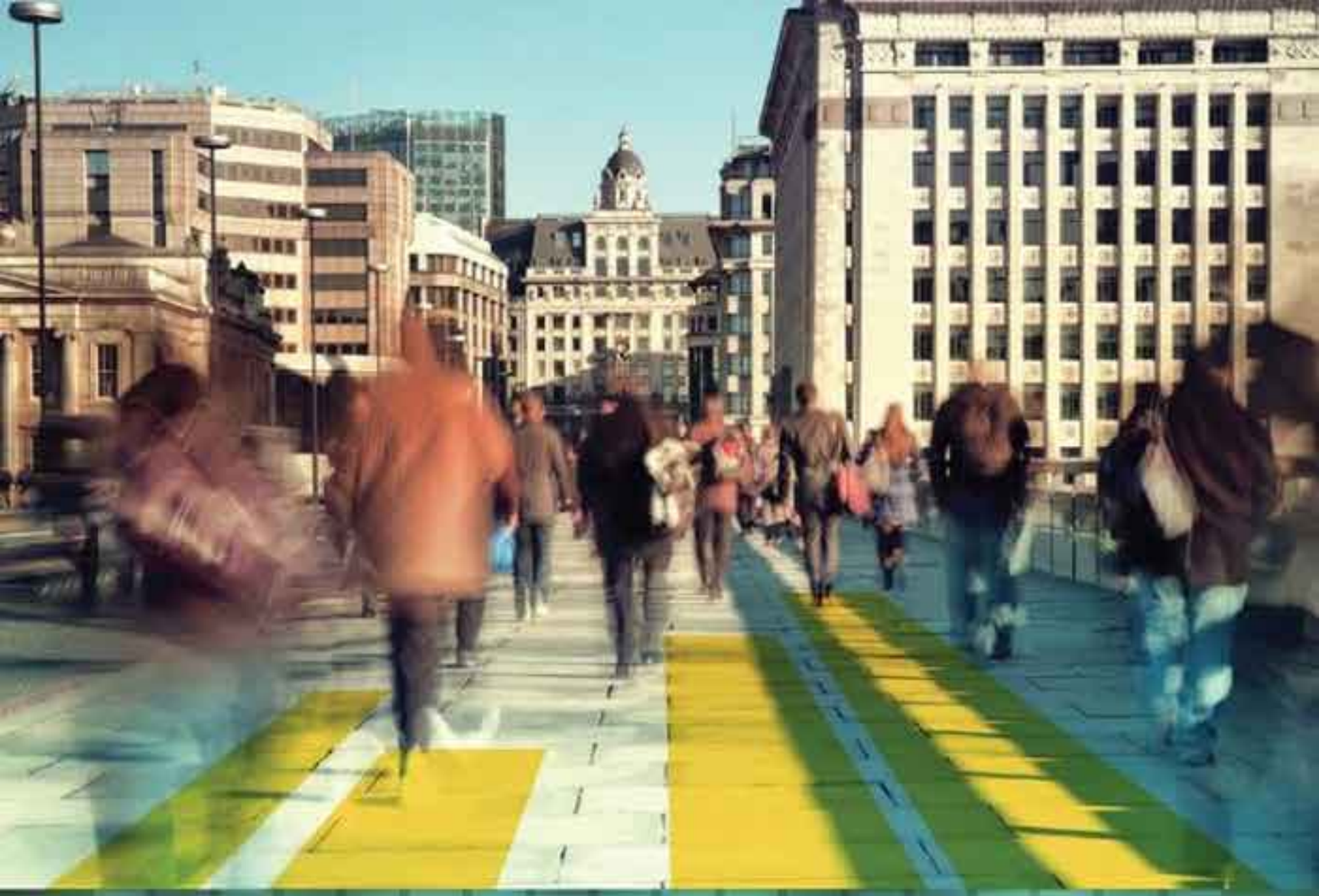

RESEARCH METHODS 5E

FOR THE BEHAVIORAL SCIENCES

CHARLES STANGOR

RESEARCH **METHODS** for the Behavioral Sciences

RESEARCH **METHODS** for the Behavioral Sciences

FIFTH EDITION

Charles Stangor
University of Maryland

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Preface

Research Methods for the Behavioral Sciences grew out of my perceived need for a textbook that covers a complete body of research approaches, is accessible for a first-year undergraduate methods or laboratory class, and yet is still detailed enough to serve as a reference book for students as they progress to higher-level courses. I think you will find this book to be easily understood by sophomores yet comprehensive enough to serve as a useful handbook for students working as research assistants or writing theses. Indeed, I use the textbook as a test for my graduate students—if they know everything in it, I can trust that they will be able to fully and adequately analyze their data or be able to realize what other information they might need to do so.

Furthermore, I wanted a book that is balanced in emphasis between conducting and consuming research. For the consumer of research, I have incorporated many sections and much pedagogy on how to draw inferences from existing research (see for instance the Research Project Ideas in Chapters 11, 12, and 14). I have devoted two full chapters to the essential topics of internal and external validity and have endeavored to use these chapters to help develop students' critical thinking and interpretive skills. But I have also filled the book with practical advice for students who are conducting their own research, including:

- "Goals of an ethical research project" in Chapter 3
- "Guide to improving the reliability and validity of questionnaires" in Chapter 5
- Sections in Chapter 12 concerned with designing valid and powerful experiments
- Appendix A on writing research reports
- The section on data preparation and analysis in Appendix B
- Appendix F on using computers to collect data

A number of examples of IBM Statistical Package for the Social Sciences (SPSS) printouts have been placed in the chapters, allowing students to see how the statistics look when they are initially computed.

I have placed as much emphasis on nonexperimental research methods as I have on experimental ones, arguing that all three research approaches—descriptive, correlational, and experimental—have unique strengths and weaknesses (see Table 1.3). Although the focus is primarily on quantitative

research, I have also pointed out the appropriate use of qualitative research, such as focus groups and case studies. I have devoted two full chapters (4 and 5) to the important concerns of creating measures and evaluating their effectiveness. My guess is that many of the students in this course will some day have to design a survey, and in order to do so they will have to know how to write effective, reliable, and valid items. Issues of measurement are frequently underdeveloped in research methods texts, and I have tried to correct this omission.

I believe that this book simultaneously serves the needs of even the most demanding instructor and yet can be enjoyed by students. I have tried to make it thorough, interesting, integrative, accessible, and to provide an effective pedagogy. From an instructor's perspective, I think this book will help students enjoy learning about research methods, understand them well, and think critically and creatively about research. From a student's perspective, the book is brief and succinct, concepts are easy to grasp, and there are several helpful examples. As one reviewer put it, "The book basically represents the most important concepts—what a student might highlight in a longer book."

Organization and Coverage

The book is divided into four sections. Part One covers the background of research.

Chapter 1 emphasizes the importance of research to citizens in contemporary society and the potential implications of using (or failing to use) research to make decisions. Chapter 2 explains how science is conducted—the scientific method and the use of the literature review to develop and refine the research hypothesis. Chapter 3 represents a broad overview of research ethics, including practical guides for conducting ethical research.

Part Two deals with measures and measurement. Chapter 4 teaches students how to develop both self-report and behavioral measures and reviews the strengths and weaknesses of each. Practical hints for constructing useful measures are given. Chapter 5 covers the important aspects of reliability and construct validity, and in more detail than any competing text. Chapter 6 presents the elements of surveys and sampling, and Chapter 7 introduces observational and archival methods. I have attempted to point out to students (and instructors might note this as well) that the methods covered in these chapters are both research designs (descriptive research) and also methods that can be used as measured variables in correlational and experimental research.

The chapters in Part Three present the basics of testing research hypotheses. Chapter 8 covers the principles of hypothesis testing and inferential statistics, while Chapters 9 and 10 cover the logic of correlational and experimental research, respectively. Chapter 9 includes sections on multiple regression, longitudinal designs, path analysis, and structural equation modeling.

Part Four considers the design and interpretation of complex experiments, including factorial experimental designs and means comparison tests (Chapter 11). Internal and external validity are covered in Chapters 12 and 13, respectively, and the Hands-On Experiences in these chapters provide a wealth of examples. Chapter 12 also gives practical advice for designing effective experiments. Chapter 14 reviews the strengths and difficulties of quasi-experimental research designs, with a focus on the many threats to internal validity that they contain and how these threats can be overcome.

The appendixes are designed to supplement the text. They can be assigned at any time during the course or used for reference afterward. Appendix A presents an overview of how scientists share their data with others, including a detailed description of how to write a research report following APA style. This appendix also includes an annotated example of a research report written in APA format. Appendixes B and C provide the formulas for most of the univariate statistical tests contained in an introductory statistics text. Appendix B also includes practical advice for analyzing data using computer software programs, along with many examples of IBM SPSS outputs. Students who are collecting and analyzing their own data should therefore find Appendix B extremely useful in helping them understand how to interpret their results. Appendix D summarizes the most commonly used multivariate research techniques, along with sample computer output. Although it is not likely that a first-year methods student will need to conduct a factor or structural equation analysis, these techniques are so common in contemporary research reports that students should have a place to go to learn the basics of such techniques, and accomplished students (for instance, those writing theses) should be able to learn how to conduct them if necessary.

Statistical Issues

I assume that most students who are taking a research methods or laboratory course are familiar with univariate statistical procedures, but I have designed this book to function effectively even for courses in which the students are not familiar with statistics. Although I cover many statistical issues in the book itself (Chapter 6, "Surveys and Sampling"; Chapter 8, "Hypothesis Testing and Inferential Statistics"; Chapter 9, "Correlational Research Designs"; and Chapters 10 and 11 on ANOVA), students who need a refresher can be directed to Appendixes B and C at any point in the semester. The text always references the Appendixes that cover the calculations of the statistics under discussion. The placement of all calculations in the Appendixes allows instructors to choose whether and when to assign this material. Because of the increasing importance of students' learning to use computers to conduct statistical analyses, Appendix B introduces this process, and Appendix F, "Using Computers to Collect Data," expands upon this topic. Many examples of computer output are presented in the text and in the Appendixes. The discussion is framed around SPSS—in my opinion the package with the most user-friendly platform.

Pedagogical Features

To promote mastery of the broad array of concepts, terms, and applications central to the research methods course, each chapter of the book includes both standard pedagogical elements and several unique features:

- A chapter outline provides a basic orientation to the chapter.
- Unique chapter-opening Study Questions help students learn to formulate appropriate questions about the topics that are to come before reading the chapter. Students can review these questions again when preparing for exams.

  A new feature, Thinking Critically About Research, provides students with critical thinking questions that they can use to improve their skills at critically evaluating research studies.
- Boldface Key Terms and an end-of-text Glossary are useful tools for learning and reviewing the vocabulary of the course.
- A chapter Summary highlights the key points of the chapter.
- Review and Discussion Questions help students assess their mastery of chapter concepts and provide productive points of departure for classroom discussion.
- Particularly useful Research Project Ideas supply a wealth of practical problems and exercises that complement and expand upon the examples given in the text.

New to This Edition

In addition to a number of updates, the fifth edition of *Research Methods for the Behavioral Sciences* has added a new feature, Thinking Critically About Research. These questions can be used as course assignments or as discussion topics to help students improve their skill at evidence-based reasoning, evaluating research studies, and discovering the limitations of empirical research.

Supplements to the Text

The following supplementary materials are available with *Research Methods for the Behavioral Sciences*. Contact your local Cengage Learning representative for more information.

For Instructors:

Instructor's Manual with Test Bank. Full answers to the Review and Discussion Questions and the Hands-On Experiences can be found in the

instructor's resource manual (written by the author). For the fifth edition, this resource has been revised to include Learning Objectives, a research paper checklist that can be distributed as an in-class handout, and additional chapter-by-chapter resources to enhance and facilitate learning.

Companion Website. Instructors will find content for each chapter including glossary, flash cards, multiple-choice quizzing, and more. www.cengagebrain.com

For Students:

***Using IBM SPSS® for Windows®*, Fourth Edition.** I have also written a manual called *Using IBM SPSS® for Windows®* that introduces students to the basics of IBM SPSS. This handbook, with step-by-step instructions, sample output, and student exercises based on data sets provided on CD-ROM, can be shrink-wrapped with the text. The fourth edition has been fully updated to reflect the current version of IBM SPSS software, including new screenshots, more practice exercises, and additional data sets.

IBM SPSS® for Windows® Software. The current student version of IBM SPSS software can be shrink-wrapped with the text and is available for sale to students whose schools don't license SPSS.

Companion Website. Students will find content for each chapter including glossary, flash cards, multiple-choice quizzing, and more. www.cengage.com/psychology/stangor

Acknowledgments

It is not possible for me to acknowledge all of the people who helped me write this book. The list would include my students, whose questions, comments, and complaints taught me how to better teach research methods, convinced me of the need for this book, and helped me make the book more useful. My wife, Leslie, supported me as only she can during and after the long hours in front of the word processor. I am grateful to those who gave me feedback and materials, including Lisa Aspinwall, Jude Cassidy, Jack Fyock, Paul Hanges, Madeline Heilman, Bill Hodos, John Jost, Dave Kenny, James Lange, and Gretchen Sechrist. I am particularly indebted to Jud Mills, who read just about every word at least once and who was my own best instructor in research methods. Thanks also to the Department of Psychology at the University of Maryland, to the members of the Society for Personality and Social Psychology, and to the editorial and production group at Cengage Learning, including Program Director Jon-David Hague and Outsource Development Coordinator Joshua Taylor.

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- Molly Wernli, College of Saint Mary
- Julie Carpenter, Paradise Valley Community College
- Melinda Myers, Humboldt State University

I am always interested in receiving comments from instructors and students. You can write to me at the Department of Psychology, University of Maryland, College Park, MD 20742 or contact me via e-mail: stangor@umd.edu. I hope you find this book useful and enjoyable.

PART **ONE**
Getting Started

CHAPTER ONE
Introduction to Research

Behavioral Research

Everyday Science Versus Empirical Research
Relying on Our Intuition
Discovering the Limitations of Using Intuition

The Scientific Method

Values Versus Facts in Scientific Research
Facts and the Formation of Values
Distinguishing Between Facts and Values
Values and Facts in the Research Report

Basic and Applied Research

The Importance of Studying Research Methods
Evaluating Research Reports
Conducting Research
Thinking Critically About Research

Research Designs: Three Approaches to Studying Behavior
Descriptive Research: Assessing the Current State of Affairs
Correlational Research: Seeking Relationships Among Variables
Experimental Research: Understanding the Causes of Behavior
The Selection of an Appropriate Method

Current Research in the Behavioral Sciences: Preferences for Brands That Contain the Letters of Our Own Name

Summary

Key Terms

Review and Discussion Questions

Thinking Critically About Research

Research Project Ideas

STUDY QUESTIONS

- What is behavioral research, and why is it conducted?
- What are the limitations of "everyday science" and intuition for understanding behavior?
- What is the scientific method, and why do scientists use it?
- What is the difference between a fact and a value, and how do a scientist's values influence his or her research?
- What are the goals of basic research and of applied research, and how do the two types of goals relate to each other?
- What are the goals of descriptive, correlational, and experimental research? What are the advantages and disadvantages of each research approach?
- What benefits are there to be gained from learning how to evaluate research, conduct it, and think critically about it?

Part of the excitement of contemporary life is observing the speed at which the world around us changes. It was only 100 years ago that people first flew in an airplane. Today, astronauts spend months at a time in space. It was only a little over 500 years ago that Johannes Gutenberg printed the first page of a book. Today, we read our textbooks on digital devices that store thousands of pages of text. A doctor who studied medicine 100 years ago learned that most diseases were incurable—medicine could hope only to make the remaining life of a patient more comfortable. Today, doctors routinely give people new life by replacing the coronary arteries of the heart and preventing the growth of tumors through the use of chemical and radiation treatments.

Yet, despite the benefits that technological change has brought, many of the problems facing humanity appear to be as great as ever. There are still many children, in all parts of the world, who are hungry and who do not have adequate housing or health care. Physical violence is prevalent, including child and spousal abuse, gang violence in cities, ethnic conflicts within nations, and terrorism. Divorce continues to have an impact on the lives of thousands of children, and people continue to expose themselves to deadly viruses such as acquired immune deficiency syndrome (AIDS), even when there are ways to avoid contracting these diseases. Although people now live longer and enjoy many of the comforts of technological achievement, the dramatic technological advances that have occurred over the past few decades have not generally been paralleled by advances in the quality of our interpersonal and social behavior.

It is this behavior, among both humans and animals, and the scientific research designed to study it that are the focus of this book. Indeed, the purpose of behavioral research is to increase our understanding of behavior and, where possible, to provide methods for improving the quality of our lives. The results of such research are becoming increasingly relevant to our perception of such human problems as homelessness, illiteracy, psychological disorders, family instability, and violence. Thus, it is not surprising that research is being used more and more frequently to help guide public policy. For instance, behavioral research has been used to guide court rulings on racism, such as in the landmark *Brown v. Board of Education* (1954), and sexism (Fiske, Bersoff, Borgida, Deaux, & Heilman, 1991), as well as on the use of lie detectors in criminal trials (Saxe, Dougherty, & Cross, 1985) and the effects of playing violent video games on aggressive behavior (DeLisi, Vaughn, Gentile, Anderson, & Shook, 2013). Behavioral research is also being used to help us understand which methods of educating children are most effective, and teachers are being trained to make use of the most effective techniques (Berliner & Calfee, 1996). The federal government has recently created a center at my university to study the behavioral aspects of terrorism.

Behavioral research also provides important information that complements other scientific approaches. For instance, in the field of medicine, infectious diseases such as measles and polio were once major causes of death. Today, people's own behavior is implicated in most of the leading killers, including homicide, lung cancer, heart disease, and AIDS. Furthermore, much of

the productive capability of modern societies is now dependent not only on further technological advances but also on the availability of an educated and skilled workforce.

In sum, behavioral research is used to study important human problems and provide solutions to them. Because research has such a significant impact on scientific decisions and public policy, informed citizens, like you, are wise to understand it.

Behavioral Research

Behavioral research is conducted by scientists in such fields as behavioral medicine, communication, criminology, human development, education, psychology, and sociology. The goal of **behavioral research** is to discover, among other things, how people perceive their world, how they think and feel, how they change over time, how they learn and make decisions, and how they interact with others. Behavioral scientists study behavior both because they want to understand it and because they want to contribute to creating solutions to the everyday problems that face human beings.

Of course, behavioral scientists aren't the only people who are concerned with human behavior or the only ones who propose solutions to social problems. Philosophers, religious leaders, and politicians, for instance, also attempt to provide explanations for social behavior. But what sets behavioral scientists apart from many other people who are concerned with human behavior is their belief that, just as dramatic technological advances have occurred through scientific research, personal and social behavior can be understood, and potentially improved, through the application of scientific research methods. In contrast to many statements made by philosophers, politicians, and religious leaders, which are based only on their own personal beliefs, faith, or intuition, the statements made by social scientists are **empirical,** which means that they are based on systematic collection and analysis of data, where **data** are information collected through formal observation or measurement.[1] Behavioral scientists draw their conclusions about human behavior from systematic collection and analysis of data.

Behavioral scientists believe that research is the best tool for understanding human beings and their relationships with others. For instance, rather than accepting the claim of a religious leader that the adoption of traditional religious beliefs will change behavior, a behavioral scientist would collect data to empirically test whether highly religious people are more helpful and less aggressive toward others than are less religious people. Rather than accepting a politician's contention that creating (or abandoning) a welfare program will

[1] Although the word *data* is technically a plural noun, scientists frequently treat it as a singular noun, and this practice is now accepted by linguists. Although it is thus correct to say either "the data were collected" or "the data was collected," this book uses the more traditional plural form.

improve the condition of poor people, a behavioral scientist would attempt to empirically assess the effects of receiving welfare on the quality of life of welfare recipients. And rather than relying on a school principal's beliefs about which teaching methods are most effective, behavioral scientists would systematically test and compare the effectiveness of different methods. In short, behavioral scientists believe in the value of scientific research to answer questions about human behavior.

The claim that human behavior is best known through the use of a scientific approach is not something that everyone believes or that is without controversy. I hope that you will become convinced of the utility of behavioral research for understanding people, but I also hope that you will learn to think critically about its value as you study this book. I hope that you will continually ask yourself what behavioral research methods offer in the way of understanding and improving our lives that other approaches do not. And I hope you will consider the limitations of behavioral research. And, most important, I hope that you will learn how to critically evaluate the strengths and weaknesses of behavioral research.

Although behavioral research is conducted in large part to provide information about important social problems and to further scientific understanding about the principles of human behavior, I also hope that you will find it interesting in its own right—you might even discover that conducting research is fun! If you have ever wondered about how we learn and why we forget, what dreams are for and whether they influence us when we are awake, whether we can tell if others are lying to us, or even whether some people have extrasensory perception, you will find that behavioral research is the best way to provide answers to these interesting questions. Studying behavioral research and conducting it yourself is exciting, because it allows you to discover and understand new things. In sum, I hope you will enjoy this book, both because you like behavioral research and because you realize that it has a significant impact on human behavior, scientific decisions, and public policy.

Everyday Science Versus Empirical Research

Just like scientists, most of us have an avid interest in asking and answering questions about our world. We want to know why things happen, when and if they are likely to happen again, and how to reproduce or change them. Such knowledge enables us to predict our own behavior and that of others. We even collect data to aid us in this undertaking. Indeed, it has been argued that people are "everyday scientists" who conduct research projects to answer questions about behavior (Manktelow, 2012; Nisbett & Ross, 1980). When we perform poorly on an important test, we try to understand what caused our failure to remember or understand the material and what might help us do better the next time. When our good friends Eva and Joshua break up, despite what appeared to have been a relationship made in heaven, we try to determine what happened. When we contemplate the rise of terrorist acts

around the world, we try to investigate the causes of this problem by looking at the people themselves, the situation around them, and the responses of others to them.

The results of these "everyday" research projects can teach us many principles of human behavior. We learn through experience that if we give someone bad news, she or he may blame us even though the news was not our fault. We learn that people may become depressed after they fail at a task. We see that aggressive behavior occurs frequently in our society, and we develop theories to explain why this is so. These insights are part and parcel of everyday social life. In fact, much behavioral research involves the scientific study of everyday behavior (Heider, 1958; Kelley, 1967).

Relying on Our Intuition

Many people believe that they can find answers to questions about human behavior by using their own intuition. They think that because they spend their whole lives with others, they should certainly have learned what makes people do what they do and why. As a result, many may believe that behavioral research is basically "common sense" and that, therefore, formal study of it is not necessary. Although there is no question that we do learn about other people by observing them, if our observations are conducted informally, they may lead us to draw unwarranted or incorrect conclusions. In fact, we are often incorrect in our intuition about why others do what they do and even (as Sigmund Freud so insightfully noted) why we ourselves do what we do!

The problem with the way people collect and interpret data in their everyday lives is that they are not always particularly thorough. Often, when one explanation for an event seems to make sense, we adopt that explanation as the truth even when other explanations are possible and potentially more accurate. To take a couple of examples, eyewitnesses to violent crimes are often extremely confident in their identifications of the perpetrators of these crimes. But evidence shows that eyewitnesses are no less confident of their identifications when they are incorrect than when they are correct (Lampinen, Neuschatz, & Cling, 2012). People also become convinced of the existence of extrasensory perception, or the predictive value of astrology, when there is no evidence for either. Accepting explanations without testing them thoroughly may lead people to think that they know things that they do not really know.

Behavioral scientists have also found that there are a variety of cognitive and motivational biases that frequently bias our perceptions and lead us to draw erroneous conclusions (Fiske & Taylor, 2007; Hsee & Hastie, 2006). As one example, the research by Brendl and his colleagues reported at the end of this chapter shows that people have a preference for the letters in their own name, even though it is unlikely that many people realize that they do. Because these biases occur out of our awareness, it is very difficult for us to correct for them.

Discovering the Limitations of Using Intuition

In one empirical demonstration of how difficult it can be to understand even our own behavior, Nisbett and Wilson (1977) had college students read a passage describing a woman who was applying for a job as a counselor in a crisis intervention center. Unknown to the students, the descriptions of the interview were varied so that different students read different information about what occurred during the interview. Some students read that the woman had superb academic credentials, whereas others did not learn this information. For some students the woman was described as having spilled a cup of coffee over the interviewer's desk during the interview, whereas for others no such event was mentioned. After reading the information, the students first judged the woman they had read about in terms of her suitability for the job on rating scales such as how much they liked her and how intelligent they thought she was. They also indicated how they thought each of the behaviors they had read about (for instance, being highly intelligent or spilling coffee over everything) influenced their judgments.

On the basis of these data, the researchers were able to determine how the woman's behaviors actually influenced the students' judgments of her. They found, for instance, that being described as having excellent academic credentials increased ratings of intelligence and that spilling coffee on the interviewer's desk actually *increased* how much the students liked her.[2] But, when the actual effects of the behaviors on the judgments were compared to the students' reports about how the behaviors influenced their judgments, the researchers found that the students were not always correct. Although the students were aware that information about strong academic credentials increased their judgments of intelligence, they had no idea that the applicant's having spilled coffee made them like her more.

Still another way that intuition may lead us astray is that, once we learn about the outcome of a given event (for instance, when we read about the results of a research project), we frequently believe that we would have been able to predict the outcome ahead of time. For instance, if half of a class of students is told that research concerning interpersonal attraction has demonstrated that "opposites attract" and the other half is told that research has demonstrated that "birds of a feather flock together," both sets of students will frequently report believing that they would have predicted this outcome before they read about it. The problem is that reading a description of the research finding leads us to think of the many cases that we know that support it and thus makes it seem believable. The tendency to think that we could have predicted something that we probably could not have predicted is called the **hindsight bias.**

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[2]A person who seems "too good to be true" on the surface can sometimes endear him- or herself to observers by accidentally making a small, humanizing mistake (such as spilling coffee). Such a blunder is known as a *pratfall*.

In sum, although intuition is useful for getting ideas, and although our intuitions are sometimes correct, they are not infallible. People's theories about how they make judgments do not always correspond well to how they actually make decisions. And because people believe that they would have predicted events that they would not have, research findings seem like they are just common sense. This does not mean that intuition is not important—scientists frequently rely on their intuition to help them solve problems. But, because they realize that this intuition is frequently unreliable, they always back up their intuition empirically. Behavioral scientists believe that, just as research into the nature of electrons and protons guided the development of the transistor, so behavioral research can help us understand the behavior of people in their everyday lives. And these scientists believe that collecting data will allow them to discover the determinants of behavior and use this knowledge productively.

The Scientific Method

All scientists (whether they are physicists, chemists, biologists, sociologists, or psychologists) are engaged in the basic processes of collecting and organizing data and drawing conclusions about those data. The methods used by scientists to do so have developed over many years and provide a basis for collecting, analyzing, and interpreting data within a common framework in which information can be shared. We can label the set of assumptions, rules, and procedures that scientists use to conduct research the **scientific method.** Indeed, the focus of this book is the use of the scientific method to study behavior.

In addition to requiring that science be empirical—based on observation or measurement of relevant information—the scientific method demands that the procedures used be **objective,** or free from the personal bias or emotions of the scientist. The scientific method prescribes how scientists collect and analyze data, how they draw conclusions from data, and how they share data with others. These rules increase objectivity by placing data under scrutiny by other scientists and even by the public at large. Because data are reported objectively, other scientists know exactly how the scientist collected and analyzed the data. This means that they do not have to rely only on the scientist's own interpretation of the data; they may also draw their own, potentially different, conclusions. Of course, we frequently trust scientists to draw their own conclusions about their data (after all, they are the experts), and we rely on their interpretations. However, when conclusions are made on the basis of empirical data, a knowledgeable person can check up on these interpretations should she or he desire to do so. This book will demonstrate how.

The scientific method also demands that science be based on what has come before it. As we will discuss in Chapter 13, most new research is designed to *replicate*—that is, to repeat, add to, or modify—previous research findings. The scientific method results in an *accumulation* of scientific knowledge, through the reporting of research and the addition to and modifications of these reported findings through further research by other scientists.

Values Versus Facts in Scientific Research

Although scientific research is an important method of studying human behavior, not all questions can be answered using scientific approaches. Statements that cannot be objectively measured or objectively determined to be true or false are not within the domain of scientific inquiry. Scientists, therefore, draw a distinction between values and facts. **Values** are personal statements such as "Abortion should not be permitted in this country," "I will go to heaven when I die," or "It is important to study behavioral research." **Facts** are objective statements determined to be accurate through empirical study. Examples are "There were over 16,000 homicides in the United States in 2002" and "Behavioral research demonstrates that individuals who are exposed to highly stressful situations over long periods of time are particularly likely to develop health problems such as heart disease and cancer."

Facts and the Formation of Values

Because values cannot be considered to be either true or false, science cannot prove or disprove them. Nevertheless, as shown in Table 1.1, behavioral research can sometimes provide facts that can help people develop their values. For instance, science may be able to objectively measure the impact of unwanted children on a society or the psychological trauma suffered by women who have abortions. The effect of capital punishment on the crime rate in the United States may also be determinable. This factual information can and should be made available to help people formulate their values about abortion and capital punishment, as well as to enable governments to articulate appropriate policies. Values also frequently come into play in determining what research is appropriate or important to conduct. For instance, the U.S. government has recently supported and provided funding for research on HIV and AIDS while at the same time limiting the possibility of conducting research using human stem cells.

TABLE 1.1 Examples of Values and Facts in Scientific Research

Personal Value	Scientific Fact
Welfare payments should be reduced for unmarried parents.	The U.S. government paid over $21 billion in unemployment insurance in 2002.
Handguns should be outlawed.	There were over 30,000 deaths caused by handguns in the United States in 2002.
Blue is my favorite color.	Over 35 percent of college students indicate that blue is their favorite color.
It is important to quit smoking.	Smoking increases the incidence of cancer and heart disease.