psychology *Personality psychology* considers personality, consisting of the relatively enduring characteristics of individuals. Personality psychologists study topics such as traits, goals, motives, genetics, personality development, and well-being. Researchers in personality psychology are interested in those aspects of your psychological makeup that make you uniquely you. The field of personality is explored fully in the chapter "Personality".

Social Psychology *Social psychology* deals with people's interactions with one another, relationships, social perceptions, social cognition, and attitudes. Social psychologists are interested in the influence of groups on our thinking and behavior and in the ways that the groups to which we belong influence our attitudes. Their research focuses on topics such as understanding and working to reduce racial prejudice, determining whether two heads really are better than one, and exploring how the presence of others influences performance. The chapter "Social Psychology" reviews the major research findings of social psychology.

Industrial and Organizational Psychology *Industrial and organizational psychology (I-O psychology)* centers on the workplace—both the workers and the organizations that employ them. I-O psychology is often divided into *industrial psychology* and *organizational psychology*. Among the main concerns of industrial psychology are personnel matters and human resource management. Thus, industrial psychology is increasingly referred to as *personnel psychology. Organizational psychology* examines the social influences in organizations, as well as organizational leadership. The chapter "Industrial and Organizational Psychology" investigates the key concerns and findings of I-O psychology.

Clinical and Counseling Psychology *Clinical and counseling psychology* is the most widely practiced specialization in psychology. Clinical and counseling psychologists diagnose and treat people with psychological problems. Counseling psychologists sometimes work with people to help solve practical problems in life. For example, counseling psychologists may work with students, advising them about personal problems and career planning. Clinical psychologists are interested in **psychopathology**—the scientific study of psychological disorders and the development of diagnostic categories and treatments for those disorders. The chapters "Psychological Disorders" and "Therapies" explore the intriguing world of psychological disorders and therapies.

● **psychopathology** The scientific study of psychological disorders and the development of diagnostic categories and treatments for those disorders.

Health Psychology *Health psychology* is a multidimensional approach to human health that emphasizes psychological factors, lifestyle, and the nature of the healthcare delivery system. Many health psychologists study the roles of stress and coping in people's lives. Health psychologists may work in physical or mental health areas. Some are members of multidisciplinary teams that conduct research or provide clinical services. Health psychology is examined in the chapter "Health Psychology".

This list of specialties cannot convey the extraordinarily rich knowledge you will gain as a student in introductory psychology. To whet your appetite for what is to come, check out the Psychological Inquiry feature and try answering some of the questions that fascinate psychologists.

The specialties that we have discussed so far are the main areas of psychology that we cover in this book. However, they do not represent an exhaustive list of the interests of the field. Other specializations in psychology include the following.

Community Psychology *Community psychology* concentrates on improving the quality of relationships among individuals, their community, and society at large. Community psychologists are practitioner scientists who provide accessible care for people with psychological problems. Community-based mental health centers are one means of delivering services such as outreach programs to people in need, especially those who traditionally have been underserved by mental health professionals.

psychological *inquiry*

Questions That Psychology Specialists Ask

This table identifies the chapter topics we will investigate in this book (column 1). For each topic, a question is posed that the chapter will answer (column 2). What do you think the research will show about each of these questions?

Chapter Topic	Question
Psychology's Scientific Method	How is deception used in psychological research?
Biological Foundations of Behavior	How does behavior change the brain?
Sensation and Perception	Is there evidence for the existence of ESP?
States of Consciousness	What do dreams mean?
Learning	How do pop quizzes influence studying?
Memory	Are you likely to remember what you've learned in intro psychology this year, 50 years from now?
Thinking, Intelligence, and Language	If you know you are fighting a losing battle, does it make sense to quit or keep trying?
Human Development	What kind of parenting is associated with children who are responsible and kind?
Motivation and Emotion	Does pursuing happiness make people happier?
Gender, Sex, and Sexuality	Where does sexual orientation come from?
Personality	Are personality characteristics genetically determined?
Social Psychology	How can we best combat racial prejudice?
Industrial and Organizational Psychology	What kind of leadership leads to success?
Psychological Disorders	What role do genes play in psychological disorders?
Therapies	Does psychotherapy work?
Health Psychology	What is the role of religion and spirituality in influencing healthy choices?

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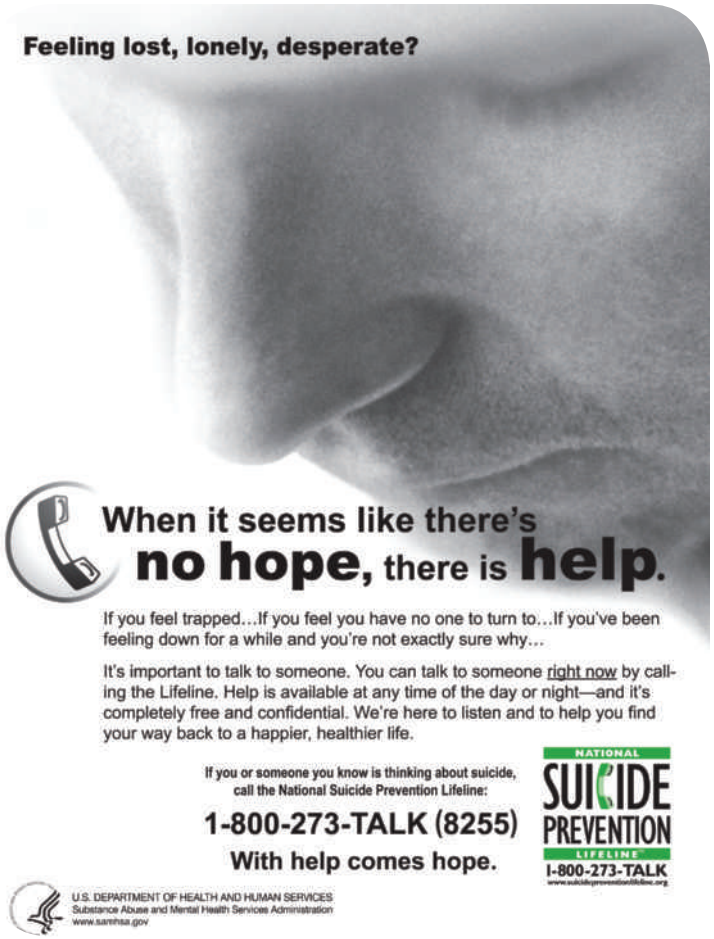
Community psychologists strive to create communities that are more supportive of their residents by pinpointing needs, providing services, and teaching people how to access resources that are already available. Community psychologists are also concerned with prevention. That is, they try to prevent mental health problems by identifying high-risk groups and then intervene by connecting individuals with appropriate services and resources in the community.

School and Educational Psychology *School and educational psychology* focuses children's learning and adjustment in school. School psychologists in elementary and secondary school systems test children, make recommendations about educational placement, and collaborate on educational planning teams. Educational psychologists work at colleges and universities, teach classes, and do research on teaching and learning.

Environmental Psychology *Environmental psychology* is the study of the interactions between people and their physical environment. Environmental psychologists explore the effects of physical settings in most major areas of psychology, including perception, cognition, learning, development, abnormal behavior, and social relations. Topics that an environmental psychologist might study range from how different arrangements of buildings and rooms influence behavior to what strategies might be used to reduce human behavior that harms the environment (Steg, 2015).

Forensic Psychology *Forensic psychology* is the field of psychology that applies psychological concepts to the legal system. Social and cognitive psychologists increasingly conduct research on topics related to psychology and law. Forensic psychologists are hired by legal teams to provide input about many aspects of trials, such as jury selection. Forensic psychologists who have clinical training may also testify as experts in trials, such as when they are asked to evaluate whether a person is likely to be a danger to society.



Community psychologists provide accessible care to local populations, often through efforts such as the suicide-prevention program advertised in this poster.

Source: U.S. Department of Health and Human Services

Sport Psychology *Sport psychology* applies psychology's principles to improving sport performance and enjoying sport participation. Sport psychology is a relatively new field, but it is rapidly gaining acceptance. It is now common to hear about elite athletes working with a sport psychologist to improve their performance.

Cross-Cultural Psychology Cross-cultural psychology is the study of cultural influences on behavior, thought, and emotion. Cross-cultural psychologists compare the nature of psychological processes in different cultures with a particular focus on whether psychological phenomena are universal or culture specific. Comparing different cultures can provide a way to answer some of the most fascinating questions that psychologists in other areas puzzle over.

Keep in mind that psychology is a collaborative science in which psychologists work together to examine a wide range of research questions. It is common for scholars from different specialties within psychology to join forces to study some aspect of human behavior. *The Science of Psychology* has features called Intersections that show how areas of psychology come together to address important questions. You will read one later in this chapter.

test yourself

1. What are some career options for a person with an undergraduate degree in psychology? What careers might someone with a graduate degree in psychology pursue?
2. What are the important distinctions between a clinical psychologist and a psychiatrist?
3. Name five areas of specialization in psychology and describe the primary concerns of each.

5. THE SCIENCE OF PSYCHOLOGY AND HEALTH AND WELLNESS

We have reviewed a variety of ways that psychologists approach human behavior, and psychologists have learned much about behavior that is relevant to you and your life. By tying research in psychology to your physical health and psychological wellness, in *The Science of Psychology* we seek to answer the question "What does psychology say about *you*?" At the close of each chapter, we will consider how the topics covered matter to your mind and your physical body. This link between the mind and the body has fascinated philosophers for centuries. Psychology occupies the very spot where the mind and body meet.

How the Mind Impacts the Body

When you think about psychology, your first thought might be about the mind and the complex feelings—such as love, gratitude, hate, and anger—that emanate from it. Psychologists have come to recognize more and more the degree to which the mind is intricately connected to the body. As you will see when we examine neuroscience in the chapter "Biological Foundations of Behavior", observations of the brain at work reveal that when mental processes change, so do physical processes.

Health psychologists view health behavior as a subset of behaviors that are relevant to physical health. These behaviors might include eating well, exercising, not smoking, performing testicular and breast self-exams, and getting enough sleep. But think about it: Is there ever a time when your behavior is *not* relevant to your body and therefore to your health? Is there ever a time when you are doing something—thinking, feeling, walking, running, singing—when your physical body is not present? As long as your body is there—with your heart, lungs, blood, and brain activated—your health is affected. In short, *everything* we do, see, think, and feel is potentially important to our health and well-being.

The way we think can have important implications for our physical health. To read about research showing the ways that students think about how much they fit in at college can affect their experience of stress, see the Intersection.

The skills of tennis great Sloane Stephens combine psychological and physical processes.

How the Body Impacts the Mind

Similarly, the body can influence the mind in dramatic ways. Consider your fuzzy morning thinking after a late night on the town and how much easier it is to solve life's problems when you have had a good night's sleep. Also recall your outlook on the first day of true recovery from a nagging cold: Everything just seems better, and your mood and your work improve. Clearly, physical states such as illness and health influence the way we think.

The relationship between body and mind is illustrated in a major question that psychologists regularly encounter: What is the relative impact of nature (genetic heritage) versus nurture (social experience) on a person's psychological characteristics? The influence of genetics on a variety of psychological features and the ways that genetic endowments can themselves be altered by social experience will be addressed in many of the main topics in this book, from development (in the chapter "Human Development") to personality (in the chapter "Personality") to psychological

INTERSECTION

Health Psychology and Social Psychology: Can Difference-oriented Interventions Buffer the Stress of Coming to College?

Do I belong here? Do I have what it takes to succeed? The way new college students answer these questions can have important implications not only for their academic success but also their psychological and physical health (Adelman & others, 2017; Jury & others, 2017). Coming to college can be especially challenging for first-generation college students (those whose parents never attended college). These students can experience a mix of emotions—from excitement and pride to homesickness and worry (Fisher, O'Donnell, & Oyserman, 2017). If people feel that they differ in important ways from everyone around them, they can begin to feel uncertain about their answers to that question, "Do I belong here?" (Destin, Rheinschmidt-Same, & Richeson, 2017). Sometimes, such concerns lead students to dedicate themselves to academic success while sacrificing their physical health (Destin, 2018). Is there a way to succeed academically without harming physical health?

How do you answer the question "Do I belong here?"

Many universities have instituted orientation programs to ease the transition to college for first-generation students (Harackiewicz & Priniski, 2018; Zuo & others, 2018). At one school, new students listened for an hour as seniors shared stories about coming to college and learning how to be successful. In this "difference-education" program, the stories highlighted students' diverse backgrounds and how these experiences influenced their college life, both as weaknesses and as strengths. Sounds inspiring, but can something as minor as an hour in an orientation program really have an impact on how students adjust to college over the long haul?

A team of psychologists decided to answer this question. Two years after this orientation experience, the researchers recruited students who had taken part in the difference-education experience as well as students who had participated in an orientation program that addressed the transition to college but did not highlight diverse backgrounds (Stephens & others, 2015). The students came to the lab and were asked to complete a series of stressful tasks, including giving a speech about themselves and completing standardized tests. Their bodily responses to the stressful tasks were measured, and the results of the study were striking: Even two years later, participants who had received the difference-education orientation were more likely to talk about their own diverse backgrounds as strengths in their speeches. In addition, first-generation students who had received difference education were more physiologically balanced during the stressful tasks. The difference-education orientation experience led their bodies to respond better under stress. These results speak to the enduring power of a simple experience to help students recognize that they do have what it takes to succeed in college.

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Certainly, for all of us, entering a new and unfamiliar situation can lead us to feel uncertain about our skills, abilities, and even our very identities. Our expectations for others and ourselves, our identities, roles, and group memberships can influence us in profound ways throughout our lives. Our answers to the question, "Do I belong here?" guide us in and out of situations every day, and we always take our bodies with us.

disorders (in the chapter "Psychological Disorders"). You will see that your physical and mental selves are intertwined in ways you may have never considered.

Throughout *The Science of Psychology*, we investigate the ways that the various approaches to psychology matter to your life. Psychology is crucially about *you*—essential to your understanding of your life, your goals, and the ways that you can use the insights of thousands of scientists to make your life healthier and happier. In taking introductory psychology, you have an amazing opportunity. You will learn a great deal about human beings, especially one particular human being: you. Whether the psychological research presented is about emotions and motivation or the structures of the nervous system, it is still essentially about the mystery that is you.

test yourself

1. What has psychology increasingly come to recognize about the relationship between the mind and the body?
2. What are some mental processes that might be involved in efforts to change your physical body, as through diet or exercise?
3. What is some real-life evidence of the body's impact on the mind? Give examples that are different from those in the text.

SUMMARY

1. DEFINING PSYCHOLOGY

Psychology is the scientific study of human behavior and mental processes. Psychologists approach human behavior as scientists who think critically and are curious, skeptical, and objective. Behavior includes everything organisms do that can be observed. Mental processes are thoughts, feelings, and motives.

As a truly general science, psychology addresses all sides of human experience—positive and negative, strengths and weaknesses. Psychology is characterized by controversy and debate, and new psychological perspectives sometimes arise when some scientists question the views of others.

2. PSYCHOLOGY IN HISTORICAL PERSPECTIVE

Psychology emerged as a science from the fields of philosophy and physiology. Two founders of the science of psychology are Wilhelm Wundt and William James. Wundt's structuralism emphasized the conscious mind and its structures. James's functionalism focused on the functions of the mind in human adaptation to the environment. The functionalist emphasis on the mind's adaptive character fit well with the new understandings that came from Charles Darwin's theory of evolution.

3. CONTEMPORARY APPROACHES TO PSYCHOLOGY

Different approaches to psychology include biological, behavioral, psychodynamic, humanistic, cognitive, evolutionary, and sociocultural views. All of these consider important questions about human behavior from different but complementary perspectives.

The biological approach focuses on the body, especially the brain and nervous system. Technological advances in brain imaging have allowed researchers to examine the brain in all its complexity. The behavioral approach emphasizes the scientific study of observable behavioral responses and their environmental determinants. John B. Watson and B. F. Skinner were important early behaviorists. The psychodynamic approach emphasizes unconscious thought, the conflict between biological instincts and society's demands, and early childhood family experiences. Sigmund Freud was the founding father of the psychodynamic approach. The humanistic approach emphasizes human beings' capacity for positive growth, freedom to choose their destiny, and positive qualities. The cognitive approach emphasizes the mental processes involved in knowing. Cognitive psychologists study attention, thinking, problem solving, remembering, and learning. The evolutionary approach stresses the importance of adaptation, reproduction, and "survival of the fittest." The sociocultural approach focuses on the social and cultural determinants of behavior and encourages us to attend to the ways that our behavior and mental processes are embedded in a social context.

4. WHAT PSYCHOLOGISTS DO

Psychologists work in a wide range of settings and engage in many different activities. Individuals with undergraduate training in psychology hold occupations ranging from human resources and business consulting to doing casework for individuals struggling with psychological disorders. Those with graduate training in psychology might work as therapists and counselors, researchers and teachers in universities, or as business consultants or marketing researchers.

A clinical psychologist typically has a doctoral degree in psychology, whereas a psychiatrist is a medical doctor who specializes in treating people with abnormal behavior. A psychiatrist treats patients with psychotherapy and can prescribe drugs; a clinical psychologist generally cannot prescribe medication.

Main areas of specialization in psychology include physiological psychology and behavioral neuroscience, developmental psychology, sensation and perception, cognitive psychology, learning, motivation and emotion, personality psychology, social psychology, industrial and organizational psychology, clinical and counseling psychology, and health psychology. Other specialties include community psychology, school and educational psychology, environmental psychology, the psychology of women, forensic psychology, sport psychology, and cross-cultural psychology.

5. THE SCIENCE OF PSYCHOLOGY AND HEALTH AND WELLNESS

Psychologists recognize that the mind and the body are intricately related. The mind can influence the body. The way we think has implications for our nervous system and brain. Our motives and goals can influence our bodies as we strive to be physically fit and eat well. In turn, the body can have an impact on the mind. We think differently when our bodies are rested versus tired, healthy versus unhealthy.

Plan to make the most of your experience in taking introductory psychology by applying your learning to your life. Psychology is, after all, the scientific study of you—your behavior, thoughts, goals, and well-being.

key *terms*

behavior
behavioral approach
biological approach
cognitive approach
critical thinking
empirical method
evolutionary approach
functionalism
humanistic approach
mental processes
natural selection
neuroscience
positive psychology
psychodynamic approach
psychology
psychopathology
science
sociocultural approach
structuralism

apply your *knowledge*

1. Ask 10 friends and family members to tell you the first thing that comes to mind when they think of psychology or a psychologist. After hearing their answers, share with them the broad definition of psychology given in this chapter. How do they react?
2. Visit the website of a major book retailer (such as Amazon) and enter "psychology" as a search term. Read the descriptions of five to seven of the most popular psychology books listed. How well do the themes covered in these books represent your perceptions of what psychology is? How well do they represent the approaches to psychology discussed in the text? Are any perspectives over- or underrepresented? If so, why do you think that is?
3. In the directory for your school (or for another institution), look up the psychology faculty. Select several faculty members and see what the areas of specialization are for each person (be careful: their specialty areas may not be the same as the classes they teach). How do you think their areas of academic training might affect the way they teach their classes?
4. Human beings evolved long ago in a very different environment than we occupy today. The survivors were those who were most able to endure extremely difficult circumstances, struggling to find food, avoid predators, and create social groups. What do you think were the most adaptive traits for these early humans? Are those traits still adaptive? To what specific environments are humans adapting today?
5. Adopt Wilhelm Wundt's approach to understanding the human mind and behavior. Invite three friends to listen to a piece of music, and then ask them to reflect on the experience. Examine what each of them say about various aspects of the music. What does this exercise tell you about the subjectivity of introspection? In what ways do you think the method is worthwhile and in what ways is it limited?

CHAPTER 2

CHAPTER OUTLINE

1 Psychology's Scientific Method

2 Types of Psychological Research

3 Research Samples and Settings

4 Analyzing and Interpreting Data

5 Conducting Ethical Research

6 Thinking Critically About Psychological Research

7 The Scientific Method and Health and Wellness

Psychology's Scientific Method

Growing Up to Be a "Laser Jock"

In October 2018, Donna Strickland became the third woman in history (and the first in 55 years) to receive the Nobel Prize in physics. Strickland, a self-described "laser jock," and her co-inventor were recognized for their discovery of ways to enhance the intensity of lasers (Bryner, 2018). Their work affects many aspects of everyday life, because lasers are used in surgery, manufacturing, drilling, and cutting. Donna Strickland faced barriers throughout her career. Women and people of color are sorely underrepresented among the group of people who call themselves scientists. Not everybody grows up with the idea that they can or should think the way a scientist thinks. Thinking like a scientist means looking at the world with a particular mindset and the goal of understanding why things are the way they are and how they might be changed for the better. Science provides us with solutions to problems by showing us what works and what doesn't. Leaders, policymakers, and concerned people might come up with various ideas to fix a problem, but finding out whether a proposed solution will work requires scientific observation. Psychologists are scientists who examine behavior in all its forms. In a sense, psychologists are children who grow up to become "behavior jocks."

PREVIEW

Being a psychologist means being a scientist who studies psychology. In this chapter, we review the scientific method. You will read about the ways psychologists have applied this general method and about the steps that are involved in recognizing research questions, developing methods to test them, and using statistical techniques to understand the results. Later in the chapter we will consider some of the ethical issues involved in scientific inquiry. Psychology shares a great deal with other sciences, but as you will see, topics that psychologists study sometimes require special methodological and ethical consideration. At the end of the chapter we will examine the role of psychological research in health and wellness.

1. PSYCHOLOGY'S SCIENTIFIC METHOD

Science is defined not by what it studies but by how it investigates. Butterflies and happiness can be studied in a scientific manner.

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Science is defined not by *what* it studies but by *how* it does so. Whether you want to study butterflies, Saturn's moons, or happiness, the *way* you study your question of interest determines whether your approach is scientific. The scientific method allows psychologists to gain knowledge about mind and behavior.

Using the scientific method makes psychology a science. Indeed, most of the studies published in psychological research journals follow the scientific method, which comprises these five steps (Figure 1):

1. Observing some phenomenon
2. Formulating hypotheses and predictions
3. Testing through empirical research
4. Drawing conclusions
5. Evaluating the theory

Step 1. Observing Some Phenomenon

The first step in conducting a scientific inquiry involves observing a specific phenomenon. The curious, critically thinking psychologist sees something and wants to know why or how it is the way it is. Examples of moments that might inspire a scientific inquiry include the following:

- Current events, such as public protests of various policies
- Social issues, like the divorce rate
- Personal experiences, such as an interaction with a child

● **theory** A broad idea or set of closely related ideas that attempts to explain observations and to make predictions about future observations.

As scientists consider such issues, they often develop theories. A **theory** is a broad idea or set of closely related ideas that attempts to explain observations. Theories tell us about the relationships between variables on a conceptual level. They seek to explain why certain things have happened and can be used to make predictions about future observations. Theories provide a logical basis for aspects of research studies, from predictions to designs.

It can be difficult to fully grasp what a theory is or why theories are important. A theory is a testable set of propositions that describe something important about the world and allow scientists to make predictions. Psychologists have proposed theories that describe human behavior and lead to specific predictions about that behavior. For instance, some psychologists theorize that the most important human need is to belong to a social group (Baumeister & Leary, 2000). From this theory we might come up with a variety of predictions. For example, we might expect that people will be highly motivated to fit in and feel especially distressed when they are not accepted by others (Verhagen, Lodder, & Baumeister, 2018). This theory might also lead to the prediction that being rejected by others would be a very distressing experience (Antico & others, 2018). Theories make sense of some aspect of human behavior and allow us to extrapolate into different circumstances and domains to

1

Observing Some Phenomenon

We feel good when we give someone a gift. However, do we genuinely feel better giving something away than we might feel if we could keep it? Elizabeth Dunn, Lara Aknin, and Michael Norton (2008) decided to test this question.

2

Formulating Hypotheses and Predictions

These researchers hypothesized that spending money on other people would lead to greater happiness than spending money on oneself.

3

Testing Through Empirical Research

In an experiment designed to examine this prediction, the researchers randomly assigned undergraduate participants to receive money ($5 or $20) that the students had to spend either on themselves or on someone else by 5 p.m. that day. Those who spent the money on *someone else* reported greater happiness that night.

4

Drawing Conclusions

The experiment supported the hypothesis that spending money on others can be a strong predictor of happiness. Money might not buy happiness, the researchers concluded, but spending money in a particular way—that is, on other people—may enhance happiness.

5

Evaluating the Theory

The experimental results were published in the prestigious journal *Science*. Now that the findings are public, other researchers might investigate related topics and questions inspired by this work, and their experiments might shed further light on the original conclusions.

FIGURE 1 **Steps in the Scientific Method: Is It Better to Give Than to Receive?** This figure shows how the steps in the scientific method were applied in a research experiment examining how spending money on ourselves or others can influence happiness.
(first photo) ©C Squared Studios/Photodisc/Getty Images; (third photo) ©Jupiter Images/Brand X Pictures/Alamy Stock Photo

think about what we should expect. Those expectations are hypotheses and predictions. Theories are useful because they guide scientists in designing their research.

Step 2. Formulating Hypotheses and Predictions

The second step in the scientific method is stating a hypothesis. A **hypothesis** is an educated guess that derives logically from a theory. It is an expectation that can be tested. A theory can generate many hypotheses. If more and more hypotheses related to a theory turn out to be true, the theory gains in credibility. For example, a researcher who believes that social belonging is the most important aspect of human functioning might predict that people who belong to social groups will be happier than those who do not. Another hypothesis from the theory that belonging to a group is important to human functioning might be that individuals who have been socially excluded will feel less happy than those who have been socially included. These general hypotheses can be tested in different studies. A **prediction** is a specific expectation for the outcome of a study.

- **hypothesis** An educated guess that derives logically from a theory; a prediction that can be tested.

- **prediction** A statement about the specific expectation for the outcome of a study.

Step 3. Testing Through Empirical Research

The next step in the scientific method is to test the hypothesis by conducting empirical research. The **empirical method**, as discussed in the "What Is Psychology?" chapter, means gaining knowledge by observing objective evidence. In empirical research, we learn about the world by conducting systematic inquiries, collecting data, and analyzing the information. During this step in the scientific process, it is time to design a study that will test predictions that are based on the theory. To do so, a researcher first needs to find a concrete way to measure the variables of interest. Empirical researchers gain knowledge by observing objective evidence, not by relying on beliefs or theories. The person who designed the research described in Figure 1 probably believed that spending on others would lead to higher happiness than spending on oneself. But science requires empirical research to determine whether this is true.

- **empirical method** Gaining knowledge through the observation of events, the collection of data, and logical reasoning.

● **variable** Anything that can change.

● **operational definition** A definition that provides an objective description of how a variable is going to be measured and observed in a particular study.

The phenomena that scientists study are called *variables*, a word related to the verb *to vary*. A **variable** is anything that can change. All the different things psychologists study are variables, including experiences like happiness, gratitude, aggression, belongingness, conformity, and so forth. An **operational definition** provides an objective description of how a variable is going to be measured and observed in a particular study. Operational definitions eliminate the fuzziness that might creep into thinking about a problem. Imagine, for instance, that everyone in your psychology class is asked to observe a group of children and to keep track of kind behaviors. Do you think that all your classmates will define "kind behaviors" in the same way? Establishing an operational definition ensures that everyone agrees on what a variable means.

To measure personal happiness, for example, prominent psychologist Ed Diener and his students (1985) devised a self-report questionnaire that measures how satisfied a person is with his or her life, called the Satisfaction with Life Scale. (You will get a chance to complete the questionnaire later in this chapter.) Scores on this questionnaire are then used as measures of happiness. Research using this scale and others like it has shown that certain specific factors—marriage, religious faith, purpose in life, and good health—are strongly related to being happy (Diener, 1999, 2012b).

Importantly, there is not just one operational definition for any variable. Although Diener and his colleagues used a questionnaire, researchers have used diverse operational definitions for this variable—in this case, happiness. For instance, in a study of the relationship between happiness and important life outcomes, researchers used the facial expressions displayed by women in their college yearbook pictures as a measure of happiness. The women in the pictures had graduated 30 years prior. The researchers coded the photographs for the appearance of *Duchenne smiling* (Harker & Keltner, 2001). This type of smiling is genuine smiling—the kind that creates little wrinkles around the outer corner of the eyes—and it has been shown to be a sign of true happiness (Danvers & Shiota, 2018). (If you want to see whether someone in a photograph is smiling genuinely, cover the bottom of the person's face. Can you still tell that he or she is smiling? A genuine smile is evident in the eyes, not just the mouth.) In addition to coding those photos, the researchers followed up on the women's life experiences since graduating and found that happiness, as displayed in yearbook pictures, predicted positive life outcomes, such as successful marriages and satisfying lives, some 30 years later (Harker & Keltner, 2001).

So, in Diener's research, happiness was operationally defined as a score on a questionnaire; however, in this second study, happiness was operationally defined as Duchenne smiling. These definitions are just two among the many ways that psychologists have operationalized happiness. Another way to operationally define happiness is to *make* people happy, for example, by giving them an unexpected treat like candy or cookies or having them watch an amusing video or listen to happy music.

Devising effective operational definitions for the variables in a study is a crucial step in designing psychological research. To study anything, we must have a way to see it or measure it. Clearly, to establish an operational definition for any variable, we first have to agree on what we are trying to measure. If we think of happiness as something that people know about themselves, then a questionnaire score might be a good operational definition of the variable. If we think that people might not be aware of how happy they are (or aren't), then a facial expression might be a better operational definition. In other words, our definition of a variable must be set out clearly before we operationally define it. You might try your hand at operationally defining the following variables: generosity, love, maturity, exhaustion, and physical attractiveness. What are some things that *you* find interesting? How might you operationally define these variables?

Because operational definitions allow for the measurement of variables, researchers have a lot of numbers to deal with once they have conducted a study. A key aspect of the process of testing hypotheses is data analysis. *Data* are all the information (all those numbers) researchers collect in a study—say, the questionnaire scores or the behaviors observed. Data analysis means "crunching" those numbers mathematically to find out whether they support predictions. We will cover some of the basics of data analysis later in this chapter.

Researchers have identified Duchenne smiling (notice the wrinkles) as a sign of genuine happiness.

Let's consider an example that demonstrates the first three steps in the scientific method. One theory of well-being is *self-determination theory* (Rigby & Ryan, 2018; Ryan & Deci, 2017). According to this theory, people are likely to feel fulfilled when their lives meet three important needs: relatedness (warm relationships with others), autonomy (independence), and competence (mastering new skills).

One hypothesis that follows logically from this theory is that people who value money, material possessions, prestige, and physical appearance (that is, *extrinsic rewards*) over relatedness, autonomy, and competence (*intrinsic rewards*) should be less fulfilled, less happy, and less well adjusted (Sortheix & Schwartz, 2017). In a series of studies entitled "The Dark Side of the American Dream," researchers Timothy Kasser and Richard Ryan asked participants to complete self-report measures of values and of psychological and physical functioning (Dittmar & others, 2014; Kasser & Ryan, 1996; Kasser & others, 2004). Thus, the operational definitions of values and psychological functioning were questionnaire scores. The researchers found that individuals who value material rewards over more intrinsic rewards do indeed tend to suffer as predicted.

Step 4. Drawing Conclusions

Based on the results of the data analyses, scientists then draw conclusions from their research. Do the data support the predictions or not? What do the findings tell us about the theory that guided the study? Psychologists write articles presenting those findings. The articles are submitted for publication in scientific journals where they undergo rigorous review by other scientists who evaluate the work for its scientific merit. If the research is judged to be of sufficiently high quality, the paper is published for all to see and read.

Step 5. Evaluating the Theory

The final step in the scientific method is one that never really ends. Once a paper is published, the community of scientists continues to evaluate it in light of other research. When many studies have been conducted on the same topic, scholars go back and consider the theory that started it all. Do the studies really support the theory? It is important to keep in mind that usually a theory is revised only after a number of studies produce similar results.

A key step after a study is published is **replication**. Replicating a study means repeating it and getting the same results. Scientific conclusions rely on showing that the results remain the same, regardless of the specific scientist who conducts the study or the specific group of people who were studied. *Direct replication* means doing the study precisely as it was conducted in its original form. *Conceptual replication* means doing the study with different methods or different types of samples. For instance, a researcher might want to know if a particular strategy to enhance social skills works not only for college students but for older adults. If a research finding is shown again and again—that is, if it is *replicated*—across different researchers and different specific methods—it is considered *reliable*. It is a result on which we can depend.

● **replication** Repeating a study in a new sample to see if results are the same as in previous work. A direct replication employs the very same methods as the original study. A conceptual replication employs different methods to test the same prediction.

Recently, many fields of science, including psychology, have confronted what has become known as a "replication crisis" (Nosek & Errington, 2017). When other investigators have tried to reproduce results from many studies they have not found the same results (Shrout & Rodgers, 2018). In response to this issue, two important principles have emerged to guide researchers. First, scientists should use large numbers of participants in their studies and should pool data across labs when a single lab can only collect a small number of participants (for instance, in infant research). Second, researchers should be transparent and thorough in reporting methods so that their work can be replicated correctly. Contemporary researchers often provide public access to their original data so that others can repeat the statistical analyses used. In addition, many psychologists have begun to *preregister* their hypotheses, predictions, and methods prior to running their studies. These scientists publicly report exactly what they predict and how they plan to test those predictions in advance (Rusz, Bijleveld, & Kompier, 2018).

A special type of study is called a meta-analysis. **Meta-analysis** is a statistical procedure that summarizes a large body of evidence from the research literature on a particular

● **meta-analysis** A statistical procedure that summarizes a large body of evidence from the research literature on a particular topic, allowing the researcher to assess the strength of the relationship between the variables.

topic. For a meta-analysis, a researcher tries to find all of the studies that have been done on the topic of interest. The researcher then compares results from all the studies. A meta-analysis allows researchers to determine whether a result is consistent in the literature and to estimate the size of the relationship between variables or the effect of an intervention (Gurevitch & others, 2018). Meta-analytic results are more powerful than those of any single study because they combine many findings in the literature.

For example, you have probably heard of people engaging in "random acts of kindness" like putting coins in an expired parking meter or anonymously paying for the next car in a drive-thru. Such behaviors are thought to boost the mood of the person doing them. Do they work? A recent meta-analysis addressed this question (Curry & others, 2018). The researchers gathered studies in which people who had engaged in kind behaviors were compared with others to find out whether kindness boosted well-being. From 27 studies employing over 4,000 people, the researchers concluded that yes, doing nice things for others does lead to a small but consistent increase in happiness.

The research community maintains an active conversation about what scientists know, and this dialogue constantly questions conclusions. From published studies, a scholar may come up with a new idea that will eventually change the established thinking on a particular topic. Steps 3, 4, and 5 in the scientific method are part of an ongoing process. That is, researchers go back and do more research, revise their theories, hone their methods, draw conclusions, and evaluate their revised theories. Think of science as an ongoing conversation. Published papers tell us what we know, right now. But conclusions are always open to revision.

test yourself

1. What are the five steps in the scientific method?
2. What is an operational definition, and what is its value in a study?
3. What is a meta-analysis? Why do researchers use this procedure?

● **descriptive research** Research that determines the basic dimensions of a phenomenon—defining what it is, how often it occurs, and so on.

2. TYPES OF PSYCHOLOGICAL RESEARCH

Psychologists commonly use three types of research. *Descriptive research* involves finding out about the basic dimensions of some variable (for example, what the average level of happiness is for men in the United States). *Correlational research* seeks to discover relationships among variables (for instance, whether being married predicts greater happiness for men). *Experimental research* concerns establishing causal relationships between variables (such as, whether women perceive men as more attractive if the men are smiling). In this section, we examine each of these types of research.

Descriptive Research

Just as its name suggests, **descriptive research** is about describing some phenomenon—determining its basic dimensions and defining what this thing is, how often it occurs, and so on. Descriptive research can help identify problems, such as the spread of a disease or the frequency of negative outcomes, such as violent crime. By itself, descriptive research cannot prove what causes some phenomenon, but it can reveal important information about people's behaviors and attitudes. Descriptive research methods include observation, surveys and interviews, and case studies.

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OBSERVATION

Imagine that you are going to conduct a study on how children who are playing together resolve conflicts that arise. The data that interest you concern conflict resolution. As a first step, you might go to a playground and simply observe what the children do—how often you see conflict resolution occur and how it unfolds. You would likely keep careful notes of what you observe.

This type of scientific observation requires important skills. Unless you are a trained observer and practice your skills regularly, you might not know what to look for, you might not remember what you saw, you might not realize that what you are looking for is changing from one moment to the next, and you might not document and communicate your observations effectively. Furthermore, you might not realize the value of