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, feed the hungry, house the homeless, or improve public services to 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. (See www.fedstats.gov to get a flavor of all that is available from the U.S. federal government alone.)

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 or *methodology*.

Methodology refers to the sampling strategies, measurement instruments, comparisons, statistical techniques, and other procedures that produce research evidence. So we need to understand methodology to judge the quality of research. Research methodology is what this book is all about.

May the Best Methodology Win

We also need an understanding of research methodology 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 methodology. If my study is better made, I win the argument. But if your study turns out to be better made, you win. So, although the war may start from a substantive policy or program disagreement such as how best to provide sex education to teens, the battles often rage over research methodology.

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 questions of methodology. 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 and other institutions as well as data generated by programs and organizations—means that those who know how to handle, analyze, and interpret data have great value to organizations and employers. Agencies and 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 grants or funding for your program or agency, 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 further in your career.

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

The world these days is awash in 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. 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; de Lancer Julnes & Holzer, 2008; 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

Many program evaluations aim to answer the question: Did the 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 public policy and management in the public and nonprofit sectors (Rossi, Lipsey, & Freeman, 2003; 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 field 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 and foundations 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).

Due to limited resources, policymakers 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 backs up 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.

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 extraordinary 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 & Fessendent, 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.

Misleading Samples

In response to a recent Supreme Court decision on gun control, A *USA Today* (2008) quick poll asked visitors to its Web site, "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 the high rate of gun ownership in the United States is an important public health as well as criminal justice issue. 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—it seems the United States is awash in guns! But the quick poll relied on a voluntary sample—Web site 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? It turns out that 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* (2008) 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: © iStockphoto.com/guenter2.

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. Recently, people have begun to 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 a causal relationship—and so we shouldn't change municipal water treatment policy because of it.

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 15), it is not the focus of most of what we cover in this book, nor what we mean when we use the word *research*.

Rather, we use the term *research* to refer mostly to original, 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 also 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* also can be a bit confusing. If we looked 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—*raw data*, it's sometimes called.

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

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 simulations
- Naturalistic observations of real-world settings
- Carefully planned manipulations
- 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 learn 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 also 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

We tend to think of research as providing certain and universal conclusions. But experienced researchers know otherwise—especially those involved in social and policy research. Research evidence includes a large dose of *uncertainty*, often 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, suppose a study looks at a policy of requiring copayments for emergency room visits and finds 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 copayments for their visits to the emergency room. 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).

Consider global warming—Is the world really heating up and, if so, is global warming natural or manmade? 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 and political costs involved in responding to global warming—the United Nations and the U.S. federal government each established scientific panels to review the research evidence. The UN's Intergovernmental Panel on Climate Change concluded that the earth had probably gotten warmer over the past 100 years and that human activity was "very likely" the cause (Intergovernmental Panel on Climate Change, 2007). 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 this conclusion took many years of research, and thousands of individual studies—not to mention much political debate—to arrive at. 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 and research conferences where studies on a topic are published 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 manmade 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 **peer-review** process. 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 methodology and worth of the paper or proposal. This process is usually blind (neither the researcher nor the reviewer know who is who) to rule out favoritism and to encourage reviewers to be honest and forthright in their criticism. You, too, should learn to think in this honest, critical way as you hear or read about research.

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 every bit as rigorous and scientific as quantitative studies—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 referred to as **triangulation**.

Although more 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 the chapters. And we devote an early chapter 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.

Formulating Research Questions

Research answers questions—but what kinds of questions, and where do they come from?

How the World Is—Not How It Should Be

To begin with, it is important to understand that research questions are **positive**—about how the world really is; they are not **normative**—about how we want the world to be. Consider again the debate between those who favor an abstinence-only approach to sex education for teenagers and those wanting comprehensive sex education (including the distribution of condoms). Research is well suited to answering the *positive* question of whether these approaches do, or do not, do anything to reduce the rate of sexual activity and sexually transmitted disease among teenagers. Research does not help much with answering the *normative* question of which approach is the right thing to do, given our moral beliefs or community values.

However, doing research does not mean giving up your values. In fact, you can use research to support or create policies that further your goals and reflect your values. For example, if you care about the homeless, you can choose to study the homeless—who they are, how they became homeless, and what programs are most effective at improving their well-being. Values can legitimately shape what one chooses to study. But researchers try hard not to let their values lead them to suppress or distort their findings to conform to their normative beliefs. Good research gives us a window on reality—even if we do not always like what we see.

Applied and Basic Research

Research questions—particularly those in **applied research**—often come from a practical need to know. For example: How many people are currently unemployed? Would smaller classes improve learning? Does adding police officers reduce crime? The answers to questions in applied research

typically have direct implications for policy and practice. Most of the examples in this book focus on applied research.

In contrast, **basic research** is often thought of as 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, or how children acquire a language. Basic research also advances policy and practice by providing a solid foundation of knowledge. But the link is less direct.

Questions We Ideally Would Like to Answer, and Those We Really Can

Although practical needs generate pressing questions, research frequently cannot answer exactly the question we might ideally want answered. Often, we must settle for an answer to a related question—an approximation of sorts. But it is better to have an approximate answer than none at all.

For example, suppose we want to describe lab tests among those with diabetes in the United States. Due to the fragmented nature of the U.S. health care system, there is no one source of medical records representative of all people with diabetes in the United States. Instead, a study might be done on people over 65 with diabetes using Medicare data, while another study might get records on younger adults from a private insurer operating in one region of the country. Neither study would generalize to the entire U.S. population of diabetics—far from it. So the best that can be done is to conduct several studies that collectively might help us approximate an answer.

Consider another example: Does divorce have long-term detrimental effects on children, psychologically or educationally? Because we cannot rewind the clock and see what would have happened to these children, had their parents not divorced, this question is hard to answer directly. We could compare differences between those whose parents divorced and those whose parents did not, as in a study by Huurre, Junkkari, and Aro (2005). But because these groups may be different in important ways, this comparison answers a different, but still valuable, question. A study by Gruber (2004) used changes over time in state divorce laws to determine the long-term effects on children of making divorce easier. But this, too, is a slightly different question from our desired question, because we still aren't sure if the detrimental effects on children can be attributed to divorce itself or perhaps some other consequence of the changes in law. And Gruber's study was unable to consider some of the psychological outcomes observed by Huurre and colleagues (2005). Flexibility and compromise are required when translating a policy question into a doable research question.

To make good use of research, it is important to understand what question a study addresses, and how it might differ from the one you ideally want answered. In Chapter 15, we return to the difference between applied policy and practice questions and the often more limited, approximate answers that research can provide. We will look at how those differences shape both research and its effect on policy. Also in Chapter 15, we offer some suggestions on developing your own research question, which similarly involves a trade-off between what you ideally want to answer and what you can answer, given available data and resources.

In the next section, we describe perhaps the most fundamental distinction concerning research questions—the distinction between descriptive and causal questions.

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 roadmap of sorts for the rest of this book.

Description: What Is the World Like?

Concern about autism has been growing for the past two decades, and parents and other advocates have pressed for services to help autistic children and for more research about the disease. In

What is known about autism?

Source: © iStockphoto.com/Tramper2.

evaluating how to react to autism, policymakers and practitioners need to know how many autistic people (and particularly autistic children) 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, policymakers 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. 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 those 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 also not so certain—perhaps autism is not consistently identified everywhere. Descriptive research can be harder than you might expect.

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 and watch things happen. In the case of autism, policymakers 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 autistic children 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.

Causal Research Needs Qualitative Research

Qualitative research is also very important to causal research. We often get ideas about possible causes from case studies or qualitative observations. And qualitative methods do an especially good

[1]See the chapter "Vaccines and Autism?" in the book by Arthur Allen (2007), which addresses this controversy.

job of uncovering and documenting causal processes or mechanisms—for example, the precise ways in which a program influences participants.

Quantitative, statistical studies do a good job of demonstrating a connection between two variables, such as a program and an outcome, but have less to contribute to our understanding of what process or mechanism was responsible for how the program influenced the outcome. Good causal research often needs the insight from qualitative research.

Don't Confuse Correlation With Causation

It is easy to confuse correlation, the existence of a relationship, with causation. If more educated mothers are more likely to have autistic children—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, policymakers, 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 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 10, 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 III covers strategies for causation. We will stress again and again the distinctions between description and causation and between correlation and causation.

Let's look now more closely at what we call *the scientific method* as one of several ways that we have of knowing about the world.

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 Web site that you trust (secondary research). But of course, you should consider how the Web site 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—especially in matters of public policy or professional practice. The research methods 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 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.

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, 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 first toward the development of a logical explanation or theory and next gathers evidence to test the theory. For example, in astronomy,

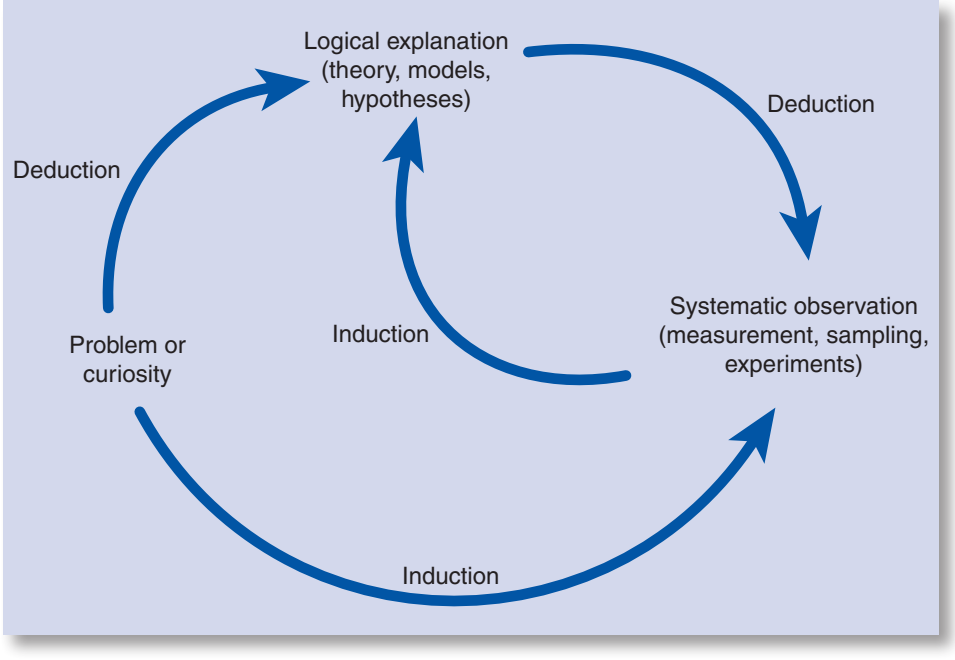


Figure 1.1 Induction and Deduction

researchers might develop a theory that predicts when a planet will appear where in the night sky. They then use telescopes to make observations of the planet and to see if its appearances agree with their prediction. 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

While most researchers practice a combination of induction and deduction, even in a single study, the structuralists have a point that applies broadly in research: *Data cannot be used to both develop a theory and definitively confirm it.*[2] Fresh data are required to truly test a theory or support a hypothesis. Think of your favorite detective novel. The detective struggles to come up with a theory of the crime or mystery that fits all the existing clues. Then the detective uses the theory to predict some previously unknown and unsuspected fact—mud on the perpetrator's evening dress, for example. If the prediction indeed matches the fact, the perpetrator's guilt appears much more likely. Prediction provides powerful proof.

[2]We cover this issue in more detail in Chapter 8. It is related to issues of statistical power in hypothesis testing.

In social and policy research, some studies strive to generate theory, while others aim to test theories. Research is often an iterative process in which deduction and induction alternate (as Figure 1.1 illustrates).

Truth in Social Science: Controversy and Consensus

The scientific method originated with physical sciences such as astronomy and physics. The discoveries of Newton and Galileo are early examples. Natural and biological scientists were also early users of the method.

The more isolated the study is from real-world complexities, the better the scientific method works. For example, the scientific method works better for physics and biology than for engineering and medicine. Nevertheless, the scientific method is responsible for enormous strides in both engineering and medicine.

Social phenomena are more complex and varied than physical or even biological phenomena due to factors such as human self-awareness, personality, and culture. Social phenomena vary by place and time much more than physical or biological phenomena. So truths in the social and policy sciences, such as how markets work or how children learn, are much grosser approximations of truth than in engineering or medicine—and far from the more universal truths of physics.

Moreover, how we interpret social phenomena is shaped by language and culturally constructed categories. These categories shape our interpretation and even what we observe, and our constructions 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 at least somewhat conditioned by our categories of subjective experience and judgment.

Because social ideas and facts are constructed, some reject the relevance of the scientific method to the study of society and policy. Indeed, some even reject the idea that an objective truth, even a contingent truth, exists for social phenomena. We acknowledge that all real-world social and policy research will have limitations, based on the researchers' interests and perspectives, and will only get at part of the truth.

But we prefer to take what is probably best described as a **critical pragmatic** point of view in this book. That is, we seek feasible methods and practical knowledge that will help us improve some problem or condition in the world. In doing so, we believe that it is important to try to be objective (as best as we can agree), because that is how we will find the most useful information. When studying social phenomena, the scientific method can serve as an ideal—even if social and policy research does not always live up to this ideal.

Approaching Research From Different Angles

You may encounter research from various angles: as a consumer of research findings in news articles, government reports, or journal articles, as someone who commissions research to satisfy a pressing information need, or as someone who conducts research on your own or as part of a team. This book addresses all these perspectives.

Consuming Research

Research appears in many forms—in journal articles, government papers, foundation or advocacy reports, and various summaries in print and electronic news media. An important goal of this book is to help you become a better consumer of research evidence—to take what's valuable and useful from available research and apply it to the task of solving important problems and improving people's lives. We hope that this book sparks your curiosity about what's out there ("I wonder if someone has done a study about . . ?") and that it gives you the skills and confidence to go directly to the source. There is much to learn from reading an original study (even though it is not always written in a very user-friendly style, something researchers need to work harder at, in our view).

Many of you are members of or will join professional associations—in public administration, education, public health, social work, criminal justice, or other fields. As members, you may receive research journals in your field. Through your association or employer, you also may have online access to relevant research journals. And there is a growing movement toward *open-access* journals—online journals that are freely available to the public. So getting access to original studies in your field is becoming increasingly trouble-free. The only hindrance is your own ability and confidence to read, understand, and apply what's in these research journals. We hope that this book helps you do that.

Often, you'll come across the results of research—not in academic journals or in research reports—but in newspapers, magazines, TV shows, or on the Internet. Some media summaries leave out a lot and some even make mistakes. Journalists have an interest in getting readers' attention and consequently sometimes exaggerate or sensationalize results. Good journalists, however, clearly and accurately explain research—a valuable service to society. The tools that you'll learn in this book will be even more valuable for critically examining journalistic accounts of research. And if you aspire to be a part of the media, this book will give you the tools to describe research accurately to your audience.

Commissioning Research

Policymakers, practitioners, and managers often have important research questions that have not been addressed in prior studies or analyses. So they need to commission research from internal staff or outside consultants.

An understanding of research methods is essential for all phases of this task. You need to adequately frame the initial research question and discuss it with the research team. You need to approve the team's proposal or work plan—how it will sample, measure, and draw analytical conclusions to help answer your question. As the client, you will be called on to make decisions or sign off on changes as the research unfolds (nothing ever goes perfectly as planned). You will be the main reviewer of briefings and draft reports. And most likely, you will participate in the presentation of the final research results in meetings with organizational leaders, in testimony before legislative bodies, or in press conferences with the media.

Who is selected to do the research will, of course, have a critical influence on its quality—so hire or choose your research team wisely. But you, as the client who commissioned and managed the research in the first place, are just as important a part of the process. This book will help you become a better purchaser and manager of research.

Conducting Research

When we think of a researcher, we tend to envision a tweedy professor in a university or a white-coated scientist in a laboratory. If this is your calling, then of course you must know research methods especially well. Indeed, a solid grasp of research methodology can help a new scholar become more productive, succeed at publishing, and participate more fully in his or her field of study.

But not everyone who conducts research these days fits this traditional mold. On the contrary, increasingly, applied research of various kinds is being conducted in large and small government agencies, nonprofit organizations, foundations, advocacy groups, the news media, and a growing industry of consulting firms that support the research needs of public, nonprofit, and business organizations. Some of these applied researchers have PhDs or other doctoral degrees, but many do not. Indeed, there are quite a few master's and even undergraduate programs that provide research and analysis skills sufficient to begin a career as an applied researcher or policy analyst.

Moreover, there are many situations in which practitioners engage in *informal research*. Examples include doing your own survey of employees or clients; making comparisons using performance measures; examining the effectiveness of a new program or management initiative using administrative data; and doing qualitative interviews or focus groups for purposes of internal strategy, marketing, or decision making. These activities are research, too, even though the people doing them do not aim to publish in peer-reviewed journals or release results in fancy research reports. Knowledge of research methods can dramatically improve one's ability to do informal research well.

Ethics of Research

Social and policy research raises important ethical issues because it deals with human beings—their health, living conditions, rights, and well-being. In the chapters to come, we deal with these ethical concerns in the context of particular methods and study types covered in this book. For example, qualitative research presents unique ethical issues that we address in Chapter 3; the use of existing administrative data raises confidentiality concerns that we cover in Chapter 6; and experiments involving human beings require many ethical considerations that we discuss at length in Chapters 10 and 12.

However, there are certain core principles that are worth reviewing here as a preview of what lies ahead. These principles come from an important document known as the Belmont Report (available from the U.S. Department of Health and Human Services at www.hhs.gov/ohrp/humansubjects/guidance/belmont.htm).

- **Respect for persons** dictates that people used as the subjects of research provide informed consent and are not coerced into participating in research.
- **Beneficence** dictates that people who participate in research are not harmed and, indeed, that they should realize some benefit from the research.
- **Justice** requires consideration of equity among subjects and fairness in regard to who becomes a research subject.

The history of applied policy research has some ugly chapters. In the infamous Tuskegee syphilis study, for example, the U.S. Public Health Service recruited poor African American sharecroppers with the disease into a long-term study and then left them untreated for many years—even after penicillin was found to be an effective cure—to study the progression of the disease. The Belmont Report came out of this experience. In Chapter 14, we cover the history and practice of ethics in research in more detail.

Conclusion: The Road Ahead

The ideas and concepts of research methodology come from many different disciplines—sociology, economics, the health sciences, and education, to name a few. As a result, it is less a neatly ordered landscape than a somewhat tangled and overgrown woods. So as you travel the road ahead, we will try to clear away the brush along the way—yet still preserve the variety of ideas and concepts that you will find in the many disciplinary journals and reports of research. It might comfort you to know that even experienced research methodologists, talking across disciplinary boundaries, often do not understand one another because of the many dialects of research methodology. This communication gap is unfortunate, of course, but it is part of the real world of research. Thus, an important skill to have, both as a researcher and a consumer of research, is to be able to see through the tangle of terms and to get a good view of what issue or idea is really at stake.

We begin our journey in the next chapter with an introduction to *theory and models*—the conceptual tools researchers use to think about the world and to begin to figure out how to study it.

Exercises

Battleship Research

1.1. You saw in this chapter how research gets used in battles over controversial public policies, such as sex education or global warming. Can you think of other, important policy debates in which opponents use research to support their arguments? How has research methodology played a role in these debates?

Research in the Corner Office

1.2. We made the case in this chapter that the ability to judge and apply research evidence is an important qualification for top management and leadership positions. Identify this kind of position in an organization or agency in your area of policy or practice. In what ways does the person in this job use or commission research? If possible, interview the person.

Following the Trends

1.3. In your area of policy or practice, think of an example for each of the following:

- A performance measure
- A program evaluation
- An evidence-based policy or practice

Misleading Evidence

1.4. We gave a few examples in this chapter of research evidence that sometimes misleads. Can you think of other examples? Think about a misleading measurement, a misleading sample, or a misleading correlation.

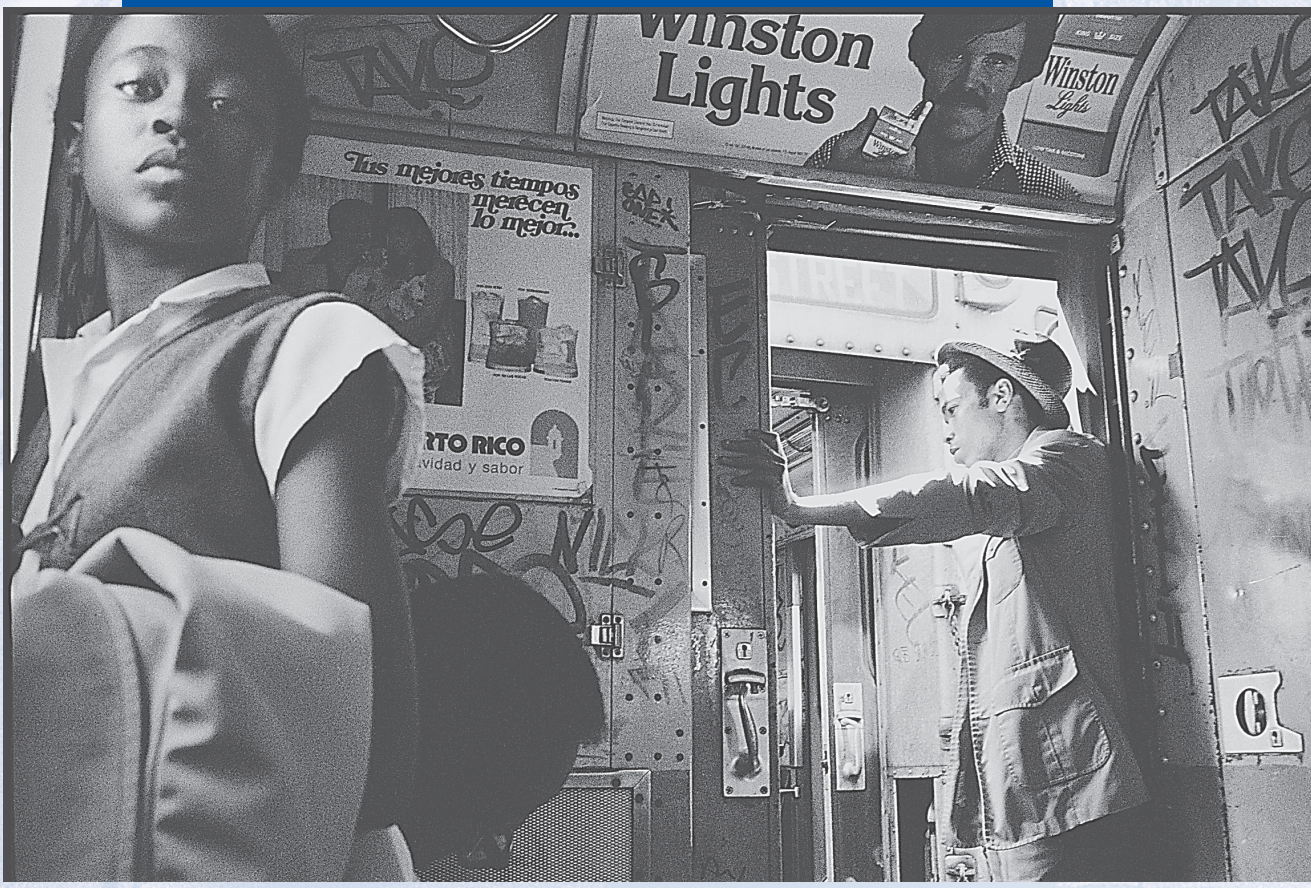
Descriptive Versus Causal Research

1.5. The distinction between descriptive and causal questions is a fundamental distinction in research. Think about a current social problem or issue that people are talking about these days. What are some descriptive questions research could help answer? What are some causal questions?

Formulating a Research Question

1.6. Think about a pressing question in your work or community that interests you. What information would help you? How would you use that information? Formulate a research question to provide that information.

Objectives: This chapter introduces you to some of the conceptual building blocks of social and policy research. You will learn how researchers use a theory to explain an outcome of interest—and how they use a model to express a theory. You will understand the parts of a model—variables, relationships, and causal mechanisms. And you will gain practice using path diagrams to think through the logic of a theory. Finally, you will appreciate the usefulness of theories and models for explaining social problems and for designing, implementing, and choosing effective public policies and programs.



The broken windows theory was used to fight crime in New York's subways.

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