1 Research in the Real World

Do Methods Matter?

We want to do things in our lives and in our work to make a difference in the world—to educate children, treat or prevent sickness, reduce crime and violence, promote the arts, develop innovative products, feed the hungry, house the homeless, and improve our workplaces and our communities. We share a desire to do something meaningful, to leave our mark in the world. But doing so requires a base of evidence beyond our own personal knowledge and experience—evidence about how things really are, and evidence about how to make things better.

We need such evidence not only to enhance our own understanding and decision making but also to convince others—those with the authority and resources that we need to accomplish our aims, or those with opposing points of view who stand in our way.

Good Evidence Comes From Well-Made Research

The best evidence comes from good research. Good research can appear in the form of a study published in a journal, but it can also be an internal analysis of administrative data, a government or foundation report, a performance measurement brief, a program evaluation, a needs assessment, or a client or employee survey. Government agencies collect and disseminate a great variety of empirical evidence on many important topics, such as health services and outcomes, educational attainment, labor market characteristics, crime victimization and punishment, housing conditions, environmental air and water quality, and so on. (To get a flavor of all that is available from the U.S. federal government, visit *data.gov;* or for United Nations data, visit *data.un.org.* Most national governments and many international organizations and regional governments have similar sites.)

Because of the Internet and modern communications technology, we now live and work in a world in which an abundance of studies and statistics swirl all about us and hover within easy grasp—provided we know what to choose, how to make sense of it, and where to apply it.

Good research—just like a good car or a good pair of shoes—must be well designed and well made. But we cannot simply rely on brand names (although knowing that research comes from a respected scientific journal or reputable research institution does provide some assurance). Still, each study is unique, and each has unique strengths and weaknesses. So we need to understand how research is made—that is, research methods.

Research methods are the techniques and procedures that produce research evidence, such as sampling strategies, measurement instruments, planned comparisons, and statistical techniques. So we need to understand research methods to judge the quality of a study and the evidence it provides. Research methods

are what this book is all about.

May the Best Methods Win

We also need an understanding of research methods to attack evidence that hurts our cause or defend evidence that helps it.

Consider the controversy over abstinence-only sex education for teenagers. Some communities feel strongly that teens should be discouraged as much as possible from engaging in sexual activity and that comprehensive sex education (which can involve distributing condoms and instructing teens in their use) sends the wrong signal. Others warn that the abstinence-only approach does little to change the reality of teenagers' lives, leaving them vulnerable to unwanted pregnancy and sexually transmitted diseases (including AIDS).

Sex education in schools has spurred controversy—and research.

Source: © iStockphoto.com/IsaacLKoval.

As is often the case with a controversial public policy issue, both sides can point to studies to bolster their arguments. A review by Douglas Kirby (2007) uncovered 115 studies of various pregnancy prevention programs targeting U.S. teens, including abstinence and comprehensive programs. So neither side can win just by pointing to "*a* study" that supports their position.

Instead, we must struggle over how well made the conflicting studies are—meaning their methods. The argument may be won by having a better made study—or lost by having a poorly made one. So, although the war may start from a substantive policy disagreement, such as how best to provide sex education to teens, the battles often rage over research methods.

Research-Savvy People Rule

Some of you may be training to become researchers or analysts—and so doing research will be (or already is) part of your job. Clearly, knowing research methods is important to you. But many of you are (or plan to be) practitioners, doers—implementing programs, delivering services, managing people, or leading organizations. Why do you need to know research methods? We've already suggested a few reasons: Good research provides a fact base for decisions and wins arguments, and the quality of research often hinges on the methods used.

But knowing research methods can help your career more directly as well.

We live and work in an "information age" in which the ability to find, understand, and make use of complex sources of information—such as research—represents an important skill. An explosion of data of all kinds—from governments, businesses, and virtually every other institution or activity in our lives—means that those who know how to handle, analyze, and interpret data have great value to organizations and employers. Organizations regularly commission research, and so their top leaders or managers must know how to make sense of and apply research findings to improve policies and programs. Funding agencies and legislative bodies demand "evidence-based"—meaning research-based—programs and management reforms. To win funding for your program or organization, you need the ability to demonstrate an understanding of research in your field of policy or practice.

So without a grasp of research methods, you will be at a disadvantage in applying for jobs, advancing into leadership positions, and attracting financial and political support for your program or cause. With a good understanding of research methods, you can do more and go farther in your career.

Text in gray boxes is not required reading

Research, Policy, and Practice

Research has become an essential element of modern public policy and management in the form of performance measurement, program evaluation, and the push for evidence-based policy and practices.

Performance Measurement

In many fields these days, there has been much emphasis put on **performance measurement** and performance management. The idea is sensible: We should measure how well we're doing and ideally manage to improve it. New York City's CompStat program—a data-driven effort to closely track crime and hold managers accountable for controlling it—is an often-cited example. And the push to measure performance is big in education, business, health care, and many other fields. The mass of data available today, thanks to the information revolution, fuels this trend. Performance measurement has now become a pillar of contemporary policy and practice in the public and nonprofit sectors (Hatry, 2007; Kaplan & Harvard Business School, 2009; Poister, 2003).

In the following chapters, you will see how logic models can help you figure out what to measure. You will learn what makes for valid and reliable measurements. And you will be introduced to various sources of data to measure outputs and outcomes, including both existing data and original surveys. All this material is critical to understanding and implementing performance measurement and management.

Evaluation Research

Much **evaluation research** aims to answer these questions: Did a program or intervention have an impact? Did it improve or change things? Other program evaluations seek to describe the process of implementing the program. Evaluation research is now a standard requirement of most government or foundation grants and contracts. Most new policy or management initiatives demand some form of evaluation as well. So evaluation research, too, has become a pillar of contemporary policy making and management in the government, the nonprofit sector, and even the business world (Rossi, Lipsey, & Freeman, 2003; C. Weiss, 1997).

But how can we know if a program or initiative is having its intended effect? Later chapters will introduce you to the basic ideas involved in thinking about cause and effect. They will cover strategies for estimating causal effects, including the use of control variables, randomized experiments, and various forms of what are called natural and quasi experiments. These are the major strategies for conducting evaluations of program impact.

Evidence-Based Policy and Programs

As suggested earlier, governments, businesses, and nonprofit organizations increasingly favor evidence-based policies and programs—strategies that have proven their effectiveness with research. It's not enough anymore to have a few heartwarming testimonials or a plan that just looks good on paper. The trend toward evidence-based policy and practice now permeates many fields (Davies, Nutley, & Smith, 2000). Even political campaigns now make much greater use of data and evidence-based approaches to gathering votes (Scola, 2012).

Due to limited resources, policy makers and practitioners must often choose between effective programs. Therefore, comparing the effectiveness of different programs is crucial, as is comparing *cost-effectiveness*—the outcome obtained relative to the cost of the program. Such comparisons require evidence about the magnitude of a program's effect—how large an influence a program has on the outcome.

The chapters that follow will give you tools to identify and assess evidence that supports or can improve your program or initiative. And it will help you understand how to produce good research evidence to support your aims.

Evidence Can Mislead

On top of all that we've mentioned so far about the importance of research methods, it can be embarrassing to be wrong—and sometimes, if you're not careful, evidence can mislead.

Text in orange boxes is not required reading YET but will be later

Misleading Measurements

No Child Left Behind (NCLB) was signed into law in 2002, setting in motion a wave of reform in schools all across the United States that became suddenly preoccupied with high-stakes testing, worried about closing the race gap, and apprehensive about the need to demonstrate rapid gains in test scores. NCLB won support in part because of the "Houston miracle," the fact that this large, diverse city had itself demonstrated remarkable gains in reading and math scores, especially for Black and Hispanic students—at least according to scores on the Texas Assessment of Academic Skills (TAAS). If Houston could do it, so could the rest of the nation.

But scores on another test—the Stanford Achievement Test—taken by the same Houston students during the same school years showed a much different picture, according to an analysis by the *New York Times* (Schemo & Fessenden, 2003). Scores on the Stanford test, which is used nationwide, showed little or no gain overall in Houston and little or no narrowing of the race gap. Several well-known experts in education statistics, asked by the *New York Times* to review the discrepancy, concluded that the TAAS had considerably overstated the progress made by Houston students. Standardized tests do not necessarily provide a consistent measure.

QUESTION

What examples have you seen of performance measurement, program evaluation, or a focus on evidenced-based policy in your work or area of interest?

Misleading Samples

In response to a U.S. Supreme Court decision on gun control, a *USA Today* (2008) quick poll asked visitors to its website, "How many guns do you own?" About 30,000 people die in the United States each year from gun-related accidents or violence (Centers for Disease Control and Prevention, 2008), so many are concerned about gun ownership in the U.S. population. But how high is the rate of gun ownership? A total of 1,987 people responded to the *USA Today* quick poll, and the results showed that fully 89% owned a gun—suggesting gun ownership is nearly universal. But the quick poll relied on a voluntary sample—website visitors who found the article online and decided to participate in the poll.

When the General Social Survey (GSS) asked a sample of 1,996 adults if they owned a gun, only 35% reported that they did. Which survey do we believe? The GSS uses much better methods—including careful random sampling—to produce its results. The true rate of gun ownership in the United States is certainly much closer to 35% than it is to the strikingly high figure of 89%. The flawed methods of the *USA Today* quick poll grossly overstated gun ownership in the United States. The solid methods of the GSS get us closer to the truth.

Fluoridated water is associated with weakened bones, but is it a cause?

Source: Can Stock Photo Inc./Elenathewise.

Misleading Correlations

Many cities and towns add fluoride to the water supply because it helps prevent tooth decay in children. Other cities do not add fluoride. Some people worry that ingesting fluoride can have adverse effects on older people, in particular, weakening their bones and leading to debilitating and painful hip and other bone fractures. This fear comes from studies that show that older people living in cities and towns with fluoridated water tend to have higher rates of bone fractures as compared with older people living in cities and towns with untreated

water (Jacobsen et al., 1990). In other words, there is a correlation between fluoride in the water and bone fractures. Should cities stop the practice of adding fluoride to municipal water supplies?

People living in cities that add fluoride to the water may be different from people living in cities that do not. A study in the United Kingdom (Hillier et al., 2000) used methods to take individual differences in characteristics (age, sex, and body weight) and lifestyle (physical activity, smoking, and drinking alcohol) into account. When they did, the correlation between exposure to fluoridated water and bone fractures disappeared. This study suggests that the original correlation many people worried about was probably due to these other factors—it was a **spurious correlation**. In other words, it would be misleading to interpret the correlation between fluoridated water and bone fractures as showing that fluoridated water causes bone fractures to increase—and so we shouldn't change municipal water treatment policy because of it.

QUESTION

Can you think of any other examples of a misleading measurement, sample, or correlation?

What Is Research?

This book is about research methods—but what is research? We can define research as a social and intellectual activity that involves systematic inquiry aimed at accurately describing and explaining the world. But it helps to get a bit more specific.

Secondary and Primary Research

People often "research" a topic at the library or on the Internet. Such information searches and syntheses are best referred to as **secondary research**—the search for published sources describing the results of research or information provided by others. While secondary research is an important skill that we cover in the last chapter (Chapter 17), it is not the focus of most of what we cover in this book, nor is it what we mean when we use the word *research*.

Rather, we use the term *research* to refer mostly to original research, or **primary research**—the original collection or analysis of data to answer a new research question or to produce new knowledge. In journals, such studies are referred to as original contributions. What gets confusing is that original or primary research can involve **primary data** collection—collecting *new* data to provide a description or explanation of the world. But it can also involve the original analysis of **secondary data**—data collected by others, such as existing government surveys, administrative records, or transcripts. Indeed, much primary research gets done using secondary data.

Unfortunately, the term *data* can be a bit confusing. When we look up a few published facts or even a table of statistics online or in the library, we sometimes refer to this as finding "data" on a topic. But in this book, we use the term **data** to refer to largely unprocessed observations—a data set or raw data, they're sometimes called.

We now turn to some of the key features of research, particularly as it applies to policy and practice.

QUESTION

In your own words, explain the differences between primary and secondary research and between primary and secondary data.

It Comes in Various Shapes and Sizes

As you will see from the many examples throughout the chapters in this book, research comes in a surprisingly wide variety of shapes and sizes:

- Large-scale studies of broad populations
- Small-scale studies of one locally situated group
- Snapshots in time
- Studies of outcomes or events that occur over many periods of time
- Laboratory experiments
- Naturalistic observations of real-world settings
- Carefully planned interventions
- Theoretical analyses
- Opportunistic discoveries of unplanned events
- Informal research conducted for the purpose of organizational strategy or management

One of the important points to realize about research, and about researchers, is that inventiveness and creativity are an important part of the process. Good research often involves the imaginative application of new methods, innovative techniques, or clever strategies to learn about the world. It is this creative aspect of research methods that makes the topic so interesting to those familiar with it. We will try to give you a flavor of this variety and creativity in the chapters to come.

It's Never Perfect

Research, like everything else that is human, is not perfect—far from it. Every study has weaknesses, as you will see in this book. It is important to spot these shortcomings and understand their implications.

But it is also important not to entirely discard a study because it has some methodological or other shortcomings. We don't want to throw the baby out with the bathwater. Every study has strengths, too—or at least most studies do. There is often something to be learned from almost any study, and the perfect study is just not possible—especially in social and policy research. A good consumer of research can both spot the weaknesses and recognize the strengths.

It's Uncertain and Contingent

Many think of research as providing certain and universal conclusions. But research evidence often includes a

large dose of *uncertainty*, typically expressed in the form of probability statements or qualified conclusions. Thus, researchers talk about the results "indicating" this or that, "suggesting" that something is true, or showing that an outcome was "likely" due to a presumed cause. In part, this comes from the language of modern statistics, which uses the laws of probability to make inferences about unknown populations or causes. But this way of speaking and writing also reflects the inherent uncertainties involved in making firm statements or conclusions about complex human and public affairs.

Social and policy research is also **contingent**—bounded in space, time, and context. A study that finds evidence for the effectiveness of an education reform in one school district, for example, may not hold true in other districts with different children, teachers, budgets, and administrative structures. A mental health intervention that is shown to be effective with affluent suburban adults may not have the same effect on poor, inner-city adults living much-different lives. The motivations found to encourage productivity in one organization may not be the same as the motivations that matter in another organization.

It Aims to Generalize

Generalizability is the ability to take the results of research and apply them in situations other than the exact one in which the research was carried out. Although we just noted that research is often contingent, researchers nevertheless strive at the same time to make their work generalizable. This is quite important: If the research results only apply in the exact setting (time, place, circumstances) in which the study was conducted, then they cannot be used to inform policies or practices in other situations.

For example, a study might examine a policy of requiring out-of-pocket payments for emergency visits to the hospital and find no impact on health outcomes for patients. But say the study is done using data from one insurance plan that covers mostly younger, healthy workers with good incomes. Do the results apply to insurance plans that cover older, less healthy individuals with low incomes? Probably not: Such individuals might well behave differently if required to make payments for their emergency visits. So the study has limited generalizability. We might even worry that the study is only relevant for that one particular insurance plan and the population it serves, making it of little use to anyone else. While generalizability is always a goal, real-world research is often less generalizable than we would like.

This is not to say that social and policy research has little to offer—on the contrary. But you do need to be realistic and appreciate the limits, as well as the rewards, of research.

Bits and Pieces of a Puzzle

It's also true that a single study is almost never definitive. Rather, empirical evidence on a topic is cumulative. Research produces a *body* of evidence, and researchers talk about arriving at a scientific *consensus* within the bounds of what is likely to be true (or not).

QUESTION

Explain in your own words the meaning of generalizability.

Consider global warming—is the world really heating up, and if so, is global warming natural or man-

made? There have been thousands of individual studies of various aspects of global warming over the years, from tracking the melting of the polar ice caps to observing animal species, mapping storms and rainfall, sampling the level of ozone and other pollutants in the atmosphere, and so on. None of these studies alone definitively proves that human activity is causing the earth to get hotter—indeed, some contradict this hypothesis. To help establish a consensus—particularly given the monumental economic costs and political complexities involved in responding to global warming—the United Nations (UN) and the U.S. federal government each established scientific panels to review the research evidence. The UN's Intergovernmental Panel on Climate Change (2007) concluded that the earth had probably gotten warmer over the past 100 years and that human activity was "very likely" the cause. The U.S. government's panel also said it was likely that global warming had been caused by human activity (U.S. Global Change Research Program, 2009). But to arrive at this conclusion took many years of research and thousands of individual studies—not to mention much political debate. And the process goes on.

The same kind of process of accumulating evidence, engaging in scientific debate, and searching for consensus characterizes most areas of research. Of course, most topics of research do not inspire as many studies or the establishment of large national or multinational scientific panels to search for a consensus. Nevertheless, something similar happens on a smaller, quieter scale in the various journals, research conferences, and institutions where studies on a topic are presented and debated. And consensus is not always, or even often, possible: Too much is unknown, and more research remains to be done.

It Involves Competition and Criticism

The process of research is also one of continual competition and criticism—the continuous testing of the consensus. There are researchers who doubt aspects of the man-made global warming hypothesis, for example, and they are busy conducting and gathering evidence to challenge, or at least refine, the consensus. Conclusions that withstand this kind of competitive onslaught become what we consider to be established knowledge (for the time being).

The formal expression of this critical attitude is the process of **peer review**. Most research journals, as well as research funding programs, use a peer-review process in which the studies or proposals are reviewed and approved (or rejected) by a group of peers—other researchers in the same field—who render a judgment on the methods and worth of the paper or proposal. This process is usually blind (neither the researcher nor the reviewer knows who is who) to rule out favoritism and to encourage reviewers to be honest and forthright in their criticism. You, too, should think in this honest, critical way as you hear or read about research (although, of course, sometimes even the best and most experienced researchers struggle to keep an open mind).

It Can Be Quantitative, Qualitative, or a Mix of Both

Much research involves numerical measurement and statistics, but research can also involve language, images, and other forms of expressing meaning that researchers then interpret. The former is referred to as quantitative research, the latter qualitative research. Qualitative studies involving the interpretation of language can be done rigorously—despite the lack of scientific-looking tables and formulas. Numbers do not make a study good or scientific.

These days, social and policy research often uses mixed methods that combine the advantages of both

quantitative and qualitative techniques. Because social phenomena are so difficult to pin down, researchers often use multiple methods to confirm a finding, a process sometimes referred to as triangulation.

Although most of the chapters in this book are devoted to topics typically thought of as part of quantitative research, we discuss the role and contribution of qualitative methods in all of the chapters. And we devote an early chapter (Chapter 3) to qualitative research because we consider it to be foundational. In an important sense, good quantitative research is based on good qualitative research. The two perspectives enhance one another.

It Can Be Applied or Basic

Research can be **applied**—done because we have a practical need to know. For example: How many people are currently unemployed? Would smaller classes improve learning? Does adding police officers reduce crime? Applied research typically has direct implications for policy and practice. Many of the examples in this book focus on applied research.

But research can also be **basic**—the pursuit of knowledge for its own sake, rather than being based on an immediate practical need. Basic research in a given field also tends to focus on more abstract or fundamental processes of nature or society. For example, we might be interested in studying how people make decisions involving uncertainty, how the human body responds to long-term exposure to stress, how children acquire a language, or the evolutionary basis of human cooperation. Basic research also advances policy and practice by providing a solid foundation of knowledge. But the link is less direct.

Descriptive and Causal Research

Research sometimes aims simply to describe the world—how things are. At other times, its goal is to provide a causal explanation—how would things be different if we changed something? This basic distinction is fundamental to thinking about and conducting research and provides a road map of sorts for the rest of this book.

QUESTION

In your own words, describe some of the defining characteristics of social science research.

Description: What Is the World Like?

Concern about autism has been growing for some time, and parents and other advocates have pressed for services to help autistic children and for more research about the disease. In evaluating how to react to autism, policy makers and practitioners need to know how many people (and particularly children) with autism there are in the population. They need to know if the rate of autism is growing—and, if so, how quickly. They need to know whether autism is more concentrated in certain places or groups in the population. They need to know the severity and forms of autism. In other words, policy makers and practitioners need a good *description* of autism to address the problem.

The goal of **descriptive research** is to paint an accurate picture of the way the world is. Descriptive

research includes describing just one variable—such as the rate of autism in the population. It also includes describing **relationships**—how two different variables are related (see Chapter 2). Relationships are often referred to as associations or correlations. For example, autism rates have been growing, so time and autism are related. Or at least it seems so—researchers worry that perhaps we have simply gotten better over time at identifying people with autism and that this enhanced ability to identify the disease accounts for the upward trend. Autism and geographical region are also related—the disease is more common in California, for example, than in other parts of the United States. But it turns out that this description is not so certain—perhaps autism is not consistently identified everywhere. Descriptive research can be harder than you might expect.

What is known about autism?

Source: © iStockphoto.com/Tramper2.

Before figuring out what to do about a problem like autism, the problem must be described. Knowing the lay of the land is important before deciding where to go. But once practitioners have described the problem, the task of tackling and solving it has just begun. After all, we want to figure out how to make things better—not just sit around and watch things happen. In the case of autism, policy makers and practitioners want to figure out how to prevent and hopefully cure, or at least ameliorate, the disease.

Causation: How Would the World Be Different If Something Changed?

The goal of **causal research** is to answer "what if" questions to find out how to make things happen. Specifically, if we change one thing, will other things (outcomes we care about, such as autism) change? And if they do change, by how much?

For example, what would happen to the severity of the disease if children with autism stopped eating gluten? Would it change at all? If so, by how much? Or what would happen to autism rates if children stopped being vaccinated?[1] More generally, we want to know what factors have caused the growth of autism over time (if indeed the trend is real and not just an artifact of better identification techniques).

Descriptive and causal research are both important in practice, but answering causal questions is especially

central to the work of practitioners. Public policies, social programs, and management initiatives aim to do things—to make something happen. So answering questions such as "What will happen if we do X?" is essential.

Description of a Correlation Is Not Proof of Causation

It is easy to confuse correlation, the description of a relationship, with causation. If more educated mothers are more likely than less educated mothers to have children with autism—a correlation—then it is easy to conclude that something about educated mothers causes autism. However, that may not be so. Think about the earlier example of fluoridated water and fractured bones. When researchers, policy makers, or practitioners naively assume that a correlation implies causation, grave errors can be made.

For example, because autism rose over the same period that vaccine use rose, and because autism symptoms start at about the same time that toddlers receive many vaccines, many people concluded that vaccines cause autism. Many parents started to reject vaccines, causing some outbreaks of previously suppressed illnesses.

One of the most important skills you will gain from this book is how to distinguish a correlation, the description of a relationship, from evidence of a causal effect. We address this in Chapter 11, our chapter on causation. Another, perhaps even more important, skill is how to judge the quality of evidence of causation and how to do research that provides evidence of whether a causal effect exists and how big it is.

Because distinguishing description from causation is so important, we have organized this book around that distinction. Part II of the book covers strategies for description, while Part IV covers strategies for causation. We will stress again and again the distinctions between description and causation and between correlation and causation.

QUESTION

What is the difference between descriptive and causal research?

Epistemology: Ways of Knowing

How much do you weigh? How do you *know* that's how much you weigh? Probably you used a scale and remember the result. You measured your weight—an elementary act of research. How high is Mount Everest? If you know, how do you know? Did you measure it? If you don't know, how might you try to learn how high Mount Everest is? You will probably turn to other sources, perhaps searching the Internet and examining a website that you trust (secondary research). But of course you should consider how the website got its information.

We have many ways of knowing—what philosophers of science call **epistemologies**. Sometimes we directly learn something ourselves. But we can't do that about most things in the world. Often, we just accept what some trusted authority says is true. Sometimes, we rely on knowledge that comes from our cultural or religious traditions. We know other things through intuition or common sense.

The Scientific Method

There are many ways of knowing things, but in modern society the scientific method is a privileged way of knowing. Most of the ideas and techniques presented in this book are based on the scientific method.

Obviously, you cannot directly research everything you need to know on your own. So this book will teach you not only how to do research but how to critically assess and make use of the research produced and published by others. It will also help you judge knowledge that comes from authority, tradition, and common sense more effectively by using the standards of the scientific method.

The **scientific method** can be defined as an approach to acquiring and correcting our knowledge about the world. It has several key characteristics:

- Systematic observation—or measurement of various features or behaviors in the world (including qualitative observation).
- Logical explanation—in the form of a theory or model that makes sense according to basic rules of logic and accepted facts.
- Prediction—in the form of a hypothesis, based on a theory, of what we will observe if the theory is true. (This is seen as superior to after-the-fact, or ex post facto, explanations, which are not falsifiable.)
- Openness—meaning the methods used to produce evidence are clearly documented and made available for review. This allows for replication—repeating the study to see if the results hold (and in what contexts).
- Skepticism—researchers scrutinize and critique each other's work, a process referred to as peer review, in search of possible shortcomings or alternative explanations.

In sum, the scientific method is a privileged form of knowing because it is generally transparent, logical, and fact based. But scientific evidence can be misrepresented or misused, so you still need to question scientific knowledge just as you would question common sense, tradition, or authority. Also, it is important to point out that there are varying understandings of what constitutes the scientific method, and that this understanding has changed over time and across scientific fields (Godfrey-Smith, 2003).

Is There One Truth in Social Science?

The scientific method originated with the natural sciences. Newton's physics, Galileo's astronomy, Lavoisier's chemistry, and Mendel's genetics are early examples. But the social world is different from the physical or biological worlds, due to factors such as human consciousness, culture, history, and politics. And social phenomena vary by place and time much more than do physical or biological phenomena.

As a result, knowledge produced by the social sciences, such as how markets work or how children learn, is more contingent and less generalizable than is knowledge produced by the natural sciences. Moreover, how we interpret social phenomena is shaped in part by language and culturally constructed categories. These categories even influence the kinds of social objects or actions we observe, and our social constructions also vary from time to time, from culture to culture, and from political perspective to political perspective. So even when we try to be objective, our interpretations will be influenced by our categories of subjective experience

and judgment.

Because social ideas and facts are constructed in this way, some people reject the relevance of the scientific method to the study of society and public policy. Indeed, others even reject the idea that an objective truth, even a contingent truth, exists for social phenomena outside of our various subjective, socially constructed vantage points. This skeptical view is generally referred to as *antipositivism*, because it is opposed to so-called **positivism**, the approach of social researchers who pattern their work after the natural sciences. However, positivism has a more precise meaning in the philosophy of science, where it refers to a rather strict form of empiricism (such as behaviorism in psychology). We acknowledge that ideas and even observations about social phenomena are inevitably influenced by social constructions, particularly by history and culture. Nonetheless, we believe that the scientific method, broadly defined, provides the most pragmatic approach to understanding and solving many of the pressing social problems we face today.

Our perspective in this book can be described generally as **scientific realism** (Bunge, 1993; Godfrey-Smith, 2003): "realism" because we believe that the social world, although profoundly shaped by human history and culture, is still part of an objective reality that exists outside of our thoughts and perceptions, and "scientific" because we believe it is possible to use the scientific method—or methods modeled on the scientific approach—to learn about and understand the social world. We do not mean to minimize the practical problems of applying scientific approaches to social phenomena, but we consider them to be *practical*, not existential, problems. When studying policy and society, the scientific method can serve as an ideal—even if social and policy research does not always live up to this ideal.

Induction and Deduction

There are several ways in which researchers employ the scientific method to tackle a problem or curiosity, as illustrated in Figure 1.1. One approach is to begin by doing systematic observation of the world, and then develop a logical explanation (theory) to account for what they see—an approach referred to as **induction**. In anthropology, for example, researchers typically observe people in a community for some time before developing an explanatory theory. Qualitative research, described in Chapter 3, is often inductive. Induction also happens in quantitative research when many possible relationships between variables are explored before an explanatory theory emerges from the observed patterns.

The other approach is **deduction:** The researcher moves straight to the development of a logical explanation or theory and only later gathers evidence to test the theory. For example, rational choice theorists in economics and other fields approach many problems with the fundamental assumption that people or institutions will seek to maximize their gains and minimize their losses. Starting from this assumption, they then generate hypotheses and predictions about not only economic decisions but also such things as racial discrimination, marriage, and voting (Becker & Becker, 1998). In social research, some researchers called **structuralists** insist that social research must always start with theories and test these with empirical predictions.

Most researchers, however, practice a combination of induction and deduction. They have a theory, gather data to test it, but then also examine the data in other ways to develop new theories.

Proof Requires Fresh Data