PSYCHOLOGY

AND

LIFE

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PEARSON

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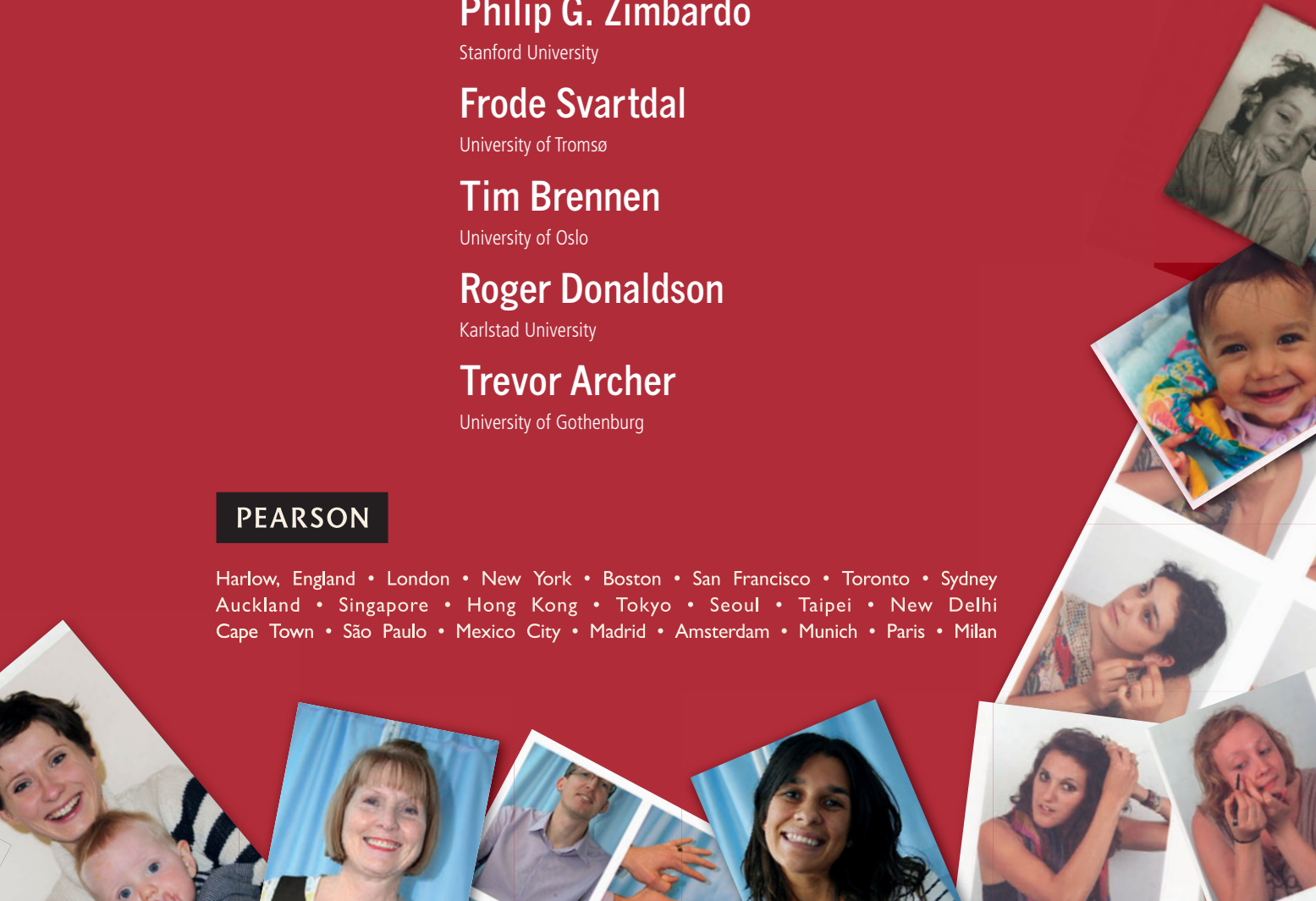Karlstad University

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Brief contents

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Contents

Preface

Teaching introductory psychology is one of the greatest challenges facing any academic psychologist. Because of the range of our subject matter, it is probably the most difficult course to teach effectively in all of academia. We must cover both the micro-level analyses of nerve cell processes and the macro-level analyses of cultural systems: both the vitality of health psychology and the tragedy of lives blighted by mental illness. But teaching psychology faces another challenge: often the infusion of 'pop psychology' into our society has created misconceptions about psychology that must be corrected. Students also bring expectations about what they want to get out of a course in psychology – they want to learn much that will be personally valuable, that will help them improve their everyday lives. Indeed, that is a tall order for any teacher to fill. But we believe that *Psychology and Life* can help you to fill it. Our goal has been to design a text that students will enjoy reading as they learn what is so exciting and special about the many fields of psychology. In every chapter, in every sentence, we have tried to make sure that students will want to go on reading. At the same time, we have focused on how our text will work within the syllabi of instructors who value a research-centred, applications-relevant approach to psychology.

This European edition of *Psychology and Life* is based on the 18th edition of the classic Gerrig and Zimbardo textbook. It is the first time that we adapting authors, Frode Svartdal, Tim Brennan, Roger Donaldson, and Trevor Archer have collaborated on a project of this scale. One of our goals with this book is to make the text relevant to the lives of our students in Scandinavia, so while we have retained examples from the US, we have also tried to include relevant examples, research and illustrations from Norway, Sweden and Denmark as well as relevant research from other European countries.

Text theme: The science of Psychology

The aim of *Psychology and Life* is to use solid scientific research to combat psychological misconceptions. In our experience as teachers, one of the most reliable occurrences on the first day of introductory psychology is the throng of students who push forward at the end of class to ask, in essence, 'Will this class teach me what I need to know?': My mother is taking Prozac: Will we learn what it does? Are you going to teach us how to study better? What should I do if I have a friend talking about suicide? We take comfort that each of these questions has been addressed by rigorous empirical research. *Psychology and Life* is devoted to providing students with scientific

analyses of their foremost concerns. As a result, the features of *Psychology and Life* support a central theme: psychology as a science, with a focus on *applying* that science to your students' lives.

New feature: Research in your life

Research in your life, a new feature that has been especially written for the European edition, appears at the end of every chapter and features interviews with researchers in different psychological fields. Many of the researchers are from Scandinavia or other European countries, as well as a few 'classical' researchers from the US; one of them is Philip Zimbardo himself. The aim of the feature is to show how these researchers became interested in psychological research, and to give an insight into their research and careers.

Research in your life interviews featured in each chapter are:

Chapter 1: Philip Zimbardo
Chapter 2: Andy Field
Chapter 3: Kenneth Hugdahl
Chapter 4: Peter Thompson
Chapter 5: Claus Bundesan
Chapter 6: Peter R. Killeen
Chapter 7: Elizabeth Loftus
Chapter 8: Bruno Laeng
Chapter 9: Robert J. Sternberg
Chapter 10: Pehr Granqvist
Chapter 11: Frederick Toates
Chapter 12: Gerry Larsson
Chapter 13: Per Magnus Johansson
Chapter 14: Claudia Fahlke
Chapter 15: Gerhard Andersson
Chapter 16: Dorthe Berntsen
Chapter 17: Richard Crisp

Critical Thinking in Your Life

An important goal of *Psychology and Life* is to teach the scientific basis of psychological reasoning. When students ask questions – what they need to know – they quite often have acquired partial answers based on the types of information that are available in the popular media. Some of that information is accurate, but often

students do not know how to make sense of it. How do they learn to interpret and evaluate what they hear in the media? How can they become wiser consumers of the overabundance of research studies and surveys cited? How can they judge the credibility of these sources? To counteract this infusion of so-called reliable research, we provide students with the scientific tools to think critically about the information with which they are surrounded and to draw generalizations appropriate to the goals and methods of research.

With the feature Critical thinking in your life, we seek to confront students directly with the experimental basis of critical conclusions. Our intention is not to maintain that each of these boxes has the definitive answer to a particular research area, but to invite critical thinking and open the door for further questions. Critical thinking in your life topics, by chapter:

Chapter 1:	Why do friendships end?
Chapter 2:	The lesson from Clever Hans
	Psychological research: Basic and applied
Chapter 3:	How do brain imaging techniques work?
	Do early experiences affect the connectivity of your memories?
	What does 'It's genetic' mean?
Chapter 4:	Can technology restore sight?
	How do we recognize faces?
Chapter 5:	Introspection revisited
	Does ecstasy harm the brain?
Chapter 6:	Unexpected effects of rewards
	~Animal intelligence
Chapter 7:	How can memory research help you prepare for exams?
	Can a brain scanner tell what you remember really happened or not?
Chapter 8:	How does gesture influence language processing?
	Can political experts predict the future?
Chapter 9:	From Cyril L. Burt to cutting edge
	Can you trust intelligence assessment on the internet?
Chapter 10:	What is a 'crack baby'?
	How is the Strange Situation Test relevant today?
Chapter 11:	Functions of motivational concepts
	How does motivation affect academic achievement?
Chapter 12:	Why are some people happier than others?
	Healthy behaviour in Sweden
Chapter 13:	Who are you on the internet?
	How many items are necessary?
Chapter 14:	Seasonal affective disorder (SAD) – a controversial diagnosis and a controversial treatment
	What is insanity?
Chapter 15:	The dark age of psychiatry?
	Does therapy affect brain activity?
Chapter 16:	Is the fundamental attribution error universal?
	Do late-night TV ads really work?
Chapter 17:	Conformity and compliance revisited
	On the definition of aggression.

Psychology In Your Life

The Psychology in your life sections include questions that in our experience, students are curious to know the answers to. Our hope is that students will see, in each instance, exactly why psychological knowledge is directly relevant to the decisions they make every day of their lives. Psychology in your life topics, by chapter:

Chapter 1:	Can psychology help me find a career?
	In what ways do psychologists participate in the legal system?
Chapter 2:	Can survey research affect your attitudes?
	How can you evaluate psychological information on the Web?
Chapter 3:	Are your brain cells programmed to die?
	Why does music have an impact on how you feel?
Chapter 4:	Can you see and smell without knowing about it?
	Why is eating 'hot' food painful?
Chapter 5:	Do you get enough sleep?
	What is hypnotherapy?
Chapter 6:	How does classical conditioning affect cancer treatment?
	Learning and awareness
Chapter 7:	How much do you think you will remember from your psychology degree in 10 years time?
	Why does Alzheimer's disease affect memory?
Chapter 8:	Why and how do people lie?
	What to ask your doctor when you test positive for something
Chapter 9:	The frontline of psychology – fetal alcohol syndrome
	Do theories of intelligence matter?
Chapter 10:	Will your brain work differently as you age?
	Can physical exercise reduce the negative effects of normal ageing and Alzheimer's disease?
Chapter 11:	How does genetics contribute to obesity?
	Achievement and well-being
Chapter 12:	The stress of life events
	A toast to your health

For each chapter additional Critical thinking in your life and Psychology in your life boxes have been added by the adapting author team in order to make them even more relevant to the lives of students living in Europe, particularly Scandinavia.

Research studies

We have included a number of interesting studies that illustrate the *how* and *why* behind key psychological research. These studies have been expertly integrated into the text itself, allowing students to understand their full impact within the context of their reading. Example topics include plasticity in the visual cortex of adult rats, the impact of meditation on brain structure, the impact of culture on judgements of which category members are typical, the impact of emotions on memory for visual details, individual differences in intimacy goals, family therapy for children's anxiety disorders, cross-cultural differences in cognitive dissonance, and genetic influences on physical and social aggression.

Pedagogical features

Psychology and Life has maintained a reputation for presenting the science of psychology in a way that is challenging, yet accessible, to a broad range of students, and this edition is no exception. To enhance students' experience with the book, we include several pedagogical features:

- *Review questions.* This feature appears at the end of every major section and provides students with thought-provoking questions to test their mastery of material before moving on.
- *Recapping main points.* Each chapter concludes with a chapter summary, *Recapping main points,* which summarizes the chapter content and is organized according to major section headings.
- *Key terms.* Key terms are in boldface within the flow of the text and are then defined at the bottom of the page they appear on.
- *Practice tests.* Each chapter concludes with practice tests with multiple choice questions based on the material in both the main text and the boxes. In addition, we've provided sample essay questions that allow students to think more broadly about the content of each chapter. Multiple choice answers can be found in the Answer Appendix, and essay question suggested answers can be found in the Instructor's Manual.

Guided tour

Chapter table of contents – lists the main topics covered in the chapter and also the Psychology in your life and Critical Thinking in your life features included in the chapter

Chapter opening scenario – each chapter starts with a fictional or real life scenario to bring the topic under discussion alive

Link to online resources – there are online resources available to support each chapter of the Psychology and Life, available at **www.mypsychlab.co.uk**

Psychology in your life – These features link topics covered in the chapter to real-life or everyday situations

Critical thinking in your life – These features ask controversial questions to spark critical thinking and debate

Research studies – interesting research studies that discuss the how and the why behind key psychological research

Definitions– key terms are emboldened within the main body of the text and defined at the bottom of the page

Review questions – thought provoking questions at the end of each section to confirm your understanding of a topic

Recapping main points – a summary of what the chapter has covered

Essay questions – to help you test your knowledge and also think more broadly about the topics covered in the chapter

Practice test – Multiple choice questions to test your knowledge of the topics covered in the chapter

Research in your life – appears at the end of every chapter and features interviews with researchers in different psychological fields

About the authors

Richard J. Gerrig earned his Ph.D. in cognitive psychology at Stanford University. His academic career began at Yale University, where he was awarded the Lex Hixon Prize for teaching excellence in the social sciences. He moved to Stony Brook University in 1994, where he is currently a professor of psychology. At Stony Brook, he has been actively involved in initiatives focused on innovations in undergraduate education. His research on cognitive psychological aspects of language use has been widely published. One line of work examines the mental processes that underlie efficient communication. A second research program considers the cognitive and emotional changes readers experience when they are transported to the worlds of stories. He has served as an associate editor for the journals *Psychonomic Bulletin & Review* and J*ournal of Experimental Psychology: Learning, Memory, and Cognition*. He has been named a fellow of the Society for Text & Discourse, the American Psychological Association, and the Association for Psychological Science. His book *Experiencing Narrative Worlds* was published by Yale University Press.

Philip Zimbardo is one of the world's most distinguished living psychologists, having served as President of the American Psychological Association, designed and narrated the award winning PBS-TV series, Discovering Psychology, and has published more than 50 books and 400 professional and popular articles and chapters. His popular Publications are *Shyness – What Is It? What To Do About It?*, *The Shy Child, The Lucifer Effect,* and *The Time Paradox*.

A professor emeritus at Stanford University, Dr Zimbardo has spent 50 years teaching and studying psychology. He received his PhD in Social Psychology from Yale University. During his career his research interests have varied from shyness to time perspective, persuasion, cults, madness, violence, vandalism, political psychology and evil. He is best known for his controversial Stanford Prison Experiment that highlighted the ease with which ordinary intelligent college students could cross the line between good and evil when caught up in the matrix of situational and system forces.

Dr Zimbardo's current passion is the Heroic Imagination Project (HIP), that he founded as a non-profit organization dedicated to researching heroism and developing education materials based on that research, not only in the United States, but other parts of the world. HIP believes everyone has the potential to transform the private virtue of compassion into the civic virtue of heroic action, and is dedicated to helping individuals adopt heroic values and express their 'heroic imagination' in service to humanity.

Frode Svartdal is a professor of psychology at the University of Tromsø, Norway. His main research areas are within the psychology of learning, cognition and consciousness. Svartdal is also involved in research on social competence and problem behaviour in children and adolescents. He has also published a number of books (in Norwegian) on learning, general psychology and research methods.

Tim Brennen is a professor of psychology at the University of Oslo. He has previously worked at the University of Tromsø, as well as universities in France and England. His research is in cognitive psychology, and has ranged from seasonal swings in cognitive performance, to memory for faces and names, to, more recently, the effects of exposure to severe trauma on what we remember. He has been on the editorial boards of several journals, and is currently an associate editor for *Applied Cognitive Psychology*. Tim has lived in five European countries, speaks four and a half languages, and is now moving to Vietnam.

Roger Donaldson is a lecturer in psychology at Karlstad University in Sweden and has been employed there for more than 10 years. Before teaching at the university Roger has been employed as a school psychologist, worked with refugee families, and worked in the Swedish Public Employment Service. His courses at Karlstad University include Group Psychology, Social Psychology, Crisis Psychology, Clinical Psychology, Personality, and others. He is also responsible for the courses offered as distance learning. Roger also has a smaller private practice where he offers lecturing and consultation.

Trevor Archer studied Biology in Cambridge and then Miss Catherine Hebb (the sister of Donald Hebb), the Head of the Institute of Animal Physiology, Babraham, arranged a scholarship and for him to study Psychology and Physiology at the University of Newcastle upon Tyne. On completion of his Honours degree in Newcastle, he settled in Uppsala, Sweden, where he was offered the chance to do a PhD in Psychology, which he completed in 1979. Trevor had already started working at the Astra Pharmaceutical Company and was there until appointed to the Chair of Biological Psychology in 1988. By the end of this year he will be 62 years old and have worked in scientific laboratories since he was 17. The study of Biology and Psychology has given him the best life anyone could wish for. He has had an average of around 200 undergraduate and 10–15 graduate students over 25 years and his debt to them is immeasurable.

Contributors

The Research in your life features that come at the end of each chapter were kindly and expertly written by the following contributors:

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Bruno Laeng, University of Oslo

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Dorthe Berntsen, Aarhus University

Richard Crisp, University of Kent

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Figures

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Tables

Text

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1 Psychology and life

Why should you study psychology? Our answer to that question is quite straightforward: we believe that psychological research has immediate and crucial applications to important issues of everyday experience: your physical and mental health, your ability to form and sustain close relationships, and your capacity for learning and personal development. One of the foremost goals of *Psychology and Life* is to highlight the personal relevance and social significance of psychological expertise.

This edition of *Psychology and Life* is aimed at European psychology students, particularly those in Scandinavia, and is dotted throughout with examples of relevance for northern Europe, and highlighting contributions from researchers in this part of the world. The original textbook is by Gerrig and Zimbardo, and has now been adapted by four authors at Scandinavian universities. Some aspects of psychology are universal, whether one lives in the Guatemalan countryside or in a Swedish city; so, for instance, some basic perceptual and cognitive processes seem to organized in exactly the same way regardless of where one lives and comes from. Other aspects of psychology, however, vary a lot more between cultures, like how particular mental illnesses exhibit themselves, or how one goes about finding a partner.

There is a core of psychological theories and phenomena and approaches to the discipline that most introductory books will include. And this book is typical in that sense. What is less typical is the focus on examples relevant in the Scandinavian context, the emphasis on research done in Scandinavia, and the effort to relate psychological research to issues in people's lives.

Every semester when we begin to teach the course in introductory psychology, we are faced with students who have some very specific questions in mind. Sometimes those questions emerge from their own experience ('What should I do if I think my mother is mentally ill?' 'Will taking this course tell me how I can use psychology to get better marks?'); sometimes those questions emerge from the type of psychological information that is communicated through the popular press ('Do people who solve Sudoku puzzles have less chance of getting Alzheimer's?' 'Are women really better parents than men?'). A challenge for us as we teach the course is to bring what we know from psychological research to bear on questions that matter to our students.

Research in psychology provides a continuous stream of new information about the basic mechanisms that govern mental and behavioural processes. As new ideas replace or modify old ones, we are continually intrigued and challenged by the many fascinating pieces of the puzzle of human nature. We hope that, by the time you have finished the book, you too will cherish your store of psychological knowledge.

You will discover as you go through the book that what is key in psychology is the scientific quest for understanding. We will inquire about the how, what, when and why of human behaviour and about the causes and consequences of behaviours you observe in yourself, in other people and in animals. We will explain why you think, feel and behave as you do. What makes you uniquely different from all other people? Yet why do you often behave so much like others? Are you moulded by heredity, or are you shaped more by personal experiences? How can aggression and altruism, love and hate, and madness and creativity exist side by side in one person? In this opening chapter, we consider how and why all these types of questions have become relevant to psychology's goals as a discipline.

What makes psychology unique?

To appreciate the uniqueness and unity of psychology, you must consider the way psychologists define the field and the goals they bring to their research and applications. By the end of the book, we hope you will think like a psychologist. In this first section, we'll give you a strong idea of what that might mean.

Definitions

Many psychologists seek answers to this fundamental question: What is human nature? Psychology answers this question by looking at processes that occur within individuals as well as forces that arise within the physical and social environment. In accordance with this, we formally define **psychology** as the scientific study of the behaviour of individuals and their mental processes. Let's explore the critical parts of this definition: *scientific, behaviour, individual* and *mental.*

The scientific aspect of psychology requires that psychological conclusions be based on evidence collected according to the principles of the scientific method. The **scientific method** consists of a set of orderly steps used to analyse and solve problems. This method uses objectively collected information as the factual basis for drawing conclusions. We will elaborate on the features of the scientific method more fully in Chapter 2, when we consider how psychologists conduct their research.

Behaviour is the means by which organisms adjust to their environment. The subject matter of psychology largely consists of the observable behaviour of humans and other species of animals. Smiling, crying, running, hitting, talking and touching are some obvious examples of behaviour you can observe. Psychologists examine what the individual does and how the individual goes about doing it within a given behavioural setting and in the broader social or cultural context. Think, for example, how people from different cultures greet each other: genuine kisses, fake kisses, hugs, a handshake, stiff nods are all normal greetings to be found in various places in Europe. And think how you might greet a friend differently according to the context: when you see her at the university, or in town, or at a party, or if you met her by accident at the airport.

The subject of psychological analysis is most often an *individual* – a newborn infant, a teenage athlete, a student adjusting to life away from home for the first time, a man facing a midlife career change, or a woman coping with the stress of her husband's deterioration from Alzheimer's disease. However, the subject might also be a chimpanzee learning to use symbols to communicate, a white rat navigating a maze, or a sea slug responding to a danger signal. An individual might be studied in its natural habitat or in the controlled conditions of a research laboratory.

Many researchers in psychology also recognize that they cannot understand human actions without also understanding *mental processes,* the workings of the human mind. Much human activity takes place as private, internal events – thinking, planning, reasoning, remembering, creating and dreaming. Many psychologists believe that mental processes represent the most important aspect of psychological inquiry. As you shall soon see, psychological investigators have devised ingenious techniques to study mental events and processes – to make these private experiences public.

The combination of these concerns defines psychology as a unique field. Within the *social sciences,* psychologists focus largely on behaviour in individuals, whereas sociologists study the

Psychology The scientific study of the behaviour of individuals and their mental processes.

Scientific method The set of procedures used for gathering and interpreting objective information in a way that minimizes error and yields dependable generalizations.

Behaviour The actions by which an organism adjusts to its environment.
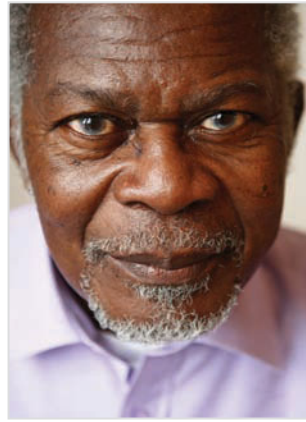
Most psychological study focuses on individuals – usually human ones, but sometimes those of other species. What aspects of your own life would you like psychologists to study?

Sources: From left to right Bananastock/Imagestock; Imagestate Media/Imagestate/John Foxx Collection; Pearson Education Ltd/Lord & Leverett; Alamy Images/Adam Gault.

behaviour of people in groups or institutions, and anthropologists focus on the broader context of behaviour in different cultures. Even so, psychologists draw broadly from the insights of other scholars. Psychologists share many interests with researchers in *biological sciences,* especially with those who study brain processes and the biochemical bases of behaviour. As part of the multidisciplinary area of *cognitive science,* psychologists' vquestions about how the human mind works are related to research and theory in computer science, artificial intelligence and applied mathematics. As a *health science* – with links to medicine, education, law and environmental studies – psychology seeks to improve the quality of each individual's and the collective's well-being.

Although the remarkable breadth and depth of modern psychology are a source of fascination to those who become psychologists, these same attributes make the field a challenge to the student exploring it for the first time. There is so much more to the study of psychology than you might expect initially – and, because of that, there will also be much of value that you can take away from this introduction to psychology. The best way to learn about the field is to learn to share psychologists' goals. Let's consider what those goals might be.

The goals of psychology

The goals of the psychologist conducting basic research are to describe, explain, predict and control behaviour. These goals form the basis of what psychological research attempts to do. What is involved in trying to achieve each of them?

Describing what happens

The first task in psychology is to make accurate observations about behaviour. Psychologists typically refer to such observations as their *data.* **Behavioural data** are reports of observations

> **Behavioural data** Observational reports about the behaviour of organisms and the conditions under which the behaviour occurs or changes.

about the behaviour of organisms and the conditions under which the behaviour occurs. As you will see in this book, there is an astonishing range of what counts as data in psychology, including interviews and questionnaires on any aspect of being human, counting the occurrences of phenomena, measuring how long it takes for people to respond to what they are seeing, and many neurological and genetic measures as well. When researchers undertake data collection, they must choose an appropriate *level of analysis* and devise measures of behaviour that ensure *objectivity.*

In order to investigate an individual's behaviour, researchers may use different *levels of analysis* – from the broadest, most global level down to the most minute, specific level. Suppose, for example, you were trying to describe a painting you saw at a museum (see Figure 1.1). At a global level, you might describe it by title (*Bathers*) and by artist (Georges Seurat). At a more specific level, you might recount features of the painting: some people are sunbathing on a riverbank while others are enjoying the water, and so on. At a very specific level, you might describe

| **Figure 1.1** | Levels of analysis. Suppose you wanted a friend to meet you in front of this painting: how would you describe it? |

Suppose your friend wanted to make an exact copy of the painting: how would you describe it?

Source: Bathers, by Georges Seurat. Photo: The National Gallery, London/akg-images.

the technique Seurat used – tiny points of paint – to create the scene. The description at each level would answer different questions about the painting.

Different levels of psychological description also address different questions. At the broadest level of psychological analysis, researchers investigate the behaviour of the whole person within complex social and cultural contexts. At this level, researchers might study how violent behaviour is expressed differently in different cultures, the origins of prejudice and the consequences of mental illness. At the next level, psychologists focus on narrower, finer units of behaviour, such as speed of reaction to a red traffic light, eye movements during reading and grammatical errors made by children acquiring language. Researchers can study even smaller units of behaviour. They might work to discover the biological bases of behaviour by identifying the places in the brain where different types of memories are stored, the biochemical changes that occur during learning, and the neural pathways responsible for vision or hearing. Each level of analysis yields information essential to a complete picture of humans, and this is one of the defining characteristics of psychology: descriptions of human behaviour at a wide variety of different levels. A key point, then, is that a psychologist is comfortable with descriptions of phenomena at biological, cognitive, social and cultural levels.

However tight or broad the focus of the observation, psychologists strive to describe behaviour *objectively*. Collecting the facts as they exist, and not as the researcher expects or hopes them to be, is of utmost importance. Because every observer brings to each observation his or her *subjective* point of view – biases, prejudices and expectations – it is essential to try to prevent these personal factors from creeping in and distorting the data. As you will see in the next chapter, psychological researchers have developed a variety of techniques to maintain objectivity.

Explaining what happens

Whereas *descriptions* must stick to perceivable information, *explanations* deliberately go beyond what can be observed. In many areas of psychology, the central goal is to find regular patterns in behavioural and mental processes. Psychologists want to discover *how* behaviour works. Why do you laugh when something unexpected happens? What conditions lead people to plan and commit serious crimes?

Explanations in psychology usually recognize that most behaviour is influenced by a combination of factors. Some factors operate within the individual, such as genetic make-up, motivation, intelligence level or self-esteem. These inner determinants say something about the particular person. Other factors, however, operate externally. Suppose, for example, that a child tries to please a teacher in order to win a prize, or that a motorist trapped in a traffic jam becomes frustrated and hostile. These behaviours are largely influenced by events outside the person. When psychologists seek to explain behaviour, they almost always consider both types of explanations. Suppose, for example, psychologists want to explain why some people start smoking. Researchers might examine the possibility that some individuals are particularly prone to risk taking (an internal explanation), or that some individuals experience a lot of peer pressure (an external explanation) – or that both a disposition toward risk taking and situational peer pressure are necessary (a combined explanation).

Often a psychologist's goal is to explain a wide variety of behaviour in terms of one underlying cause. Consider a situation in which your teacher says that to earn a good grade, each student must participate regularly in class discussions. Your friend, who is always well prepared for seminars, never raises his hand to answer questions or volunteer information. The teacher tells him off for being unmotivated and assumes he is not bright. That same friend also goes to parties but never asks anyone to dance, doesn't openly defend his point of view when it is challenged by someone less informed, and rarely engages in small talk. What is your diagnosis? What underlying cause might account for this range of behaviour? In fact, we can use the concept of shyness to explain the full pattern of your friend's behaviour (Zimbardo & Radl, 1999).

To forge such causal explanations, researchers must often engage in a creative process of examining a diverse collection of data. In the classic stories by Arthur Conan Doyle, Sherlock Holmes drew shrewd conclusions from scraps of evidence. In a similar fashion, every researcher must use an informed imagination, which creatively *synthesizes* what is known and what is not yet known. A well-trained psychologist can explain observations by using her or his insight into the human experience along with the facts previous researchers have uncovered about the phenomenon in question. Much psychological research attempts to determine which of several explanations most accurately accounts for a given behavioural pattern.

Predicting what will happen

Predictions in psychology are statements about the likelihood that a certain behaviour will occur or that a given relationship will be found. Often an accurate explanation of the causes underlying some form of behaviour will allow a researcher to make accurate predictions about future behaviour. Thus, if we believe your friend to be shy, we could confidently predict that he would be uncomfortable when asked to have a conversation with a stranger. When different explanations are put forward to account for some behaviour or relationship, they are usually judged by how well they can make accurate and comprehensive predictions. If your friend greeted a stranger warmly, we would be forced to rethink.

Just as observations must be made objectively, scientific predictions must be worded precisely enough to enable them to be tested and then rejected if the evidence does not support them. Suppose, for example, a researcher predicts that the presence of a stranger will reliably cause babies and baby monkeys, beyond a certain age, to respond with signs of anxiety. We might want to bring more precision to this prediction by examining the dimension of 'stranger.' Would fewer signs of anxiety appear in a human or a monkey baby if the stranger were also a baby rather than an adult, or if the stranger were of the same species rather than of a different one? To improve future predictions, a researcher would create systematic variations in environmental conditions and observe their influence on the baby's response.

What causes people to smoke? Can psychologists create conditions under which people will be less likely to engage in this behaviour?
Source: Pearson Education Ltd/Imagestate/John Foxx Collection.

Controlling what happens

For many psychologists, control is the central, most powerful goal – it gives psychologists ways of helping people improve the quality of their lives. Control means making behaviour happen or not happen – starting it, maintaining it, stopping it, and influencing its form, strength or rate of occurrence. A causal explanation of behaviour is convincing if it can create conditions under which the behaviour can be controlled.

As noted above, the ability to control behaviour is important because it gives psychologists ways of helping people improve the quality of their lives. Throughout *Psychology and Life,* you will see examples of the types of *interventions* psychologists have devised to help people gain control over problematic aspects of their lives. Chapter 15, for example, discusses treatments for mental illness. We also describe how people can harness psychological forces to eliminate unhealthy behaviours like smoking and initiate healthy behaviours like regular exercise (see Chapter 12). You will learn what types of parenting practices can help parents maintain solid bonds with their children (Chapter 10); you will learn what forces make strangers reluctant to offer assistance in emergency situations and how those forces can be overcome (Chapter 17). These are just a few examples of the broad range of circumstances in which psychologists use their knowledge to control and improve people's lives. In this respect, psychologists are a rather optimistic group; many believe that virtually any undesired behaviour pattern can be modified by the proper intervention.

Review questions

1. What are the four components of our definition of psychology?

2. Why is there often a close relationship between the goals of explanation and prediction?

Psychology in your life

Can psychology help find me a career?

If you've ever had a job you didn't like, you probably know a lot about what it means to suffer from a lack of motivation: you can hardly stand the idea of turning up at work; every minute seems like an hour. An important part of having a successful career is finding a job that provides the types of challenges and rewards that fit your motivational needs, and researchers have studied the match between vocations and people's individual personalities, values and needs.

Suppose you have been given some advice about what career to pursue. How do you select a particular company to join – and how does that company select you? Researchers in *personnel psychology* have focused a good deal of attention on the concept of *person–organization fit* – the goal is to maximize the compatibility between people and the organizations that employ them (Dineen et al., 2002; Van Vianen, 2000). One research project has focused on the match between people's personalities and the 'culture' of organizations. Consider the personality factor called agreeableness, which encodes a continuum from 'sympathetic and kind' to 'cold and quarrelsome' (see Chapter 13). Consider, also, a continuum of organizational cultures from those that are supportive and team oriented to those that are aggressive and outcome oriented. Research suggests that job seekers who score high on agreeableness will prefer organizations that are culturally supportive and team oriented (Judge & Cable, 1997). Research of this type suggests why it is not just your own motivational states that matter for career success: the extent to which your preferences for achieving goals match the organization's preferences matters as well.
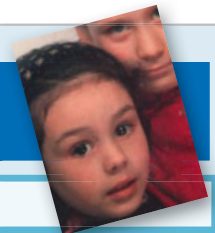
The emergence of modern psychology

In the twenty-first century, it is relatively easy to define psychology and to state the goals of psychological research. As you begin to study psychology, however, it is important to understand the many forces that led to modern psychology. At the core of this historical review is one simple principle: *ideas matter*. Much of the history of psychology has been characterized by heated debates about what constitutes the appropriate subject matter and methodologies for a science of mind and behaviour.

Our historical review will be carried out at two levels of analysis. In the first section, we will consider a period of history when the intellectual environment in Europe gave rise to the critical groundwork for modern psychology, namely the late nineteenth century. This will enable you to witness at close range the battle of ideas. In the second section, we will describe in a broader fashion seven perspectives that have emerged in the modern day. For both levels of focus, you should allow yourself to imagine the intellectual passion with which the theories evolved.

Psychology's historical foundations

'Psychology has a long past, but only a short history', wrote one of the first experimental psychologists, the German **Hermann Ebbinghaus** (1908–73). By this he meant that scholars had long asked important questions about human nature – about how people perceive reality, the nature of consciousness and the origins of madness – but they did not possess the means to answer them. Consider the fundamental questions posed in the fourth and fifth centuries BC by the classical Greek philosophers Socrates, Plato and Aristotle. Although forms of psychology existed in ancient Indian Yogic traditions, Western psychology traces its origin to these great thinkers' dialogues about how the mind works, the nature of free will and the relationship of individual citizens to their community or state. It was only much later, toward the end of the nineteenth century, that psychology began to emerge as a discipline when researchers applied the laboratory techniques from other sciences – such as physiology and physics – to the study of these fundamental questions from philosophy.

A critical figure in the evolution of modern psychology was **Wilhelm Wundt,** who, in 1879 in Leipzig, Germany, founded the first formal laboratory devoted to experimental psychology. Although Wundt had been trained as a physiologist, over his research career his interest shifted from questions of body to questions of mind: he wished to understand basic processes of sensation and perception as well as the speed of simple mental processes. By the time he established his psychology laboratory, Wundt had already accomplished a range of research and published the first of several editions of *Principles of Physiological Psychology* (Kendler, 1987). Once Wundt's laboratory was established at Leipzig, he began to train the first graduate students specifically devoted to the emerging field of psychology. Wundt was fantastically productive at work: he wrote many huge ground-breaking volumes on a wide variety of philosophical, anthropological and psychological topics, started a journal, supervised 116 dissertations in psychology, as well as 70 PhDs in philosophy, and then at the age of 85 took 3 years revising his major works, and writing his autobiography. Many of his students became founders of their own psychology laboratories around the world, and not least in the US, where psychology was then beginning to establish itself. In fact, there was a shift in the centre of gravity in psychology around that time, from Europe to the United States. As you will see below, it is true to say that, apart from psychoanalysis, all current schools of thought in psychology that have arisen since the beginning of the twentieth century originated in the USA. The US is still a dominant force within psychological research and theorizing.

It is documented that a Norwegian called Sigvardt Thorkelson visited Wundt's lab twice in the 1880s and performed work on the psychophysics of time (Teigen, 2009). Despite this early interest, the first psychological laboratory in Norway was only established in Oslo in 1909, whereas the first in Sweden was founded in 1902 in Uppsala. The first professor in psychology at the University of Stockholm was appointed in 1937 and the first professor at the Department of Psychology in Bergen was appointed in 1967. Since that time, psychology has grown enormously in both Sweden and Norway. In Sweden, universities at Karlstad, Örebro, Umeå, Linkjöping, Malmö and Göteborg have large teaching programmes in psychology, as do both the universities of Trondheim and Tromsø and the College at Lillehammer in Norway.

Psychology became established as a separate discipline somewhat earlier in the US. The first was at Johns Hopkins University in 1883, and by 1900 there were more than 40 psychology laboratories in North America (Hilgard, 1986). These early laboratories often bore Wundt's impact. For example, after studying with Wundt, **Edward Titchener** became one of the first psychologists in the United States, founding a laboratory at Cornell University in 1892. Incidentally, Titchener had a student named Boring, who wrote the definitive history of experimental psychology (Boring, 1929). However, at around the same time, a young Harvard philosophy professor, **William James,** brother of the great novelist Henry James, wrote a two-volume work, *The Principles of Psychology* (1890/1950), which many experts consider to be the most important psychology text ever written, because it was so engagingly written and ahead of its time and it is still worthwhile for students of today. Shortly after, in 1892, G. Stanley Hall, who had studied with both James and Wundt, founded the American Psychological Association, starting with 31 members, which grew to 664 in 1940, over 30,000 in 1970 and 88,500 in 2000. So in the US too, recent decades have brought a huge increase in the number of psychologists.

Almost as soon as psychology emerged, a debate arose about the proper subject matter and methods for the new discipline. The sort of arguments were about whether psychology should be concerned with reflecting on the thoughts that flutter through one's mind, or whether one should reject such fluffy topics and rather measure objective aspects of human performance, like how quickly one can detect a light? Does it make sense to

speculate about 'mentalistic' terms like thoughts, beliefs and desires, or should psychologists restrict themselves to stimuli and behaviour that can be *observed*? This debate isolated some of the issues that still loom large in psychology. We will describe, specifically, the tension between structuralism and functionalism.

Structuralism: the contents of the mind

Psychology's potential to make a unique contribution to knowledge became apparent when psychology became a laboratory science organized around experiments. In Wundt's laboratory, experimental participants made simple responses (saying yes or no, pressing a button) to stimuli they perceived under conditions varied by laboratory instruments. Because the data were collected through systematic, objective procedures, independent observers could replicate the results of these experiments. Emphasis on the scientific method (see Chapter 2), concern for precise measurement and statistical analysis of data characterized Wundt's psychological tradition.

When Titchener took Wundt's psychology to the United States, he advocated that such scientific methods be used to study consciousness, the contents of your mind at any one moment. His method for examining the elements of conscious mental life was *introspection,* the systematic examination by individuals of their own thoughts and feelings about specific sensory experiences. Titchener emphasized the 'what' of mental contents, rather than the 'why' or 'how' of thinking. So if you asked a group of introspectionists what they saw in front of them, they would not say 'I see a table', but each would rather describe in detail the exact shapes, colours and other visual impressions that their particular viewing angle led them to experience. Titchener's approach came to be known as **structuralism,** as it is the study of the structure of mind and behaviour.

Structuralism was based on the presumption that all human mental experience could be understood as the combination of basic components, i.e. that complex thoughts and memories can be explained in terms of simpler mental elements. The goal of this approach was to reveal the underlying structure of the human mind by analysing the component elements of sensation and other experiences that form an individual's mental life. So it is making the claim that one can explain, for instance, your reaction to seeing the Eiffel Tower in terms of a combination of how you react to the various patches of colours in the scene. Many psychologists attacked structuralism on three fronts: (1) it was *reductionistic* because it reduced all complex human experience to simple sensations; (2) it was *elemental* because it sought to combine parts, or elements, into a whole rather than study complex, or whole, behaviours directly; and (3) it was *mentalistic* because it studied only verbal reports of human conscious awareness, ignoring the study of individuals who could not describe their introspections, including animals, children and the mentally disturbed.

One important alternative to structuralism, pioneered by the German psychologist **Max Wertheimer,** focused on the way in which the mind understands many experiences as *gestalts* – organized wholes – rather than as the sums of simple parts: your experience of a painting, as in Figure 1.1 for example, is more than the sum of the individual daubs of paint. The gestalt psychologists provide another example of how a school of thought originated in Europe and migrated to the US, in this case literally because Wertheimer and the two other pioneers of gestalt psychology, Kurt Koffka and Wolfgang Köhler, emigrated there as a reaction to Hitler's rise to power in 1930s Germany. One key phenomenon in the gestalt movement of the early twentieth century, that also captures the spirit of the movement, is called the phi phenomenon. You have seen the phi phenomenon at fairgrounds, when by arranging the rapid turning on and off of lights, decorative lighting appears to move. This is so key in gestalt thinking because *there is no real movement*, and therefore the perception of movement cannot be reduced to its elements, as introspectionists supposed. As we will see in Chapter 4, g*estalt psychology* continues to have an impact on the study of perception.

Functionalism: minds with a purpose

A second major opposition to structuralism came under the banner of *functionalism.* William James agreed with Titchener that consciousness was central to the study of psychology, but for James, the study of consciousness was not reduced to elements, contents and structures. Instead, consciousness was an ongoing stream, a property of mind in continual interaction with the environment. Human consciousness facilitated one's adjustment to the environment; thus the acts and functions of mental processes were of significance, not the contents of the mind.

Functionalism gave primary importance to learned habits that enable organisms to adapt to their environment and to function effectively. For functionalists, the key question to be answered by research was 'What is the function or purpose of any behavioural act?' The founder of the school of functionalism was the American philosopher **John Dewey.** His concern for the practical uses of mental processes led to important advances in education. Dewey's theorizing provided the impetus for *progressive education*: 'Rote learning was abandoned in favor of learning by doing, in expectation that intellectual curiosity would be encouraged and understanding would be enhanced' (Kendler, 1987, p. 124). This reflects functionalism's combination of an enlightened and positive view of people with a hard-nosed scientific attitude.

Although James believed in careful observation, he put little value on the rigorous laboratory methods of Wundt. In James's psychology, there was a place for emotions, self, will, values and even religious and mystical experience. His 'warm-blooded' psychology recognized a uniqueness in each individual that could not be reduced to formulas or numbers from test results. For James, explanation rather than experimental control was the goal of psychology (Arkin, 1990).

> **Structuralism** The study of the structure of mind and behaviour; the view that all human mental experience can be understood as a combination of simple elements or events.

> **Functionalism** The perspective on mind and behaviour that focuses on the examination of their functions in an organism's interactions with the environment.

The legacy of these approaches

Despite their differences, the insights of the practitioners of both structuralism and functionalism created an intellectual context in which contemporary psychology could flourish. Psychologists currently examine *both* the structure and the function of behaviour. Consider the process of speech production. Suppose you want to invite a friend to watch a Champions League match with you. To do so, the words you speak must serve the right function – *football match, with me, today* – but also have the right structure. It wouldn't do to say, 'Would watch match football me with today you to like?' Or consider the classic example of the difference in newsworthiness between 'Dog bites man' and 'Man bites dog'! To understand how speech production works, researchers study the way that speakers fit meanings (functions) to the grammatical structures of their languages (Levelt, 1989). (We will describe some of the processes of language production in Chapter 8.) Throughout *Psychology and Life,* we emphasize both structure and function as we review both classic and contemporary research. Psychologists continue to employ a great variety of methodologies to study the general forces that apply to all humans as well as unique aspects of each individual.

Current psychological perspectives

There are several markedly diverse perspectives within psychology. Some psychologists and some types of research can be clearly located within one of these, whereas other psychologists manage to maintain openness towards more than one of these. These perspectives have radically different ways of examining behaviour and mental processes. The perspectives influence what psychologists look for, where they look and what research methods they use. In this section, we define seven perspectives – psychodynamic, behaviourist, humanistic, cognitive, biological, evolutionary and sociocultural. As you read the section, note how each perspective defines the causes and consequences of behaviour.

A word of caution: although each perspective represents a different approach to the central issues of psychology, think about why most psychologists borrow and blend concepts from more than one of these perspectives. Each perspective enhances the understanding of the entirety of human experience. In the chapters that follow, we will elaborate in some detail on the contributions of each approach because, taken together, they represent what contemporary psychology is all about.

The psychodynamic perspective

According to the **psychodynamic perspective,** behaviour is driven, or motivated, by powerful inner forces. In this view, human actions stem from inherited instincts, biological drives, and attempts to resolve conflicts between personal needs and society's demands. Deprivation states (like hunger and thirst), physiological arousal and conflicts provide the power for behaviour just as coal fuels a steam locomotive. According to

Sigmund Freud suggested that behaviour is often driven by motives outside of conscious awareness. What implications does that perspective have for the ways in which you make life choices?
Source: Alamy Images/Illustrated London News Picture Library/Ingram Publishing/Alamy.

this model, the organism stops reacting when its needs are satisfied and its drives reduced. The main purpose of action is to reduce tension between the body's and mind's needs and their current state.

Psychodynamic principles of motivation were most fully developed by the Viennese physician **Sigmund Freud** (1856–1939) in the late nineteenth and early twentieth centuries. Freud's ideas grew out of his work with mentally disturbed patients, but he believed that the principles he observed applied to both normal and abnormal behaviour. Freud's psychodynamic theory views a person as pulled and pushed by a complex network of forces. Freud's model was the first to recognize that human nature is not always rational, and that actions may be driven by motives that are not in conscious awareness. In fact, according to this perspective, a variety of *defence mechanisms* exist that conceal

> **Psychodynamic perspective** A psychological model in which behaviour is explained in terms of past experiences and motivational forces; actions are viewed as stemming from inherited instincts, biological drives and attempts to resolve conflicts between personal needs and social requirements.

our true motives from ourselves and others: for instance, denial (which has now passed into everyday language as an explanation of people's behaviour), projection (the attribution of one's own motives to others) and reaction formation (unwittingly doing the opposite of what one really would like to do).

Many psychologists since Freud have taken the psychodynamic model in new directions. Freud himself emphasized early childhood as the stage in which personality is formed, whereas neo-Freudian theorists have broadened psychodynamic theory to include social influences and interactions that occur over the individual's entire lifetime. Psychodynamic ideas have had a great influence on many areas of psychology. You will encounter different aspects of Freud's contributions as you read about child development, dreaming, forgetting, unconscious motivation, personality and psychoanalytic therapy.

The behaviourist perspective

Those who take the **behaviourist perspective** seek to understand how particular environmental stimuli control particular kinds of behaviour. First, behaviourists analyse the *antecedent* environmental conditions – those that precede the behaviour and set the stage for an organism to make or withhold a response. Next, they look at the *behavioural response,* which is the main object of study – the action to be understood, predicted and controlled. Finally, they examine the observable *consequences* that follow from the response. A behaviourist, for example, might be interested in how much decreasing the maximum payout from a gambling machine also decreases the amount of money spent by gamblers.

Ivan Pavlov's work in St Petersburg on how the salivary reflex in dogs could be triggered with stimuli that had consistently been presented simultaneously with food was the forerunner to behaviourism. In psychology, the behaviourist perspective was pioneered by **John Watson** (1878–1958), who argued that psychological research should seek the laws that govern observable behaviour across species. **B. F. Skinner** (1904–90) extended the influence of behaviourism, and both researchers insisted on precise definitions of the phenomena studied and on rigorous standards of evidence. Both Watson and Skinner believed that the basic processes they investigated with non-human animals represented general principles that would hold true for humans as well.

Behaviourism has given rise to some important practical applications. Although behaviourists have conducted much basic research with non-human animals, the principles of behaviourism have been widely applied to human problems. Behaviourist principles have yielded a more humane approach to educating children (through the use of reward rather than punishment), and effective therapies for modifying behaviour disorders. Behaviourism's emphasis on the need for rigorous experimentation and carefully defined variables has influenced most areas of psychology, not least today's dominant cognitive and neuropsychological perspective.

The humanistic perspective

Humanistic psychology emerged in the 1950s as an alternative to the psychodynamic and the behaviourist models. According to the **humanistic perspective,** people are neither driven by the powerful, instinctive forces postulated by the Freudians nor manipulated by their environments, as proposed by the behaviourists. Instead, people are active creatures who are innately good and capable of choice. Humanistic psychologists study behaviour, but not by reducing it to components, elements and variables in laboratory experiments.

According to the humanistic perspective, the main task for humans is to strive for positive development. For example, **Carl Rogers** (1902–87) emphasized that individuals have a natural tendency toward psychological growth and health – a process that is aided by the positive regard of those who surround them. **Abraham Maslow** (1908–70) coined the term *self-actualization* to refer to each individual's drive toward the fullest development of his or her potential. A self-actualized person is one who is independent, autonomous and wise, one who accepts human limitations in themselves and others, and is someone who manages to be spontaneous and not just focused on one's own problems. In addition, Rogers, Maslow and their colleagues defined a perspective that strives to deal with the whole person, practising a *holistic* approach to human psychology. They believed that true understanding requires integrating knowledge of the individual's mind, body and behaviour with an awareness of social and cultural forces.

The humanistic approach expands the realm of psychology by attempting to study phenomena of the human existence like love, art, religion and literature that other perspectives are often thought to neglect or ignore. In this manner, psychology becomes a more complete discipline. Humanists suggest that their view helps psychology rise above its focus on negative forces and on the animal-like aspects of humanity. As we shall see in Chapter 15, the humanistic perspective had a major impact on the development of new approaches to psychotherapy.

The cognitive perspective

The cognitive revolution in psychology emerged as another challenge to the limits of behaviourism. Cognitive psychology

Behaviourist perspective The psychological perspective primarily concerned with observable behaviour that can be objectively recorded and with the relationships of observable behaviour to environmental stimuli.

Behaviourism A scientific approach that limits the study of psychology to measurable or observable behaviour.

Humanistic perspective A psychological model that emphasizes an individual's phenomenal world and inherent capacity for making rational choices and developing to maximum potential.

has clear links back to William James, for example, but emerged after the Second World War, as psychology became influenced by advances in other fields, such as artifical intelligence, linguistics and information theory. The centrepiece of the **cognitive perspective** is human thought and all the processes of knowing – attending, thinking, remembering and understanding – and gradually from the 1950s, this approach began to take over from behaviourism as the dominant perspective in psychology. A landmark event was the publication of Neisser's textbook, *Cognitive Psychology*, in 1967. According to the cognitive model, behaviour is only partly determined by preceding environmental events and past behavioural consequences, as behaviourists believe. Some of the most significant behaviour emerges from totally novel ways of thinking, not from predictable ways used in the past. The ability to imagine options and alternatives that are totally different from what one has experienced enables people to transcend current circumstances, for instance by reminiscing about past holidays, or planning exactly what they are going to do on Saturday evening. An individual responds to reality not as it is in the objective world of matter, but as it is in the *subjective reality* of the individual's inner world of thoughts and imagination. Cognitive psychologists view thoughts as both results and causes of overt actions. Feeling regret when you've hurt someone is an example of thought as a result. But apologizing for your actions after feeling regret is an example of thought as a cause of behaviour.

Cognitive psychologists study higher mental processes such as perception, memory, language use, problem solving and decision-making at a variety of levels. They may examine patterns of blood flow in the brain during different types of cognitive tasks, a student's recollection of an early childhood event, or changes in memory abilities across the lifespan. Because of its focus on mental processes, many researchers see the cognitive perspective as the dominant one in psychology today.

The biological perspective

The **biological perspective** guides psychologists who search for the causes of behaviour in the functioning of genes, the brain, the nervous system and the endocrine (or hormonal) system. An organism's functioning is explained in terms of underlying physical structures and biochemical processes. Experience and behaviours are largely understood as the result of chemical and electrical activities taking place within and between nerve cells.

The biological perspective has become very much more influential within psychology over the past few decades. Researchers who take the biological perspective generally assume that psychological and social phenomena can be ultimately understood in terms of biochemical processes: even the most complex phenomena can be understood by analysis, or reduction, into ever smaller, more specific units. They might, for example, try to explain how you are reading the words of this sentence with respect to the exact physical processes in cells in your brain. According to this perspective, behaviour is determined by physical structures and hereditary processes. Experience can modify behaviour by altering these underlying biological structures and processes. Researchers might ask, 'What changes in your brain occurred while you learned to read?' The task of psychobiological researchers is to understand behaviour at the most precise level of analysis.

Many researchers who take the biological perspective contribute to the multidisciplinary field of **behavioural neuroscience.** Neuroscience is the study of brain function; behavioural neuroscience attempts to understand the brain processes underlying behaviours such as sensation, learning and emotion. The advances in the brain-imaging techniques that we describe in Chapter 3 have led to dramatic breakthroughs in the field of **cognitive neuroscience.** Cognitive neuroscience has a multidisciplinary research focus on the brain bases of higher cognitive functions such as memory and language, and brain-imaging techniques allow the biological perspective to be extended into a broad range of human experience. So where cognitive psychology provides understanding of, for instance, how memory works, cognitive neuroscience links this knowledge to brain structures, and to models of how brain parts interact dynamically with each other to control human behaviour.

The evolutionary perspective

The **evolutionary perspective** seeks to connect contemporary psychology to a central idea of the life sciences, Charles Darwin's (1809–82) theory of evolution by natural selection. The idea of natural selection is quite simple: those organisms that are better suited to their environments tend to produce offspring (and pass on their genes) more successfully than those organisms with poorer adaptations. Over many generations, the species changes in the direction of the privileged adaptation. The evolutionary perspective in psychology suggests that *mental abilities* evolved over millions of years to serve particular adaptive purposes, just as physical abilities did.

Cognitive perspective The perspective on psychology that stresses human thought and the processes of knowing, such as attending, thinking, remembering, expecting, solving problems, fantasizing and consciousness.

Biological perspective The approach to identifying causes of behaviour that focuses on the functioning of the genes, the brain, the nervous system and the endocrine system.

Behavioural neuroscience A multidisciplinary field that attempts to understand the brain processes that underlie behaviour.

Cognitive neuroscience A multidisciplinary field that attempts to understand the brain processes that underlie higher cognitive functions in humans.

Evolutionary perspective The approach to psychology that stresses the importance of behavioural and mental adaptiveness, based on the assumption that mental capabilities evolved over millions of years to serve particular adaptive purposes.

How does living in a Scandinavian city affect your behaviour?
Source: Photodisc/F. Schussler.

To practise evolutionary psychology, researchers focus on the environmental conditions in which the human brain evolved. Humans spent 99 per cent of their evolutionary history as hunter-gatherers living in small groups during the Pleistocene era (the roughly 2-million-year period ending 10,000 years ago). Evolutionary psychology uses the rich theoretical framework of evolutionary biology to identify the central adaptive problems that faced our species: avoiding predators and parasites, gathering and exchanging food, finding and retaining mates, and raising healthy children. After identifying the adaptive problems that these early humans faced, evolutionary psychologists generate ideas about the sorts of mental mechanisms, or psychological adaptations, that might have evolved to solve those problems.

Evolutionary psychology differs from other perspectives most fundamentally in its focus on the extremely long process of evolution as a central explanatory principle. Evolutionary psychologists, for example, attempt to understand the different sex roles assumed by men and women as products of evolution, rather than as products of contemporary societal pressures. This leads this branch of psychology into conflict with others, particularly the sociocultural one. Because evolutionary psychologists cannot carry out experiments that vary the course of evolution, they tend to build up plausible scenarios of how particular psychological traits or skills evolved, and then back this up with data from genetics, or cognitive psychology or studies of animals.

The sociocultural perspective

Psychologists who take a **sociocultural perspective** study *cross-cultural* differences in the causes and consequences of behaviour. The sociocultural perspective is an important response to the criticism that psychological research has too often been based on a Western conception of human nature and has mainly studied the behaviour of white middle-class Americans (Gergen et al., 1996). All psychology students should be acutely aware of this fact, and should always consider whether the phenomena, theories and perspectives being described apply in their context. Studies of how young Americans find their spouses may be unlikely to be applicable to other cultures, for example. A proper consideration of cultural forces may involve comparisons of groups within the same national boundaries. For example, when investigating the integration of immigrants, researchers may want to compare the level of anti-Muslim feeling in different regions of Norway or Sweden. Cultural forces may also be assessed across nationalities, if for example one wanted to study the relative importance of a country's national days to citizens of different countries, or as in comparisons of moral judgements in the United States and India (see Chapter 10). Cross-cultural psychologists want to determine whether the theories researchers have developed apply to all humans, or only to more narrow, specific populations.

A cross-cultural perspective can be brought to bear on almost every topic of psychological research. Are people's perceptions of the world affected by culture? Do the languages people speak affect the way they experience the world? How does culture affect the way children develop toward adulthood? How do cultural attitudes shape the experience of old age? How does culture affect our sense of self? Does culture influence an individual's likelihood to engage in particular behaviours? Does culture affect the way individuals express emotions? Does culture affect the rates at which people suffer from psychological disorders?

By asking these types of questions, the sociocultural perspective often yields conclusions that directly challenge those generated from the other perspectives. Researchers have claimed, for example, that many aspects of Freud's psychodynamic theories cannot apply to cultures that are very different from Freud's Vienna. This concern was raised as early as 1927 by the anthropologist Bronislaw Malinowski (1927), who soundly critiqued Freud's father-centred theory by describing the family practices of the Trobriand Islanders of New Guinea, for whom family authority resided with mothers rather than with fathers. The sociocultural perspective, therefore, suggests that some universal claims of the psychodynamic perspective are incorrect. The sociocultural perspective poses a continual, important challenge to generalizations about human experience that ignore the diversity and richness of culture.

> **Sociocultural perspective** The psychological perspective that focuses on cross-cultural differences in the causes and consequences of behaviour.

Comparing perspectives: focus on aggression

Each of the seven perspectives rests on a different set of assumptions and leads to a different way of looking for answers to questions about behaviour. Table 1.1 summarizes the perspectives. Let's briefly compare how psychologists using these models might deal with the question of why people act aggressively. All of the approaches have been used in the effort to understand the nature of aggression and violence. For each perspective, we give examples of the types of claims researchers might make and experiments they might undertake.

- *Psychodynamic.* Analyse aggression as a reaction to frustrations caused by barriers to pleasure, such as unjust authority. View aggression as an adult's displacement of hostility originally felt as a child against his or her parents.
- *Behaviourist.* Identify reinforcements of past aggressive responses, such as extra attention given to a child who hits classmates or siblings. Assert that children learn from physically abusive parents to be abusive with their own children.
- *Humanistic.* Look for what personal values a person may have and what social conditions they are surrounded by, and see how they foster aggression instead of solidarity and empathy.
- *Cognitive.* Explore the hostile thoughts and fantasies people experience while witnessing violent acts, noting both aggressive imagery and intentions to harm others. Study the impact of violence in films and videos, including pornographic violence, on attitudes toward gun control, rape and war.
- *Biological.* Study the role of specific brain systems in aggression by stimulating different regions and then recording any destructive actions that are elicited. Also analyse the brains of mass murderers for abnormalities; examine female aggression as related to phases of the menstrual cycle.

Table 1.1	Comparison of seven perspectives in contemporary psychology	
Perspective	**Focus of study**	**Primary research topics**
Psychodynamic	Unconscious drives Conflicts	Behaviour as overt expression of unconscious motives
Behaviourist	Specific overt responses	Behaviour and its stimulus causes and consequences
Humanistic	Human experience and potentials	Life patterns Values Goals
Cognitive	Mental processes Language	Inferred mental processes through behavioural indicators
Biological	Brain and nervous system processes	Biochemical basis of behaviour and mental processes
Evolutionary	Evolved psychological adaptations	Mental mechanisms in terms of evolved adaptive functions

Critical thinking in your life

Why do friendships end?

An important goal of *Psychology and Life* is to improve your ability to think critically about the world around you: We want to help you 'reach intelligent decisions about what [you] should believe and how [you] should act' (Appleby, 2006, p. 61). Let's consider that aim with respect to a question that has often seemed urgent for the students who enrol in our classes: Why do friendships end?

Try to think back to circumstances in which a valued friendship has dissolved. Were you able to understand what had gone wrong? Psychology can provide theoretical analyses to help you understand what goes on in your life. In fact, researchers have studied the types of events that cause friendships to come to an end (Sheets & Lugar, 2005). People report such incidents as romantic competition ('she slept with my boyfriend'), disrespectful behaviour ('he let his friends destroy my room'), and betrayals of confidence ('he blabbed all my secrets'). If you understand these different categories, you now have a framework to assess any tensions in your own friendships. The research provides even more specific conclusions: among about 400 students from the midwestern United States, the most common sources of conflicts – the causes of arguments that ended friendships – were romantic competition and disrespectful behaviour. Can you use this information to look more critically at the state of your friendships? This research illustrates how psychology can help you perceive and apply appropriate distinctions for your life experiences.

But there's another aspect of critical thinking you can engage here: you should try to ask yourself how broadly you should apply the information you learn. For example, we asserted that the results about friendship emerged from US students from the Midwest. In this chapter, we've already identified the sociocultural perspective that prompts contemporary researchers always to be mindful of the impact of culture on research results. To assess the cross-cultural generality of their findings, the researchers collected data from a group of students in Russia. Those students collectively reported that the greatest source of conflict with their friends centred on betrayals of confidence. Why might that be the case? The researchers speculated that Russians are more sensitive to these circumstances because of 'Russia's totalitarian history, during which a friend's breach of confidence could threaten one's life' (Sheets & Lugar, 2005, p. 391).

There are a couple of noteworthy implications for this cultural difference between US and Russian students. First, this result reminds you that an important component of critical thinking is to test a conclusion for its soundness and generality. In Chapter 2, we will focus on the scientific method. That discussion will give you an indication of the standards researchers must meet before we report their research in *Psychology and Life*. In addition, throughout the text we will be mindful of how important it is to consider the ways in which culture can affect basic aspects of human existence. The second implication of this difference between US and Russian students refers to how you might behave toward the people around you. Most people now live and work in settings with cultural diversity. Let your education in psychology make you more sensitive to the domains in which culture does and does not matter. Remember, the goal is to have your psychological knowledge help you make more intelligent decisions with respect to your everyday experiences.

- How do you think a sample of students from your country would classify the ends of their friendships?
- In what other ways do friendships end?

- *Evolutionary.* Consider what conditions would have made aggression an adaptive behaviour for early humans. Create a plausible scenario describing how aggressive behaviour would have been generated under those conditions.
- *Sociocultural.* Consider how members of different cultures display and interpret aggression. Identify how cultural forces affect the likelihood of different types of aggressive behaviour.

From this example of aggression, you can see how the different perspectives conspire to provide a full understanding of particular domains of psychological research. In contemporary psychology, most research is informed by multiple perspectives. Throughout *Psychology and Life* you will see how new theories often emerge from combinations of different perspectives. In addition, technological advances have made it easier for researchers to combine perspectives. For example,

the innovative brain-imaging techniques you'll learn about in Chapter 3 allow researchers to bring a biological perspective to topics as varied as personality differences (Chapter 13) and therapeutic outcomes (Chapter 15). Moreover, developments such as the Internet have made it easier for researchers to collaborate across the globe. They can bring a sociocultural perspective to topics as diverse as moral reasoning (Chapter 10) and people's body images (Chapter 11). Psychology's diversity of perspectives helps researchers think creatively about core topics of human experience.

Review questions

1. What are the central concerns of the structuralist and functionalist approaches?

2. How do the psychodynamic and behaviourist perspectives conceptualize the forces that shape people's actions?

3. Which perspective suggests that people are active creatures who strive for positive development?

4. What is the purpose of cognitive neuroscience?

5. How do the evolutionary perspective and sociocultural perspective complement each other?

What psychologists do

You now know enough about psychology to formulate questions that span the full range of psychological inquiry. If you prepared such a list of questions, you would be likely to touch on the areas of expertise of many psychologists. In Table 1.2, we provide our own version of such questions and indicate what sort of psychologist might address each one.

Looking through Table 1.2, you will note the great many subdivisions within the profession of psychology. Some of the labels the field uses tell you about the major content of a psychologist's expertise. For example, *cognitive psychologists* focus on basic cognitive processes such as memory and language; *social psychologists* focus on the social forces that shape people's attitudes and behaviour. Some of the labels identify the domains in which psychologists apply their expertise. For example, *industrial–organizational psychologists* focus their efforts on improving people's adjustment in the workplace; *school psychologists* focus on students' adjustment in educational settings.

Each type of psychologist achieves a balance between *research* – seeking new insights – and *application* – putting those insights to use in the world. There's a necessary relationship between those two types of activities. For example, we often think of *clinical psychologists* largely as individuals who apply psychological knowledge to better people's lives. However, as we will see in Chapters 14 and 15, clinical psychologists also have important

research functions. Contemporary research continues to improve our understanding of the distinctions among psychological disorders and the treatments that best ease patients' distress.

Take another look at Table 1.2. We intended the list of questions to demonstrate why psychology has so many divisions. Did we manage to capture your own concerns?

Have you begun to wonder exactly how many practising psychologists there are in the world? Surveys suggest the number is well over 500,000. Figure 1.2 gives you an idea of the distribution of settings in which psychologists function. Although the percentage of psychologists in the population is greatest in Western industrialized nations, interest in psychology continues to increase in many countries. The International Union of Psychological Science draws together member organizations from 70 countries (Ritchie, 2004). In Sweden, Sveriges Psykologförbund has about 9,000 members, whereas in Norway the Norsk psykologforening has about 5,000 members, and both have traditionally leant towards clinical psychology. The American Psychological Association (APA), an organization that includes psychologists from all over the world, has over 150,000 members. The Association for Psychological Science (APS), with more than 14,000 members, is an international organization that focuses more on scientific aspects of psychology and less on the clinical, or treatment, side.

It probably won't surprise you to learn that, early in its history, research and practice in psychology were dominated by men. Even when they were still few in numbers, however, women made substantial contributions to the field (Russo & Denmark, 1987; Scarborough & Forumoto, 1987). Anna Freud, daughter of Sigmund Freud, brought about important advances in the practice of *psychoanalysis,* a form of therapy based on the psychodynamic perspective. We will highlight the work of pioneering women researchers throughout *Psychology and Life.* As psychology continues to contribute to the scientific and human enterprise, more people – women and men, and members of all segments of society – are being drawn to it as a career.
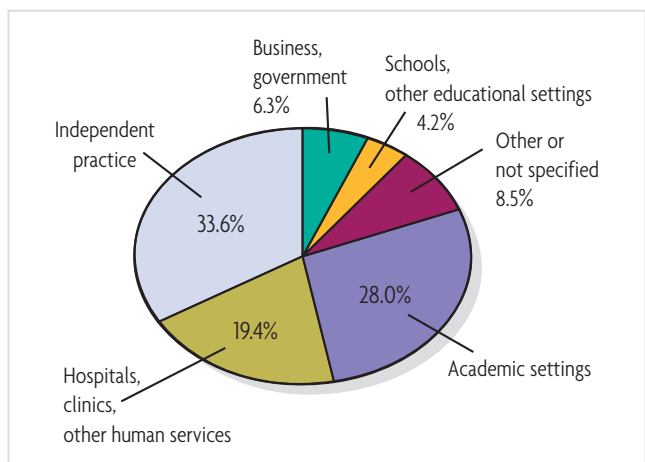
Figure 1.2 Work settings of psychologists. The percentages of psychologists working in particular settings are shown, according to a survey of American Psychological Association members holding doctoral degrees in psychology.

Table 1.2	The diversity of psychological inquiry	
The question	**Who addresses it?**	**Focus of research and practice**
How can people cope better with disorders and evaluate day-to-day problems?	Clinical psychologists Counselling psychologists Community psychologists Psychiatrists	Study the origins of psychological treatment options; provide diagnosis and treatment of psychological disorders and other issues of personal adjustment
How can I cope with the after-effects of a stroke?	Rehabilitation psychologists	Provide assessment and counselling for people with illnesses or disabilities; offer coping strategies and education to affected individuals, caretakers, employers, and community members
How do memories get stored in the brain?	Biological psychologists Psychopharmacologists	Study the biochemical bases of behaviour, feelings and mental processes
How can you teach a dog to follow commands?	Experimental psychologists Behaviour analysts	Use laboratory experiments, often with non-human participants, to study basic processes of learning, sensation, perception, emotion and motivation
Why can't I always recall information I'm sure I know?	Cognitive psychologists Cognitive scientists	Study mental processes such as memory, perception, reasoning, problem solving, decision-making and language use
What makes people different from one another?	Personality psychologists Behavioural geneticists	Develop tests and theories to understand differences in personalities and behaviours; study the influence of genetics and environments on those differences
How does peer pressure work?	Social psychologists	Study how people function in social groups as well as the processes by which people select, interpret and remember social information
What do babies know about the world?	Developmental psychologists	Study the changes that occur in the physical, cognitive and social functioning of individuals across the lifespan; study the influence of genetics and environments on those changes
Why does my job make me feel so depressed?	Industrial–organizational psychologists Human factors psychologists	Study the factors that influence performance and morale in the general workplace or on particular tasks; apply those insights in the workplace
How should teachers deal with disruptive students?	Educational psychologists School psychologists	Study how to improve aspects of the learning process; help design school curricula, teaching-training programmes, and child-care programmes.
Why do I get sick before every exam?	Health psychologists	Study how different lifestyles affect physical health; design and evaluate prevention programmes to help people change unhealthy behaviours and cope with stress
Was the defendant insane when she committed the crime?	Forensic psychologists	Apply psychological knowledge to human problems in the field of law enforcement
Why do I always play badly during important handball games?	Sports psychologists	Assess the performance of athletes and use motivational, cognitive and behavioural principles to help them achieve peak performance levels

Psychology in your life

In what ways do psychologists participate in the legal system?

An important lesson of *Psychology and Life* is that empirical research provides psychologists with a broad range of expertise. As this text unfolds, we will have a good number of opportunities to demonstrate how research results are applied to important issues in everyday life. In this opening chapter, we'll take an opportunity to provide a concrete example of how psychological expertise functions in the public forum. We focus our attention on some ways in which forensic psychologists become involved in important legal decisions.
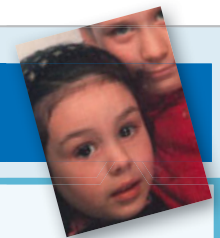
The legal system relies on forensic psychologists to provide assessments for both civil and criminal proceedings. On the civil side, for example, forensic psychologists provide evidence that influences decisions about child custody in divorce hearings. They might also testify about the potential psychological harm workers have sustained in a particular place of employment. On the criminal side, forensic psychologists evaluate people's capacity to understand the acts they have committed and their competence to stand trial. The legal system also asks forensic psychologists to assess whether individuals are a danger to themselves or others. Let's examine that last role more closely.

It's hard to read the news without learning about someone who has committed a violent crime. Suppose that person is sent to prison and, after having served some time, he or she arrives at a parole hearing. An important consideration at that hearing will be what lies in the prisoner's future. What is the likelihood that violent acts will occur again?

In recent years, psychologists have attempted to provide increasingly research-based answers to that question. This type of research often begins with a theoretical analysis of the factors in people's lives that make violence more or less likely. Researchers make an important distinction between static and dynamic factors (Douglas & Skeem, 2005). Static factors are those that are relatively stable over time (such as gender and age at first conviction); dynamic variables are those that may change over time (such as emotional control and substance abuse). The inclusion of dynamic factors suggests why the risk a particular individual presents changes over time. Past history alone does not provide a valid indication of how a person will behave in the future. It's also important to measure the trajectory of a person's life.

When researchers develop new risk assessment devices, they must provide evidence that those devices are successful at predicting future violence. To do so, researchers often follow groups of individuals over time. For example, Wong and Gordon (2006) evaluated 918 adult male offenders who were incarcerated in the Canadian provinces of Alberta, Saskatchewan and Manitoba. Each participant was evaluated with the Violence Risk Scale (VRS), a device that measures 6 static and 20 dynamic variables. To evaluate the validity of the VRS, the researchers followed their participants over several years, to see how often they were convicted of new crimes after they had been released into the community. In both the short term (after 1 year) and the longer term (after 4.4 years), men who had obtained higher ratings on the VRS were more likely to be convicted of additional violent crimes.

Research results of this sort are quite important because they help forensic psychologists provide more accurate guidance for legal judgements.

Review questions

1. What is the relationship between research and application?
2. In what two settings are most psychologists employed?

How to use this book

In the rest of the book, you will read about the many areas of modern psychology. The hope is that you will discover what is known about the most incredible phenomena in the entire universe: the brain, the human mind and the behaviour of all living creatures. Psychology is about understanding the seemingly mysterious processes that give rise to your thoughts, feelings and actions.

This guide offers general strategies and specific suggestions about how to use this book to get the quality grade you deserve for your performance and to get the most from your introduction to psychology.

Study strategies

1. **Set aside sufficient time** for your reading assignments and review of class notes. This text contains much new technical information, many principles to learn, and a new glossary of terms to memorize. To master this material, you will need at least 3 hours of reading time per chapter.
2. **Keep a record of your study time** for this course. Plot the number of hours (in half-hour intervals) you study at each reading session.
3. **Be an active participant.** Optimal learning occurs when you are actively involved with the learning materials, rather than reading or listening while only half paying attention.

Developmental psychologists may use puppets or other toys in their study of how children behave, think or feel. Why might it be easier for a child to express his or her thoughts to a puppet than to an adult?

Source: Pearson Education Ltd/Jules Selmes.

4. **Space out your studying.** Research in psychology tells us that it is more effective to do your studying regularly rather than cramming just before tests. If you let yourself fall behind, it will be difficult to catch up with all the information included in introductory psychology at last-minute panic time.

5. **Choose the right place to study.** Find a place with minimal distractions for studying. Reserve that place for studying, reading and writing course assignments – and do nothing else there. The place will come to be associated with study activities, and you will find it easier to work whenever you are seated at your chosen place.

Study techniques

In this section, we give you specific advice about a technique you can use to learn the material for this course and your other courses. The technique emerged from the principles of human memory we will discuss in Chapter 7. It is called *PQ4R* from the initials of the six phases it suggests for effective study: preview, questions, read, reflect, recite and review (Thomas & Robinson, 1972).

1. *Preview.* Skim through the chapter to get a general sense of the topics the chapter will discuss. Make yourself aware of the organization and major topics. Read the section headings and scan the photos and figures. In fact, your first stop for each chapter should be the section 'Recapping main points.' There you will find the main ideas of the chapter organized under each of the first-level headings, which will give you a clear sense of what the chapter covers.

2. *Questions.* For each section, make up questions. You should use the section headings and key terms to help you. For example, you might transform the heading 'The goals of psychology' into the question 'What are the goals of psychology?' You might use the key term *biological perspective* to generate the question, 'What is the major focus of the biological

perspective?' These questions will help direct your attention as you read.

3. *Read.* Read the material carefully so that you are able to answer the questions you invented.

4. *Reflect.* As you read the text, reflect on it to relate the material to your prior knowledge about the topics. Think of extra examples to enrich the text. Try to link the ideas together across the subsections.

5. *Recite.* After you have read and reflected on a section, try to demonstrate your recall of the material as concretely as possible. For example, answer the questions you invented earlier by producing the material out loud. For later review, write down the ideas you find difficult to remember.

6. *Review.* After you have read the entire chapter, review the key points. If you are unable to recall important points, or you cannot answer the questions you invented, consult the book and repeat the earlier phases (read, reflect and recite).

Take a moment now to use PQ4R for one of the earlier sections of this chapter to see how each phase works. It will take you some time to master the flow of PQ4R. Make that investment at the beginning of the semester.

Special features

Psychology and Life has several features that will help you acquire psychological knowledge.

1. The 'Psychology in your life' boxes present applications of psychological research to your everyday life. Each of these boxes presents an answer to questions that we have been asked in class by our own students and we imagine you might ask us.

2. The 'Critical thinking in your life' boxes illustrate how you can put your psychological knowledge to use to improve the quality of your thinking. The boxes provide you with tools

for evaluating conclusions and seeing where they apply in your day-to-day experiences. We complete each box with questions to help you deepen your understanding.

3. The chapters feature several research studies that help you see the direct link between the experiments researchers conduct and the conclusions they draw. Researchers in psychology seek rigorous answers to questions that are often urgent. We include specific research studies so you have abundant opportunities to experience the concrete details of that type of rigorous research.

4. Each 'Review questions' provides questions that refer to the key points you should know before going ahead to the next section. Think of these questions as supplements to those you generated by using PQ4R. Try to answer the questions as you finish your reading of each main section. If any of the questions stumps you, plunge back into the text and reread the appropriate material until you feel you can provide a good answer. Similarly, use these questions as a starting point for your studying before tests. You will find answers to the questions in the Appendix, beginning on page A1. On some occasions, we will also include more open-ended questions intended to improve your critical thinking with respect to research studies. We leave those questions unanswered, to allow you to discuss them with your professor or classmates.

5. Each chapter concludes with a *practice test* with multiple-choice questions based on the material in both the main text and the boxes. In addition, we've provided sample essay questions that allow you to think more broadly about the content of each chapter.

6. *Key terms and major contributors* are highlighted in **boldface type** so they stand out. When you use PQ4R and study for tests, be sure you can define each term and identify each major researcher.

7. The key terms are also gathered together in the *glossary,* found at the end of the text. The glossary provides formal definitions of all key terms that appear in the text. Use it to refresh your memory while studying for tests.

We hope *Psychology and Life* will be a worthwhile read, full of memorable moments and unexpected pleasures. Enjoy!

Review questions

1. What does it mean to be an active participant in a course?

2. What is the relationship between the questions and read phases of PQ4R?

3. What is the purpose of the recite phase of PQ4R?

Recapping main points

What makes psychology unique?

- Psychology is the scientific study of the behaviour and the mental processes of individuals.
- The goals of psychology are to describe, explain, predict and help control behaviour.

The emergence of modern psychology

- Structuralism emerged from the work of Wundt and Titchener. It emphasized the structure of the mind and behaviour built from elemental sensations.
- Functionalism, developed by James and Dewey, emphasized the purpose behind behaviour, and that mental activity should be understood in terms of how it allows the person to adapt to their environment.
- Taken together, these theories created the agenda for modern psychology.
- Each of the seven contemporary approaches to studying psychology differs in its view of human nature, the determinants of behaviour, the focus of study, and the primary research approach.
- The psychodynamic perspective looks at behaviour as driven by instinctive forces, inner conflicts, and conscious and unconscious motivations.
- The behaviourist perspective views behaviour as determined by external stimulus conditions.
- The humanistic perspective emphasizes an individual's inherent capacity to make rational choices.
- The cognitive perspective stresses mental processes that affect behavioural responses.
- The biological perspective studies relationships between behaviour and brain mechanisms.
- The evolutionary perspective looks at behaviour as having evolved as an adaptation for survival in the environment.
- The sociocultural perspective examines behaviour and its interpretation in cultural context.

What psychologists do

- Psychologists work in a variety of settings and draw on expertise from a range of speciality areas.
- Almost any question that can be generated about real-life experiences is addressed by some member of the psychological profession.
- At the start of the twenty-first century, the profession of psychology has become more international in scope and more diverse in the composition of its practitioners and researchers.

How to use this book

- Devise concrete strategies for determining how much study time you need and how to distribute the time most efficiently.
- Take an active approach to your lectures and the text. The PQ4R method provides six phases – preview, questions, read, reflect, recite and review – for enhanced learning.
- The text includes several special features to help you learn psychological information and apply it to your everyday

Practice tests

1. The definition of psychology focuses on both _____ and _____.
   a. **behaviours; structures**
   b. **behaviours; mental processes**
   c. **mental processes; functions**
   d. **mental processes; structures**

2. To what goal of psychology is 'level of analysis' most relevant?
   a. **Explaining what happens**
   b. **Describing what happens**
   c. **Predicting what will happen**
   d. **Controlling what happens**

3. If you want to _____ what will happen, you first must be able to _____ what will happen.
   a. **describe; explain**
   b. **describe; control**
   c. **control; predict**
   d. **explain; predict**

4. A researcher notices that colours seem fainter to her after having been in bright sunlight for a while, and decides to study this phenomenon in her lab. What best describes the origin of this idea?
   a. **Theory**
   b. **Literature**
   c. **Functionalism**
   d. **Introspectionism**

5. Who founded the first laboratory that was devoted to experimental psychology?
   a. **William James**
   b. **Wilhelm Wundt**
   c. **Max Wertheimer**
   d. **John Dewey**

6. A researcher tells you that her main goal is to understand mental experiences as the combination of basic components. It is most likely that she finds the historical roots of her research in _____.
   a. functionalism
   b. the humanist perspective
   c. structuralism
   d. the evolutionary perspective

7. Two professors at universities in Oslo and Bombay are collaborating on a research project to determine how their students in the Norway and India respond to the same reasoning problems. It's likely that they take a _____ perspective in their research.
   a. humanistic
   b. sociocultural
   c. biological
   d. psychodynamic

8. The _____ perspective draws on the ways in which human mental abilities serve adaptive purposes.
   a. cognitive
   b. humanistic
   c. evolutionary
   d. sociocultural

9. An expert on eyewitness memory is asked to testify in a court case, Most likely the person is a _____ psychologist.
   a. health
   b. social
   c. forensic
   d. developmental

10. What type of question would a cognitive psychologist be likely to ask?
    a. Why do children sometimes have imaginary friends?
    b. Why do some students get sick every time they have a major exam?
    c. How can we design a keyboard for a computer that allows people to type more quickly?
    d. How are bilingual individuals able to switch between their two languages?

11. Which type of psychologist is *least* likely to focus on genetic aspects of human psychology?
    a. Industrial–organizational psychologists
    b. Developmental psychologists
    c. Personality psychologists
    d. Biological psychologists

12. Experiences with totalitarian regimes may have made Russian students more sensitive to their friends'
    _____.
    a. betrayals of confidence
    b. romantic competition
    c. disrespectful behaviour
    d. jealousy

13. Where in Scandinavia was the first research laboratory in psychology established/
    a. Stockholm
    b. Oslo
    c. Uppsala
    d. Copenhagen

14. Individuals with advanced degrees in psychology are most likely to be working in _____.
    a. academic settings
    b. hospitals and clinics
    c. business and government
    d. independent practice

15. What is the proper order of phases for PQ4R?
    a. Questions, recite, reflect
    b. Read, reflect, recite
    c. Preview, review, read
    d. Reflect, review, recite

16. In what phase of P4QR should you try to relate the textbook material to your prior knowledge about a topic?
    a. Reflect
    b. Recite
    c. Review
    d. Questions

Essay questions

1. With respect to the goals of psychology, why is it appropriate to characterize psychologists as 'rather optimistic'?

2. Why is it often good to consider the same research question from several of psychology's seven contemporary perspectives?

3. Why does the field of psychology include both research and application?

Research in your life

Philip Zimbardo

Philip Zimbardo is internationally recognized as the 'voice and face of contemporary psychology' through his widely seen PBS-TV series, *Discovering Psychology*, his media appearances, best-selling trade books on shyness, and his classic research, *The Standford Prison Experiment*. Zimbardo has been a Stanford University professor since 1968 (now emeritus), having taught previously at Yale, NYU, and Columbia University. **Websites:** www.zimbardo.com; www.heroicimagination.org; www.prisonexp .org; www.lucifereffect.com; and www.thetimeparadox.com

1. What do you see now as your most important contribution to the field of psychology?

In understanding the causes of human behaviour, especially of character transformations, I have highlighted the importance of situational factors. Through my research, scholarly writings and lectures it has been my goal to balance the excessive focus in academic psychology on the power of the person with the power of the situation. That means acknowledging and identifying variables in the social context that impact decisions and actions of individuals and groups. In addition, my recent work has expanded this view to include the significance of the system that creates and maintains situations. Systems are where the real power resides; they are based in history, culture, economics and legal foundations.

2. What would you say has been the most important event in the field of psychology during this time?

In a general sense, the use of behavioural laboratory experiments to illustrate social dynamics that are vital, but complex in everyday life. But I would add that the new awareness of the central role of memory in human affairs is really important and a huge leap from the boring studies of memory from my student days. Combining this refreshed view of memory with the new technology of brain imaging of people as they learn, remember and plan activities is surely a major new contribution of psychological knowledge.

3. The Stanford Prison Experiment is a well-known experiment in psychology that most students have been exposed to. At the same time it is something that happened many years ago. Is it still important today? How?

My prison simulation experiment, conducted 40 years ago, has become iconic since then. Its messages are taught not only in high school and college courses in psychology, but also in sociology, criminology, business and, of course, in ethics courses. The study itself offers a message that is not time bound; that of the power of role-playing to become reality, of the transformation of good people into perpetrators of evil (in the guard role), and how being made to experience learned helplessness and powerlessness can emotionally devastate healthy young men (in the prisoner role). The torture of Iraqi prisoners by American military police in Abu Ghraib prison (2004) was a modern instance of the underlying principles at work in the Stanford Prison Experiment. I became an expert witness for one of those prison guards, and was able to reduce the severity of his prison sentence by identifying the direct parallels between the situation he experienced in that Iraq prison and those our students experienced in our simulated prison. My book, *The Lucifer Effect: Understanding how good people turn evil* (2007) details fully the events in my experiment as well as how I understood the comparable events at Abu Ghraib.

4. What new areas of psychology do you see opening, or becoming more important, in the coming years?

The most important new realm of psychology is a fuller understanding of how mental processes impact our biology, how health of the body and health of the mind are entwined, so that we can live longer, healthier, fully functioning lives.

About your research

My new mission in life is sowing the seeds of heroism around the world, as part of a new social movement.

The Heroic Imagination Project (HIP) is a non-profit organization I founded that encourages and empowers individuals to develop the personal attributes that lead them to take heroic action during crucial moments in their lives, on behalf of others, for a moral cause, aware of possible risks or costs, and without expectation of gain. These attributes include integrity, compassion and moral courage, heightened by an understanding of the power of situational forces, an enhanced social awareness and an abiding commitment to social action.

I coined the term 'heroic imagination' because it was the opposite of the 'hostile imagination', a term used by Sam Keen, in *Faces of the Enemy*, where he talks about the ways in which certain situations have the power to trigger, or activate, hatred of other people, creating a psychology of enmity. Hostile imagination includes thinking of other people as objects, as unworthy, as less than human – in short, dehumanizing others. This in turn leads to thinking about and treating those people differently than you would your own kind or kin. The end product of this hostile imagination is creating the conditions of wanting to destroy the 'other', so it's not just that you have a negative perspective, you really want to destroy them and you engage in or support antisocial behaviour. Here we see the bad attitude leading to destructive behaviour. Another aspect of the hostile imagination is sharing the negative attitude without taking the hostile action, instead being indifferent to the hostile actions taken against the selected victims by others. This kind of indifference allows tacit approval of the hostility and thereby encourages it.

The very situations that inflame the hostile imagination in some can inspire in the heroic imagination in others. 'Heroic imagination' is really a mindset – a set of attitudes about helping others, caring for others, being willing to sacrifice or take risks on behalf of others. Those who engage their heroic imagination are making themselves aware of opportunities where they can help others in need, and then being willing to take the appropriate action regardless of the personal risk involved. When the heroic imagination motivates pro-social behaviour it becomes heroic action. This kind of behaviour is labelled heroic.

We have begun original research on heroism (there is hardly any), and have created educational curricula for teens. See the HIP site for more: www.heroicimagination.org

My most exciting and potentially valuable research is actually a programme of ideas that have stimulated a variety of experiments and correlational studies in the domain of the psychology of time perspective. I have been engaged in this project for 40 years and some of the most exciting consequences are just beginning to emerge. Time perspective is one kind of subjective or psychological time – in contrast with chronological time – in which people learn to automatically mentally divide their experiences into time frames, such as past, present and future. That mental set or response predisposition then influences virtually all their decisions in a non-conscious way. Problems arise when one comes to develop a cognitive bias in which one of these time frames is overused and the others are underused, that can lead to bad decisions and faulty actions.

There is relatively little systematic research on this psychological process that I believe is vital to understand because of its wide-ranging impact on human thought, feeling and action. Also, I believed that despite its importance in human affairs, neither psychologists nor the general public were aware of its operation. My research then was first exploratory about the nature of these phenomena, then more specifically focused on measuring them, then relating time perspective differences between people to various behaviours and, finally, to apply this knowledge in practical ways, such as treating a form of mental illness, known as PTSD, post-traumatic stress disorder.

Such a research programme is multi-method, multi-response, including interviews, surveys, scale development, scale assessment of reliability and validity, correlational studies that related time perspective scores to many other psychological scales and, finally, experiments relating time perspective differences to behavioural differences.

This programme of research has generated many exciting findings that I have summarized in my book, *The Time Paradox* (Zimbardo & Boyd, 2008) as well as on our website: www.theTimeParadox.com.

Briefly, we have developed a way to measure and index individual differences in time perspective with my scale that has proven to be both reliable and valid, and is now translated into two dozen languages being used by researchers around the world, the Zimbardo Time Perspective Inventory, or ZTPI.

Our scale has identified six different time zones or factors that characterize almost all people: two past-oriented: positive vs negative; two present-oriented: hedonistic vs fatalistic, and two future-oriented: goal-oriented planning vs transcendental future (life begins after the death of the mortal body).

These time perspective differences predict a host of other traits, such as anxiety, depression, aggression, conscientiousness, novelty-seeking, friendliness, energy and much more.

In turn, comparing groups of people who are high on one time factor with those high scoring on a different time factor enables predictions of college course grade levels, risk taking, problem solving, addictive behaviours, life satisfaction and more.

Now we are using the idea of a balanced time perspective in psychotherapy: moderately high future orientation, high past positive and moderate present hedonism, with low past negative and low present hedonism – to cure veterans who have been suffering from PTSD for many years.

Time perspective is proving to be one of the most important factors influencing almost all of human behaviour in subtle but profound ways.

I am heading a team of young researchers from a dozen nations to study cultural differences and similarities in time perspective, its origins and its links to many behaviours of interest in their cultures.

Source: Courtesy of Philip G. Zimbardo.
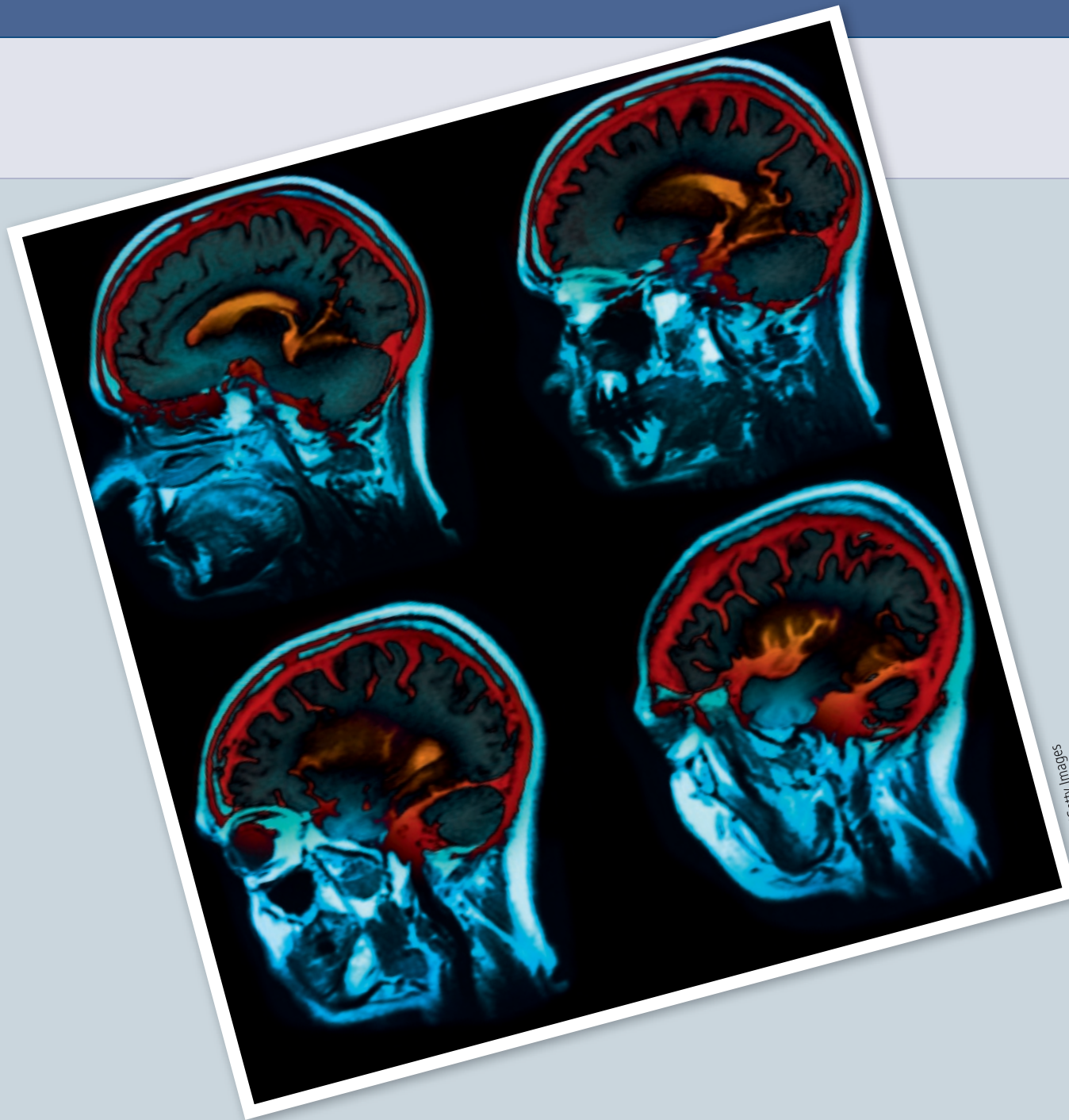
Research methods in psychology

I n 1891, William von Osten, a German, started displaying his horse 'Clever Hans' before the public. Von Osten believed that animals possess an intelligence that is equal to that of a human, and that Hans was his definite proof.

Von Osten claimed that Hans could answer even complex questions by tapping his hoof. Numbers were simply counted, the alphabet was encoded as 'A' = one tap; 'B' = two taps, etc. Hans's intellectual abilities also included performing mathematical calculations, telling the time, identifying musical intervals and naming people. Before long, Hans was doing more complex calculations such as square roots. Hans was not always correct, but was correct so often that his ability required investigation.

Many investigators, including a special commission of 13 people of varied background in 1904 led by Carl Stumpf, director of the Berlin Psychological Institute, were absolutely convinced of the startling intelligence of Clever Hans.

Of course, we – as many sceptics did at that time – may suspect that horses do not possess the intellectual capabilities of humans, but if von Osten was wrong, how could his beliefs be disproved? Oskar Pfungst undertook careful scientific investigations of the alleged capabilities of Clever Hans, and was – after 15 years of the original display of the horse – finally able to solve the mystery. Pfungst published his findings in the book, *Clever Hans: The Horse of Mr Von Osten*, in 1907.

In this chapter, we describe how psychologists generate answers to research questions. We focus on the special way in which psychology applies the scientific method to its domain of inquiry. We want you to understand how psychologists design their research: How can solid conclusions ever be drawn from the complex and often fuzzy phenomena that psychologists study – how people think, feel and behave? Even if you never do any scientific research in your life, mastering the information in this section will be useful. The underlying purpose here is to help improve your *critical thinking skills* by teaching you how to ask the right questions and evaluate the answers about the causes, consequences and correlates of psychological phenomena. The mass media constantly release stories that begin with 'Research shows that . . .'. By sharpening your critical thinking we will help you become a more sophisticated consumer of the research-based information that confronts you in everyday life.

The process of research

The research process in psychology can be divided into several steps that usually occur in sequence (see Figure 2.1). The process typically begins with a first step in which observations, beliefs, information and general knowledge lead a researcher to come up with a new idea or a different way of thinking about a phenomenon. An important source of knowledge for the researcher is, of course, the results of previous research and theorizing within the field of investigation. This knowledge is found in research journals and books. Part of the initial step of research is therefore to examine relevant sources to verify that the idea is viable: Has it been examined before? Is it of interest?

Within psychology there are more than 2,000 scientific journals. Most of them are searchable in databases such as PsycINFO and PubMed. The articles in such databases are from peer-reviewed journals. This means that the articles are quality checked by other experts. Only a small fraction of all submitted articles are accepted for publication. This implies that the contents of such databases reflect high-quality material. PsycINFO provides systematic coverage of the psychological literature from the 1800s to the present, and contains abstracts, references and other information of articles and books. This database can be seen as a condensed storage room for psychological research knowledge. As such it is extremely valuable in the initial phases of a research project. Also, as a research project is progressing, researchers will attempt to publish their results in a peer-reviewed journal. If succesful, the results will then be incuded in the PsycINFO database. Visit the PsycINFO homepage at http://www.apa.org/pubs/databases/psycinfo/
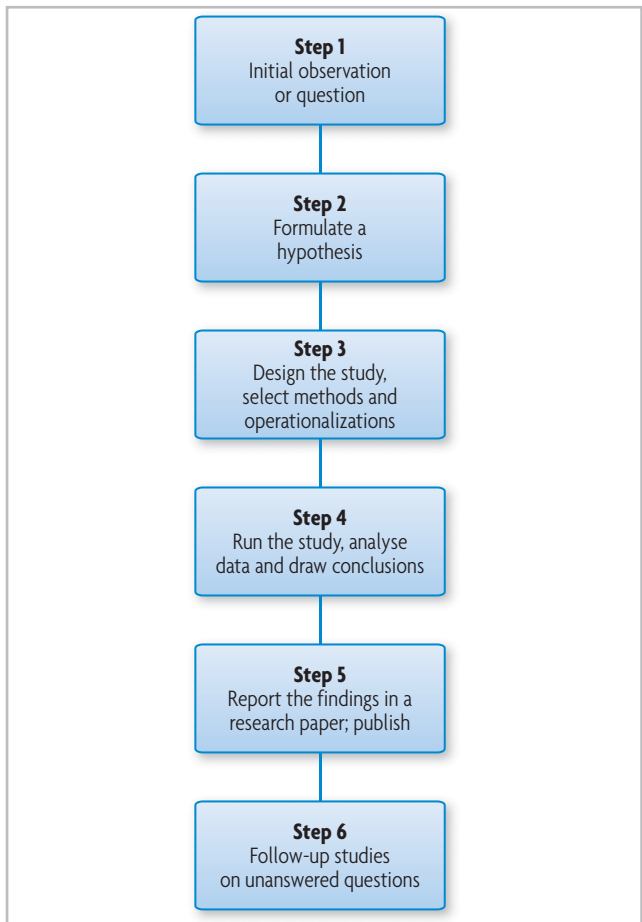
Figure 2.1   Steps in the process of conducting and reporting research.

As psychologists have accumulated information about phenomena, they have created theories that become an important context or framework to formulate research questions. A **theory** is an organized set of concepts that *explains* a phenomenon or set of phenomena. At the common core of most psychological theories is the assumption of **determinism,** the idea that all events – physical, mental and behavioural – are the result of, or determined by, specific causal factors. These causal factors are found in the individual's environment or within the person. Researchers also assume that behaviour and mental processes follow *lawful patterns* of relations, patterns that can be discovered and revealed through research. Psychological theories are typically claims about the causal forces that underlie such lawful patterns.

Theory An organized set of concepts that explains a phenomenon or set of phenomena.

Determinism The doctrine that all events – physical, behavioural and mental – are determined by specific causal factors that are potentially knowable.

An important function of theories is that they, as a second step in the research process, can generate new hypotheses. A **hypothesis** is a tentative and testable statement about the relation between events, often between causes and consequences. Hypotheses are often stated as 'if–then' statements, specifying certain outcomes from specific conditions. We might predict, for example, that *if* children view a lot of violence on television, *then* they will engage in more aggressive acts toward their peers. Research is required to examine the if–then link.

As a third step, researchers rely on the *scientific method* to put their hypotheses to the test. The scientific method is a general set of procedures for gathering and interpreting evidence in ways that limit sources of errors and yield dependable conclusions (see Stanovich, 2010, for an excellent discussion). The scientific method originated within natural science in the seventeenth century, and has proved to be extremely successful as a means of obtaining sound and useful knowledge. As an approach to understanding the world, the scientific method relies on observation and examination – **empiricism.** Scientists find out about the world by examining it. However, observation and examination must be systematic and focused. Therefore, observation and examination are usually theory-driven. Hypotheses and theories are formulated so that they, at least in principle, can be falsified (Popper, 1959). Scientific progress depends on verifying correct beliefs, but rejecting incorrect beliefs is equally important. In dealing with the results of their observations, data, scientists rely on *logical* and *rational* thinking to make inferences. The scientific approach to understanding the world can then be described as *systematic*, *logical* and *critical empiricism*. Psychology is considered a science to the extent that it follows the rules established by the scientific method. Much of this chapter is devoted to describing the scientific method.

Once researchers have collected their data, they proceed to a fourth step in which they analyse those data and generate conclusions. Most research done by scientists aims at contributing to the field, and to do so, researchers will take a fifth step and submit the paper for publication in a journal. For publication to be possible, researchers must keep complete records of observations and data analyses in a form that other researchers can understand and evaluate. This is an essential part of the research process. The research process must be open for public verifiability, so that other researchers have the opportunity to inspect, criticize, replicate or disprove the data and methods.

Most research contributions are attempts or suggestions to answer a research question; whether or not the answer is successful must be decided by the scientific community. Most research articles start this process in a *discussion* section in which the researchers lay out the implications and limitations of their work. They might explicitly describe the type of future research they consider desirable. When the data do not fully support a hypothesis, researchers must rethink aspects of their theories.

> **Hypothesis** A tentative and testable explanation of the relationship between two (or more) events or variables; often stated as a prediction that a certain outcome will result from specific conditions.
>
> **Empiricism** Position that holds that understanding of the world must be based on observation and examination.

Thus there is continual interaction between theory and research. Often, therefore, researchers act on open questions and begin the research cycle again.

This research process is centred around appropriate uses of the scientific method. The goal of the scientific method is to allow researchers to draw conclusions with maximum objectivity. Conclusions are *objective* when they are uninfluenced by researchers' emotions or personal biases. Each of the next two sections begins with a *challenge to objectivity* and then describes the *remedy* prescribed by the scientific method. First, however, let us examine two types of data that a research project can focus on, qualitative and quantitative.

Qualitative and quantitative approaches to research

The main focus of this chapter is on *quantitative methods*, which are methods that measure psychological processes using numbers, for example scores on a test for depression. To study depression qualitatively would imply that depressed participants convey information about their depression by other means, such as in interviews. Thus, *qualitative methods* rely on non-numerical data and often aim at illuminating subjective experience and meaning.

Qualitative methods are useful in the study of complex social behaviour. For example, to gain insight into the reasons why people choose a career as a police officer, participants can be selected from among the members of that profession and interviewed. A qualitative study would then focus on the reasons and arguments formulated by the participants.

Qualitative methods might include collecting information from conversations and interviews, written material (e.g. letters, e-mail), and other forms of personal expression. Such data can be collected according to a plan, as in an interview, or from behaviour as it unfolds under naturalistic conditions. For example, a politician could be interviewed about his or her views on a particular topic, or this information could be inferred from a political speech. In both cases the content of the material can be coded according to predefined topics of interest, such as foreign policy, economics and so on.

The strength of qualitative methods is that they can reveal complex subjective and cultural information that is not easily accessible by quantitative methods. Also, the researcher typically is strongly involved in the research process, often as a participant observer. However, the richness and complexity of the information gained in this way also represent a problem, because complex information can rarely be interpreted in only one way.

The relation between quantitative and qualitative methods is not mutually exclusive; rather, these approaches should complement each other. First, quantitative research always involves at least some qualitative analysis in the sense that we cannot measure a psychological phenomenon unless it has been described in qualitative terms. Thus, we cannot measure depression quantitatively unless this condition has been described qualitatively. Second, choosing between qualitative and quantitative methods should be done depending on the purpose of the study. A given investigation could also include both

qualitative and quantitative methods, as is done is so-called mixed methods designs.

Observer biases and operational definitions

When different people observe the same events, they don't always 'see' the same thing. In this section, we describe the problem of *observer bias* and the steps researchers take as remedies.

The challenge to objectivity

An **observer bias** is an error due to the personal motives and expectations of the viewer. At times, people see and hear what they expect rather than what is. Consider a rather dramatic example of observer bias. Around the beginning of the twentieth century, a leading psychologist, Hugo Munsterberg, gave a speech on peace to a large audience that included many reporters. He summarized the news accounts of what they heard and saw in this way:

> The reporters sat immediately in front of the platform. One man wrote that the audience was so surprised by my speech that it received it in complete silence; another wrote that I was constantly interrupted by loud applause and that at the end of my address the applause continued for minutes. The one wrote that during my opponent's speech I was constantly smiling; the other noticed that my face remained grave and without a smile. The one said that I grew purple-red from excitement; and the other found that I grew chalk-white. (1908, pp. 35–6)

It would be interesting to go back to the original newspapers, to see how the reporters' accounts were related to their political views – then we might be able to understand why the reporters supposedly saw what they did.

In a psychology experiment, we wouldn't expect differences between observers to be quite as radical as those reported by Munsterberg. Nonetheless, the example demonstrates how the same evidence can lead different observers to different conclusions. The biases of the observers act as *filters* through which some things are noticed as relevant and significant and others are ignored as irrelevant and not meaningful.

We'd like you now to try the demonstration in Figure 2.2, to illustrate how easy it is to create an observer bias. This quick demonstration gives an idea of how the experiences you have prior to making an observation can influence how you interpret what you see.

Observer bias The distortion of evidence because of the personal motives and expectations of the viewer.

Look at the glass in this illustration. How would you answer the classic question: Is the glass half empty or half full?
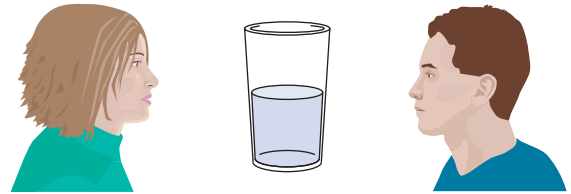
Now suppose you watched this sequence in which water is poured into the glass. Wouldn't you be likely to describe the glass as half full?
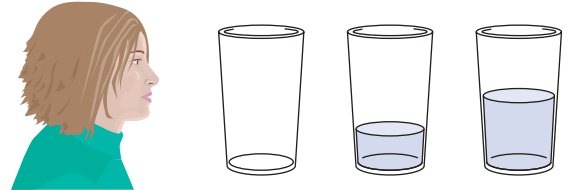
Suppose you watched the sequence in which water is removed. Now doesn't the glass seem half empty?
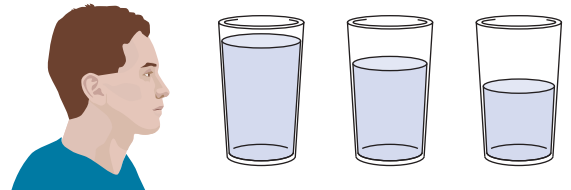
Figure 2.2 Observer bias. Is the glass half empty or half full?

Let's apply this lesson to what happens in psychology experiments. Researchers are often in the business of making observations. Given that every observer brings a different set of prior experiences to making those observations – and often those experiences include a commitment to a particular theory – you can see why observer biases could pose a problem. What can researchers do to ensure that their observations are minimally affected by prior expectations?

The remedy

To minimize observer biases, researchers rely on standardization and operational definitions. **Standardization** means using uniform, consistent procedures in all phases of data collection. All features of the test or experimental situation should be sufficiently standardized so participants experience the same conditions. Standardization means asking questions in the same way and scoring responses according to pre-established rules.

Observations themselves must also be standardized: scientists must solve the problem of how to translate their theories

Standardization A set of uniform procedures for treating each participant in a test, interview or experiment, or for recording data.

Participants, as well as spectators and broadcast viewers, are subject to observer bias. How can you determine what really happened?
Source: Press Association Images/AP Images/Amy Sancetta.

into concepts with consistent meaning. The strategy for standardizing the meaning of concepts is called *operationalization.* An **operational definition** standardizes the meaning of a concept by defining it in terms of specific operations or procedures used to measure it or to determine its presence. For example, if you were researching the effect of reward using a rat, a pellet of food would fit the operational definition of a 'reward' – whereas if your research involved a child, the operational definition could for instance be a verbal reward. All the variables in an experiment must be given operational definitions.

A **variable** is a something that is considered of importance to the study at hand, such as the sex or age of the participant, By definition, a variable is something that varies in amount or kind (if it does not vary, it is a constant). Variables can relate to personal characteristics (e.g. sex and age) and to situational characteristics (e.g. reward, noise, temperature). Also, variables can be factors or characteristics that psychologists and others assume to exist on a more theoretical level, such as intelligence or depression. In fact, all variables are abstract in the sense that they cannot be measured or manipulated directly; variables are measured or manipulated through proper operationalizations. Thus, even variables like age or height must be operationalized in order for them to be used in scientific investigations. For example, a research project on sexual debut age might measure participants' ages in years; another project studying language development in children might require that the exact age is measured in months.

In experimental settings, researchers wish to demonstrate cause-and-effect relations between variables. This is accom-

plished by *manipulating* an independent variable and observing the effect on a dependent variable. The **independent variable** is the factor that the researcher manipulates; it functions as the causal part of the relation. The effect part of the relation is the **dependent variable,** which is what the experimenter measures. If the researcher's claims about cause and effect are correct, the value of the dependent variable will *depend* on the value of the independent variable. Imagine, for example, that you wished to test the hypothesis we mentioned earlier: that children who view a lot of violence on television will engage in more aggressive acts toward their peers. You could devise an experiment in which you manipulated the amount of violence each participant viewed (the independent variable) and then assessed how much aggression he or she displayed (the dependent variable). (Note that such an experiment would require approval from an ethics committee. This issue is discussed in a later section.)

Let's take a moment to put these new concepts to use in the context of a real experiment. The research project we will describe begins with the observation that the world can be sorted into people who claim to be 'morning people' – they feel best performing tasks in the morning – and others who are most definitely not morning people. Researchers have demonstrated that people's self-judgements are correct: in laboratory tests, people most often perform best at those times of day they say they prefer (Yoon et al., 1999). But why? One theory is that performance is worse at the 'wrong' time of day because the individuals suffer from a general decrease in the level of physiological arousal or alertness. This leads to a hypothesis: if you can do something to increase alertness at the wrong time of day, you should be able to lessen or eliminate performance problems.

In Figure 2.3, we present an experiment that tested this hypothesis (Ryan et al., 2002). The experiment focused on *older adults*, those aged 65 and older. Unlike their younger selves, most older adults are morning people. In this study, the researchers wished to make certain that all their participants were morning people. For that reason, they had each potential participant fill out the Morningness–Eveningness Questionnaire – a measurement device that categorizes people on a scale ranging from 'definitely morning' to 'definitely evening' (Horne & Ostberg, 1976). The experiment used participants who were at least 'moderately' morning people.

Next, the researchers needed a procedure to manipulate the independent variable – physiological arousal. As shown in Figure 2.3, the researchers used a procedure that will be quite familiar to most of you. One group consumed coffee with caffeine and the other group got decaf. The participants didn't know which type of coffee they had. The researchers predicted that the caffeine would produce physiological arousal that would, in turn, have an impact on the participants' ability to perform

> **Operational definition** A definition of a variable or condition in terms of the specific operation or procedure used to determine its presence.
>
> **Variable** In an experimental setting, a factor that varies in amount and kind.
>
> **Independent variable** In an experimental setting, a variable that the researcher manipulates with the expectation of having an impact on values of the dependent variable.

> **Dependent variable** In an experimental setting, a variable that the researcher measures to assess the impact of a variation in an independent variable.

at the 'wrong' time of day. To measure the dependent variable – performance – the researchers challenged the participants to memorize a 16-word list. A memory test occurred 20 minutes later. The participants received lists and memory tests once in the morning (8am) and once in the afternoon (4pm) in sessions separated by 5–11 days.

As you can see in Figure 2.3, the independent variable (i.e. level of arousal) had the effect on the dependent variable (i.e. performance) that the researchers expected. In circumstances of high physiological arousal – when participants consumed the coffee with caffeine – performance was more or less equal at the two times of day. However, without the caffeine, memory performance was worse in the afternoon.

As with all research results, we need to take stock of what we now know. The theory is stated in general terms: there is a relation between physiological arousal and performance. However, the experiment uses the specific independent variable of caffeine consumption and the specific dependent variable of memory performance as operationalizations of 'physiological arousal' and 'performance'. Take a moment to think about alternative ways in which you might operationalize these two concepts, to test the same hypothesis in different fashions. You might, for example, want to manipulate physiological arousal without using caffeine, to show that it is not the caffeine itself having magical effects.

Experimental methods: alternative explanations and the need for controls

You know from day-to-day experience that people can suggest many causes for the same outcome. Psychologists face this same problem when they try to make exact claims about causality. The goal of the **experimental method** is to make strong causal claims about the impact of one variable on the other. In this section, we describe the problem of *alternative explanations* and some steps researchers take to counter the problem.

The challenge to objectivity

When psychologists test a hypothesis, they most often have in mind an explanation for why change in the independent variable should affect the dependent variable in a particular way. For example, you might predict, and demonstrate experimentally, that the viewing of television violence leads to high levels of aggression. But how can you know that it was precisely the viewing of *violence* that produced aggression? To make the strongest possible case for their hypotheses, psychologists must be very sensitive to the existence of possible *alternative explanations*. The more alternative explanations there might be
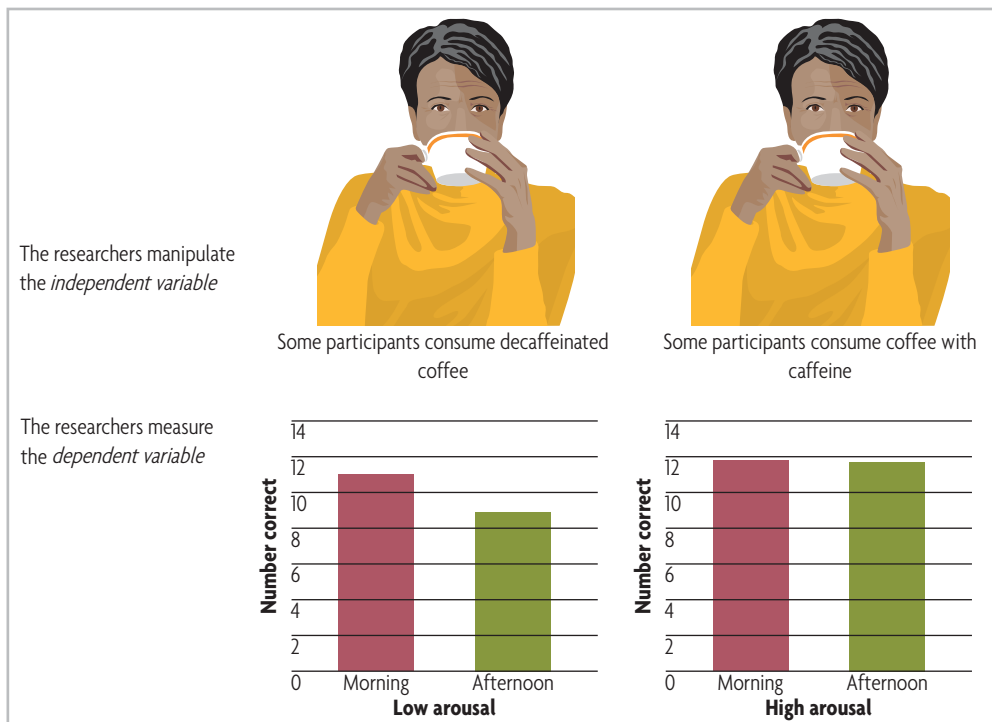
Figure 2.3 Elements of an experiment. To test their hypotheses, researchers create operational definitions for the independent and dependent variables.

Experimental method Research methodology that involves the manipulation of independent variables in order to determine their effects on the dependant variables.

for a given result, the less confidence there is that the initial hypothesis is accurate. When something other than what an experimenter purposely introduces into a research setting changes a participant's behaviour and adds confusion to the interpretation of the data, it is called a **confounding variable.** When the real cause of some observed behavioural effect is *confounded,* the experimenter's interpretation of the data is put at risk. Suppose, for example, that violent television scenes are louder and involve more movement than do most non-violent scenes. In that case, the violent and the superficial aspects of the scenes are confounded. The researcher is unable to specify which factor uniquely produces aggressive behaviour.

Although each different experimental method potentially gives rise to a unique set of alternative explanations, we can identify two types of confounds that apply to almost all experiments, which we will call *expectancy effects* and *placebo effects.* Unintentional **expectancy effects** occur when a researcher or observer subtly communicates to the research participants the behaviours he or she expects to find, thereby producing the desired reaction. Under these circumstances, the experimenter's

expectations, rather than the independent variable, actually help trigger the observed reactions.

> In an experiment, 12 students were given groups of rats that were going to be trained to run a maze. Half of the students were told their rats were from a special *maze-bright* breed. The other students were told their rats were bred to be *maze-dull*. The rats were actually all the same. Nonetheless, the students' results corresponded with their expectations for their rats. The rats labelled bright were found to be much better learners than those that had been labelled as dull (Rosenthal & Fode, 1963).

How do you suppose the students communicated their expectations to their rats? Do you see why you should worry even more about expectancy effects when an experiment is carried out within species – with a human experimenter and human participants? Expectation effects distort the content of discovery.

Critical thinking in your life

The lesson from Clever Hans

Recall the story about the horse Clever Hans at the start of this chapter. How could the horse Hans answer even complex arithmetic questions? The results from experiments such as the one by Rosenthal and Fode (1963) indicate that subtle mechanisms involved in the interaction between Hans and his owner could have been important. For example, in his investigations of the Clever Hans case, Oskar Pfungst (1907) noted that Hans needed visual contact with the questioner in order to answer correctly. The further away the questioner was, the less accurate the answers. Pfungst also found that Hans could only answer correctly if the questioner also knew the answer to the question. When the questioner did not know the answer to the question, Hans could not 'report' the answer.

These results indicate that Hans was as clever as the owner allowed him to be. Importantly, this was not necessarily a deliberate act on part of von Osten to deceive his public. Rather, the investigation – and later research – has shown that subtle and unintentional cueing on part of the questioner may influence behaviour of a horse (or even a rat) to a significant degree. This is why research designs routinely prevent expectations

to have unintended effects through 'blind' and 'double blind' procedures (see section below).

The case of Clever Hans illustrates two important issues in scientific research (Stanovich, 2010). First, the public witnessing Clever Hans' performance did their observations in public gatherings with reduced possibility for careful observation and control. Pfungst, in his investigations, arranged comparable observations under more controlled conditions to be able to isolate possibly important factors. This turned out to be critical in solving the riddle. Second, the case of Clever Hans underscores the importance of distinguishing between *description* of a phenomenon (the horse tapping his hoof in a lawful and seemingly intelligent manner), and *explanation* of the phenomenon. The phenomenon was never disputed, but the explanation accepted at the time (i.e. that horses are as intelligent as humans) was a possible – but unlikely – explanation. Scientific investigations provided a more likely explanation. Also note that the scientific explanation is simpler, and that it is more logical – it is not logical to assume that horses are as intelligent as humans!

Confounding variable A stimulus other than the variable an experimenter explicitly introduces into a research setting that affects a participant's behaviour.

Expectancy effects Results that occur when a researcher or observer subtly communicates to participants the kind of behaviour he or she expects to find, thereby creating that expected reaction.

A **placebo effect** occurs when participants change their behaviour in the direction of their expectations in the *absence* of a causal factor. This concept originated in medicine to account for cases in which a patient's health improved after he or she had received medication that was chemically inert or a treatment that was non-specific. The placebo effect refers to the improvement in health or well-being caused by the individual's *belief* that the treatment will be effective. Some treatments with no genuine medical effects have been shown, even so, to produce good or excellent outcomes for 70 per cent of the patients on whom they were used (Roberts et al., 1993).

In a psychological research setting, a placebo effect has occurred whenever a response is influenced by a person's expectation of what to do or how to feel, rather than by the specific intervention or procedures employed to produce that response. Such expectations may arise from the way participants are introduced to the experimental situation, and other clues that inadvertently convey information about the purpose of the experiment. Cues that convey such information are called *demand characteristics*. Recall the experiment relating television viewing to later aggression. Suppose we discovered that experimental participants who hadn't watched any television at all also showed high levels of aggression. We might conclude that these individuals, by virtue of being put in a situation that allowed them to display aggression, would expect they were *supposed* to behave aggressively and would go on to do so. In general, experimenters must always be aware that participants change the way they behave simply because they are aware of being observed or tested. For example, participants may feel special about being chosen to take part in a study and thus act differently than they would ordinarily. Such *reactivity* effects can compromise an experiment's results.

The remedy

Because human and animal behaviours are complex and often have multiple causes, good research design involves anticipating possible confounds and devising strategies for eliminating them. Researchers' strategies are called **control procedures** – methods that attempt to hold constant all variables and conditions other than those related to the hypothesis being tested. In an experiment, instructions, room temperature, tasks, the way the researcher is dressed, time allotted, the way the responses are recorded, and many other details of the situation must be similar for all participants, to ensure that their experience is the same. The only differences in participants' experiences should be those introduced by the independent variable. Let's look at remedies for the specific confounding variables, expectancy and placebo effects.

Imagine, for example, that you enriched the aggression experiment to include another group that watched comedy programmes. You'd want to be careful not to treat your comedy and

violence participants in different ways based on your expectations. Thus, in your experiment, we would want the research assistant who greeted the participants and later assessed their aggression to be unaware of whether they had watched a violent programme or a comedy. In the best circumstances, bias can be eliminated by keeping *both* experimental assistants and participants unaware of, or *blind* to, which participants get which treatment. This technique is called a **double-blind control.** Recall that in the coffee study (Figure 2.3), we specifically noted that the participants didn't know whether the beverage they were asked to consume contained caffeine or not. In fact, the design was double blind because the experimenters administering the memory tests also did not know which participants had each kind of drink. To provide further reassurance that expectations were not responsible for the memory effects, the experimenters asked the participants to guess which type of coffee they had consumed. Participants were unable to guess correctly (Ryan et al., 2002). This result provides strong evidence that the memory findings did not depend on the participants' expectations about the relation between caffeine and memory performance.

To account for placebo effects, researchers generally include an experimental condition in which the treatment is not administered. We call this a **placebo control.** Placebo controls fall into the general category of controls by which experimenters assure themselves they are making appropriate comparisons. Consider the story of a young girl who, when asked if she loved her older sister, replied, 'Compared to what?' That question is one that must be asked – and satisfactorily answered – before you can really understand what a research finding means.

Ways of doing experiments

Suppose you see a late-night TV commercial that celebrates the herbal supplement ginkgo biloba as an answer to all your memory problems. What might you expect if you buy a supply of ginkgo and take it weekly? One study demonstrated that university students who took ginkgo every morning for 6 weeks did, in fact, show improvements in their performance on cognitive tasks (Elsabagh et al., 2005). On one task, people were asked to view a series of 20 pictures on a computer screen, name them, and later recall those names. The participants were 14 per cent better at this task after 6 weeks of ginkgo. However, participants who took a placebo – a pill with no active ingredients – also improved by 14 per cent. The placebo control suggests that improvement on the task was the result of practice from the initial session. The data from control conditions provide an important baseline against which the experimental effect is evaluated.

Placebo effect A change in behaviour in the absence of an experimental manipulation.

Control procedures Consistent procedures for giving instructions, scoring responses and holding all other variables constant except those being systematically varied.

Double-blind control An experimental technique in which biased expectations of experimenters are eliminated by keeping both participants and experimental assistants unaware of which participants have received which treatment.

Placebo control An experimental condition in which treatment is not administered; it is used in cases where a placebo effect might occur.

In some research designs, which are referred to as **between-subjects designs,** different groups of participants are *randomly assigned,* by chance procedures, to an experimental condition (exposed to one or more experimental treatments) or to a control condition (not exposed to an experimental treatment). Random assignment is one of the major steps researchers take to eliminate confounding variables that relate to individual differences among potential research participants. This is the design we had in mind for the aggression experiment. The random assignment to experimental and control conditions ensures that the two groups will be similar in important ways at the start of an experiment, because each participant has the same probability of being in a treatment condition as in a control condition. We shouldn't have to worry, for example, that everyone in the experimental group loves violent television and everyone in the control group hates it. Random assignment should mix both types of people together in each group. If outcome differences are found between conditions, we can be more confident that the differences were caused by a treatment or intervention rather than by pre-existing differences.

Another type of experimental design – a **within-subjects design** – uses each participant as his or her own control. For example, the behaviour of an experimental participant before getting the treatment might be compared with behaviour after. Consider an experiment that assessed 12-month-old infants' ability to learn from emotional responses they witnessed on a television screen.

How do children learn which objects in their environments are *nice* and which are *nasty?* Researchers tested the idea that children acquire some of this positive and negative information from passive observation of other individuals (Mumme & Fernald, 2003). In one study, 12-month-old infants had the opportunity to interact with novel objects such as a bumpy ball and a plastic valve. As shown in Figure 2.4, the children were seated in front of a television screen, with the objects in easy reach. The children viewed two video presentations of an actress describing one of the two objects. In the initial presentation, the actress mentioned the *target* object with a neutral tone of voice and a neutral facial expression. But in the second presentation, the actress used a negative tone of voice and a negative expression while mentioning the same object. The actress never discussed the *distracter* object. Figure 2.4 shows the within-subjects comparison of the extent to which the infants touched each object. As you can see, when the actress's emotion became negative, the infants tended to shy away from the target object. The infants weren't just getting bored. Their behaviour did not vary with respect to touching the object the actress hadn't mentioned.

Figure 2.4   Infants learn emotional responses. The 12-month-olds were seated so that they could interact with the same objects that appeared on the television screen. In two video presentations, an actress mentioned the *target* object and ignored the *distracter* object. The first video presentation provided a neutral baseline to measure the children's initial preference to interact with each object. In the second video presentation, the actress expressed negative emotions related to the target object. The bar graphs plot the proportion of time the infants spent touching each object. The researchers calculated this measure by dividing the amount of time the infants touched each object into the total duration of the play period. As you can see, when the actress expressed negative emotions toward an object, children touched it much less often.

Because this study was within subjects, the experimenters could draw the strong conclusion that the infants' observation of the actress's negative emotions *changed* their willingness to interact with the object. By the way, the experimenters repeated the experiment with 10-month-old infants and discovered that those younger participants did not change their behaviour based on the actress's expressed emotions (Mumme & Fernald, 2003). Thus it's somewhere in that 2-month window between 10 and 12 months that children begin to let their behaviour be guided by their observation of other people's emotional reactions.

Between-subjects design A research design in which different groups of participants are randomly assigned to experimental conditions or to control conditions.

Within-subjects design A research design that uses each participant as his or her own control; for example, the behaviour of an experimental participant before receiving treatment might be compared with his or her behaviour after receiving treatment.

Within-subjects designs are powerful because they study the *same* individuals under different experimental conditions. Remember that between-subjects designs rely on comparisons of *different* individuals under different experimental conditions. Hence, variability due to differences between individuals is lower in within-subjects designs, and because of this, the within-subjects design is more sensitive to the experimental manipulation. The drawback is that exposing the same individuals to different experimental conditions over time may create unwanted *carry-over* effects. For example, comparing the effects of low vs high reward on performance may be difficult in within-subjects experiments because the sequence of reward (low → high; high → low) may not be comparable – receiving low reward following a high reward is very different from receiving high reward following a low!

A variant of the within-subjects design is the *single subject design*, where one participant is tested at a time. Such designs are common, particularly within behavioural psychology. Historically, this design was common; in fact, most experiments performed by Pavlov, Thorndike, Skinner, Ebbinghaus and other psychological pioneers were based on single subject designs. As in the within-subjects group design, the single subject design uses the participant as his or her own control. To accomplish this, several observations (e.g. 3–5) must be performed under each experimental condition. At the outset of the experiment, behaviour is measured 3–5 times as it occurs under a control condition, the *baseline* condition. Then, an experimental manipulation is introduced, and behaviour is again repeatedly measured. To demonstrate experimental control, the same sequence of control and experimental conditions may be repeated. This design, often called the ABAB design, is powerful in establishing cause–effect relations using a single participant. If used therapeutically, a simple AB design may be appropriate. Here, behaviour is observed repeatedly under baseline conditions (A), then an intervention is introduced (B). If behaviour changes reliably under intervention conditions, it may be unnecessary and even unethical to reverse conditions. For example, if the intervention cures a problem, we would hesitate to reintroduce conditions that implies that the problem returns.

The research methodologies we have described so far all involve the manipulation of an independent variable to look for an effect on a dependent variable. Although the experimental method often allows researchers to make the strongest claims about causal relations among variables, several conditions can make this method less desirable. First, during an experiment, behaviour is frequently studied in an artificial environment, one in which situational factors are controlled so heavily that the environment may itself distort the behaviour from the way it would occur naturally. Much of the richness and complexity of natural behaviour patterns may be lost in controlled experiments, sacrificed to the simplicity of dealing with only one or a few variables and responses. Second, research participants typically know they are in an experiment and are being tested and measured. As discussed, this awareness changes their behaviour from what it would be if they were unaware of being monitored. Third, some important research problems are not amenable to ethical experimental treatment. We could not, for example, try to discover whether the tendency toward child abuse is transmitted from generation to generation by creating an experimental group of children who would be abused and a control group of children who would not be. In the next section, we turn to a type of research design that often addresses these concerns.

Correlational research

Is intelligence associated with creativity? Are optimistic people healthier than pessimists? Is there a relation between experiencing child abuse and later mental illness? These questions involve variables that a psychologist could not easily or ethically manipulate. To answer these questions requires research based on **correlational methods.** Psychologists use correlational methods when they want to determine to what extent variables, traits or attributes are related.

Suppose, for example, researchers were interested in determining the correlation between students' sleep habits and their success in their studies. They might operationally define *sleep*
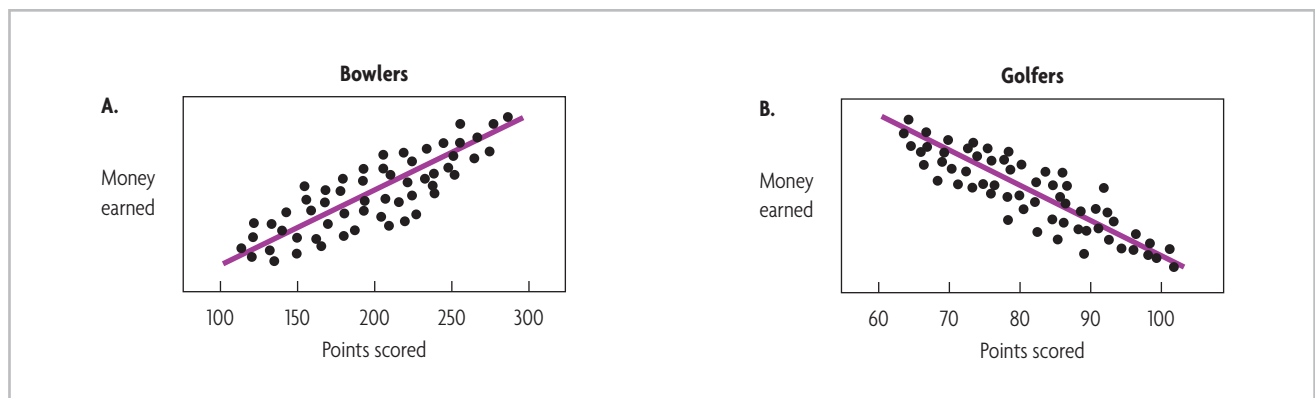
Figure 2.5 Positive and negative correlations. These imaginary data display the difference between positive and negative correlations. Each point represents a single bowler or golfer. (A) In general, the more points a professional bowler scores, the more money he or she will earn. Thus, there is a positive correlation between those two variables. (B) The correlation for golf is negative, because golfers earn more money when they score fewer points.

Correlational methods Research methodologies that determine to what extent two variables, trait, or attributes are related.

habits as the average amount of sleep per night. *Success in college* could be defined as mean grades over the semester. The researchers could assess each variable for an appropriate sample of students and determine if the variables are related. A strong positive relation would mean that the more a student sleeps, the higher his or her mean grade is likely to be. Knowing a student's 'hours per night' would also allow the researchers to make a reasonable prediction about the student's mean grade.

To determine the precise degree of relation that exists between two variables, psychologists compute a statistical measure known as the **correlation coefficient (*r*)**. This value can vary between +1.0 and −1.0, where +1.0 indicates a perfect positive correlation, −1.0 indicates a perfect negative correlation, and 0.0 indicates no correlation at all. A positive correlation coefficient means that as one set of scores increases, a second set also increases. The reverse is true with negative correlations; the second set of scores goes in the opposite direction to the values of the first scores (see Figure 2.5). Correlations that are closer to zero mean that there is a weak relation or no relation between scores on two measures. As the correlation coefficient gets stronger, closer to the +1.0 maximum, predictions about one variable based on information about the other variable become increasingly more accurate.

The researchers might want to take the next step and say that the way to improve students' grades would be to force them to sleep more. This intervention would be misguided. A strong correlation indicates only that two sets of data are related in a systematic way; the correlation does not ensure that one causes the other. Correlation does not imply causation. The correlation could reflect any one of several cause-and-effect possibilities, or none. For example, a positive correlation between sleep and school grades might mean that (1) people who study more efficiently get to bed sooner, (2) people who experience anxiety about schoolwork cannot fall asleep, or (3) people sleep better when they are taking easy courses.

You can see from this example that correlations most often require researchers to probe for deeper explanations.

We don't want to leave you with the impression that correlational methods aren't valuable research tools. Throughout *Psychology and Life,* we will see many correlational studies that have led to important insights. We'll offer an example here to whet your appetite:

> What environmental factors explain why, even by the age of 5 years, some boys are displaying conduct problems and others are not? A team of researchers sought to demonstrate that this difference among boys arises, in part, from the varying amount of *destructive sibling conflict* the boys experience with their brothers and sisters (Garcia et al., 2000). The researchers reasoned that high levels of conflict with siblings might reinforce the boys' tendency toward aggressive or inappropriate responses to life situations. To measure destructive sibling conflict, the researchers videotaped hour-long play sessions between each of 180 boys and his sibling while they were playing together with different sets of toys. The videotaped play sessions were evaluated on dimensions such as the number of conflicts between the children and the intensity of those conflicts. Correlational analyses strongly supported the prediction that boys who experienced high levels of sibling conflict would also be most likely to display aggressive and delinquent behaviours.

Can you see why a correlational design is required to address this prediction? You can't randomly assign children to have a little or a lot of conflict with their siblings. You must wait to see what differences emerge after children are in one situation or the other.

Sampling and generalization of results

Typically, psychology experiments use from 20 to 100 participants. Correlational research often uses larger samples. In both cases, researchers would like to generalize from this **sample** to the **population** from which the sample is drawn. That is, we perform an investigation on a selection of students (e.g. 50) at the University of Tromsø (UiT) with the intention of generalizing the results to the whole UiT student population. Suppose you want to test the hypothesis that 6-year-old children are more likely to lie than 4-year-old children. You can bring only a very small subset of all of the world's 4- and 6-year-olds

What procedures might you follow to determine the correlation between students' sleep habits and their academic success? How would you evaluate potential causal relations underlying any correlation?

Source: Pearson Education Ltd/Gareth Boden.

Correlational coefficient (*r*) A statistic that indicates the degree of relationship between two variables.

Sample A subset of a population selected as participants in an experiment.

Population The entire set of individuals to which generalizations will be made based on an experimental sample.

into your laboratory. To generalize beyond your samples, you need to have confidence that your particular 4- and 6-year-olds are comparable to any other 4- and 6-year-olds. A sample is a **representative sample** of a population if it closely matches the overall characteristics of the population with respect, for example, to the distribution of males and females, racial and ethnic groups, and so on. You can generalize from your sample only to the population it adequately represents. If you had only boys as participants in your lying study, you'd be incorrect to draw conclusions about girls' probable behaviour.

Note, however, that many experiments are *not* conducted using samples that are representative of a given population. This is due to the fact that experiments often aim at demonstrating the possible causal effect of a variable rather than formulating a general insight. For example, to experimentally demonstrate that a placebo effect *can* occur in a given sample is important, regardless of this sample being representative of any population. On the other hand, some experiments are performed on carefully selected samples in order to provide information that can be generalized to the population from which the sample was selected. For example, to test a new treatment procedure for depression, depressed participants are randomly allocated to conditions (new treatment or control) to measure the efficacy of the new treatment. In such cases, the very purpose of the experiment is to generalize from the sample studied (depressed individuals) to the population from which the sample was selected (depressed people in general).

When researchers formulate research knowledge, the evidence must be trustworthy. Is the finding reliable? This implies that a given conclusion must be supported by more than one single study. Typically, research conclusions are based on many studies performed by independent researchers; often, research conclusions are based on hundreds of studies. In such cases, researchers rely on a sophisticated statistical procedure called *meta-analysis*. Meta-analyses combine the actual outcomes of many single studies to formulate an unbiased overall conclusion about a research question. This is particularly important if research reports support diverging conclusions. For example, if a treatment procedure has proved successful in 20 studies, but unsuccessful in 15 other studies, what should we conclude? A meta-analytic study would use the exact outcome results (the strength of the effect, and its direction) along with the number of participants in each study to calculate an overall conclusion.

Subliminal influence?

To close this section, we offer one concrete example of how psychological research has been used to assess the vigorous claims of advertisers anxious to make you believe in their products. It is well known that subliminal influence is possible – people can be influenced in thinking and behaviour by information and messages of which they are not consciously aware. However, what are the limits of such influence? You will almost certainly have been subjected to adverts for products that promise to change your life with messages outside conscious awareness. One CD guarantees a better sex life; another provides a quick cure for low self-esteem; a third promises safe and effective weight loss. How? All you have to do is *listen* – in bed, while jogging, when doing your homework – to the 'restful splash of ocean waves breaking on sandy shores'. Are such allegations true?

Although it was almost certainly a hoax, a 1957 study made headlines when the 'inventor' of subliminal advertising claimed that the message 'Buy popcorn' flashed on the screen during a movie yielded a 58 per cent increase in popcorn sales (Rogers, 1993). So, do subliminal messages really influence mental states and behaviour as their advocates claim? Our answer comes from an application of the experimental methods we have described (see Figure 2.6).

> **Representative sample** A subset of a population that closely matches the overall characteristics of the population with respect to the distribution of males and females, racial and ethnic groups, and so on.

A team of experimenters set out to determine the effectiveness of listening to commercially available audiotapes designed to improve self-esteem or memory. The participants were 237 men and women volunteers, ranging from 18 to 60 years of age.

After a pretest session in which their initial self-esteem and memory were measured on standard psychological tests and questionnaires, the participants

Pretest | Independent variables | Post-test

Population → Sample →

Experimental condition 1
Self-esteem tape

Experimental condition 2
Memory tape

Self-esteem

Memory

Random assignment Time, duration of treatment
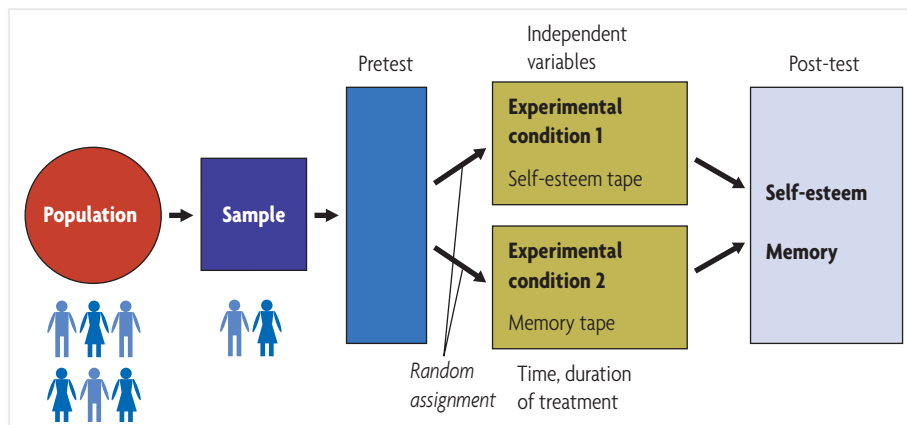
Figure 2.6 Experimental design for testing hypotheses about the effectiveness of subliminal messages. In this simplified version of the experiment, a sample of people is drawn from a larger, general population. They are given pre-test measures and randomly assigned to receive subliminal tapes. They are then given post-tests that objectively assess any changes in the dependent variables: memory and self-esteem.

were randomly assigned to two conditions. Half of them received subliminal memory tapes, and the others received subliminal self-esteem tapes. They listened regularly to the tapes for a five-week period and then returned to the laboratory for a post-test session to evaluate their memories (using four memory tests) and self-esteem (using three self-esteem scales). The researchers were blind to which participants received which treatment (Greenwald et al., 1991).

Did the tapes boost self-esteem and enhance memory? The results from this controlled experiment indicate no significant improvement was shown on any of the objective measures of either self-esteem or memory. However, one very powerful effect did emerge: the placebo effect of expecting to be helped. Anticipating this placebo effect, the researchers had added another independent variable. Half the participants in each group received memory tapes that were

mismarked 'self-esteem' and the others received self-esteem tapes in 'memory' boxes. Participants *believed* their self-esteem improved if they received tapes with that label or felt their memory improved if their tapes were labelled 'memory' – even when they had been listening to the other tape!

This experiment allows for some very concrete advice: save your money; subliminal self-help programmes offer nothing more than placebo effects.

This experiment also gives you a specific example of the types of variables that psychologists measure. In this case, it was participants' beliefs about improvements in self-esteem and memory as well as objective measures of self-esteem and memory. In the next section, we discuss more generally the way in which psychologists measure important processes and dimensions of experience.

Psychology in your life

Can survey research affect your attitudes?

Consider this scenario. It's about election time. Just when you've finished eating supper, the telephone rings. A friendly voice at the other end asks you if you have a few minutes to answer some questions about the candidates. You say, 'Why not?' This is an opportunity for you to be a research participant outside the laboratory. But here's an answer to your question, 'Why not?' The questions on the survey can have a strong impact on your attitudes.

Let's look at a laboratory study that illustrates this principle. The study took place in England, so it focused on participants' attitudes toward the then Prime Minister, Tony Blair (Haddock, 2002). Participants filled out a questionnaire that began with the question, 'How interested are you in British politics?' After that, the questionnaire continued in one of four ways. One version asked participants to list two positive characteristics for Blair; a second asked participants for five positive characteristics. The remaining two versions of the questionnaires asked for two or five negative characteristics. The next questions on each questionnaire asked the participants to provide favourability ratings toward Blair on 7-point scales with higher scores reflecting more positive attitudes.

From this description, you can see that one important component of the experiment was the number of characteristics each participant attempted to list. Why might that matter? Suppose you were asked to list negative attributes for a well-known politician. You would probably find it easy to generate two negative attributes but relatively hard to generate five.

After trying to generate five, you might be thinking, 'Hey, if I can't think of five things that are bad about this person, maybe he or she is actually pretty good' (see Schwarz et al., 2003). For that reason, if you try to generate more negative characteristics, you might actually come to like the politician better; if you try to generate more positive characteristics, that effort can have a negative impact on your attitudes.

The results presented in the figure within this feature support these predictions for the subset of participants who were relatively uninterested in British politics. For example, those participants' ratings of Blair were relatively more positive when they attempted to recall more negative characteristics. For those students who were already interested in British politics – presumably because they had sufficient knowledge and strong attitudes – the ease with which they could retrieve information about Blair did not have a similar impact on their attitudes.

From this pattern of results, here's what you might anticipate when you get that after-supper call: the first thing the voice should ask is how interested you are in politics. At that point, the voice will know how easy it might be to alter your attitudes with questions that, on the surface, seem quite reasonable. Would you have anticipated that having people focus at length on Blair's negative characteristics would make them like him more?

So when you answer 'research' questions out in the real world, be wary of the true purposes of the enterprise. In the laboratory, researchers must provide you with debriefing

information (see p. 45) that helps you understand how research participation might have influenced how you think or feel. Those people who catch you after dinner have no similar responsibilities toward full disclosure. Their major hope is that they can change your attitudes in a way that will affect your behaviour when you find yourself in the voting booth.

Interest in politics
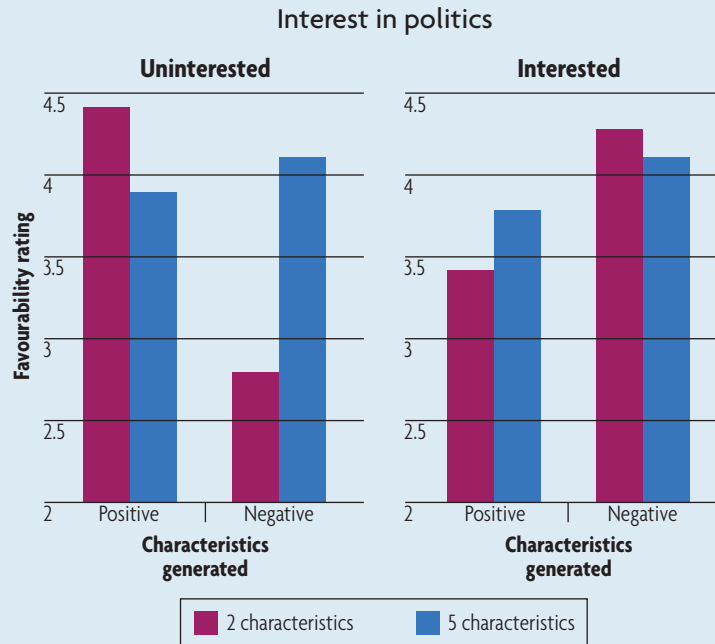
Review questions

1. What is the relation between theories and hypotheses?
2. What steps can researchers take to overcome observer biases?
3. Why do researchers use double-blind controls?
4. What is meant by a within-subjects design?
5. Why does correlation not imply causation?

Critical Thinking: Consider the study in which 12-month-olds learned emotions toward objects from TV. Why was it important that the children had no prior experience with the objects?

Psychological measurement

Because psychological processes are so varied and complex, they pose major challenges to researchers who want to measure them. Although some actions and processes are easily seen, many, such as anxiety or dreaming, are not. Thus one task for a psychological researcher is to make the unseen visible, to make internal events and processes external, and to make private experiences public. You have already seen how important it is for researchers to provide operational definitions of the phenomena they wish to study. Those definitions generally provide some procedure for assigning numbers to, or *quantifying*, different levels, sizes, intensities or amounts of a variable. Many measurement methods are available, each with its particular advantages and disadvantages.

Our review of psychological measurement begins with a discussion of the distinction between two ways of gauging the accuracy of a measure: *reliability* and *validity*. We then review different measurement techniques for data collection. By

whatever means psychologists collect their data, they must use appropriate statistical methods to verify their hypotheses. A description of how psychologists analyse their data is given in the Statistical Supplement, which follows this chapter. Read it in conjunction with this chapter.

Achieving reliability and validity

The goal of psychological measurement is to generate findings that are both reliable and valid. **Reliability** refers to the consistency or dependability of behavioural data resulting from psychological testing or experimental research. A reliable result is one that will be repeated under similar conditions of testing at different times. A reliable measuring instrument yields comparable scores when employed repeatedly (and when the thing being measured does not change). Consider the experiment we just described, which showed that subliminal audiotapes generate only placebo effects. That experiment used 237 participants. The experimenters' claim that the result was 'reliable' means that they should be able to repeat the experiment with any new group of participants of comparable size and generate the same pattern of data. If this is the case, the result is *statistically significant*. Statistical significance is tested by means of appropriate statistical procedures (see Statistical Supplement) and tells us whether a given outcome from a study is reliable.

Validity means that the information produced by research or testing accurately measures the psychological variable or quality it is intended to measure. A valid measure of happiness, for example, should allow us to measure how happy you are in a particular situation. In the context of experiments, a valid experiment means that the researcher can generalize to broader circumstances, often from the laboratory to the real world. Here, validity refers both to the causal inference the researcher makes in the experiment (does the manipulated variable create a change in the dependent variable?), and to the generalization of this result (does it apply to the real world?). The first is called *internal* validity, the second *external* validity.

Tests and experiments can be reliable without being valid. We could, for example, use your shoe size as an index, i.e. a measure, of your happiness. This would be reliable (we'd always get the same answer), but not at all valid (we'd learn very little about your day-to-day happiness level).

As you now read about different types of measures, try to evaluate them in terms of reliability and validity.

Self-report measures

Often researchers are interested in obtaining data about experiences they cannot directly observe. Sometimes these experiences are internal psychological states, such as beliefs, attitudes and feelings. At other times, these experiences are external behaviours but – like sexual activities or criminal acts – not generally appropriate for psychologists to witness. In these cases, investigations rely on self-reports. **Self-report measures** are verbal answers, either written or spoken, to questions the researcher poses. Researchers devise reliable ways to quantify these self-reports so they can make meaningful comparisons between different individuals' responses. Such measures are therefore quantitative. (If the researcher instead did interviews and based her research on interpreting the interviews, the data would have been qualitative.)

Self-reports include responses made on questionnaires and during interviews. A *questionnaire* or *survey* is a written set of questions, which can range in content from questions of fact ('Are you a registered voter?'), to questions about past or present behaviour ('How much do you smoke?'), to questions about attitudes and feelings ('How satisfied are you with your present job?'). *Open-ended* questions allow respondents to answer freely in their own words. For example, the open-ended question 'Name your four preferred leisure activities' would allow respondents to respond with any activity they choose. Questions may also have a number of *fixed alternatives* such as *yes, no* and *undecided.*

An *interview* is a dialogue between a researcher and an individual for the purpose of obtaining detailed information. Interviews are typically qualitative in nature because the interviewer relies on an overall interpretation of the information given rather than on scoring responses. An interview often is *interactive* in the sense that the interviewer may vary the questioning to follow up on something the respondent said. Good interviewers are also sensitive to the process of the social interaction as well as to the information revealed. They are trained to establish a positive social relationship with the respondent that encourages trust and the sharing of personal information. Some interviews can be structured or semi-structured, as for example interviews for jobs and oral examinations. Here, the interviewer focuses on specific topics according to a predefined plan.

Although researchers rely on a wide variety of self-report measures, there are limits to their usefulness. Obviously, many forms of self-report cannot be used with preverbal children, illiterate adults, speakers of other languages, some mentally

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Reliability The degree to which a test produces similar scores each time it is used; stability or consistency of the scores produced by an instrument.

Validity The extent to which a test measures what it was intended to measure.

Self-report measures The self-behaviours that are identified through a participant's own observations and reports.

disturbed people, and animals. Even when self-reports can be used, they may not be reliable or valid. Participants may misunderstand the questions or not remember clearly what they actually experienced. Furthermore, self-reports may be influenced by social desirability. People may give false or misleading answers to create a favourable (or, sometimes, unfavourable) impression of themselves. They may be embarrassed to report their true experiences or feelings. If respondents are aware of a questionnaire's or interview's purpose, they may lie or alter the truth: for example, to get a job, to get discharged from a mental hospital, or to accomplish a particular goal. An interview situation also allows personal biases and prejudices to affect how the interviewer asks questions and how the respondent answers them.

Behavioural measures and observations

Psychological researchers are interested in a wide range of behaviours. They may study a rat running a maze, a child drawing a picture, a student memorizing a poem, or a worker repeatedly performing a task. **Behavioural measures** are ways to study actions and observable and recordable reactions.

One of the primary ways to study what people do is *observation.* Researchers use observation in a planned, precise and systematic manner. Observations focus on either the *process* or the *products* of behaviour, or both. In an experiment on learning, for instance, a researcher might observe how many times a research participant rehearsed a list of words (process) and then how many words the participant remembered on a final test (product). Observation may be *systematic*, which means that the researcher has defined specific behavioural categories to record. For example, in a laboratory experiment on emotions, a researcher could observe a participant's facial expressions as the individual looked at emotionally arousing stimuli and record predefined categories such as joy, disgust and surprise. Unsystematic observations in the same situations would imply that the researcher simply made notes of the emotional expressions observed.

A researcher's direct observations are often augmented by technology. For example, contemporary psychologists often rely on computers to provide very precise measures of the time it takes for research participants to perform various tasks, such as reading a sentence or solving a problem. Computers now provide extraordinary flexibility in controlling experiments, and collecting and analysing data. Later in the chapter we will describe the newest types of technologies that allow researchers to produce behavioural measures of a remarkable kind: pictures of the brain at work.

In *naturalistic observations,* some naturally occurring behaviour is viewed by a researcher, who makes no attempt to

change or interfere with it. For instance, a researcher behind a one-way mirror might observe the play of children who are not aware of being observed. Researchers may also perform naturalistic observations by being present as the observed behaviour unfolds, as when the researcher observes classroom behaviour at a school by being present in the classroom. In such cases the researcher must be careful to reduce *reactivity*, i.e. that behaviour in the observed individuals is caused by the observation itself. Simply being present for some time in the classroom prior to observation may reduce reactivity.

When studying behaviour in a laboratory setting, a researcher is unable to observe the long-term effects of one's natural habitat in shaping complex patterns of behaviour. Therefore, field studies may be very valuable. One of the best examples of naturalistic observation conducted in the field is the work of **Jane Goodall** (1986, 1990; Peterson & Goodall, 1993). Goodall has spent more than 40 years studying patterns of behaviour among chimpanzees in Gombe, on Lake Tanganyika in Africa. Goodall notes that had she ended her research after 10 years – as she originally planned – she would not have drawn the correct conclusions:

> We would have observed many similarities in their behaviour and ours, but we would have been left with the impression that chimpanzees were far more peaceable than humans. Because we were able to continue beyond the first decade, we could document the division of a social group and observe the violent aggression that broke out between newly separated factions. We discovered that in certain circumstances the chimpanzees may kill and even cannibalize individuals of their own kind. On the other side of the coin, we have learned of the extraordinarily enduring affectionate bonds between family members . . . advanced cognitive abilities, [and the development of] cultural traditions. (Goodall, 1986, pp. 3–4)

In the early stages of an investigation, naturalistic observation is especially useful. It helps researchers discover the extent of a phenomenon or to get an idea of what the important variables and relations might be. The data from naturalistic observation often provide clues for an investigator to use in formulating a specific hypothesis or research plan.

When they wish to test hypotheses with behavioural measures, researchers sometimes turn to *archival data*. Imagine all the types of information you might find in a library or on the Web: birth and death records, weather reports, movie attendance figures, legislators' voting patterns and so on. Any of those types of information could become valuable to test the right hypothesis. Consider a study that examined whether men and women differ in their level of *heroism* (Becker & Eagly, 2004). To address this question, the researchers couldn't create a laboratory test; they couldn't set a building on fire to see whether more men or women rushed in. Instead, they identified behaviours out in the world that were arguably heroic and then

> **Behavioural measures** Overt actions and reactions that are observed and recorded, exclusive of self-reported behaviour.

looked to archival records to assess the relative contributions of men and women. The defining elements of heroism include benefiting others, acting selflessly and confronting risk. As one operationalization of heroism, the researchers examined participation in 'Doctors of the World', an organization that sends medical personnel to all corners of the globe. Personnel in this programme assume a 'nonnegligible risk [by] delivering health and medical services in environments marked by local violence and unsanitary conditions' (Becker & Eagly, 2004, p. 173). What did the archival data show? More than half of the participants in Doctors of the World (65.8 per cent) were women.

We must emphasize that many research projects combine both self-report measures and behavioural observations. Researchers may, for example, specifically look for a relation between how people report they will behave and how they actually behave. In addition, rather than involving large numbers of participants, some research projects will focus all their measures on a single individual or small group in a **case study.** In such studies, researchers can apply a diversity of methods such as interview, observation or testing. Intensive analyses of particular individuals can sometimes yield important insights into general features of human experience. For example, careful observations of single patients with brain damage provided the basis for important theories of the localization of language functions in the brain.

Researchers also apply physiological measures to record bodily activities that occur in conjunction with psychological processes. For example, to record muscle activity, the **electromyogram (EMG)** can be used. Measures of muscle activity can be of interest in many psychological phenomena, including sleep and dreams (see Chapter 5). Here, researchers have identified characteristic variations in muscle activity over the sleep cycle. In studies of emotions and stress, researchers often apply *skin conductance* (galvanic skin response, GSR) as a physiological measure (Chapter 12).

Recording and imaging of brain activity

In addition to self-report and behavioural measures, researchers rely on a number of other procedures and measures to collect data to answer scientific questions. One important set of measures address biological processes associated with psychological phenomena. *Brain activity* is a prominent example. Here, the researcher has a number of recording methods available. For example, signals from a number of electrodes attached to the surface of the scalp can record larger, integrated patterns of electrical brain activity in what is called the **electroencephalogram (EEG).** EEGs can be used to study the relation between psychological activities

and brain response. For example, in one experiment participants were asked to view a series of faces and make judgements about whether they thought they would be able to recognize each face in a later memory task. The EEGs revealed a distinctive pattern of brain activity, at the time the participants made their judgements, that predicted those instances in which the participants were later able to recognize the faces (Sommer et al., 1995).

Some of the most exciting technological innovations for studying the brain were originally developed to help neurosurgeons detect brain abnormalities, such as damage caused by strokes or diseases. These devices produce images of the living brain without invasive procedures that risk damaging brain tissue. For example, in research with positron emission tomography, or **PET scans,** participants are given different kinds of radioactive (but safe) substances that eventually travel to the brain, where they are taken up by active brain cells. Recording instruments outside the skull can detect the radioactivity emitted by cells that are active during different cognitive or behavioural activities. This information is then fed into a computer that constructs a dynamic portrait of the brain, showing where different types of psychological activities are actually occurring (see Figure 2.7). In this way, observation of a psychological activity can be linked to activity in specific areas of the brain.

Magnetic resonance imaging, or **MRI,** uses magnetic fields and radio waves to generate pulses of energy within the brain.
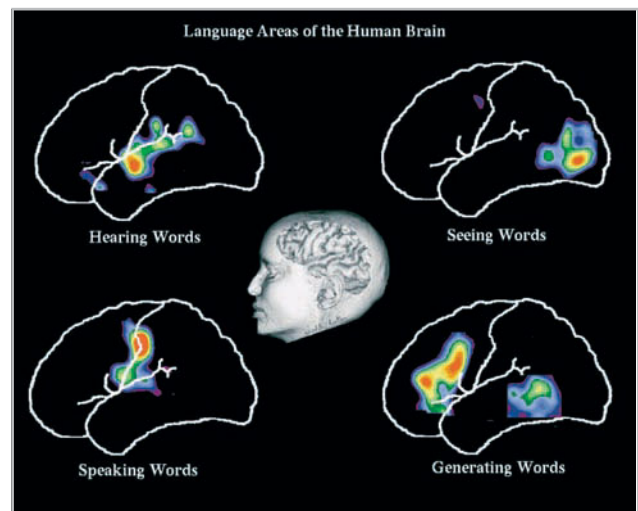
Figure 2.7 PET scans of the brain at work. These PET scans show that different tasks stimulate neural activity in distinct regions of the brain.

Source: Courtesy of Marcus E. Raichle, M.D.

Electroencephalogram (EEG) A recording of the electrical activity of the brain.

PET scans Brain images produced by a device that obtains detailed pictures of activity in the living brain by recording the radioactivity emitted by cells during different cognitive or behavioural activities.

Magnetic resonance imaging (MRI) A technique for brain imaging that scans the brain using magnetic fields and radio waves.

Case study Intensive observation of a particular individual or small group of individuals.

Electromyogram (EMG) A record of muscle activity produced by an electromyograph.

As the pulse is tuned to different frequencies, some atoms line up with the magnetic field. When the magnetic pulse is turned off, the atoms vibrate (resonate) as they return to their original positions. Special radio receivers detect this resonance and channel information to a computer, which generates images of the locations of different atoms in areas of the brain. By examining the image, researchers can link brain structures to psychological processes. For example, the MRI can identify a tumour in the brain and then linked to psychological effects like speech or memory impairment.

MRI is most useful for providing clear images of anatomical details; PET scans provide better information about function. A newer technique called **functional MRI,** or **fMRI,** combines some of the benefits of both techniques by detecting magnetic changes in the flow of blood to cells in the brain; fMRI allows more precise claims about both structure and function. Researchers have begun to use fMRI to discover the distributions of brain regions responsible for many of your most important cognitive abilities, such as attention, perception, language processing, and memory (Cabeza & Nyberg, 2000).

We have now described several types of procedures and measures that researchers use. Before we move on, we want to give you an opportunity to see how the same issue can be addressed in different research designs. Consider Shakespeare's question, 'What's in a name?' In *Romeo and Juliet*, Juliet asserts, 'That which we call a rose by any other name would smell as

sweet.' But is that correct? Do you think your name has an impact on the way other people treat you? Is it better to have a common, familiar name or a rare, distinctive one? Or does your name not matter at all? In Table 2.1 we give examples of combinations of measures and methods that researchers might use to answer those questions. As you read through Table 2.1, ask yourself how willing you would be to participate in each type of study. In the next section, we consider the ethical standards that govern psychological research.

Ethical issues in research

In the study that tested the effectiveness of subliminal messages, the researchers deceived the participants by mislabelling the tapes. They did so to see if the participants' expectations would lead them to believe that the messages were helpful even if objective measures of memory and self-esteem showed no improvement. Deception is always ethically suspect, but in this case, how else could researchers assess the placebo effect of false beliefs held by the participants? How should the *potential gains* of a research project be weighed against the *costs* it incurs to those who are subjected to procedures that are risky, painful, stressful or deceptive? Psychologists ask themselves these questions all the time (Rosenthal, 1994).

Respect for the basic rights of humans and animals is a fundamental obligation of all researchers. Beginning in 1953, the American Psychological Association has published guidelines for ethical standards for researchers. Current research practice is governed by the 2002 revision of those guidelines. Consider the issue of deception in research. The 2002 guidelines assert, 'Psychologists do not deceive prospective participants about research that is reasonably expected to cause physical pain or severe emotional distress' (American Psychological Association, 2002, p. 1070). Guidelines of this sort were not always in force. For example, in Chapter 17 we describe classic experiments on *obedience to authority*. In these experiments, participants were deceived into

Table 2.1	What's in a name?: methods and measures	
Research goal	**Dependent measure**	
	Self-report	**Observation**
Correlational designs		
To assess the correlation between the frequency of people's names and their experience of happiness.	Each participant's assessment of his or her own happiness	
To assess the correlation between the frequency of children's names and their acceptance by peers		Children's amount of social interaction on the playground
Experimental methods		
To determine if people judge identical photos differently when different names are assigned to them.	Participants' ratings of baby pictures to which random names have been assigned	
To determine if people's actual social interactions change because of name-based expectations		The number of positive facial expressions people produce in conversation with a stranger who has introduced himself as *Mark* or *Marcus*

> **Functional MRI (fMRI)** A brain-imaging technique that combines benefits of both MRI and PET scans by detecting magnetic changes in the flow of blood to cells in the brain.

believing that they were giving dangerous electric shocks to total strangers. Evidence from the experiments suggests that the participants were, in fact, experiencing 'severe emotional distress'. For that reason – although the research is quite important to an understanding of human nature – no responsible psychologist could advocate replicating the studies today. In fact, researchers no longer make decisions about issues like the use of deception in isolation. To guarantee that ethical principles are honoured, special committees oversee every research proposal. Such *review boards* approve and reject proposals for human and animal research. The web addresses for these ethical committees can be found at www.etikkom.no/en/In-English. Let's review some of the factors those review boards consider.

Informed consent

At the start of nearly all laboratory research involving humans, participants are given a description of the procedures, potential risks and expected benefits they will experience. Participants are assured that their privacy is protected: all records of their behaviour are kept strictly confidential; they must approve before there can be any public sharing of them. Participants are asked to sign statements indicating that they have been *informed* about these matters and that they *consent* to continue. The participants are assured in advance that they may leave an experiment any time they wish, without penalty, and are given the names and phone numbers of officials to contact if they have any grievances.

Risk/gain assessment

Most psychology experiments carry little risk to the participants, especially where participants are merely asked to perform routine tasks. However, some experiments that study more personal aspects of human nature – such as emotional reactions, self-images, conformity, stress or aggression – can be upsetting or psychologically disturbing. Therefore, whenever a researcher conducts such a study, risks must be minimized, participants must be informed of the risks, and suitable precautions must be taken to deal with strong reactions. Where any risk is involved, it is carefully weighed by each institutional review board in terms of its necessity for achieving the benefits to the participants of the study, to science and to society.

Intentional deception

For some kinds of research, it is not possible to tell the participants the whole story in advance without biasing the results. If you were studying the effects of violence on television on aggression, for example, you would not want your participants to know your purpose in advance. But is your hypothesis enough to justify the deception?

We have already noted that the use of deception is ethically problematic. In addition to the guideline that participants not be misled about the probability of physical or emotional distress, the guidelines provides other restrictions: (1) the study must have sufficient scientific and educational importance to warrant deception, (2) researchers must demonstrate that no equally effective procedures excluding deception are available, (3) the deception must be explained to the participants by the conclusion of the research, and (4) participants must have the opportunity to withdraw their data once the deception is explained. In experiments involving deception, a review board may impose constraints, insist on monitoring initial demonstrations of the procedure, or deny approval.

Debriefing

Participation in psychological research should always be a mutual exchange of information between researcher and participant. The researcher may learn something new about a behavioural phenomenon from the participant's responses, and the participant should be informed of the purpose, hypothesis, anticipated results and expected benefits of the study. At the end of an experiment, each participant must be given a careful **debriefing,** in which the researcher provides as much information about the study as possible and makes sure that no one leaves feeling confused, upset or embarrassed. If it was necessary to mislead the participants during any stage of the research, the experimenter carefully explains the reasons for the deception. Finally, participants have the right to withdraw their data if they feel they have been misused or their rights abused in any way.

Issues in animal research

Should animals be used in psychological and medical research? This question has often produced very polarized responses. On one side are researchers who point to the very important breakthroughs research with animals has allowed in several areas of science (Domjan & Purdy, 1995; Petrinovich, 1998). The benefits of animal research have included discovery and testing of drugs that treat anxiety and mental illnesses as well as important knowledge about drug addiction (Miller, 1985). Animal research benefits animals as well. For example, psychological researchers have shown how to alleviate the stresses of confinement experienced by zoo animals. Their studies of animal learning and social organization have led to the improved design of enclosures and animal facilities that promote good health (Nicoll et al., 1988).

To defenders of animal rights, this list of achievements does not undercut the deep perceived error of believing that there

> **Debriefing** A procedure conducted at the end of an experiment in which the researcher provides the participant with as much information about the study as possible and makes sure that no participant leaves feeling confused, upset or embarrassed.

Psychological research: Basic and applied

Many of the questions you have read about in this chapter relate to theoretical issues. Often, scientists distinguish between *basic research* – research that is performed to solve theoretically motivated questions – and applied research – research that attempts to solve practical questions. A social psychologist trying to answer the question of how attitudes change belongs to the first category, whereas a social psychologist trying to change people's attitudes towards smoking (in the hope that this will reduce smoking) belongs to the latter category. For people outside research, such as the general public and politicians, the latter category may seem to be the important and valuable part of scientific work. As a consequence, funding for basic research is hard to obtain, and politicians and bureaucrats often direct research money to areas that seem important from a public view, such as finding a cure for specific diseases or solving important societal problems.

However, the distinction between basic and applied research is often blurred, and basic research may be more important than is often realized. For example, it is well known that basic research was a prerequisite for many of the technological advances we enjoy today, such as jet travel, the Internet, TV, vaccine, etc. Another important side of this is the danger

of basic research being ignored as an important corrective for erroneous 'knowledge'. Take Tourette syndrome as an example. Tourette syndrome, named after Dr Georges Gilles de la Tourette, who first described it in 1885, is a neurological disorder characterized by repetitive, stereotyped, involuntary movements and vocalizations called tics. In finding the cause and a cure for this disease, many attempts were made. Between 1921 and 1955 the dominating attempts were made by psychoanalysts, who interpreted the symptoms in terms of the then fashionable psychoanalytic jargon. For example, Kagan (2002, p. 79) reports that 'Sandor Ferenczi, who had never seen a patient with Tourette's syndrome, made an [. . .] error when he wrote that the frequent facial tics of people with Tourette's were the result of a repressive urge to masturbate'. This and many similar examples had the unfortunate effect that psychoanalytic thinking and theorizing hampered sound scientific work to find a cause and possible cure.

The lesson to be learnt from this is that basic research has an important function as a corrective for erroneous beliefs, findings and theories. Scientists must expose their hypotheses and theories to public scrutiny, and their hypotheses and theories must be stated in such a way that they can be falsified.

is a 'morally relevant difference separating *Homo sapiens* from other creatures' (Bowdy & Shapiro, 1993, p. 136; see also Shapiro, 1998). To remedy this error, ethicists argue for 'a shift from laboratory-based invasive research to minimally manipulative research conducted in naturalistic and semi-naturalistic settings' (Bowd & Shapiro, 1993, p. 140). Each animal researcher must judge his or her work with heightened scrutiny. The ethical committees provide firm ethical guidelines for researchers who use non-human animals in their research.

How do your beliefs compare to those of your peers? How would you make decisions about the costs and benefits of animal research?

Review questions

1. What is the purpose of informed consent?

2. What is the purpose of debriefing?

3. What recommendation about research settings do researchers make with respect to the use of non-human animals as research participants?

Becoming a wiser research consumer

In the final section of this chapter, we will focus on the kinds of critical thinking skills you need to become a wiser consumer of psychological knowledge. Honing these thinking tools is essential for any responsible person in a dynamic society such as ours – one so filled with claims of truth, with false, supposedly common-sense myths, and with biased conclusions that serve special interests. To be a *critical thinker* is to go beyond the information as given and to delve beneath appearances, with the goal of understanding the substance without being seduced by style and image.

Psychological claims are an ever-present aspect of our daily life. Unfortunately, much of the most widespread information on psychology does not come from the books, articles and reports of accredited practitioners. Rather, this information comes from newspaper and magazine articles, TV and radio shows, pop psychology and self-help books. Return to the idea of subliminal mind control which we examined earlier in the chapter. Although it began as a hoax propagated by profit-minded marketing consultant James M. Vicary (Rogers,

1993) – and, as we have seen, has been rigorously discredited in the laboratory – the idea of subliminal influences on overt behaviour continues to exert a pull on people's beliefs.

Studying psychology will help you make wiser decisions based on evidence gathered either by you or by others. Always try to apply the insights you derive from your formal study of psychology to the informal psychology that surrounds you: ask questions about your own behaviour and that of other people, seek answers to these questions with respect to rational psychological theories, and check the answers against the evidence available to you.

Here are some general rules to keep in mind:

- Avoid the inference that correlation is causation. Always ask: Is the assumed causal link documented or just postulated?
- Ask that critical terms and key concepts be defined operationally so that there can be consensus about their meanings.
- Consider first how to disprove a theory, hypothesis or belief before seeking confirming evidence, which is easy to find when you're looking for a justification.
- Always search for alternative explanations to the obvious ones proposed, especially when the explanations benefit the proposer.

- Recognize how personal biases can distort perceptions of reality.
- Be suspicious of simple answers to complex questions or single causes and cures for complex effects and problems.
- Question any statement about the effectiveness of some treatment, intervention or product by finding the comparative basis for the effect: you can always ask 'compared to what?'
- Be open-minded yet sceptical: recognize that most conclusions are tentative and not certain; seek new evidence that decreases your uncertainty while keeping yourself open to change and revision.
- Challenge authority that uses personal opinion in place of evidence for conclusions and is not open to constructive criticism.

We want you to apply open-minded scepticism while you read *Psychology and Life.* We don't want you to view your study of psychology as the acquisition of a list of facts. Instead, we hope you will participate in the joy of observing and discovering and putting ideas to the test.

A news interview with an expert may include misleading soundbites taken out of context or oversimplified 'nutshell' descriptions of research conclusions. How could you become a wiser consumer of media reports?
Source: Pearson Education Ltd/Jon Barlow.

Psychology in your life
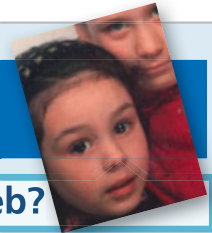
How can you evaluate psychological information on the web?

If you access the World Wide Web, you will discover a vast range of sites devoted to topics in psychology. For example, load the word *schizophrenia* (see Chapter 14) into your preferred search engine, and you will have access to millions of pages with that keyword. The challenge for all of us is to become wise consumers of all that information. How can you determine which information posted on the Web arises from legitimate sources and which does not?

In a physical library, it's much easier to determine the source of information. Most psychological research appears in *journals* that are published by organizations such as the British Psychological Society, American Psychological Association or the American Psychological Society. When research manuscripts are submitted to journals, they undergo *peer review*: Each manuscript is typically sent to two to five experts in the field. Those experts provide detailed analyses of the manuscript's rationale, methodology and results. Only when those experts have been sufficiently satisfied do manuscripts become journal articles. This is a rigorous process. For example, in 2005, journals published by the American Psychological Association

(2006) rejected, on average, 69 per cent of the manuscripts submitted to them. The process of peer review isn't perfect – no doubt some worthy research projects are overlooked and some uneven ones slip through – but, in general, this process ensures that the research you read in the vast majority of journals has met high standards.

In this context, it's easy to identify the problem with much of the information on the Web: you often can't tell who, if anyone, has evaluated the advice a webpage offers or the claims it makes. When you accept information from a webpage, you need to assure yourself that the source is legitimate. One good approach is to look for online versions of the journals available in the library. Also, look for the webpages researchers now often maintain that summarize their projects and list relevant publications. If the information you find on those or any other webpages interests you, try to find the references and publications they list. In general, you should have the greatest confidence in the information provided on a website when the authors of the site are able to point you toward the research sources for that information.

Recapping main points

The process of research

- In the initial phase of research, observations, beliefs, information and general knowledge lead to a new way of thinking about a phenomenon. The researcher formulates a theory and generates hypotheses to be tested.
- To test their ideas, researchers use the scientific method, a set of procedures for gathering and interpreting evidence in ways that limit errors.
- Researchers combat observer biases by standardizing procedures and using operational definitions.
- Experimental research methods determine whether causal relations exist between variables specified by the hypothesis being tested.
- Researchers rule out alternative explanations by using appropriate control procedures.
- Correlational research methods determine if and how much two variables are related. Correlations do not imply causation.

Psychological measurement

- Researchers strive to produce measures that are both reliable and valid.
- Psychological measurements include self-reports, behavioural measures and others, including fMRI.

Ethical issues in research

- Respect for the basic rights of human and animal research participants is the obligation of all researchers. A variety of safeguards have been enacted to guarantee ethical and humane treatment.

Becoming a wiser research consumer

- Becoming a wiser research consumer involves learning how to think critically and knowing how to evaluate claims about what research shows.

Practice tests

1. A(n) _____ is an organized set of concepts that explains a phenomenon or set of phenomena.
   a. theory
   b. hypothesis
   c. operational definition
   d. correlation

2. Professor Peterson is testing the hypothesis that people will cooperate less when a lot of people are in a group. In the experiment he plans, he will vary the number of people in each group. That will be his _____.
   a. placebo control
   b. independent variable
   c. double-blind control
   d. dependent variable

3. Rahul is serving as a research assistant. In the first phase of the experiment, Rahul gives each participant a can of cola or a can of caffeine-free cola. In the second phase of the experiment, Rahul times the participants with a stopwatch while they play a video game. It sounds like this study is lacking a(n) _____.
   a. placebo control
   b. correlational design
   c. operational definition
   d. double-blind control

4. Shirley visits an antique store. The owner explains to her that the smaller an object is, the more he can charge for it. This is an example of a _____.
   a. correlation coefficient
   b. negative correlation
   c. positive correlation
   d. placebo effect

5. Sally isn't very interested in movies. Her friend Rob wants to get her attitude to be more favourable toward his all-time favourite, *Rock 'n' Roll High School.* Rob might be best off asking Sally to generate _____ characteristics for the movie.
   a. two negative
   b. five positive
   c. 10 positive
   d. five negative

6. Dr Paul is developing a new measure of hunger. He says, 'I need a measure that will accurately predict how much food people will eat in their next meal'. Dr Paul's statement is about the _____ of the measure.
   a. operational definition
   b. standardization
   c. validity
   d. reliability

7. Giovanna is worried that the results of her experiment may be affected by her participants' desire to provide favourable impressions of themselves. It sounds like she might be using _____ measures.
   a. valid
   b. self-report
   c. reliable
   d. operational

8. Andrew wishes to test the hypothesis that people give more freely to charities when the weather is pleasant. To test this hypothesis, Andrew is likely to make use of _____.
   a. double-blind controls
   b. expectancy effects
   c. laboratory observation
   d. archival data

9. Before you participate in an experiment, the researcher should provide you with information about procedures, potential risks and expected benefits. This allows you to give _____.
   a. a risk/gain assessment
   b. informed debriefing
   c. informed consent
   d. operational definitions

10. When members of the American Psychological Association were surveyed about the uses of non-human animals in research, the majority believed that _____.
    a. observational studies in naturalistic settings were appropriate
    b. non-human animals should never be used as replacements for human participants
    c. intentional deception is unethical for experiments with non-human animals
    d. non-human animals should not be used in undergraduate psychology courses

11. Always search for _____ explanations to the obvious ones proposed.
    a. optimistic
    b. alternative
    c. negative
    d. opposite

12. When articles are submitted to most journals, they are sent out to experts for detailed analyses. This process is known as _____.
    a. debriefing
    b. informed consent
    c. peer review
    d. control procedures

Essay questions

1. Why is it so important that research procedures be open for public verifiability?

2. Suppose you wanted to measure 'happiness'. What might you do to assess the validity of your measure?

3. With respect to ethical principles, how are risks and gains defined in the context of psychological research?