APPROACHES TO SOCIAL RESEARCH

SIXTH EDITION

ROYCE A. SINGLETON, JR. | BRUCE C. STRAITS

OXFORD
UNIVERSITY PRESS

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New York Oxford
OXFORD UNIVERSITY PRESS

Oxford University Press is a department of the University of Oxford. It furthers the University's objective of excellence in research, scholarship, and education by publishing worldwide. Oxford is a registered trade mark of Oxford University Press in the UK and certain other countries.

Published in the United States of America by Oxford University Press
198 Madison Avenue, New York, NY 10016, United States of America.

For titles covered by Section 112 of the US Higher Education Opportunity Act, please visit www.oup.com/us/he for the latest information about pricing and alternate formats.

Library of Congress Cataloging-in-Publication Data

Names: Singleton, Royce, author. | Straits, Bruce C., author.
Title: Approaches to social research / Royce A. Singleton, Jr., College of the Holy Cross, Bruce C. Straits, University of California, Santa Barbara.
Description: Sixth edition. | New York : Oxford University Press, 2017. | Includes bibliographical references and index.
Identifiers: LCCN 2017007201 | ISBN 9780190614249 (hardcover : alk. paper)
Subjects: LCSH: Social sciences—Research. | Social sciences—Methodology.
Classification: LCC H62 .S4776 2017 | DDC 300.72—dc23
LC record available at https://lccn.loc.gov/2017007201

Printing number: 9 8 7 6 5 4 3 2 1

Printed by Edward Brothers Malloy, United States of America

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Preface

To the Student

Of all the courses we have taught, none is more important than research methods. Methodology is the heart of the social sciences; more than anything else, it is what distinguishes social science from journalism and social commentary, from the humanities and natural sciences. Understanding social research methods, therefore, should give you a better sense of sociology and related disciplines and of exactly what it is that social scientists do. To facilitate your understanding, in this book we have described an abundance of actual research studies that cover the full range of social science disciplines.

Besides deepening your understanding of social science, a knowledge of social research is essential for making informed decisions about our daily lives. Social scientific methods and findings influence us in numerous ways. Many government social programs are shaped and evaluated by social research; businesses constantly rely on consumer research for key marketing and management decisions; the popular press daily reports research findings on the most personal aspects of people's lives—from altruism to zero population growth. One of the goals of this book is to help you understand the logic and limitations of social research so that you can evaluate it effectively.

Finally, the study of social research methods should not only sharpen your powers of critical thinking but also enable you to become a more intelligent gatherer of information. Social research consists of activities and ways of thinking in which everyone frequently and profitably can engage. Realizing that most readers will not become social scientists, we have linked many topics to familiar subjects and frames of reference so that you can see how broadly social research may be applied.

The book is organized in four sections. Part I describes the scientific foundations of social research (Chapter 2) and the ethical issues that arise (Chapter 3). Thereafter, the organization generally follows the process of conducting research. Part II introduces the basic terminology of social research (Chapter 4) and then examines two key considerations in planning or designing a study: measurement (Chapter 5) and sampling (Chapter 6). Part III, on data collection, examines the four basic approaches to social research: experiments, surveys, field research, and the use of available data. The four main chapters (Chapters 7, 9, 11, and 12) describe the distinctive process of executing a study with each approach; two other chapters (Chapters 8 and 10) discuss technical features of experiments and surveys; and the last two chapters in this section present strategies for combining methods and approaches (Chapter 13) and for applying research methods to the evaluation of social programs and interventions (Chapter 14). Part IV deals broadly with the interpretation phase of research. Here we discuss data processing and elementary data analysis (Chapter 15) and more advanced, multivariate analysis (Chapter 16), as well as the writing of research reports (Chapter 17).

The book has several special features. Key terms are in boldface type when they first appear in the text and are also listed at the end of each chapter. If you are unsure of the meaning of a term introduced earlier in the text, you can refer to the comprehensive glossary in the back of the book. Main ideas are highlighted in two ways: key points are offset throughout the text, and each chapter ends with a summary. To test your understanding and ability to apply what you have learned, each chapter also contains a set of practical exercises. Finally, boxes are inserted to complement and expand the text; these boxes present interesting research examples, provide additional aids to learning, or discuss the historical, social, and political contexts of research.

As a further aid, we have constructed a companion website for this textbook (www.oup.com/us/singleton-approaches) designed for students at all levels of learning. The site posts the glossary of terms. For each chapter the site also contains the following:

- Answers to selected textbook exercises
- True–false and matching quizzes
- An annotated list of Web resources

To the Instructor

This book has several distinguishing features. First, it is neither a cookbook for conducting social research nor a treatise on epistemology. Rather, we have attempted to strike a balance between the "how to" of research methods (providing information for conducting research) and the "wherefore" (teaching critical analytical skills for reading and evaluating research). Chapter exercises reflect this dual purpose. Some exercises ask students to carry out their own research; others ask them to read and think critically about specific articles reporting empirical studies.

Second, recognizing the broad audience for social research methods, we discuss dozens of actual studies drawn from sociology, social psychology, communications, demography,

history, education, and political science. Many of these studies are classics, and others are very recent; all are carefully chosen to heighten students' interest.

Third, in contrast to many methods books these days, we do not endorse the postmodernist critique of sociology as a science. In Chapter 2 we discuss the growth of "qualitative research" in the late twentieth century and its challenges to a natural science model of social scientific inquiry. But otherwise, we do not make a distinction between so-called qualitative and quantitative methods. Instead, we assume that all social research is driven by the same search for understanding, operates from similar epistemological bases, and addresses similar methodological concerns regarding reliability, validity, and generalizability. Major differences among research methods reside in general research strategies. Therefore, this book focuses on the four basic approaches to social research: experimentation, survey research, field research, and the use of available data. We discuss the advantages and disadvantages of each approach, treat the approaches as complementary rather than mutually exclusive, and ultimately advocate a multiple-methods strategy.

Focusing on overall approaches to conducting social research has several pedagogical advantages. First, it enables readers to see each approach not as a method of data collection per se, divorced from research design and analysis, but as a fundamental choice that affects the entire research process. Other methods books tend to separate issues of design and data collection or discuss certain design issues only in relation to specific approaches. For example, sampling techniques are described as survey methods, or measurement is described merely in terms of self-report questionnaire items. However, because measurement and sampling must be addressed in all research, we discuss these issues in relation to each basic approach. Second, a reader's sense of both the logic and the mechanics of doing research is enhanced by understanding the unique process of executing a study with each approach. Unlike the present text, other methods texts disregard the field administration phase of survey research, limiting the discussion to sampling and/or questionnaire design. Similarly, other texts discuss experiments merely in terms of experimental design without describing their basic parts or staging. A focus on the basic approaches, we believe, gives readers a better sense of the integrity of social research and a greater appreciation for both its power and its limitations.

Teaching research methods is challenging. The challenges lie in doing justice to the complexities of research, in going beyond the simplest techniques to provide enough information for readers to become intelligent consumers of research, in developing an understanding not only of each individual stage of research but also of the interrelatedness of all phases, and in presenting information about the "nuts and bolts" of research (e.g., how to draw a sample and how to code data) while not losing sight of the logic of inquiry or the overall research process. Much of what researchers do is informed by their understanding of the entire research process so that elements of research design are dictated by a knowledge of the means of data collection and analysis. Thus, researchers precode questionnaires to facilitate data processing, and in anticipation of multivariate analysis, they include seemingly irrelevant background items in a questionnaire. Getting students to comprehend the overall process is perhaps our greatest challenge, and we believe that this challenge is best met by focusing on basic approaches to social research.

Aside from our emphasis on the four major approaches, we cover essentially the same topics in most other methods texts in approximately the same sequence. We tell students what makes social research scientific, discuss ethical considerations, introduce basic terminology, and then provide chapters on measurement, sampling, the major methods of data collection (i.e., the four approaches), data analysis, and report writing. Unlike some other texts, we also provide extended treatments of experimental designs, survey pretesting and field administration, multiple methods (triangulation), and evaluation research.

Because we subsume methods of data collection under the four approaches, we do not have separate chapters on quasi-experimental research, which we discuss in relation to experimental design (Chapter 8) and evaluation research (Chapter 14); on observational methods, which we cover in our discussion of field research (Chapter 11); and on historical document research and content analysis, which we include in the general strategy of using available data (Chapter 12). Rather than present largely outdated material, we have chosen not to devote a full chapter to index and scale construction. Instead, we discuss technical aspects of scaling relatively briefly in connection with multiple methods (Chapter 13). In general, we have tried to present current methodology in ways that complement modern statistical approaches to measurement, sampling, and data analysis. And, in a similar fashion, our presentation of data analysis emphasizes consumption and understanding rather than the production of statistical analysis.

Advanced topics are included but may be skipped without any loss of continuity. This provides considerable flexibility in using the text, allowing instructors to adopt it for either a one- or a two-term course, for a lower- or an upper-level undergraduate course, or for a graduate course. One can skip Chapter 2 and/or 3 and go directly from Chapter 1 to Chapter 4. Other advanced chapters are 8 and 10, in which we discuss technical design issues related to experimentation and survey research, respectively. For instructors who want to examine the logic of experimental design, Chapter 8 introduces sources of invalidity and basic true, factorial, and quasi-experimental designs. For instructors who emphasize survey research and have students collect data, we have found Chapter 10 on survey instrumentation to be effective in preparing students to design their own questionnaires. Another option for undergraduate courses is to assign Chapters 8 and 10, but omit the more technical end sections on quasi-experimental designs and survey pretesting, respectively. Chapter 13 on multiple methods, Chapter 14 on evaluation research, and especially Chapter 16 on multivariate analysis also are advanced. Instructors teaching one-term courses may easily skip all or portions of the more advanced chapters.

To further serve instructors' needs, the Ancillary Resource Center at arc2.oup-arc.com/ provides a variety of resources, prepared by Royce Singleton. These include (1) lecture, discussion, and exercise ideas, (2) an annotated list of Web resources (with URLs), (3) answers to textbook exercises, and (4) test items for each chapter. The student companion website also contains two sets of quizzes. We welcome comments and suggestions for further improving the book and making it better serve your needs. Just send a message to either of our e-mail addresses: rsinglet@holycross.edu or straits@soc.ucsb.edu.

The Sixth Edition

Although *Approaches to Social Research* contains the same chapters and pedagogical approach as the previous edition, we have revised the book extensively to enhance its value. To give you an idea of how extensive the changes are, let us first consider the revision by the numbers. The sixth edition

- contains 184 new references, with an average publication date of 2007;
- deletes 75 references from the previous edition, which had an average publication date of 1987;
- introduces 22 new research examples, 15 of which replace dated examples from previous editions;
- updates the data presented in 10 tables and 1 figure; and
- adds 11 new key terms.

Many of the changes we made are subtle but important. This includes editing every chapter to improve the clarity and flow of the text, replacing dated everyday examples, presenting the latest data where appropriate, and referencing the latest editions of key sources. Other changes are more substantive. Three chapters (Chapters 3, 11, and 14) were thoroughly revised. In Chapter 3, we added a discussion of the Tuskegee Syphilis Study and revised and expanded discussions of informed consent, deception, confidentiality, and values in social research. As part of our reorganization of Chapter 11, we expanded our discussion of features of field research. And in Chapter 14, we introduced a new core research example that has been integrated throughout our discussion of evaluation research.

Other substantive changes include the following:

New sections and subsections within chapters. In Chapter 2, we expanded the discussion of critiques of science to include qualitative researchers' epistemological challenges to a natural science model of social "science." In Chapter 3, we extended the section on values in social science by adding a subsection, "Managing Personal Values," in which we present an analysis of studies on the effects of homosexual versus heterosexual parenting. We also added new sections: "Big Data" in Chapter 12 and "Publishing a Research Paper" in Chapter 17.

Chapter reorganizations. To achieve consistency in our coverage of the basic approaches to social research, we moved discussions of uses and limitations of surveys (Chapter 9), field research (Chapter 11), and available-data research (Chapter 12) to the end of the respective chapters. Now all three chapters begin with a description of key features, move on to a discussion of the stages in carrying out the approach, and conclude by outlining strengths and limitations.

New interesting and rigorous examples of social research. From the first edition, an important feature of *Approaches* has been the use of diverse empirical studies, carefully chosen as rigorous examples of social research that students would find interesting and relevant to their lives. Therefore, in every edition, we have added new studies and replaced studies on less current topics or on topics unfamiliar to young readers. Among the nearly two dozen new empirical studies introduced in this edition are an audit study of job discrimination against

gay men, a content analysis of changes in parental role portrayals in children's picture books, field research on the help-seeking behavior of children in elementary schools, an evaluation study of the Gang Resistance Education and Training program, and a quantitative (path) analysis of the effects of alcohol consumption and sleep on academic performance.

We trust that these changes have improved the book, providing an ever more accessible introduction that presents the latest developments in methodology.

Acknowledgments

Approaches to Social Research has unfolded over a period of nearly 40 years. During that time we have benefited greatly from the comments of numerous persons. Although it is impossible at this point to list everyone to whom we are indebted, several individuals deserve special mention. Ron McAllister, provost emeritus of Elizabethtown College, initiated the project and coauthored the first edition. Margaret Miller Clark, another former coauthor, also made major contributions to the first edition. Many of our students and colleagues at Holy Cross and the University of California, Santa Barbara, have provided inspiration and ideas. For this edition, we benefited greatly from our collaboration with Jeff Dixon of Holy Cross, our coauthor of *The Process of Social Research*, which was a source of several ideas for revising *Approaches*.

Over the years, we have received many helpful suggestions from instructors and scholars of research methods. Beginning with the fourth edition, revisions in our description of the General Social Survey were based on feedback from Tom W. Smith of the National Opinion Research Center. Three instructors reviewed the book for the fourth edition: Ed Hackett of Arizona State University, Megan Sweeney of the University of California, Los Angeles, and Michael Turner of the University of North Carolina at Charlotte. Four reviewers helped us as we prepared to write the fifth edition: Stephanie Bohon, University of Tennessee; Kristen Harknett, University of Pennsylvania; Kathleen Warberg, Wittenberg University; and Ken Watkins, University of South Carolina.

Finally, we thank the reviewers for the sixth and current edition:

Emily Barman, Boston University;
Kebba Darboe, Minnesota State University-Mankato;
Barbara Hart, University of Texas at Tyler;
Lindsey A. Harvell, James Madison University;
Terrence D. Hill, University of Arizona;
Nalin Johri, Seton Hall University;
Hisako Matsuo, Saint Louis University;
Jonathan Matusitz, University of Central Florida;
Zachary Neal, Michigan State University;
Jason Rodriquez, University of Massachusetts-Boston;
Erin Ruel, Georgia State University;
Yvonne Vissing, Salem State University.

Approaches to Social Research

1

Introduction

Social research consists of the process of formulating and seeking answers to questions about the social world. Consider some of the questions investigated in studies reported in this book.

- Recent studies indicate that high school athletes generally receive higher grades and test scores than do nonathletes. Beckett Broh (2002) asked why. Does this finding validate the conventional wisdom that sports participation teaches discipline, perseverance, and a strong work ethic, which promote academic achievement? Or does sports participation benefit athletes' social networks, placing them in a peer group of academically oriented high achievers or helping to establish relations among parents and teachers that facilitate and encourage achievement?
- Bibb Latané and John Darley (1970) speculated about why 38 people in Queens, New York, watching the brutal attack of a woman from their apartment windows, failed to come to her aid in time to save her life. Was it the general apathy of people in modern, urban environments, as many experts claimed? Or was there something about the situation that inhibited people from helping? Why do bystanders sometimes fail to aid people immediately in a crisis situation?
- The outcome of presidential elections, many campaigners now believe, depends on which party has the superior grassroots organization or "ground game" for getting out the vote. Until recently, however, little was known about how best to mobilize turnout. Then, Donald Green and Alan Gerber (2008) asked, Which is most effective and cost-efficient: personal canvassing, telephone calls, or direct-mail appeals?

- As the number of homeless people on the streets of U.S. cities increased visibly in the early 1980s, interest in the problem of homelessness grew. Peter Rossi (1989) asked, What is the extent of the problem—that is, how many homeless individuals are there—and what forces increased the number of homeless in the 1980s? David Snow and Leon Anderson (1993) wondered how the homeless lived. What were their daily lives like? What sort of material, interpersonal, and psychological strategies helped them to survive?
- The famous witchcraft hysteria that swept through Salem, Massachusetts, in 1692 has interested writers, historians, and other social scientists for many years. Kai Erikson (1966) wondered whether the crime wave was consistent with the sociologist Emile Durkheim's theory on the relationship between deviance and social order. Did the community response to deviance demonstrate shared values and enhance community solidarity?
- Since the late twentieth century there has been considerable debate regarding the proper police response to misdemeanor domestic assaults. Should police end the dispute by asking one of the parties to leave the premises? Should they attempt to mediate to de-escalate the conflict? Or should they arrest the assailant? Feminists have pressed for more arrests. But Lawrence Sherman and Richard Berk (1984) wondered whether this was the best policy. More generally, they pondered the effects of punishment on behavior. Will punishment, such as an arrest, deter an individual from repeating the crime? Or will punishment make individuals more likely to commit crimes?

To answer such questions, social scientists have devised basic guidelines, principles, and techniques. The purpose of this book is to introduce you to these "methods" as they are applied in the social sciences. As you will see, however, the research process is much more broadly applicable. The methods of social research can be applied to investigate any curiosity, and our understanding of them can make us smarter consumers, better informed voters, and better students. Let's begin by considering the value of studying research methods.

Why Study Research Methods?

The "why study" question may be asked more often about research methods than about any other area of study in the social sciences. Often, we hear students say, "I don't intend to go to graduate school. And I don't intend to do research. Why do I need to study ('suffer through') methods?" The irony in such a statement is that, beyond providing a foundation of knowledge for those who do become social scientists, the study of research methods may provide more immediate and useful information than any other single course of study. A knowledge of methods can benefit you as both a consumer and a producer of research evidence.

Consuming Research Evidence

You may be a consumer of research in several positions: as a student reading research reports and journal articles to satisfy your curiosity or to meet course requirements and write term

papers; as a social worker, educator, librarian, journalist, manager, or other professional keeping up to date in your field and acquiring knowledge to guide you in making decisions; or as an average citizen attempting to deal with the varied claims that are purported to be based on research. To make intelligent decisions about much day-to-day information, you must be able to understand and evaluate it. It is unfortunately true that much research evidence reported in professional journals as well as in newspapers and on television either is itself in error or is misinterpreted. Let us consider some of the kinds of misinformation to which you are likely to be exposed.

In April 2009, Aryn Karpinski (2009a), a graduate student at Ohio State, presented a research paper at a professional meeting in which she reported that students who use Facebook have lower grades than those who do not. Karpinski's study generated a media frenzy, triggering such headlines as "Sad but true: Using Facebook can lower your GPA" and "Facebook dumbs you down." Although they are attention grabbing, these headlines are misleading. To conclude from this type of study that being on Facebook *causes* bad grades violates a cardinal principle of social research: A relationship between two phenomena does not mean that one thing caused the other. In fact, Karpinski (2009b) herself was careful to note this limitation: Her study merely showed an *association* between using Facebook and grades; it did not demonstrate that using Facebook *causes* one's grades to drop. An equally likely interpretation is that receiving bad grades leads you to become a Facebook user. Still another possibility is that there is no causal link between Facebook and grades. Facebook use may be a symptom of procrastination. Or, the association could be due to a common factor, such as a student's major. For example, critics of Karpinski's study pointed out that science majors, who were more likely to use Facebook than humanities and social science majors, also may tend to get lower grades, perhaps because of more stringent grading standards in the sciences (Pasek, more, and Hargittai, 2009). Studying research methods will enable you to apply this reasoning as well as identify other limitations of reported research.

A knowledge of research methods also can make you aware of the mischievous use of research evidence by advertisers. For example, how seriously should we take the television pitch that "75 percent of doctors interviewed prescribed drug X for relief of arthritic pain?" Among the questions that a careful researcher could raise about this "fact" are these:

1. How many doctors were interviewed? (The 75 percent statistic could be based on as few as four interviews.)
2. What were the doctors asked about their prescription of drug X? (If they were asked, "Have you ever prescribed drug X?" they may be just as likely to have prescribed drugs A, B, C, and D as well.)
3. Who interviewed the doctors? (If the manufacturers of drug X did the interviewing, then they may have influenced, wittingly or unwittingly, the doctors to favor their product.)

Advertisers are not the only source of misleading information. Another culprit is self-selected opinion surveys. To make money, attract new customers, and increase reader

or viewer involvement, the media frequently conduct mail-in and call-in polls (Crossen, 1994:123). For example, in April 1993 *Parade Magazine* invited its readers to voice their opinions about crime in America by calling a 900 number (*Parade Magazine*, 1993). In all, 15,028 readers took up the invitation, paying a nominal fee to call in. Some 38 percent ("more than a third of Americans," according to *Parade*) said that they did not feel safe in their homes, 35 percent did not think the police were doing a good job, 81 percent did not have faith in the legal system, and 85 percent supported the death penalty. Although *Parade* noted that the results were based on a call-in survey, the magazine also implied that the results were representative of U.S. public opinion. But how representative is this sample? Because it was not randomly selected, the sample is not representative of any population other than the 15,028 callers. As a source of information about public opinion, therefore, it is worthless. Indeed, social scientists have derived the acronym SLOP to describe self-selected listener or reader opinion polls. It seems plausible that *Parade*'s callers would tend to be more concerned about the problem of crime than the average U.S. resident. On at least two issues, data from random samples of the U.S. adult population support this conclusion: In 1992, 11 percent, compared with 38 percent in the *Parade* poll, did not feel safe and secure in their homes (Warr, 1995:305); and in 1993, 72 percent, as opposed to 85 percent in the *Parade* survey, supported the death penalty (T. W. Smith, Marsden, and Hout, 2016).

Because social science findings are reported in the media every day, we can scarcely avoid being consumers of social research evidence. Yet, as the above examples illustrate, we cannot assume automatically that conclusions based on statistical evidence from purported scientific studies are credible. It is therefore important to be able to make judgments about the quality of the data and the limits of the conclusions that might be drawn. As every good social scientist knows, research findings must be interpreted and applied with great care. Whether you are in a position where you need to know the policy implications of research findings or you are simply an ordinary citizen wanting to be better informed about such findings, the study of research methods can help you develop the ability to understand and evaluate the validity and limits of social scientific knowledge.

Producing Research Evidence

In addition to being consumers, we are gatherers and producers of research evidence. We manufacture evidence every time we seek out others' opinions about an issue, attempt to estimate the prevailing opinion within a particular group, or draw conclusions about persons and events on the basis of our own observations. As a producer of information, in this introduction to social research you will find principles and techniques that can be applied at levels of sophistication ranging from casual observation to the conduct of small-scale research projects.

Suppose you are trying to decide whether to take a course from professor X or professor Y. Gathering evidence to help you decide, you solicit opinions about the professors from fellow students. A knowledge of research principles not only could increase your awareness of the limitations in this approach but also could facilitate the collection of more trustworthy information. Research principles suggest, for example, that the trustworthiness of your information will depend on (1) the number of opinions solicited, (2) the consistency

of those opinions, (3) whether informants' opinions are formed and solicited independent of one another, and (4) how questions are posed when asking for opinions about professors X and Y.

At a less mundane level, a knowledge of research techniques is essential for nonscientists who must acquire reliable information about a particular group. This occurs more often than you might think. For example, politicians often need to determine what their constituents think about an important legislative issue; corporate executives may need information about their clients' or employees' reactions to proposed policy changes; journalists may want to know something about the makeup of their newspaper's or magazine's readership or may want to determine a community's attitude toward certain services or policies as part of a story they are preparing; students may want to collect data about student body behaviors or opinions as part of a term project or student newspaper article. None of these endeavors entails the kind of massive research effort that would require expert researchers and statisticians. Yet each endeavor calls for the systematic collection of information, which is precisely what research methods are all about.

Methodological Approaches to the Social World

As our opening set of questions reveals, the topics of social research range broadly. In fact, whether a topic or research question is a legitimate object of social research hinges on two obvious criteria. First, the topic must concern *social* phenomena. This means that the research subject involves people—how they act, think, and feel and how they interact with one another. It looks also at the groups that people form (from bowling clubs to leagues of nations), at relations within and among such groups, and at how the groups adapt to changes in society. Second, because social research is *scientific*, it must be possible to address the topic or answer the question by making appropriate observations. In Chapter 2, on the nature of science, we distinguish scientific from nonscientific questions as we discuss the similarities among all fields of scientific inquiry. Then, in the remainder of the book, we concern ourselves with research as it is practiced in such fields as anthropology, communications, economics, education, history, political science, psychology, and sociology.

Among these disciplines there are four principal research strategies for understanding the social world: experiments, surveys, field research, and the use of available data. Each discipline tends to favor one particular strategy. For example, psychologists typically conduct experiments, sociologists most often do survey research, anthropologists characteristically conduct field research, and historians tend to make use of available data. However, all four strategies are important to the world of social research because any of the four can be used to study most social science topics. In fact, one of the early tasks of researchers is to decide which approach or approaches to take.

A discussion of the four basic strategies or approaches to social research comprises the central core of this book (see Chapters 7–12). As each strategy is discussed, you will see that each has certain strengths and weaknesses that make a researcher favor one or another in different situations. Sometimes one strategy may not be feasible for ethical

reasons (see Chapter 3). Sometimes an approach will be ruled out because of constraints of time, personnel, space, or some other resource. Furthermore, many researchers argue, as we do in Chapter 13, that it is best, whenever feasible, to study a given problem with a variety of methods so that the weaknesses of one strategy may be canceled out by the strengths of another. But it is often possible to study a social science topic using any one of the four basic research strategies. To demonstrate this, we will consider the topic of altruism.

Some Preliminary Research Questions

Although altruism has been most intensively investigated during the past 50 years, its study is almost as old as social science itself. The man who coined the word "sociology," Auguste Comte, also introduced the term "altruism" more than 150 years ago. Comte thought of altruism as a sympathetic instinct or motive, in contrast to the egoistic motive of self-interest. Today, popular usage of the term still resembles his original concept. Here, for example, is one dictionary definition:

> **al-tru-ism** (al'troo iz em), *n*: 1. Unselfish concern for the welfare of others . . . opposed to *egoism*. (*Webster's New World College Dictionary*, fourth edition, 2008)

Let us suppose that you are interested in the subject of altruism. As a social scientist, your special interest is in understanding altruism as a social phenomenon: What are the patterns of altruism? When, where, and how is it likely to occur? Why are people altruistic? These are the sort of grand questions that motivate all scientific inquiry. To begin your study of altruism, however, you would need to formulate questions that narrow the topic, reducing these original grand questions to manageable proportions. For example, instead of asking, What explains altruism?, suppose you ask, Does urban crowding inhibit people's willingness to help others? Are people more likely to help others who are similar to them? Will first-aid training increase the likelihood that someone will help another in an emergency? How does a person's emotional mood influence his or her willingness to help? What is the family background of committed altruists? These are narrow, specific, and consequently *answerable* research questions.

There are a limitless variety of interesting and worthwhile questions that might be investigated. In Chapters 2 and 4 we will consider the form of scientifically meaningful questions. Researchable questions derive from various sources: a researcher's personal values and goals, intuition, observation of dramatic events, and the current state of scientific knowledge. Eventually, your questions would be refined on the basis of a thorough review of the relevant social science literature. Here is where you would establish the theoretical and practical relevance of the research question. Here also is where you would begin to grapple with several preliminary methodological issues that will shape your study.

One of the most important issues involves the process of definition. As it turns out, dictionary definitions are not satisfactory for research purposes. A dictionary would not be helpful in distinguishing between altruism and similar concepts such as "empathy" or "helping," nor would it tell you how and where to observe instances of altruism. Your literature review would thus be important in revealing how other researchers have defined

altruism conceptually and identified it empirically. A thorough review is likely to identify the following citation:

> Dovidio, John F., Jane Allyn Piliavin, David A. Schroeder, and Louis A. Penner. *The Social Psychology of Prosocial Behavior.* Mahwah, NJ: Lawrence Erlbaum, 2006.

Reading this book would reveal that it provides a comprehensive review of theory and research on helping, altruism, and cooperation, so this is an important reference. In the preface you would learn that the authors are social psychologists, that each author has studied various forms of prosocial behavior for more than 30 years, and that this book updates a 1995 volume entitled *The Psychology of Helping and Altruism: Problems and Puzzles*.

The topic of greatest interest in the book is helping, which the authors define as "an action that has the consequence of providing some benefit to or improving the well-being of another person" (Dovidio et al., 2006:22). Altruism is a type of helping that takes into account the helper's intentions, benefits, and costs. Definitions of altruism vary, but social scientists generally reserve the term for helping that is motivated purely by a desire to benefit others, without anticipation of personal rewards and often at a cost to the helper. This is more precise than our dictionary definition; however, altruism is a more elusive concept than mere helping. And as Dovidio and colleagues point out, it is not always possible to characterize a particular act of helping as altruistic.

Conceptual clarification is crucial. Still, to study altruism scientifically we must move beyond abstract definitions to specific, concrete observations. To do this is to *operationalize* the concept. One of many possible operational definitions is donating blood; another is giving money to a charitable organization. Both of these acts are intended to help others and incur some cost to the actor. Dovidio and colleagues' book offers many other examples as it reports numerous empirical studies on specific helping acts. In Chapter 5, we discuss the process of conceptually defining and operationalizing concepts as well as criteria for evaluating the quality of "operational definitions."

For now, you can get a better idea of this process as we consider how the topic of altruism might be investigated using each of the four basic approaches highlighted in this book: experiments, surveys, field research, and available data research. All four of our examples focus specifically on volunteering—either informally volunteering to participate in an experiment or formally volunteering by giving freely of one's time and effort to a nonprofit organization. As you will see, each study tailors its basic approach to a specific research question regarding volunteering. Together they provide complementary answers to the general question, What explains altruism?

An Experimental Answer

As we discuss in Chapter 7, **experiments** frequently offer the best approach for investigating the causes of phenomena. One possible cause of altruistic acts may be a sense of belonging to others. Jean Twenge and associates (2007:56) argued that altruistic behavior "depends on believing that one is part of a community in which people mutually seek to aid, to support, and, occasionally, to love each other." When people feel excluded, they are much less likely

to help others. To test this idea experimentally, the researchers needed to systematically manipulate exclusion so that some people would be made to feel excluded and others not and then to observe how these people would respond when given the opportunity to behave altruistically.

The manipulation of exclusion required several steps. First, the investigators had research participants, all of whom were psychology students who participated for partial course credit, meet together in groups of four to six to get to know one another. After the discussion, the students filled out forms that requested background information and asked them to name the two people in their group with whom they would most like to work. Finally, after collecting this information, the experimenter told each participant that either everyone or no one in their group had chosen him or her as someone they'd like to work with. In this way, half the participants felt accepted and the other half felt rejected. To observe how this manipulation affected altruism, the experimenter then asked all participants if they would be willing to volunteer to participate in up to three additional experiments, each taking about 15 minutes, for which they would not receive extra credit. The experimenters' operational definition of "altruistic behavior" consisted of the number of extra experiments for which each participant volunteered. Supporting their hypothesis, 90 percent of the "accepted" participants volunteered to help by doing at least one experiment compared with only 20 percent of the "rejected" participants.

The essential feature of this study that illustrates the experimental approach is that a potential influence on altruism—a feeling of social exclusion—was isolated and systematically varied from participant to participant, whereas other factors that might affect altruism were held constant or remained the same for all participants. For example, the same experimenter used the same instructions and same procedures. But what purpose does it serve to hold these features constant? Why was it necessary to include *two* groups, one of which was made to feel accepted and the other to feel excluded? How did the experimenters decide who would be made to feel excluded? And how is this deception ethically justified?

The experiment described here is one of seven experiments reported by the investigators. In other experiments, they found that socially excluded participants donated less money to a "student emergency fund" and were less likely to help pick up pencils accidentally spilled on the floor; they further found that social exclusion reduces helping by lowering empathy toward others (see Chapter 13 for a further description of these experiments). As you will learn, conducting multiple tests of hypotheses is common in experimental research and enhances the generalizability of the findings. But why go to the trouble of contriving and conducting an experiment when there are many naturally occurring acts of altruism that can be studied? In Chapter 7 we examine the logic of the experimental approach, the ways in which experiments are staged, and the advantages and disadvantages of this form of research. In Chapter 8 we look at different types of experimental designs.

An Answer from Survey Research

A second approach to studying altruism that might be taken is the **survey**. Survey research involves the administration of questionnaires or interviews to relatively large groups of people. One purpose of surveys is to describe the frequency of certain characteristics

among groups or populations. For example, a survey might tell you how many people at your college or in your organization have voluntarily given blood, have done volunteer work, or have contributed money to charities. Such information can be related to other characteristics of respondents, such as their gender, age, marital status, religion, and occupation, thereby enabling a survey researcher to understand as well as describe the incidence of altruism.

An example of the use of survey research in the study of altruism is a survey on volunteering in the United States that has been conducted annually in September since 2002. Each volunteering study is part of the Current Population Survey (CPS), a monthly survey conducted by the U.S. Census Bureau for the Bureau of Labor Statistics. For more than 75 years, the CPS has been the primary source of labor force statistics for the U.S. population, providing estimates of unemployment, earnings, hours of work, and other important information. In addition to collecting data on the labor force, the CPS includes supplemental questions on topics such as voting and registration, participation in the arts, and cell phone use. The CPS adds these questions on behalf of federal agencies or other sponsors. The sponsor for the Volunteer Supplement to the CPS is the Corporation for National and Community Service, a federal agency established in 1993 whose mission is "to improve lives, strengthen communities, and foster civic engagement through service and volunteering" (Corporation for National and Community Service, 2016).

The purpose of the Volunteer Supplement is to obtain information on the frequency of volunteering and the characteristics of volunteers in the United States. As in each CPS, Census Bureau staff attempt to carry out interviews with members of approximately 60,000 occupied households. The households are selected using rigorous scientific methods to ensure that they are representative of the nation as a whole. Using a laptop computer into which the interview is programmed, interviewers introduce the survey topic by telling respondents that they are "interested in volunteer activities, that is, activities for which people are not paid, except perhaps expenses," and "which they did through or for an organization." Respondents then are asked whether they have done volunteer work in the past year and, if so, how many hours they volunteered, for what kinds of organizations they volunteered, and what types of activities they performed. Other CPS questions identify several demographic characteristics such as age, gender, race, marital status, and labor force status. Among the findings are the following (Inter-university Consortium for Political and Social Research, 2016): In 2015, women were more likely to volunteer than men; 27.8 percent of college students, compared with 24.5 percent of the general population, volunteered; almost one-quarter of college-student volunteering took place in religious organizations; and the most common volunteer activities among college students were tutoring, mentoring, fundraising, preparing or serving food, and engaging in general labor.

In addition to asking people questions, a key feature of survey studies is that information is collected from part of a group (persons residing in 60,000 households) to make generalizations about the whole group (the U.S. population). However, such generalizations are hazardous unless procedures are carefully followed in deciding whom to include in the study. The number of households in the CPS is unusually large for surveys; collecting information from this many people would exceed the budgets for most research. In Chapter 6 we

discuss sampling techniques for choosing respondents that are designed to increase accuracy and reduce costs.

Many questions can be raised about survey research in general and the CPS in particular. Why does the Census Bureau conduct personal interviews, which are more costly than mailed questionnaires? What are the advantages of administering the interviews on a laptop computer rather than with pencil and paper? How do survey researchers decide which questions to ask, how best to word the questions, and in what order to ask them? These are the kinds of issues we address in Chapters 9 and 10.

An Answer from Field Research

Field research is essentially a matter of immersing oneself in a naturally occurring (rather than a "staged") set of events to gain firsthand knowledge of the situation. Anthropologists who live in remote communities for long periods to study the culture of the inhabitants are engaged in this form of research, as are other social scientists who voluntarily become members of organizations and groups or take jobs for the sake of conducting social research. In such settings, a field researcher seeks to understand the world as his or her subjects see it and to collect information without unduly influencing its shape and content.

Field research on altruism seldom has been conducted, although there are numerous settings where this approach could be applied. For example, one could work in a blood donor center or join the Red Cross or some other emergency relief organization. One also might do volunteer work, as Rebecca Allahyari (2000) did, at a charitable and nonprofit organization. Allahyari volunteered at the two largest organizations in Sacramento, California, that provide meals for the poor: the Catholic Worker–inspired Loaves & Fishes and the Salvation Army Shelter Services Center. Interested initially in "how homeless people experience social control" (ix) in their daily lives, Allahyari shifted her focus from the homeless to the volunteers who served them when she found herself struggling with moral questions about her volunteer work and relationships. She then went on to explore how the organizational cultures of these two charities shaped the moral self-definition of the volunteers.

To carry out her study, Allahyari relied primarily on her own direct experiences and observations. For 3 years, from 1991 to 1993, she volunteered regularly, preparing and serving food, cleaning up, talking informally to clients and other volunteers, and forming personal relationships. As she found, the two sites had distinct "visions of charity" grounded in different ideological orientations that affected how clients were viewed and how volunteers defined the meaning of their work.

Loaves & Fishes was founded on the Catholic Worker ethic of "personalist hospitality" in which the poor are viewed as guests—"ambassadors of God"—to be treated with dignity and respect. Guests at this site dined at tables set with flowers, were not explicitly indoctrinated, and had few rules to follow. Volunteers—mostly white, middle-class women—were formally introduced to the Catholic Worker philosophy by the staff and constructed moral selves based on gratitude for their own prosperity, commitment to feeding the urban poor, and building an ecumenical community. The Salvation Army viewed the homeless and hungry as souls to be saved by helping them better themselves through hard work and self-discipline. Within the Salvation Army Shelter Services Center, clients were expected

to follow strict rules that limited their autonomy and to take measures, such as abstaining from drinking, to redeem themselves. Volunteers, who were mainly working-class males and included many former clients and others performing court-mandated community service, "received disciplining into a work ethic that valued sobriety and productivity" (Allahyari, 2000:153) as they sought physical and spiritual salvation.

Allahyari's study typifies field research. Unlike studies based on other approaches, she reported her research in a book rather than a journal article. The book provides a rich description that is difficult to convey in a brief summary. Her research objective, established once she was in the field, was to understand the meaning that the volunteers attached to caring for others. The "data" that she reports consisted of accounts of events and quotations from those she encountered, both of which were taken from a running log of observations recorded at the end of each day. In addition to her observations as a volunteer, Allahyari formally interviewed staff and examined written documents such as a monthly newsletter produced by Loaves & Fishes staff and the Salvation Army's bimonthly magazine. In Chapter 11 we consider the key issues that Allahyari and other field researchers face: selecting an appropriate setting or group for study and then gaining entry to and getting along with others in the setting; deciding what to observe and record and when and how to record one's observations; and handling, organizing, and analyzing the observational record.

An Answer from Available Data

The final approach to studying the social world discussed in this volume is the use of **available data**—that is, data that have been generated for purposes other than those for which a researcher is using them. Prominent among such data sources are written records, from letters and diaries to newspapers and government documents; but available data also includes nonverbal physical evidence such as paintings, clothing, tools, and other artifacts. Even tombstones could be considered data in this sense since they are created for one purpose (to mark graves) but could be used for others (e.g., to study the diffusion of sculptural styles over several generations). How might altruism be studied with this approach?

A study of volunteering in the wake of the September 11, 2001, attacks on the World Trade Center and the Pentagon shows the difference between anecdotal information and systematic research based on the analysis of available data. Following this unprecedented event, numerous media reports described altruistic acts such as direct physical aid and cash donations to victims of the attacks and their families. Louis Penner and associates (2005) asked whether volunteering was affected by the September 11 attacks and, if so, for how long. They were able to answer this question empirically because they discovered and were given access to the database of an organization that uses an Internet website (VolunteerMatch) to connect volunteers with service organizations.

Several features of the website made it possible to track changes in volunteering over time and to answer the researchers' question. First, the website was launched in August 1997 and was fully functional by the end of that year, so it existed before and after the attacks. Second, the organization maintained a database that recorded key information about users of its website. Visitors to the website who are seeking volunteer opportunities are led through a sequence of steps to detailed information about specific organizations that

are located in the person's zip code. After selecting one of these organizations, the person receives a template for his or her e-mail address. If the person wants to volunteer, he or she simply clicks "Send" and his or her name and e-mail address are sent to the organization.

The database maintained by VolunteerMatch contained a daily record of the number of people who had contacted an organization to express an interest in volunteering. Penner and colleagues were provided data from August 7, 1997, through December 31, 2001. Analyzing weekly totals, they found 4 weeks in which volunteering showed unusually high rates. The first of these, December 5, 1999, was a week in which Oprah Winfrey's television show included a segment on VolunteerWatch; the other 3 weeks spanned September 9 through September 29, 2001. During that period, more than 30,000 people signed up to work as volunteers, which was more than double the rate of any other 3-week period during the 4 years analyzed.

The database also grouped service organizations according to their general purpose or targets—for example, children and youth, crisis support, disabled, health and medicine—which enabled the researchers to answer a second question: Was volunteering for certain charities differently affected by the attacks? Although they found that volunteering rates increased substantially for all kinds of charity/service organizations, rates for crisis-related organizations (e.g., the local chapter of the Red Cross) were about two to three times as great as rates for other categories.

Discovering the VolunteerWatch website and gaining the organization's cooperation made it possible for Penner and his colleagues to answer some important questions about the impact of the September 11 attacks on altruism. Indeed, simply finding appropriate available data is a major problem with this approach. It often requires considerable imagination and ingenuity just to think of and uncover the kind of information that can be used to address research questions. And once the data are in hand, still other problems arise involving data handling and analysis. The most fundamental of these problems is how to codify the data in a systematic fashion; another common problem is what to do when the information is insufficient or not comparable from one case to another. On carefully examining the VolunteerWatch database, for example, Penner and colleagues discovered several anomalies in the first few months of the website's existence, including no entries at all for several days, which, they surmised, was caused by working problems with the site in its early stages. This led them to exclude data from all but 4 days of 1997 and to focus on the remaining 4 years. Because of the recency of their data, Penner and colleagues knew precisely how the information had been gathered and tabulated; however, questions about the authenticity and accuracy of available data often arise. This is especially true for historians relying on documentary evidence from the distant past. In Chapter 12, after describing a vast array of available data, we consider these and other issues related to this approach.

Conclusions

Our goals in this introduction have been to demonstrate the value of studying research methods and to describe the general nature of social research. Social research helps us to understand the social world by producing scientifically valid answers to questions. You

may seek "answers" from social research in your student and professional lives, and you inevitably will be exposed to various answers through the media. Media reports of social scientific studies, however, sometimes distort the facts and sometimes draw erroneous or misleading conclusions. Moreover, there is inevitably some degree of uncertainty and error in social research. Studying research methods will cultivate your skepticism about research evidence. But this skepticism is healthy because enhancing your ability to understand and evaluate how research findings are arrived at will enable you to identify whether they are based on more or less sound methods of inquiry and whether they warrant strong or weak conclusions.

Exploring how social scientists have investigated the topic of altruism introduced an important theme of this book. That is, although social scientists have developed a variety of approaches to social research, no one approach is inherently superior to another and all approaches may be understood within the framework of scientific inquiry and the quest for understanding. To be sure, the four most basic approaches differ in many ways, and each has its distinctive strengths and weaknesses. Yet, we believe that all approaches must address the same central methodological issues and are subject to the same underlying logic of inference. That the sources of error vary from one approach to another only underscores the value in combining approaches and using them in complementary ways to validate knowledge.

KEY POINT

A variety of approaches may be taken to study social phenomena; the best strategy is to use multiple approaches that do not share the same weaknesses.

An Overview of the Book

Approaches to Social Research is divided into four main sections. The first section describes the scientific and ethical contexts of social research. As we explain the nature of science in Chapter 2, we assume the essential unity of all the sciences, drawing examples from physics, chemistry, and biology as well as sociology and psychology. This does not mean that there is a unified method or "cookbook" for conducting scientific research. It means, rather, that all scientific disciplines abide by the same epistemic requirements for judging the credibility of theories and evidence. Similarly, all scientists are expected to be ethical and to follow widely accepted ethical principles regarding the conduct and reporting of scientific findings and the treatment of human subjects. In Chapter 3 we examine these principles and discuss the process of ethical decision making as well as scientists' responsibility to consider the social consequences of research and to educate others on the appropriate interpretation and application of scientific findings.

The remainder of the book roughly follows the stages in conducting research, from the formulation of a problem or question to data collection to analysis and interpretation. The second section covers the major ingredients of the overall research plan. Focusing on problem formulation, Chapter 4 introduces the basic language of social research and outlines the various purposes of conducting social research and the overall research process. Chapter 5 describes how social scientists operationalize concepts and evaluate the quality

of operational definitions. Chapter 6 describes the scientific principles and methods of selecting a representative set of cases. The goal of social research is to answer questions about the social world by producing *valid* empirical evidence. Accordingly, each chapter in this section addresses a key issue in determining the validity of social scientific evidence: the validity of causal inferences (Chapter 4), the validity of operationalizations of concepts (Chapter 5), and the generalizability of findings (Chapter 6). As we discuss these issues, we draw on the first study mentioned at the beginning of the chapter: Broh's (2002) analysis of the impact of sports participation on academic achievement.

Each of the three validity issues is addressed again in the third section of the book with respect to the four basic approaches to social research. Four chapters outline the essential features, variants, steps in conducting, and distinctive advantages and disadvantages of each approach: experiments (Chapter 7), surveys (Chapter 9), field research (Chapter 11), and research using available data (Chapter 12). Two chapters elaborate on special technical features of experiments and surveys. Chapter 8 outlines a framework for analyzing the validity of causal conclusions and various experimental designs that serve as ideal models for establishing causal relationships. Chapter 10 describes the elements of designing a questionnaire. Chapter 13 then examines how two or more of the four basic approaches to social research may be combined effectively to strengthen the validity of research findings. Finally, the concluding chapter of this section examines the special features and problems of conducting evaluation studies, which are aimed at assessing social intervention programs and policies.

Throughout this section we use several studies to illustrate the process and problems of conducting social research. Thus, here is where you will read about the other studies mentioned at the beginning of this chapter: Latané and Darley's (1970) experiments on bystander intervention in emergencies (Chapter 7), Green and Gerber's (2008) field experiments on getting out the vote (Chapters 7 and 13), Snow and Anderson's (1993) field research on homelessness (Chapter 11), Erikson's (1966) analysis of the Salem witch hysteria (Chapter 12), and Sherman and Berk's (1984) analysis of the impact of arrests in cases of domestic assault (Chapters 13 and 14).

The fourth section deals broadly with the processing, analysis, and interpretation of data. Chapter 15 outlines the steps in processing data for quantitative analysis and describes elementary statistical analyses. Chapter 16 considers various statistical techniques for analyzing causal relationships. Because almost all social research ultimately becomes known and is interpreted by others through the reading of reports, books, and articles, in the final chapter (Chapter 17) we examine the writing of research.

Key Terms

All key terms are defined in the glossary at the end of the book.

experiment
survey
field research
available data

Exercises

1. Find a story or article in the media (e.g., newspaper, magazine, television) that reports the findings of a social scientific study or of a contention (e.g., an advertising claim) purportedly based on social scientific evidence. What information, if any, is given about the methods of the study or the limitations of the findings? Does the author report where the data came from, how they were collected, or how many observations the findings were based on?
2. Select a recent issue of a major social science journal, such as the *American Sociological Review*, *American Political Science Review*, or *Social Psychology Quarterly*. Based on your reading of the abstracts of each article, identify the basic approach (experiment, survey, field research, or use of available data) that is used in each study reported in the issue. Which approach is most common?

Web Resources

The website for *Approaches to Social Research*, sixth edition (www.oup.com/us/singleton-approaches), contains several resources for each chapter: (1) answers to selected exercises; (2) true–false and matching quizzes; and (3) annotated lists of Web resources.

PART I

The Scientific and Ethical Contexts of Social Research

The next two chapters describe two important contexts within which social research takes place. Chapter 2 considers the basic elements of science, for social research is fundamentally a scientific enterprise. As such, we believe it is essential to understand what unites the social sciences with the natural sciences. Obviously, it is neither the subject matter nor the specific research techniques. What unites science are its objectives, presuppositions, general methodology, and logic. That is what we focus on in Chapter 2—the epistemological foundations of science that transcend specific subject matters, guiding the efforts of researchers in many different disciplines.

Social research also has a moral foundation. At the same time that social researchers follow the canons of scientific inquiry, they must be sensitive to the ethical choices that they make. Ethics are especially relevant when scientific research involves human beings because researchers are obligated to treat research participants with respect, protect them from harm, preserve their rights, and ensure their well-being. Social scientists also have ethical obligations to their profession to conduct their research with honesty and integrity, as well as to the general public to promote the beneficial application of research findings. In Chapter 3 we consider these ethical concerns, giving special attention to the treatment of human research participants, and describe regulations and codes that guide ethical decision making in social research.

2

The Nature of Science

When you think of a "scientist," what do you think of? For many years, Royce Singleton asked his sociology methods students this question. If you are like most of Singleton's students, you associate science foremost with the natural sciences—chemistry, physics, and biology. Moreover, you probably picture a scientist in a white lab coat in a laboratory, surrounded by test tubes and microscopes (Singleton, 1998).

In short, students rarely conjure images of sociologists or other *social* scientists as scientists. The American public distinguishes between natural and social sciences in a similar way: Whereas 71.6 percent of a national sample of adults thinks that biology is "very scientific," only 8.9 percent say the same of sociology (T. W. Smith, Marsden, and Hout, 2016). Yet disciplines such as sociology and psychology aspire to be scientific (American Sociological Association, 2017; American Psychological Association, 2017). Therefore, to understand how social scientists do what they do, we must understand how science guides their activities. In this chapter, we identify the characteristic product and process of inquiry that defines and unifies all the sciences—natural and social.

Most broadly, this chapter deals with issues of **epistemology**: what constitutes knowledge in the social sciences and how it is created. Standard scientific inquiry reveals what we regard as the essential epistemological foundations of social science. There are alternative epistemologies, however; so in the end we consider some of these challenges to a unified model of science.

The Aim of Science

The word "science" comes from the Latin *scientia*, which means "knowledge." The aim of science is to produce knowledge, to understand and explain some aspect of the world around us. But accumulated knowledge per se does not distinguish science from mythology. What, then, makes an endeavor scientific? Basically, it is a matter of *how* and *why* knowledge is accepted by the scientific community. Two interrelated sets of criteria determine acceptance or rejection. One set of criteria pertains to the form or logical structure of knowledge and the other to the evidence on which it is based. In discussing the nature of science, therefore, we distinguish among the laws, principles, and theories that constitute the *product* of science and the methods and logic of inquiry that comprise the *process* through which scientific knowledge is created, tested, and refined.

Although the analogy is imperfect, it may help in following our discussion to think of a factory or industrial plant in which certain raw materials are processed to create a finished product. One of the differences between industry and science lies in what is processed: Industries manufacture material things; science processes *ideas*. Of course, science has made possible innumerable technological advances, whose material fruits, perhaps because of their visibility, are often seen as the essential end product of science. But these practical results are mere by-products of scientific inquiry. The real goal of science is to achieve understanding; the basic product is ideas.[1] We will see the form that these ideas take as we first consider science as a product. Then we will turn our attention to the science process.

Science as Product

Scientific disciplines differ in terms of their objects of study. Physics is concerned with matter and energy, biology is concerned with the life processes of plants and animals, psychology is concerned with human and animal behavior, and sociology is concerned with properties and processes of social groupings. As a consequence, each of these disciplines has developed its own unique concepts, laws, and theories. Yet, despite such differences, all scientific knowledge, regardless of the field of study, shares certain defining characteristics, the first of which is the type of questions that may be addressed.

Scientific versus Nonscientific Questions

Whether a question can be approached scientifically depends on whether it is possible to make observations—which others also are capable of making—that can answer the question. This means that philosophical questions about essence, existence, or morality are beyond the realm of science. Answers to some philosophical questions do become the fundamental postulates, or assumptions, of science, but these cannot be investigated scientifically. Thus, scientists can only assume that the world exists, that empirically verifiable knowledge is possible, that we can know the world through our senses, and that there is an order to the world. Having made such assumptions, what scientists try to do is describe and explain the order that they assume to exist.

It would be proper for a social scientist to ask such questions as Why do some people watch pornographic films? Why is one type of organization more efficient than another? Are sibling relationships related to adult sexual preference? But it would *not* be within the realm of science to ask, Is pornography morally wrong? Should efficiency be valued over morale? Is homosexuality contrary to God's will? The difference between these two sets of questions is that the former deal with how and why regular patterns of events occur, whereas the latter ask what is desirable. Questions of value and morality are worth asking and speculating about; but they fall within the purview of philosophy and religion. They are not scientific because they cannot be framed in such a way that *observations* can be made to answer them.

Both philosophers and scientists ask about the "why" of things. But to scientists, as the psychologists Michael Doherty and Kenneth Shemberg (1978:6) note, "the 'why' is just shorthand for, What is the relationship between . . . or, Under what conditions . . ." When we can use these phrases, "then the question could be a legitimate scientific question, provided the other terms in the question meet the test of observability." Thus, we can "observe" (i.e., gather data on) whether people view pornographic films, and we can try to determine the "conditions" (e.g., a person's gender and age, relationships with others, occupation) under which this is likely to occur. Likewise, we can determine what the relationship is between the type of organization and efficiency, assuming we can decide how to distinguish different forms of organization and decide on the pattern of observations that represents "efficiency." No such appeals to objective evidence, however, will enable us to decide whether purveyors of pornography should be legally prosecuted or left alone or to decide the relative importance of efficiency and morale.[2]

In short, scientific questions are questions that can be answered by making observations that identify the conditions under which certain events occur. Still, to qualify as scientific knowledge, the *answers* to such questions must take a particular form, a form that meets the requirements of description, explanation, prediction, and understanding.

Knowledge as Description

The first step in producing scientific knowledge is description. We must describe objects and events before we can understand and explain the relationships among them. Each discipline therefore develops its own special language or set of concepts.

Concepts are abstractions communicated by words or other signs that refer to common properties among phenomena. The term "weight," for example, symbolizes a conception of a property of all physical objects. Likewise, the sociological term "status" is an abstraction that points to a property of a social structure or group. The first rule about the scientific use of concepts is one word, one concept. The sociologist George Zito (1975:21) noted that in everyday language one word may stand for many different things; "mass," for example, may mean the quality of size and weight, the main part, a Christian religious ceremony, or something else entirely. To a physicist, however, "it means only the quantity of matter in a body as measured in relation to its inertia." Because everyday language is so vague and full of multiple meanings, scientists find it necessary to restrict or redefine the meaning of common words or to invent new terms (sometimes called "constructs"), thereby creating highly technical vocabularies.

Scientists' second rule about concepts is that there must be agreed-on ways of tying them to tangible objects and events. This rule extends the first rule by stating that concepts must be defined directly or indirectly in terms of precise, reliable observations. It would be scientifically unacceptable to describe something as "heavy," not only because this term has many different connotations (i.e., it refers to more than one concept) but also because as a symbol for any single concept it is imprecise. People may agree or disagree when the weight of an object is described as heavy; however, they can readily agree when the object is placed on a scale and its weight is described as 50 pounds. By the same token, many concepts (e.g., "energy," "electron," "wavelength") that are not simply and directly observable are scientifically acceptable because they imply characteristics that are observable. For example, physicists cannot directly observe the movement of molecules postulated by the kinetic theory of gases; however, using a pressure gauge, they can measure the pressure that this movement implies. Linking concepts to observable events, called "measurement," is something we will have much more to say about in Chapter 5.

To a large extent, the language we use determines what we see in the world. Research has shown, for example, that people have better recognition memory for colors that they can label with familiar words (Lucy and Shweder, 1979). Similarly, the words or concepts that scientists develop indicate their usefulness for describing and explaining phenomena of interest. The existence of the term "social class" thus reflects its utility for explaining sociological concerns such as social order and social change. This implies a third rule about language usage in science: Concepts are judged by their usefulness. Scientists are not dogmatic about concepts. Once a concept has outlived its usefulness or the explanation in which it is embedded has been superseded by a better explanation, it is discarded.

Knowledge as Explanation and Prediction

Explanations, according to the sociologist Gwynn Nettler (1970), are attempts to satisfy curiosity. Depending on the type of question and the needs of the interrogator, curiosity may be satisfied in several ways: by labeling (as when the appropriate term is given in response to a child's question about what something is), by defining or giving examples (as when new terms are clarified with familiar terms and images), by evoking empathy (as when people offer motives or other "good reasons" for their conduct), by appealing to authority (as when something is attributed to "God's will"), or by citing a general empirical rule (as when we say that this book falls when dropped because it is denser than air, and all objects denser than air fall when dropped). Only this last form of explanation is capable of meeting the twin objectives of scientific knowledge—to *explain* the past and present and to *predict* the future.

The "empirical rules" with which scientific explanations are built consist of abstract statements, or propositions, that relate changes in one general class of events to changes in another class of events under certain conditions. Consider, for example, the following two propositions, the first a part of the ideal gas law from chemistry and the second a generalization from social psychology known as the "social facilitation effect":

1. If the volume of a gas is constant, then an increase in temperature will be followed by an increase in pressure (Reynolds, 1971:5).
2. If a task is simple or well learned, then an individual will perform it better in the presence of others than in isolation.

According to each of these propositions, a change in one set of events (temperature of a gas, absence or presence of others) is followed by a change in another set of events (pressure of the gas, performance of an individual) under specified conditions (constant volume, simple or well-learned task). The propositions are abstract in two senses. First, since they may refer to past, present, or future changes, they make no reference to historical time. Second, each proposition pertains to a *general* class of events: gases of a constant volume in one instance and individuals performing simple tasks in the other. The second proposition would be less abstract if it made reference only to males and still less abstract if it applied only to males with high self-esteem. Level of abstractness is important because the ideal in science is to develop the most general understanding: to establish propositions capable of explaining and predicting the widest possible range of events.

Scientists use various terms to denote propositions such as the ideal gas law and social facilitation effect. They may be called **empirical generalizations** when they are derived from observations or **hypotheses** when they have been proposed but not tested. To the extent that the propositions have been repeatedly verified and are widely accepted, they may become known as scientific **laws**. In any case, as scientific explanations, they describe, explain, and predict particular phenomena. The terms contained within the propositions are the concepts that describe—organize and classify—the phenomena to be explained. Thus, the ideal gas law classifies gases according to their volume, temperature, and pressure; the social facilitation effect organizes individual behavior in terms of the concepts of task simplicity, presence or absence of others, and level of performance. Furthermore, each proposition explains and predicts by identifying the conditions (e.g., constant volume, increase in temperature) under which particular events occur (increase in pressure).

Scientific explanation does not end here, however, for although specific events are explained by empirical laws, the regularities expressed by these laws themselves require explanation. The ideal gas law raises the question of *why* increases in temperature invariably increase the pressure of gases under constant volume. Similarly, with respect to the social facilitation effect, why should the presence of others facilitate one's performance on simple tasks?

To answer such questions, and generally to explain empirical generalizations or laws, science introduces theories. **Theory** is one of the most elusive and misunderstood terms in science. It does not mean, as it is popularly understood, "idle speculation or conjecture." A scientific theory consists of a set of interconnected propositions that have the same form as laws but are more general or abstract. Note how the following set of propositions, called the "kinetic theory of gases," explains the ideal gas law by showing how it follows from the "conception of a gas as a collection of molecules in constant motion" (adapted from Reynolds, 1971:8):

As the temperature increases, the kinetic energy of the gas molecules increases.
As the kinetic energy increases, there is an increase in the velocity of the motion of the molecules.
As the molecules travel faster, but are prevented from traveling further by a vessel of constant volume, they strike the inside surface of the vessel more often and with more force.
As the molecules strike the sides of the vessel more frequently, the pressure on the walls of the vessel increases.
Therefore, assuming a constant volume, as the temperature increases, the pressure increases.

Scientific theories may be stated in various ways. The above set of propositions is arranged in a logical network that shows how the law may be deduced from the theory. In chemistry and physics, theories often take the form of mathematical formulas. For example, the formula $PV = nRT$ represents the ideal gas law. Aside from economics, theories in the social sciences usually are stated less formally. What is most critical, from the standpoint of science, is not how the theory is presented but that it is logically consistent and empirically testable.

Still, it is possible to have several logically coherent theories that explain a given empirical regularity and that make the same or similar testable predictions. This is true of the social facilitation effect, for which no established theoretical explanation exists, although several theories have been proposed. One theory holds that an audience enhances performance on simple tasks because the mere physical presence of others increases one's physiological arousal. According to another theory, enhanced performance occurs when persons believe that the other persons present are judging or evaluating their behavior. Scientific research often is directed toward testing such alternative theories, but ultimately one theory is judged superior to other competing theories to the extent that it (1) involves the fewest number of statements and assumptions, (2) explains the broadest range of phenomena, and (3) makes the most accurate predictions.

KEY POINT

Scientific concepts describe *what* is being studied; scientific hypotheses and theories explain *how* and *why* patterned events occur.

Knowledge as Understanding

Finally, many scientists maintain that, in addition to making testable predictions, scientific laws and theories must provide a sense of understanding. Although there is no consensus on the meaning or necessity of the "understanding" criterion, social scientists generally agree that this sense is gained by describing the causal process that connects events (Reynolds, 1971). A theory often meets this criterion in explaining a law or empirical generalization. The connection between temperature and pressure in the ideal gas law, for example, seems more understandable once we know the underlying process, described by the kinetic theory, by which temperature causes an increase in kinetic energy, which causes

an increase in the velocity of molecules, and so on. Similarly, a law or hypothesis is thought to be scientifically meaningful when it describes a **causal relationship**—that is, a relationship in which a change in one event forces, produces, or brings about a change in another. In fact, unless a true causal relationship is identified, generalizations cannot meet the dual requirement of explanation and prediction. We can see this by examining some scientifically inadequate generalizations.

Many so-called scientific generalizations purport to explain but have no readily observable consequences and, hence, cannot predict. Standard examples abound in Freudian psychology. For instance, Freud suggested that all dreams represent the fulfillment or attempted fulfillment of a wish and that all persons have a death wish (Hall and Lindzey, 1970). The problem with these generalizations is that they too readily "explain" things after the fact. We can always find some wish with which to interpret or explain a dream, once it has occurred. Similarly, every suicide or accident can be attributed to a death wish. This is like placing your bet after the race is over. Once an event has occurred, any number of plausible, intuitively appealing explanations can be offered. Post hoc generalizations thus give us a false sense of understanding. The trick is also to indicate what to expect under given conditions. Without this kind of objective testability, it is impossible to tell if one event has caused the other.

It is also possible to predict an event on the basis of empirical generalizations without understanding the connection between generalization and prediction. Astronomical predictions of the movement of the stars were accurate long before satisfactory explanations for the movement existed. Today, the healing powers of aspirin are put to use although the reason for aspirin's effectiveness is not well understood; election outcomes can be predicted accurately although their explanation remains unsatisfactory; and, more mundanely, people continue to use a variety of time-tested, reliable, yet seemingly inexplicable predictors of weather changes. It is a folk wisdom, for example, that the leaves of trees show their light green undersides when a storm is imminent. Generalizations such as these, unlike those that explain but do not predict, can be tested and are useful in certain contexts. However, their utility is limited. Once we have an adequate theory that describes the causal process connecting events, we get not only a better sense of understanding but also more accurate and more useful predictions.

Many examples from the history of science show how identifying causal processes enhances the utility of knowledge. One of the more interesting cases is the discovery of the cause and cure of rickets (Loomis, 1970). Rickets is a disease resulting in the softening and bending of growing bones. It is caused by a deficiency of solar ultraviolet radiation, which is necessary for the synthesis of a calcifying hormone released into the bloodstream by the skin. Without this hormone (calciferol), an insufficient amount of calcium is deposited in growing bones, causing the crippling deformities of rickets. Either adequate sunlight or the ingestion of minute amounts of calciferol will prevent and cure rickets. Before the causal process underlying rickets was understood, scientists could, in a sense, predict its occurrence. They noted, for example, seasonal variations in rickets—that is, its rise during the "darker" winter months. They observed its greater prevalence in cities than in rural districts and in northern industrial nations as opposed to northern nonindustrialized nations.

Identifying such patterns eventually led to the conclusion that sunlight had the power to prevent and cure rickets. But it was not until the sun's role in the production of calciferol was understood—until the complete causal process was identified—that rickets could be eradicated completely, even in areas where the sun's ultraviolet radiation is absent.

Thus, explanation in social science generally boils down to a search for causes. Knowing when and how to infer causality is a prerequisite for most social research. One of our goals, therefore, is to enhance this ability, which we will begin to do in Chapter 4 when we discuss criteria used to establish causality.

KEY POINT

Scientific hypotheses and theories provide a sense of understanding by describing the underlying causes of phenomena.

Tentative Knowledge

The psychologist B. F. Skinner (1953:11) argued that "science is unique in showing a cumulative progress," which enables each succeeding generation of scientists to begin a little further along. Thus, according to Skinner, "our contemporary writers, artists, and philosophers are not appreciably more effective than those of the golden age of Greece, yet the average high school student understands much more of nature than the greatest of Greek scientists" (11).

To the extent that this is true, it is largely a result of the *tentative* nature of scientific knowledge. Scientists never achieve complete understanding, nor do they assume access to indubitable truths. One reason is that every answer leads to new questions, and every new fact, law, or theory presents new problems so that no matter what the present state of scientific knowledge, there is always more to know. When or where this progression ends is impossible to tell; however, it is clear that science has barely scratched a very large surface.

Aside from the vast amount that there is to know, scientific knowledge is tentative and uncertain for another, more definitive reason. Unlike mathematics or logic, where the "truth" of statements either is assumed or rests on other statements that are assumed to be true, science bases the truth of its statements on observable evidence. And such evidence is always open to change through reinterpretation or to possible contradiction by new evidence. In other words, at some point a scientific proposition is accepted because it describes or interprets a recurring, observable event. But just because an event has occurred on several occasions, there is no guarantee that it will continue to occur. This can be seen from the following parable from Garvin McCain and Erwin Segal (1977:70):

> Once upon a time there lived a very intelligent turkey. He lived in a pen and was attended by a kind and thoughtful master. All of his desires were taken care of and he had nothing to do but think of the wonders and regularities of the world. He noticed some regularities—for example, that mornings always began with the sky getting light, followed by the clop, clop, clop of his master's friendly footsteps. These in turn were always followed by the appearance of delicious food and water within his pen. Other things varied: sometimes it rained and sometimes it snowed;

> sometimes it was warm and sometimes cold; but amid the variability footsteps were always followed by food. This sequence was so consistent it became the basis of his philosophy concerning the goodness of the world. One day, after more than 100 confirmations of the turkey's theories, he listened for the clop, clop, clop, heard it, and had his head chopped off.

Since it is apparent that regularity does not guarantee certainty, scientific propositions, which are based on such regularity, cannot be proven. "Knowledge," therefore, "is understood to be the best understanding that we have been able to produce thus far, not a statement of what is ultimately real" (Polkinghorne, 1983:2). Theories are accepted by the scientific community as more or less reasonable and credible according to the accuracy of their predictions and the frequency with which they have been supported by empirical evidence. Let us now examine how such evidence is processed.

KEY POINT

Scientific knowledge cannot be proven as the search for understanding is uncertain and unending.

Science as Process

The word "process" signifies a series of operations or actions that bring about an end result. In industry, the longer phrase "manufacturing process" describes the sequence of steps through which raw materials are transformed into a finished product. The process differs according to what is manufactured; furthermore, technological advances, shifting consumer demands, and the like lead to periodic changes in the sequence and in its products. But in a given industry, for long periods of time, the process is repeated over and over again along the same line from beginning to end. In science, by contrast, change is built into the process. The product itself—knowledge—is never "finished" but is constantly remodeled to fit the facts. Furthermore, the sequence of steps followed in one scientific investigation is seldom repeated precisely in another, and the end of one investigation often marks the beginning of another. Thus, although the industrial process typically follows a linear progression from raw materials to completed goods, the most characteristic feature of the scientific process is its cyclical nature.

According to John Kemeny (1959:85), the great physicist Albert Einstein, whose own scientific contributions were theoretical, repeatedly emphasized that science "must start with facts and end with facts, no matter what theoretical structures it builds in between." In other words, at some point scientists are observers collecting data and recording facts; next, they try to describe and explain what they see; then, they make predictions on the basis of their theories, which they check against their observations (i.e., the facts or data) again. This chain of events is diagrammed in Figure 2.1. Where we begin in this chain is arbitrary. But at some point, theories generate predictions or hypotheses, hypotheses are checked against data, the data produce generalizations, and the generalizations support, contradict, or suggest modifications in the theory.

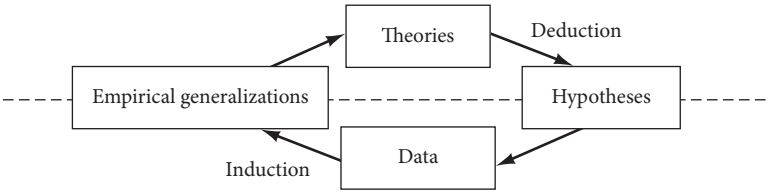

Figure 2.1. The scientific process.

KEY POINT

The essence of science is neither a body of knowledge nor a method of inquiry; rather, it is a cyclical process involving a continuous interplay between theory and research.

The horizontal dashed line in the diagram bisecting empirical generalizations and hypotheses separates the world of theory from the world of research. The development of theory, as we have seen, is the goal of science. Research supports this goal through systematic observation that generates the data from which theories are inferred and tested. In the remainder of the text, we are concerned almost exclusively with the research side of science. The important point to remember, however, is that science is a process involving the continuous interaction of theory and research. (To see the interesting turns that scientific inquiry can take, read Box 2.1.)

BOX 2.1 The Serendipity Pattern in Science

Scientific inquiry, for the most part, works within the framework of a theory. Hypotheses are derived, research is planned, and data are gathered and interpreted to test and elaborate theories. Occasionally, however, unanticipated findings occur that cannot be interpreted meaningfully in terms of prevailing theories and that give rise to new theories. Robert Merton (1957) refers to such discoveries as the **serendipity pattern**. In the history of science, there are many cases of scientific discoveries in which chance, or serendipity, played a part. One of these is Pasteur's discovery of immunization.

> Pasteur's researches on fowl cholera were interrupted by the vacation, and when he resumed he encountered an unexpected obstacle. Nearly all the cultures had become sterile. He attempted to revive them by sub-inoculation into broth and injection into fowls. Most of the sub-cultures failed to grow and the birds were not affected, so he was about to discard everything and start afresh when he had the inspiration of reinoculating the same fowls with a fresh culture. His colleague Duclaux relates: "To the surprise of all, and perhaps even of Pasteur, who was not expecting such success, nearly all these fowls withstood the inoculation, although fresh fowls succumbed after the usual incubation period." This resulted in the recognition of the principle of immunization with attenuated pathogens. (Beveridge, 1957:27)

Social science has had its share of serendipitous findings also. The well-known "Hawthorne effect," which refers to the impact that a worker's awareness of being under study has on his or her performance, was an unanticipated finding of a series of studies carried out between 1927 and 1932 at the Western Electric Hawthorne plant in Chicago (Roethlisberger and Dickson, 1939). In one of the studies, six women with the task of assembling telephone relays were placed in a special test room for observation. The idea of the study was to determine the effects of various changes in working conditions (e.g., method of payment, number and length of rest pauses, length of working day) on productivity, as measured by the number of relays completed. Over an extended period of time, numerous changes, each lasting several weeks, were introduced while the women's output was recorded. To the researchers' surprise, however, the changes were not related systematically to output. Instead, the women's output rate rose slowly and steadily throughout the study, even when working conditions introduced early in the study were reintroduced later. After questioning the women, the researchers concluded that their increased productivity was a response to the special attention given to them as participants in what was considered an important experiment. The fun of the test room and the interest of management simply had made it easier to produce at a higher rate. This was an important result in the history of social research for it indicated that subjects' awareness of being under study could affect the very actions that an investigator wishes to observe. Experiments, in particular, must take into account such effects, as we discuss in Chapter 7. (Interestingly, most scholars still trace the discovery of this effect to the Hawthorne study, although the conclusions eventually were shown to be unsupported by the evidence [see Carey, 1967].)

Durkheim's Study of Suicide

The French sociologist Emile Durkheim's classic study *Suicide* (1951), first published in 1897, nicely illustrates the interplay between theory and research. Durkheim lacked many of the tools of contemporary data analysis, and his evaluation of evidence has been criticized on several grounds (Douglas, 1967; Pope, 1976; Stark and Bainbridge, 1996). Yet his study is widely regarded as a model of social research.

Suicide was one of the most widely studied social problems of the nineteenth century (Giddens, 1965:4). Although early philosophical treatments focused on the moral implications of the act, it became the subject of intense empirical study when European nations began to routinely collect statistics on suicide in the late eighteenth century. Before Durkheim's time, several persons had collected and published data relating suicide rates to such factors as occupation, urbanization, religion, rate of social change, race, and climate. Durkheim relied extensively on these works as data sources, especially a study by the Italian physician Henry Morselli, who himself built on the work of the German scholar Adolf Wagner. Although Durkheim examined many of the same relationships as Wagner and Morselli, Durkheim's work gained prominence for its coherent sociological theory of suicide that accounted for a broad range of established findings.

In the introduction to *Suicide*, Durkheim highlights an interesting pattern in the suicide rates among different European countries: Whereas the general mortality rate was

similar from one country to another, suicide rates varied considerably. Moreover, the suicide rate for each country tended to be stable over time. For example, from 1866 to 1870 the suicide rates in Italy, France, and Denmark were 30, 135, and 277 per million, respectively; and from 1871 to 1875, the rates in these same countries were 35, 150, and 258 per million (Durkheim, 1951:50). Finally, Durkheim notes the steady rise in suicide rates, a point of concern that many writers attributed to the passing of the traditional social order typified by rural and village life and the growth of large industrialized cities. *Suicide* represents an attempt to explain this stability and variation in suicide rates. For Durkheim, these were social facts that required sociological explanation.

To begin, Durkheim considered existing theories of suicide based on nonsocial factors such as insanity, alcoholism, and climate. In each case, he challenged the theory dialectically and empirically. First, he argued against the theory on purely logical grounds; then, he presented data to test his reasoning. For example, he reasoned that if suicide were the result of insanity, the same groups with high rates of insanity ought to have high rates of suicide. Contrarily, available statistics showed that although women outnumbered men in insane asylums, men were far more likely to commit suicide; Jews had the highest rates of insanity but the lowest rates of suicide; and there was no correlation between the rates of insanity and suicide among 10 European countries. Thus, here Durkheim moved from theories to hypotheses to data, as depicted on the right side of Figure 2.1.

After rejecting nonsocial explanations of suicide, Durkheim turned to social factors. He first noted that Catholic countries like Spain, Portugal, and Italy had lower rates of suicide than Protestant countries such as Germany, England, and Denmark. Knowing that other systematic differences among these countries—for example, their level of industrialization—could account for the differences in suicide rates, Durkheim next compared Catholic with Protestant areas within the same country, first Germany and then Switzerland. In each case, he found that Catholic areas had lower suicide rates than Protestant areas. From such data, he theorized that Protestantism allows "greater freedom to individual thought" and "has fewer beliefs and practices" than Catholicism (Durkheim, 1951:159), so individuals feel less of a bond with others. More generally, the weaker the integration of the religious community, the more likely that an individual will commit suicide. And so, in this part of his analysis, Durkheim moved from data to generalization, as shown on the left side of Figure 2.1.

Having introduced the concept of social integration to explain Catholic–Protestant differences, Durkheim proceeded to show how this concept also could account for other variations in suicide. Statistics from France indicated that unmarried persons were more likely to commit suicide than married persons and that childless persons were more likely to kill themselves than people who have children. Other data revealed that the suicide rate declined during periods of political crises. Each of these findings may be explained, Durkheim argued, by the theory that "suicide varies inversely with the degree of integration of the social groups of which the individual forms a part" (1951:209). Married persons experience more intense interpersonal attachments, and hence integration, than do single persons; the same is true of persons with children compared with those without children. Furthermore, social upheavals such as revolutions and wars tend to "rouse collective

sentiments, stimulate partisan spirit and patriotism, political and national faith, alike, and concentrating activity toward a single end, at least temporarily cause a stronger integration of society" (208).

The end result of this scientific study is a theory based in fact or data. The theory is abstract enough to account for several empirical generalizations that relate suicide to religion, marital status, family size, and social change. Durkheim called this the theory of "egoistic suicide" because the cause of suicide springs from "excessive individualism" or lack of social integration. Although he went on in *Suicide* to develop a more comprehensive theory that included a fourfold typology of causes, the theory of egoistic suicide, synthesized as follows by Whitney Pope (1976:23), has received the greatest attention:

> The higher the rate of social interaction, the stronger the collective sentiments.
> The stronger the collective sentiments, the stronger social integration.
> The stronger social integration, the more individuals act in the service of social interests.
> The more individuals act in the service of social interests, the more meaning they find in life and the lower the suicide rate.

Although our description of *Suicide* shows how it encapsulates the scientific process, a single study such as this is part of a continuous, unending cycle of inquiry. Just as Durkheim built on the work of Wagner, Morselli, and others, numerous studies since Durkheim have questioned, refined, and tested his insights. Scholars have offered several methodological criticisms (one of which, called the "ecological fallacy," we take up in Chapter 4); have reinterpreted and refined his theory, especially the pivotal concept of social integration; and have repeatedly tested all of his hypotheses. Subsequent research shows that some of the patterns Durkheim found continue to hold: For instance, men have higher rates of suicide than women (see Wray, Colen, and Pescosolido, 2011), and divorce rates and nonmarried status are positively related to suicide rates (see Breault, 1994). However, some of Durkheim's interpretations and other findings have been challenged. In the late twentieth-century United States, suicide rates in areas heavily populated with certain Protestant groups, such as evangelical Protestants, were similar to those in areas with large concentrations of Catholics (Pescosolido and Georgianna, 1989; Pescosolido, 1990).

The thread running through all of this work, beyond the interplay between theory and data, is a mode of inquiry that distinguishes scientific research from other forms of research. Some people refer to this as "the scientific method." But this unfortunate phrase implies a definitive, orderly procedure that simply does not exist in science. What characterizes scientific inquiry is a commonly understood logic of justification and a set of standards that all scientists follow in generating and assessing the evidence on which their theories are based.

Logical Reasoning

Scientists are expected to follow the principles of logical reasoning. This does not mean that logic can tell scientists how to think or reason; rather, once an act of reasoning has taken place and is communicated, logic provides the criteria for evaluating the correctness of the

reasoning. Durkheim began his study with a collection of facts or data on suicide and with the idea that social facts warranted a sociological explanation. He identified several empirical generalizations and then, using his imagination, came up with the theory of egoistic suicide. There are no logical rules that Durkheim could have followed to devise his theory; however, once he had formulated the theory, it became possible for others to assess its logical consistency and to logically deduce its testable predictions.

When people reason, they make inferences; that is, they draw conclusions based on information or evidence. The two main types of logical reasoning, inductive and deductive, differ in terms of the strength or certainty with which the evidence supports the conclusion. In **deductive reasoning**, the conclusion is absolutely certain if the evidence is true. In **inductive reasoning**, the conclusion is uncertain even if the evidence is true because its content goes beyond the evidence.

Consider the following examples of each type of reasoning:

Inductive: Hubert, Walter, and Joan, who are union members, are Democrats.
Therefore, all union members are Democrats.

Deductive: All union members are Democrats.
Joan belongs to the union.
Therefore, Joan is a Democrat.

Note that the first conclusion goes beyond the information at hand. Therefore, we cannot know for certain that the conclusion is true; we can only judge how probable it is, based on the evidence. Even if the evidence is true, it is always possible that new information will show that some union members are *not* Democrats. (Remember the parable of the turkey.) By contrast, according to the rules of deductive logic, the second conclusion—"Joan is a Democrat"—must be true *if* the statement about union members being Democrats is true and *if* we have accurately identified Joan as a union member.

It is sometimes said that induction moves from specific instances to general principles, whereas deduction moves from the general to the specific.[3] Thus, in our example of induction, we observe that specific union members are Democrats and infer from this the general conclusion that they *all* are. In the example of deduction, we began with the general proposition that *all* union members are Democrats and deduced that a particular union member is a Democrat.

Scientists reason inductively when they infer empirical generalizations from data. This type of reasoning describes Durkheim's thinking when he inferred that Protestants were more likely to commit suicide than Catholics based on the fact that predominantly Protestant countries had higher suicide rates than predominantly Catholic countries. It also describes the formulation of his theory to account for generalizations relating suicide rates to religion, marital and family status, and political crises. In the scientific process depicted in Figure 2.1, inductive reasoning is a "bottom-up" process, moving from data to empirical generalizations to theories.

Scientists reason deductively when they show how a hypothesis explains or predicts specific facts. Thus, deductive reasoning represents a "top-down" process in Figure 2.1,