WHY WE DO RESEARCH

Research is formalized curiosity. It is poking and prying with a purpose.

—Zora Neale Hurston, writer

LEARNING GOALS

In this chapter, the differences between everyday thinking and scientific thinking are discussed. An argument is made about the advantages of doing survey research and understanding various kinds of research: exploratory, descriptive, explanatory, and evaluation. The chapter concludes with a comparison of quantitative and qualitative research methods. By the conclusion, you should be able to give examples of everyday thinking, discuss the components of scientific reasoning, and describe the different types of research methods.

Remember the time you asked one of your parents to buy a particular pair of expensive running shoes, let you go to a party, or do something just because "all the kids" were? Well, the astute parent would question this and wonder if it were really true that *all* your friends were actually involved. "Why not collect some data first and then report back to me what percentage of your friends own those clothes or are going to that concert?" That's what parents trained to do survey research might say!

Too often we make conclusions about entire groups of people on the basis of observations of only those we know or see around us. Or to put it more scientifically: Too often we generalize about an entire population on the basis of a nonsystematic method of collecting data from a biased sample. This is one of the major differences between everyday experience, pseudoscience, and scientific thinking. What follows

is an argument for doing things more systematically and scientifically than usual, and a justification for doing quantitative survey research as one of many approaches to understanding how and why humans think and act the way we do.

EVERYDAY THINKING

How we see the world around us is shaped by a variety of forces that include the books we read, the television and movies we see, the culture's rules and guidelines for good behavior we repeatedly hear, and the teachings from the religious organizations and schools we attend. It is also highly influenced by our friends—the peer groups we spend a good deal of time in and from whom we learn. But so many of these social forces are linked to each other in ways that tend to reinforce our already held values and beliefs. Conclusions based on networks of friends and family members are hardly useful, then, in trying to understand how most other people think or behave.

The trick of socialization, to paraphrase writer Carlos Castaneda, is to convince us that the way we see the world is the only reality, one supported by social consensus. By experiencing more diverse cultures and meeting a wider range of people, we come to understand that to make conclusions based simply on the way our friends and family live, what they believe in, or how we were socialized, is limiting. Too often those with whom we associate are similar to ourselves in values and beliefs; we end up selectively sampling like-minded people and erroneously concluding that "everyone" experiences reality in the same way we do.

Although we seem to manage fairly well on a daily basis, our everyday experiences are often based on methods that can lead to problematic decisions with outcomes that can seriously affect our lives. Imagine if some friends told us that they were able to stop flu symptoms and prevent a recurrence of a cold simply by eating only the white filling in a chocolate cookie every day for a month. Would we rush out to buy bags of these wonderful cookies and use them to ward off the flu instead of getting a vaccine? It certainly would be more fun (and fattening) but not likely to keep us from getting the flu. What if they told us to take vitamin C or echinacea? Would we run to the store to get some, or would we critically inquire about the research that tests this general statement?

Every day we make conclusions and act on them with similarly limited information. Recall how sometimes you get a message from someone you suspected would be getting in touch: "I had a feeling you were going to text me." Never mind that you don't remember the number of times you did not guess accurately or that you normally contact that person around the same time every day.

Or recall when you ran to the nearest movie theater to catch a film your friends exclaimed to be the best ever and some critic called "the best film of the year," even

though it was only March. Although it would be impossible and crazy to survey a large number of people every time we need to make a decision to do something, be aware of how the process of making a choice is often not much more systematic than believing the person with the secret cure for the common cold. Yet we make such decisions because we know from experience ("empirical data") that this particular friend's recommendations have almost always been reliable.

What we do in everyday life is typically the result of some less scientific thinking than the procedures we would expect policy makers, neurosurgeons, or airline pilots to follow when they are in control of our well-being. In other words, what we need to consider is how ordinary thinking differs from the systematic methods needed to understand complex social behavior and attitudes. By doing so, we begin our research journey on the correct foot.

The characteristics of ordinary, everyday thinking and inquiry include

- Biased questions
- Limited sampling
- Selective attention, perception, and retention
- Pseudoscience.

Biased Questions

Did anyone ever ask, "Do you really want to go to that Justin Bieber concert?" and say it with an air of disdain? It would be difficult to answer, "Yes, I really do want to hear him sing" since the questioner was implying that the performer was so bad no one in his or her right mind could really want to go. And remember the time someone wanted to know the reasons why everyone was so dissatisfied with the workplace cafeteria, thereby assuming that "everyone" was unhappy and all we needed to do now was find those reasons? Consider the research question usually worded this way: "Why is it that I study more than the other students yet they get better grades?" and the implications already formed by the phrasing. Rhetorical questions are posed to make a point rather than to seek an answer and are certainly not suitable for scientific data gathering.

In each of these three cases, everyday nonscientific thinking leads us to ask questions that are already *biased* or slanted in a particular direction. The first is already providing the answer in the way it is worded. It does not allow for a full range of possible answers, so the only conclusion would be that everyone who was asked the question in this way in our survey does not want to hear Bieber sing. We'd be making an accurate statement of what was uncovered, but the answers are only as good as the way the question was framed and applicable just to the *limited* sample. The tendency,

of course, is to *generalize* to all people, that is, to make conclusions about people not surveyed using the information obtained from those that were.

Similarly, the second question proceeds from a *selective* assumption that may not be accurate, so the only answers we get from a survey of employees' experiences are negatively *biased* ones about the organization. How many times do we really ask, "Why is this workplace such a happy one?" with the same enthusiasm and inquisitiveness as we asked why people are dissatisfied with work? Or, more accurately, how often do we ask what they think about their workplace, without qualifying it as good or awful when we inquire?

With the third question about study habits, we are talking ourselves into believing something that may not be true, but asking it in this form just the same. Rarely do we, in everyday talk or thought, put it the following way: "I wonder if there is a relationship between the amount of time people study and their grades." We often begin with a particular viewpoint and proceed to ask questions from that selective position, sometimes not even aware that we are doing so. Thus, the answers we get tend to verify what we already believe (sometimes referred to as "confirmation bias") and give us a false sense of having found some objective and honest answers (see Box 1.1). We now have the reasons why our *limited* sample of employees hate the cafeteria food and falsely *generalize* that everyone hates the food because we never found out how many liked it in the first place.

BOX 1.1
EVERYDAY BIASES

A great source for studying how people selectively see the world, make use of limited samples, generalize to people not studied, and ask questions in biased ways is to read the Letters to the Editor page in newspapers or the Comments section of online blogs and responses to controversial Facebook posts. Soon after a major shooting occurred in a suburban high school, a series of comments appeared in an online story, each with its own explanation for what happened and each likely representing the writer's own personal values and biases. These opinions included the following possible reasons:

1. Life in white monotonous suburbia and the alienation that results
2. Republican congressmen who refuse to pass legislation controlling guns
3. Parents who neglect their kids' depression and isolation
4. Schools that allow hate-filled speech and all sorts of taunting and bullying of kids who are different
5. Legal abortion and the theory of evolution, both of which lead to a devaluation of life.

Take a look at your local paper's letters to the editor or the comments for an online column or Facebook post and see how many examples you can find of everyday, nonscientific reasoning.

Our daily interactions with friends, family members, and the people we encounter on a routine basis rarely require anything more scientific. Ordinary discourse contains many such poorly worded questions and biased assumptions, and the world manages to keep going. However, imagine the consequences of asking questions in these ways when trying to understand more complex and important behaviors and opinions or when attempting to develop public policies that can seriously affect people's lives. No one should think that an educational institution, for example, can create rules to require a certain amount of study hours per week simply based on the findings of a survey that asks only why those who study less get better grades. Should the Human Resources office modify an entire organization on the basis of the results of a survey focused solely on the dissatisfaction of the employees who took the time to fill it out?

Everyday thinking, in other words, typically employs biased phrases and other nonscientific styles of framing questions when making sense of the world we live in. The results of these queries may help us decide which movie to watch, but they are not useful when it comes to making choices that affect social policies or arriving at conclusions fairly and consistently. How we can improve the way we ask questions and minimize the biases that derive from faulty wording is discussed in more detail in Chapter 4.

Limited Sampling

Most of the time, we make sense of reality by reflecting on the experiences we've had. It is not too difficult to figure out how our friends feel about various rules, political leaders, music, and television programs. We are generally good at assessing the climate of opinion about controversial topics among our peers and those whom we encounter regularly in our living spaces. Unfortunately, there is also the tendency to take these limited experiences and then assign them to larger groups of people.

"Everyone I know hates the food in the cafeteria"—so it must be bad. "I talked with others in the class who have good grades and they're not reading the assignments"—so it doesn't matter how much one studies. "No one I know liked that movie"—so it must be failing at the box office. While it may sound reasonable to make such concluding statements, the problem, of course, is that we have simply taken the opinions or measured the behaviors of those we already know and then made the assumption that they are somehow representative of "all" people: "But, Mom, *everyone* is going to be driving to school this year." But if they are our friends, they are likely to be people who share our tastes and values.

Confirmation bias is this tendency to seek information and sources that support our already held opinions. We tend to avoid sampling websites, opinion articles, and news sources that contradict or challenge our values and views.

Selective Perception

People forget that most of the time our lives are constrained and limited by the social spaces we inhabit. Ethnicity, social class, gender, sexual orientation, and religion are just some of the many characteristics that provide different experiences and push us into living in unique subcultures and communities. Everyday life is often a series of encounters in limited areas. We rarely get to move outside our circumscribed environment and, when we do, we do not always see what is there. It is part of human existence to *selectively* attend to, perceive, and recall information. After we have arrived at some belief about people or an assumption about some events, we use these beliefs to focus our attention mostly on those aspects that already fit our assumptions. We typically see only those dimensions, and we tend to remember better just the events that verify our already held beliefs. This confirmation bias is made possible through the processes of selective perception, attention, and retention. It's difficult to experience reality differently from the way we are taught, and contradictory evidence can sometimes even end up reinforcing already held positions (see Nyhan and Reifler 2010).

How many of us actually noticed what our boss or favorite professor wore yesterday? Most of us don't *attend* to or pay attention to such things unless we have a particular interest in evaluating someone else's clothing styles. And even if we did notice, what aspects of the clothing did we even see? We tend to *perceive* only some things, in this case, perhaps just the shoes or the type of shirt. And when we do make note of them, for how many days do we *retain* this information? Can we actually recall what we had for dinner or what our best friend wore a week ago?

As a result, for us to suggest that we understand how other people feel or behave on the basis of our own limited sampling, selective perceptions, and selective recall is problematic. At best, we could say that we have a sense of the way the people in our lives approach the world. To use that everyday information, though, to enact policies or change the rules of the game for everyone else would be overgeneralizing and unethical. *Overgeneralization* occurs when we attribute patterns to an entire group and make conclusions about a wide range of people or events on the basis of a few observations. The limitations imposed by our everyday investigation of only the people around us restrict our use of that information for scientific purposes. How best to sample and generalize and how to go beyond the convenience of talking to those whom we already know are the topics of Chapter 5.

Pseudoscience

One type of everyday thinking that has the appearance of being scientific yet relies heavily on anecdotal claims is termed *pseudoscience*. According to Kida (2006), it is characterized by a search for evidence to support preconceived ideas, a disregard for

data that would falsify a claim or provide alternative explanations, a lack of skeptical critical thinking, an acceptance of weak evidence for extraordinary beliefs, and an absence of systematic methods to test claims.

It is not unusual to see pseudoscience at work in advertisements for "lose weight fast" treatments or "miracle drugs" to cure baldness or the latest antioxidant food fad that can prevent the common cold. Often the claims are based on a few people posed in "before and after" photos with testimonials based on limited personal anecdotes. Implied is a cause-and-effect connection when there might at best be only a weak or no correlation between the treatment and the cure.

SCIENTIFIC THINKING

In order to be able to make valid and reliable conclusions about human behavior, we are required to go beyond the components of everyday thinking and pseudoscience. While those techniques and styles may help us get along in our daily lives, the job of measuring various aspects of the social world and people's beliefs and behaviors demands a more deliberate approach. Certainly, intuition can play some role in arriving at conclusions and making decisions, but would we really want someone about to operate on our body to do so guided by today's horoscope or by some hunch and intuition?

We would hope surgeons base their decisions on techniques and knowledge gained from decades of scientific studies and research. Although understanding study habits and grades is hardly as important as brain surgery, if we were to enact some policies and procedures that can have a positive or negative impact on students' well-being, then investigating patterns of studying also deserves some rigorous and systematic methods. Developing policy or drawing conclusions about social life is best accomplished with the assistance of scientific procedures rather than with a dependence on the everyday thinking described previously. Science is certainly not the only way of arriving at information, but it may be better suited for specific kinds of questions.

Scientific thinking is characterized by

- Empirical observations or data
- Systematic and deliberate methods
- Objective, intersubjective, and replicable procedures.

Research Design and Empirical Observations

Let's consider what these mean and see how they differ from everyday thinking. In order to be more confident that the findings on which our policies will be based or the conclusions we make about social relationships are accurate, we need to develop

scientific methods for gathering our observations. We need a *research design*, or a plan for translating our research objectives into measurable and valid information. Simply making decisions on the basis of what we see happening among our friends and the people we encounter is not a reliable procedure for making conclusions about larger groups or categories of people. Yet one of the basic principles of science is involved in everyday thinking; that is, we regularly make observations and collect data.

Empiricism states that the primary source of knowledge is experience, especially that gained through the senses. We understand the world by observation (data collecting), not just via speculative thinking or theories. At some point, to be scientific, we must encounter the reality that is out there and experience through observation whether the educated hunches or ideas we proposed in our theories are substantiated.

Systematic and Deliberate Methods

Empiricism is also part of the everyday procedures we sometimes erroneously use to make conclusions, so other elements are essential. These observations must also be *systematic*, *objective*, and *replicable*. This is where issues of representative and random sampling, measurement reliability and validity, and other methods used to make observations come into play, as discussed in later chapters. By spelling out clearly the details of how we are to measure and whom we are to observe—and "what" we will do to get the "who" to show us the "how"—we are engaging in the methodical step-by-step procedures of research design that make scientific thinking more *systematic* and deliberate than everyday thinking. Although such procedures don't always guarantee completely accurate results, they do eliminate many of the errors that are part of ordinary, nonscientific observation procedures and allow us to generalize and arrive at conclusions about larger numbers of people or events.

Objective, Intersubjective, and Replicable Procedures

Some might argue that the elimination of errors and biases is what makes science more *objective*, that is, less dependent on emotion or personal prejudices and values. Because the procedures have been systematically detailed, other researchers could *replicate* the study (i.e., repeat it using the same methods with a new sample) without interference of individual biases. Of course, researchers have biases and hold a wide range of values that not only may affect the topic they choose to study, but also could influence the procedures they develop to make the observations and collect the data. After all, scientists engage in everyday thinking, are subject to confirmation bias, and employ selective perception as well. This is why replication is a necessary step in the scientific process.

There is nothing wrong with this subjectivity; indeed, it is a key process in uncovering the multiple ways people understand reality differently. Rather than assume that certain words or concepts are objective, we sometimes need to recognize that there are alternative meanings attached to those concepts. For example, when a questionnaire inquires about marital status and the range includes "married," "divorced," "widowed," and "single/never married" categories, how are these options viewed by respondents who are living with someone of the same or opposite sex in a romantic relationship? What if respondents were cohabiting with and not legally married for 15 years and the relationship ends—are they still "never married" or "separated/divorced?" Subjectivity provides the insights and meanings others have about social behavior and attitudes and contributes new ways of developing measurements more comprehensively. We cannot, however, use subjective perspectives as a sole research method if we plan to make scientific, generalizable observations.

If the procedures are comprehensively described, and other researchers with differing values and beliefs replicate the methods in their studies and achieve similar results, we can more confidently conclude that the methods and findings are less affected by any personal biases of the researchers. Perhaps a better word than *objectivity* to describe what is going on is *intersubjectivity*, or what Ira Reiss (1993: 6) suggests happens when people with differing perspectives collectively agree on a particular way of seeing reality: "So we can define objectivity in science as those views of the world that come to be agreed upon by the community at any one point in time."

Finding the "truth" about human behavior and social processes is an ongoing goal of the social sciences. Knowledge is achieved and "facts" are built incrementally over time. The information we get at any one point is an approximation of the truth and is constantly being modified, clarified, and expanded with each new study. Scientific ideas are tentative since falsifying evidence could be uncovered with other research designs and samples. This is why it is so important to develop replicable scientific ways of measuring and thinking about patterns of social behavior and attitudes in order to achieve the basic goals of research. As Kolbert (2017: 70) put it,

> One way to look at science is as a system that corrects for people's natural inclinations. In a well-run laboratory, there's no room for myside [confirmation] bias; the results have to be reproducible in other laboratories, by researchers who have no motive to confirm them.

THE PURPOSES OF SCIENTIFIC RESEARCH

Research on human social behavior and attitudes is conducted for many reasons, including to explore, describe, explain, and evaluate for the purpose of understanding an issue in depth, arriving at decisions, and making predictions.

Exploratory Research

Sometimes research is conducted for exploratory reasons, that is, to get a rough sense of what is happening on a particular topic for which we don't yet have enough information. People use *exploratory research* to assess the opportunities for undertaking a study, to try out various methods for collecting information for a proposed larger study later on, or to learn the language and concepts used by those who will be studied. Exploratory research also has been designed to ascertain the needs and goals of a particular organization (often called *needs assessment research*) in preparation for a study or evaluation. *Focus groups*—a collection of respondents organized in a group discussion format to present their ideas about a subject—are frequently designed to achieve many of these exploratory objectives.

Let's say we are interested in understanding more regarding what concerns students about their educational institution that may cause them to drop out or stay in school. Although we should review the many studies that have been done already on dropouts, we have reason to believe that the unique dimensions of this school are particularly important to consider. So we design a study to explore what is going on at this school by developing a series of focus group discussions with students to learn their language, or jargon, uncover relevant topics, and understand different ways of viewing the institution in order to construct a better questionnaire for a later research project.

Descriptive Research

A typical goal of exploratory and almost all kinds of research is to provide basic information describing the topic and respondents involved. *Descriptive research* is often the first step in most research projects and the primary objective for some, like the U.S. Census or the General Social Survey (GSS) and similar large surveys designed for gathering information. If we are interested, for example, in understanding the relationship between the number of hours spent studying and grades earned, we need to get descriptive information about the characteristics of the students (gender, ethnicity, major, etc.), what their grades are, how many hours a week they study, how many years of education they already have, and how many hours a week they work or participate in sports or other activities. The goal of such a survey would simply be to present basic information profiling the respondents (referred to as the *demographics*) and describing the issues under study.

Explanatory Research

Once we have some descriptive information, we might then want to uncover the reasons why a relationship between grades and hours spent studying differs for the students we sample. We do this kind of research in order to *explain* relationships, to

uncover the reasons "why" or "how" some social phenomena occur among respondents. *Explanatory research* is designed to answer the "why" question: why there is a range of behaviors or opinions held among people surveyed. Why don't people all have the same attitudes toward capital punishment or vote in the same way? Ideally, we want to be able to explain or perhaps predict these opinions and behaviors with efficient, less complex reasons or causes.

Remember when a romantic relationship ended and we wanted *the* explanation or single cause for its not working out? We'd all like to have just one simple reason (such as "it was the other person's fault"), but we know down deep that there are many reasons, since most complex behaviors and attitudes require more than one cause. However, the "law of parsimony" suggests that we should look for the fewest number of reasons (causes, explanations) to account for most of the differences (variation) that exist among our respondents in the behaviors or attitudes we are attempting to study.

Evaluation Research

We are typically interested in understanding the causes of human social behavior and people's opinions about a variety of issues. Sometimes, however, research is conducted to evaluate specific outcomes and to provide the explanations for why and how a particular result occurred. Applied or *evaluation research*, as it is called, focuses on problem solving and measuring the results and specified outcomes of the implementation of various social programs and policies (the "causes"). Many educational institutions also develop evaluation tools to assess students' achievement of the schools' intended objectives and goals.

For example, a university wants to know whether its study abroad program results in students achieving an intercultural and international understanding of people and issues. It creates a new type of program designed to produce such understanding. Evaluation research would focus on the objectives of the program and assess whether the new study abroad experience directly resulted in any change in students' behavior and attitudes.

Decide and Predict

With information collected systematically, those responsible for a program or policy can make informed decisions about what dimensions need to be changed, enhanced, or removed. Using research to *decide* and *predict* outcomes is a central goal of much research, especially evaluation and explanatory research. By figuring out the causes of behavior or opinion, we use this information to make informed decisions about future events. One goal of research is to estimate what might happen after the

research is completed, that is, to make forecasts about a company's future earnings, or to estimate the impact certain social policies will have or to guide us in making *decisions*. Wouldn't it be great if teachers could present information to their students demonstrating that there would be a high likelihood of success in school if they put more hours into their studying? Wouldn't it be a worthwhile goal of research to be able to understand the causes of earthquakes or tornadoes and use this knowledge to *predict* their occurrences and make decisions about building codes and other modes of disaster preparation?

Cause and Effect

However, to determine causation, it is essential to (1) establish that a relationship (or correlation) exists between the alleged cause and the observed outcome or effect; (2) determine the timeline of occurring events, that is, the cause must precede the behavior or opinion in time; and (3) eliminate other plausible explanations or alternative causes. If we can show that (1) there is a connection between hours of studying and grades; (2) the grades come after the amount of study hours claimed (it is possible that someone with low grades could increase the number of hours studied as a result of the grades); and (3) no other possible explanation exists for the grades, such as number of hours working at a job, teaching quality, or time spent at parties, then we can more confidently conclude that how much students study explains a good deal of why they achieve various grades. We usually are not able to explain why one particular person does well or not; instead, we may have found an explanation for variation among a sample of students. Most social science research is focused on understanding differences among aggregate groups of people, not in explaining or predicting one individual's behavior or opinions.

All three of these elements must be present to declare a cause-and-effect relationship. Too often, in everyday thinking, people assume that *correlation* is the same as *causation*. Just because two variables are related does not mean we can conclude that one *caused* the other (see also Nardi 2017).

Many humorous examples of false causation based on correlation have been offered by researchers. A good illustration is a correlation between the number of fire engines at the scene of a fire and the amount of damage done. Although a strong relationship can be demonstrated between more fire engines and worse damage, the fire engines don't cause the damage. Similarly, just because most heroin addicts drank milk as children does not mean that milk is a gateway substance leading to heroin use and causing addiction (see Box 1.2 for another example).

Despite being aware of the clearly faulty reasoning in jumping from correlation to causation, researchers can make this logical error in their interpretation of data because it is often impossible to control for all available alternative explanations.

BOX 1.2
CORRELATION OR CAUSATION?
STORKS, VACCINES, AND CAUSATION

By Peter M. Nardi

Before learning about the "birds and the bees" we may have been told how the stork brought us, as a little baby, to our parents. Even with a minimal interest in the animal kingdom of storks, birds, and bees, we likely started to question this curious story.

That is until we heard this news about Denmark: Post-1960 there was a significant decline in the number of nesting storks in Denmark (Dybbro 1972). Also, beginning in the late 1960s, Denmark started recording its lowest average number of childbirths per woman. In short: fewer storks = fewer babies.

Here rests one of the fundamental errors in debates, research, and uncritical thinking: confusing correlation with causation. So powerful are spurious relationships that they can sometimes have significant public policy implications. Consider the story of autism and vaccines.

In 1998, *The Lancet*, a respected medical journal, published Dr. Andrew Wakefield's research claiming a link between autism and the MMR (measles, mumps, rubella) vaccine. Ever since, people in the autism community have raised concerns about live-virus vaccines and their children's health. Fueled by the popular media, in particular the Internet, Dr. Wakefield's research has resulted in a decline in vaccinations and, some say, a resulting increase in childhood diseases like measles.

However, on January 28, 2010, Britain's General Medical Council concluded that Dr. Wakefield acted dishonestly, unethically, and irresponsibly when carrying out his research. And on February 2, *The Lancet* said, "we fully retract this paper from the published record" (Park 2010).

Although it's reasonable to have some concerns about the many ingredients that go into vaccines and other medications, it's still important to look more closely at the specific issues raised by the MMR vaccine and autism research, and use our critical thinking skills in understanding what is going on. When assessing research, it's important to evaluate several elements: the sample, the quality of the data collection process (such as survey item wording or interview style), and how the data are analyzed (appropriate statistics and charts).

Let's begin with the sample: The original Wakefield study took blood samples from only 12 English children who were attending his son's birthday party. They were each paid the equivalent of around $8. Already, we begin to question the quality of the research when such a small sample is used. It's also important at this point to consider any ethical questions about paying the children studied and how they may have been affected by having invasive blood samples taken.

For research to carry any weight, replication is essential, and studies with larger and better samples have not demonstrated a correlation between vaccines and autism. Furthermore, before cause and effect can actually be declared from a correlation, a timeline must demonstrate that the cause came before the effect. For example, students who study more tend to have higher grades. But does studying lead to higher grades, or do those students who have higher grades (maybe who are smarter to begin with) tend to study more to ensure continuation of a high GPA?

BOX 1.2 CONTINUED

When reviewing how researchers collected the data, assessing which data occurred when is important. In many cases, it turns out that autism appeared before the vaccinations were administered.

In analyzing the data collected, in order to claim a cause and effect, review how the research eliminated alternative explanations. Do changes in industrialization and urbanization in Denmark (to go back for a moment to the stork story) connect to a decline in the stork population as well as to changes in family life and fertility? Spurious correlations are easily addressed by searching for a third explanation. The appearance of autism tends to occur between the ages of 2 and 5, the same period when vaccines are administered.

Just because there is a societal increase in autism rates coinciding with an increase in the distribution of vaccines, it does not indicate a cause and effect relationship. Increases in autism rates could be due to other explanations such as changing definitions of autism and better diagnosing techniques, thus illustrating how other variables can create the illusion of a correlation between immunizations and autism. Other studies also indicate that boys are about four times as likely to have autism despite similar rates of vaccination between boys and girls.

Finally, a major study of almost half a million Danish children found no difference in immunization records between those children with and without autism. To date, there is no scientific evidence in the published literature of a causal connection between immunization vaccines and autism. And thanks to Denmark we have the research on this spurious relationship between autism and the MMR vaccine—and, of course, on storks and childbirth.

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Many studies, for example, show a relationship between high-fiber, low-fat diets and lowered risk of heart disease. Does this mean that eating such foods causes lower rates, or could some other explanations be involved? Some researchers have found that the type of people who eat healthy foods also tend to smoke less, exercise more, and experience less stress. Could these behaviors, instead of diet, be the more direct cause of healthier hearts? Only with replication of studies demonstrating continuing strong correlations, controlling for these other plausible explanatory variables, and clearly delineating the timeline of which behaviors come before others can researchers conclude with confidence that certain foods lead to better health.

Concluding Thoughts on Scientific Methods

For us to describe, explain, and predict with any accuracy, it is necessary that we develop a research design of scientific procedures and avoid the kinds of everyday thinking that could lead to incomplete data and erroneous conclusions. While it is often tempting to make decisions, explain causation, and predict the future on the basis of psychic powers, intuition, and "gut feelings," these are not particularly useful skills for convincing funding agencies, public policy makers, or research methods professors that what we have uncovered is accurate and unbiased.

This is not to say that scientific procedures are always ideal and free of problems. There are many behaviors and opinions that elude the methods of science. How well can we really measure and explain the process of falling in love, predict who will successfully be our best friend, or fully understand religious fervor? Many have tried, but sometimes more abstract ideas require other kinds of methods besides quantitative scientific ones—or should be left to the work of poets and artists!

The research problem or the evaluation questions must determine the methods. And for most of the issues social scientists study and the complex behaviors we want to understand, scientific thinking and procedures work well. Yet the method should not precede the problem to be studied. Before we choose a questionnaire survey approach, we should consider the different kinds of methods that can be used to study human social behavior and then select the techniques that best fit the questions we are seeking to answer.

RESEARCH METHODS

Doing survey research is a skill, an art, and an intellectual process involving collaboration, patience, and creativity. As Laumann et al. (1994: 57) claim, "In practice, survey research methods, like many specific scientific laboratory techniques, remain more an art than a science." Survey research is also a choice of one method among many from which to select. As such, choosing to conduct a quantitative approach to understanding the social world can answer only some questions. It is not ideal to begin by saying, "I want to give a questionnaire out, but I am not sure what my topic is yet." Research questions must come first, and then the choice of the relevant method to study them should follow.

There are many different ways of gathering data, depending on the questions we are asking, whom or what we are studying, the financial and time limitations of our project, and the amount of detail we desire. Each method comes not only with strengths and weaknesses that must be evaluated carefully before selecting but also with a set of assumptions about the nature of knowledge, beliefs in the efficacy of science, and other philosophical questions about how we can make sense of the world in which we live. Most methods can be combined to study a topic (often termed *triangulation* or *mixed-methods research* when two or more measures or methods are used), and several of them share similar procedures, sampling strategies, and ethical considerations. Larger research textbooks (such as Babbie 2016) provide more details about the different methods and the scientific assumptions that go with them. Because the focus of this book is on quantitative survey methods, here is a brief overview of other research methods, with key points to consider when evaluating whether questionnaire survey methods are best suited for a particular study (see Box 1.3 for the advantages and disadvantages of each major type of research methodology).

BOX 1.3
COMPARING METHODS

Each method for collecting data has advantages and disadvantages that should be evaluated before you decide which ones are most suitable for a particular research topic. Table 1.1 shows some points to consider for collecting data with surveys, interviews, focus groups, qualitative methods, and experiments.

Table 1.1 Comparison Points for Data Collection Methods

METHOD	ADVANTAGES	DISADVANTAGES
Quantitative: Surveys	▪ Less costly to reach larger samples ▪ Standardized questions ▪ Ideal for asking about opinions and attitudes ▪ Less labor intensive to collect data or train researchers ▪ Can guarantee anonymity ▪ Suitable for probability sampling and more accurate generalizability ▪ Easier to code closed-ended items ▪ Respondents can answer at own pace ▪ Better for sensitive and personal topics ▪ Easier to replicate a study ▪ Can address multiple topics in one survey ▪ Ideal for computer-based and online surveys ▪ Easier to compare with other studies using similar questions	▪ Self-report requires reading ability in the language (age, eyesight limitations, education) ▪ Possible gap between what people report they do and what they actually do ▪ Return rate can be low for mailed and computer-based surveys, thus limiting generalizability ▪ Closed-ended questions can be restrictive and culturally sensitive or dependent ▪ Difficult to explain meaning of items and probe answers ▪ Depend on asking about recollected behavior ▪ More difficult to code open-ended responses ▪ Can't guarantee respondent answering it was the person intended to answer it ▪ Requires skill in questionnaire design ▪ Long and complicated surveys can be tiring to complete and lead to errors ▪ Easy to overlook, skip around, and misunderstand questions ▪ More difficult to generate reliability and validity for one-time-use questionnaires
Interviews: Structured face-to-face or telephone	▪ Standardized questions for structured interviews ▪ Can explore and probe for additional information ▪ Can clarify meaning of questions ▪ Telephone interviews are less costly and can reach larger samples ▪ Less likely to have skipped or missed questions ▪ Unanticipated answers can occur, thus leading to new, unexpected findings	▪ Limited to smaller samples ▪ Face-to-face interviews can be time consuming ▪ Training required for interviewers ▪ More difficult to code open-ended responses and unstructured interviews ▪ Interviewer characteristics (race, sex, age) and style could bias responses ▪ Some respondents reluctant to give information over the telephone ▪ Not as ideal for collecting sensitive or personal information ▪ More difficult to replicate ▪ Face-to-face interviews are not anonymous ▪ Telephone surveys are not ideal for complicated closed-ended items or choices ▪ Face-to-face interviews may require payment for participants

BOX 1.3 CONTINUED

METHOD	ADVANTAGES	DISADVANTAGES
Interviews: Focus groups	▪ Ideal for exploratory research ▪ Better for insights about complex issues and topics ▪ Suitable for studying opinions and attitudes ▪ Group interaction generates new ideas as respondents build on others' comments ▪ Can probe for additional information ▪ Best for small groups (six to 12 range)	▪ Not as ideal for collecting sensitive or personal information in some cultures ▪ A few people can dominate the discussions ▪ Responses easily affected by what others say ▪ Minority views often not disclosed ▪ Not as suitable for studying behavior ▪ Time intensive to run ▪ Requires expert skills in leading groups ▪ Small sample sizes in one geographic area ▪ May require payment for participants ▪ Limited to a few topics at a time ▪ More difficult to code responses
Experiments	▪ Ideal for studying cause-and-effect explanations ▪ Better control of variables ▪ Easier to replicate ▪ Suitable for collecting quantitative data and doing statistical analyses ▪ Better for achieving internal and external validity ▪ Good for A/B marketing designs	▪ Ideal for smaller samples but limited generalizability ▪ Experimental laboratory situations are artificial ▪ Narrow range of behavior is measured ▪ Respondents may act in a way because they know they are being studied (demand characteristics of experiments) ▪ Can take much time to run experiments ▪ Equipment costs ▪ May require payment for participants ▪ Ethical concerns about informed consent and harm
Qualitative: Observations and field methods	▪ Ideal for studying behavior in actual sites ▪ Unanticipated and unexpected findings can be collected ▪ Not limited to structured items on a survey ▪ Allows for respondents' views and perspectives ▪ Behavior and situational factors observed in context and real time ▪ Nonverbal data can be observed and analyzed ▪ Ideal for studying interactions among people ▪ Content analysis can be performed on documents and other written or visual records and artifacts	▪ Limited to smaller samples ▪ Time consuming ▪ More difficult to code observations and responses ▪ Reliability of coding of observations or other content analyses needs to be established ▪ Observer bias can affect what is being observed and how ▪ Respondents' behavior can be affected by being observed ▪ More difficult to assess opinions and attitudes ▪ Field notes take more time to write and analyze ▪ More difficult to replicate ▪ Ethical concerns about informed consent, role of the participant observer, and potential harm ▪ Not ideal for some quantitative statistical analyses

Experimental Designs

When interested in understanding how the manipulation of a variable can explain specific outcomes on another variable, some researchers find it useful to conduct experiments. A classic *experimental* research design typically involves comparing two groups, one called the experimental group, the other the control group, to both

of which respondents have been randomly assigned. In the experimental group, the researcher conducts some treatment on the subjects and measures its effects in comparison to another group that does not receive the treatment or to a group receiving a different kind of treatment.

Experiments typically occur in laboratory settings where the researcher can control the environment to prevent other plausible causes from affecting the outcome of the treatment or experiment, thereby ensuring internal validity or accuracy and perhaps allowing for generalizability, or what is sometimes called external validity (see Chapter 3 for a discussion of validity). Experimental designs are also suited for testing specific hypotheses and for doing applied evaluation research, rather than for conducting an exploratory study.

Imagine we are interested in understanding the impact on teenagers of an educational film about prejudice and racism. In the classic experimental design, we would randomly assign the teens to two groups. Each group completes a questionnaire focused on attitudes toward racial minorities and other indicators of prejudice. The experimental group views the film (the treatment) while the control group does not, or perhaps sees a different one if we were interested in comparing films. A few weeks later, a questionnaire on racism is given to the two groups and comparisons are made. Ideally, those who watched the film now have lower prejudice scores than the group who did not see the film; we infer that the film was partly responsible for this change. There are many variations of this classic experimental model, many of which are used in evaluation research and by experimental psychologists and social psychologists (see Campbell and Stanley 1963 for detailed descriptions of various experimental and quasi-experimental designs).

One popular variation, especially among marketing researchers, is called *A/B testing*. Subjects are presented two versions of a website, an advertisement, a text, or a graphic. One randomized group receives version A and another randomized group sees version B in which one thing has been altered (perhaps a different image, headline, or landing page for a website). Responses are monitored (how many click a button or link, reply to an e-mail, or leave the webpage) and analyzed to see which version has been more successful.

Qualitative Methods

If the goal is to understand human behavior in its natural setting and from the viewpoint of those involved, then an appropriate method is often a qualitative one, as opposed to a quantitative method in which predetermined categories and a more structured scientific approach are involved. *Qualitative research* explores new topics by getting into the settings where people carry out their lives. Anthropologists

typically use qualitative methods to understand a culture, and some of the earliest sociologists (often referred to as the Chicago School of sociology) were pioneers in using these methods to study how people lived in small towns and urban centers (Plummer 2001).

Field research, participant observations, ethnographies, case studies, open-ended interviews, and focus groups are some common types of qualitative research methods. At some level, they all involve observing what people do, what they produce, and how they interact verbally and nonverbally. For example, if we wanted to understand how people make decisions about what food to eat in the employee cafeteria, we might do better observing them than to ask such questions days later on a questionnaire. Going to the cafeteria, taking extensive notes about the kinds of people who choose different foods, observing how much they eat, listening to how they interact with other diners, and talking with them about their choices are just some of the methods of a qualitative approach.

Trying to understand with more depth and sensitivity people's subjective understandings while acting in their social situations is the main goal for qualitative research. We typically do not get to study a very large number of people when using qualitative techniques compared with survey research, but we usually get richer details and a stronger sense of the variety of ways people engage with the world around them. It is a technique ideally suited for doing exploratory research as well.

Content Analysis and Archival Research

It is not always necessary to study people and their behaviors and opinions. Occasionally, we might be interested in understanding what they produce and to see how this might change over time. *Content analysis* involves the study of artifacts, usually written (such as diaries, newspapers, blogs, biographies, Twitter messages, Instagram photos, and official documents) but also visual and other forms of communication. It is based on developing a way of coding and classifying the information (the content) in the documents or media being studied. Content analysis is also used in coding answers to open-ended items on questionnaires (see Chapter 6 for a discussion about this). It includes qualitative methods and sometimes the quantification of information. For example, we can study the content of radio talk shows and code the broadcast in terms of how liberal or conservative the views of the host and the callers are, as well as tabulate the percentage of men and women who air their opinions. Or we might be interested in researching the images of gays and lesbians in television shows and do both a quantitative analysis of the number of characters and a content analysis of how they are depicted in these shows: Are they portrayed in stereotypical ways? What are their issues? Are they shown in relationships or isolated?

Let's say we are interested in evaluating online blogs about global climate change. We would develop a sampling scheme, read the postings and construct coding categories, and then evaluate the blogs in terms of those codes, perhaps looking for biases in language when discussing scientific studies and what positions the blog writers take about global warming issues. Sometimes this work involves searching archives and other *historical* documents for information about environmental concerns in newspaper editorials from previous pre-Internet decades, for example. *Comparative research* could also include reviewing blogs and climate change laws in different countries.

Big Data and Meta-Analysis

With the increasing power of large computers, newer kinds of data analysis and research methods have emerged. *Big Data* refers to the collection of huge amounts of information gleaned from social media, business transactions, online searches, and databases now more easily stored in large computer memory banks. Audio, e-mails, videos, purchasing information, and even "likes" you make on Facebook or Instagram, for example, stream into these computers, often in real time, and are instantly analyzed to find connections, patterns, and trends.

Although individual pieces of information might not indicate much, predictions are improved when they are combined with thousands of others. Studying these relationships among large data sets has led to improved business models; epidemiological findings about diseases and treatments; predictive algorithms suggesting the next song, movie, or book you would like; and an understanding of variations in trends among different gender and ethnic groups. Yet working with such large data sets has its limitations since there may not be any control in the methods used to collect the information, small differences in very large samples can artificially seem to be significant, and nonrandom sampling may limit the generalizability of the results to other populations.

Can these large collections of data provide explanatory information, or are they limited to descriptive and exploratory research? Ethical issues of privacy related to the collection and storage of information about you are particularly important to consider when Big Data are accessed. With computers becoming more powerful, would it eventually be possible to drill down through aggregated data and identify individuals and their personal preferences? What if even generalized data, such as differences in ethnicities or sexual orientation, are used to determine eligibility for insurance or a job? As additional data are combined, the accuracy of predictions made and the unethical use of findings can increase. Who will monitor the collection of these data and the distribution of information derived from the analyses?

Because of large computers, *meta-analysis* research is also possible. This method involves statistical analysis of data from multiple studies focused on the same topic. Advanced statistical models are applied to data pooled from a range of studies using systematic review of their methodologies and findings in order to seek patterns and provide more statistical power and precision in interpreting the results. This technique is especially useful in epidemiological research and the testing of medicines and new treatments.

But like Big Data, the quality of the analysis depends on the quality of the research methods used in the original studies that are being combined. Decisions have to be made to determine which studies to include or exclude in the meta-analysis without bias. The criteria for selecting the articles must be explicitly described. While doing Big Data research or meta-analysis is beyond the scope of this introductory textbook, the tools to evaluate the pooled studies and big databases depend on the same methods discussed in the chapters that follow (such as reliability, validity, questionnaire design, sampling, and statistics).

Social Network Analysis

Not all research is focused at the individual level; more and more, researchers are interested in the interactions among people in organizations, communities, and other social groupings. *Social network analysis* (SNA) studies the patterns of connections using mathematical and visual methods, all made possible thanks to powerful computers. It develops graphs and statistical information about which people or groups are central to the communications flow and structure of an organization or community. How are others then linked to these key people or nodes, how many connections do they in turn have, and what is the structure of these relationships? Rather than just looking at individuals and their attributes as survey research tends to do, social network analysis emphasizes the statistical and visual modeling of individuals' ties, thereby developing a complex mapping of relationships making up the social, economic, and political structures of a community, organization, or even a computer network (see Hanneman and Riddle 2005).

Quantitative Survey Methods

Many times, researchers are interested in describing the number of people involved in certain behaviors or holding specific beliefs. Some want to make use of archival data that have been collected by others over the years, such as all the information gathered during a census. Others like to focus on explaining the way people behave or predicting how they might act in the future. Underlying all these is an assumption that social

phenomena can be systematically measured and scientifically assessed. For many of these kinds of questions and assumptions, the use of quantitative methods is most appropriate, as we have been discussing in this book.

Some of the techniques involved in content analysis, experimental designs, archival research, meta-analysis, social network analysis, and in-depth interviewing use quantitative approaches. Structuring questions for an interview, developing categories and variables for coding printed content, and counting responses and observations are just some of these techniques. An easy way to remember the differences between quantitative and qualitative research is to think about how someone reviews a movie. A reviewer who goes into detail about the acting, the camera work, the screenplay and dialogue, and the grand meaning of the story is providing a qualitative content analysis. A reviewer who simply says it's worth three stars or two thumbs up has given a quantitative response with fewer details but a convenient summary evaluation.

Quantitative methods typically involve writing questions for surveys and in-depth interviews, learning to quantify or count responses, and statistically (mathematically) analyzing archival, historical, or our own data. A common form is a self-administered questionnaire. Questionnaires are particularly suited for respondents who can read, for measuring people's attitudes and opinions, and for getting a very large number of respondents too difficult and time consuming to observe with qualitative methods.

Doing survey research well is the theme of the rest of this book. It focuses primarily on questionnaires with samples of people, but many of the techniques described apply to other situations and methods. The chapters of this book are arranged in the order typically used for generating a research design and writing up the results for presentation:

- Find a topic to study.
- Review the previous literature and research.
- Develop research questions and hypotheses.
- Specify how to measure (operationalize) the variables in your hypotheses.
- Design a questionnaire.
- Develop a sample.
- Collect data.
- Prepare a codebook and data file.
- Analyze data statistically.
- Write up and present the results and conclusions.

The first stop on the research journey is learning to create good research questions and generate problems to evaluate. In the next chapter, we look at ways to find ideas for using the scientific methods of quantitative inquiry.

REVIEW: WHAT DO THESE KEY TERMS MEAN?

A/B testing
Biased questions
Big Data
Causation versus correlation
Comparative research
Confirmation bias
Content analysis
Describe, explain, explore, evaluate, and predict
Empiricism
Experiments
Focus groups
Generalizations
Limited sampling
Meta-analysis
Needs assessment research
Objectivity and intersubjectivity
Pseudoscience
Qualitative research
Replicable procedures
Research design
Selective attention, perception, and retention
Social network analysis
Systematic methods
Triangulation or mixed-methods research

TEST YOURSELF

(Answers for "Test Yourself" Exercises in Each Chapter are in the Appendix)

1. What three things must be decided before you can conclude that there is a cause-and-effect relationship?
2. Using these three factors, what kinds of questions would you ask about autism or, for that matter, about storks and birthrates, as described in Box 1.2?
3. What other elements of everyday thinking are evident, and what scientific thinking is needed to look at the relationships described in Box 1.2?

INTERPRET: WHAT DO THESE REAL EXAMPLES TELL US?

1. What are the errors in everyday thinking in the following comments posted on an online blog focused on educational issues?
   a. "As a parent, I am glad that private and parochial school teachers are not required to go through the training given to public school teachers. If they did, those schools would have the same problems and bad education public school kids face."
   b. "National standardized testing will lead teachers to teach only what is necessary to pass the test. This isn't what teaching is all about."

2. For each of the following academic studies, on the basis of just what is stated here, say whether the main goal of the research is to describe, explain, and/or predict:
   a. Poirier et al. (2016) investigated the social contagion effect of anxiety symptoms among Canadian children's friendships: Does having anxious friends lead to anxiety in these elementary school kids, independent of any genetic contributions?
   b. Pew Research Center (2017b) conducted a national survey of 1,040 adults to examine their cybersecurity habits and attitudes. This survey found that a majority of Americans have directly experienced some form of data theft or fraud and that a sizeable share of the public thinks that their personal data have become less secure in recent years.
   c. Milosavljevic (2017) was interested in the perception of well-being and happiness among Serbian gay men which originates from their online communication on gay dating sites and social networks. The study looked at the connection between online identity and health disclosure and how participating in online communication contributes to a sense of belonging to a community and related well-being.

CONSULT: WHAT COULD BE DONE?

One of your friends tells you that she heard from a friend that students living in Gryffindor Hall have the highest grades on campus and suggests that you should move there next semester. When you do so, your grades will go up, she says.

1. How would you respond to this statement?
2. Is this an example of everyday thinking or of scientific thinking? In what ways? What would be the purpose of doing some research on this?
3. How would you respond to the cause-and-effect statement your friend is making?

DECIDE: WHAT DO YOU DO NEXT?

This exercise continues in each chapter throughout the book and builds on the answers you provide at the end of the chapters. Taken together, your responses will form a complete research design and can serve as a model of how to develop a research proposal. If you have a different topic you want to research for a project, simply replace the sentences about a friendship study with your focus. The questions asked in each chapter apply to most research topics.

You are invited to conduct a study on how people develop and maintain diverse friendships. With the widespread influence of Facebook, Twitter, and Instagram,

what does it even mean to say you have friends or that you "friended" someone? The goal is to understand similarities and differences among different people. For example, do men and women have the same values about the meaning of friendship? How do people of various ethnicities and cultures maintain their friendships? Is age an important component of friendship?

1. Give examples from *everyday thinking* that you have heard about friendship formation. What are some errors in making conclusions on the basis of these everyday examples?
2. Provide examples of studies you could do whose purpose is to (a) *explore* friendship formation and maintenance, (b) *describe* the relationships between friendship and people's characteristics (gender, age, etc.), and (c) *explain* the relationships. What kinds of questions would you ask and how would they differ for each type of study?
3. Determine what more you would need to know to declare there is a *cause-and-effect* relationship between friendship formation and specific characteristics (demographics).

For additional examples, resources, and "test yourself" questions, go to http://doingsurveyresearch.wordpress.com/

2 FINDING IDEAS TO RESEARCH

> Imagination is more important than knowledge. For while knowledge defines all we currently know and understand, imagination points to all we might yet discover and create.
>
> —*Albert Einstein, physicist*

LEARNING GOALS

Discovering topics to study by searching for research ideas and finding existing studies is one of the goals of this chapter. Learning to write a good literature review is discussed, especially in the context of using theory to guide your research. The chapter also raises the ethical issues involved in doing research. By the end of the chapter, you should be able to search for topics in the library and in computer databases, write a coherent and focused review of the research literature, and note the ethical concerns various kinds of research topics might raise.

You've just been handed an assignment by your boss to gather data for a work-related project about customer satisfaction using a self-administered questionnaire. Or maybe a professor is asking you to develop a research topic for your education major honors thesis. Now what do you do? Where do you even start? You're probably thinking: I wish I had written down all those ideas I've had over the years because now I can't think of anything to study! Figuring out what to research or how to begin an assigned project can be a daunting task for many people. For some, curiosity generates too many broad questions. Others begin with too narrow an idea that goes nowhere beyond a simple query. What follows are some strategies that can be used to develop a research agenda that is meaningful and focused and that can help in creating a successful research design.