

According to this way of thinking, a scientific theory is a mathematical model that describes and codifies the observations we make. A good theory will describe a large range of phenomena on the basis of a few simple postulates and will make definite predictions that can be tested. If the predictions agree with the observations, the theory survives that test, though it can never be proved to be correct. On the other hand, if the observations disagree with the predictions, one has to discard or modify the theory. (At least, that is what is supposed to happen. In practice, people often question the accuracy of the observations and the reliability and moral character of those making the observations.)

(2001: 31)

In summary, a rich variety of theoretical paradigms can be brought to bear on the study of social life. With each of these fundamental frames of reference, useful theories can be constructed. We turn now to some of the issues involved in theory construction, which are of interest and use to all social researchers, from positivists to postmodernists—and all those in between.

Elements of Social Theory

As we have seen, paradigms are general frameworks or viewpoints: literally “points from which to view.” They provide ways of looking at life and are grounded in sets of assumptions about the nature of reality.

Where a paradigm offers a way of looking, a theory aims to explain what we see. Theories are systematic sets of interrelated statements intended to explain some aspect of social life. Thus, theories flesh out and specify paradigms. Recall from Chapter 1 that social scientists engage in both idiographic and nomothetic explanations. Idiographic explanations seek to explain a limited phenomenon as completely as possible—explaining why a particular woman voted as she did, for example—whereas nomothetic explanations attempt to explain a broad range of phenomena at least partially: identifying a few factors that account for much voting behavior in general.

Let’s look a little more deliberately now at some of the elements of a theory. As I mentioned in Chapter 1, science is based on observation. In social research, *observation* typically refers to seeing, hearing, and (less commonly) touching. A corresponding idea is *fact*. Although for philosophers “fact” is as complex a notion as “reality,” social scientists generally use the term to refer to some phenomenon that has been observed. It is a fact, for example, that Barack Obama defeated Mitt Romney in the 2012 presidential election.

Scientists aspire to organize many facts under “rules” called *laws*. Abraham Kaplan (1964: 91) defined *laws* as universal generalizations about classes of facts. The law of gravity is a classic example: Bodies are attracted to each other in proportion to their masses and in inverse proportion to the distance separating them.

Laws must be truly universal, however, not merely accidental patterns found among a specific set of facts. It is a fact, Kaplan points out (1964: 92), that in each of the U.S. presidential elections from 1920 to 1960, the major candidate with the longest name won. That is not a law, however, as shown by elections since. The earlier pattern was a coincidence.

Sometimes called *principles*, laws are important statements about what is so. We speak of them as being “discovered,” granting, of course, that our paradigms affect what we choose to look for and what we see. Laws in and of themselves do not explain anything. They just summarize the way things are. Explanation is a function of theory, as we’ll see shortly.

There are no social science laws that claim the universal certainty of those of the natural sciences. Social scientists debate among themselves whether such laws will ever be discovered. Perhaps social life essentially does not abide by invariant laws. This does not mean that social life is so chaotic as to defy prediction and explanation. As we saw in Chapter 1, social behavior falls into patterns, and those patterns quite often make perfect sense, although we may have to look below the surface to find the logic.

As I just indicated, laws should not be confused with theories. Whereas a law is an observed regularity, a *theory* is a systematic explanation for observations that relate to a particular aspect of life. For example, someone might offer

a theory of juvenile delinquency, prejudice, or political revolution.

Theories explain observations by means of concepts. Jonathan Turner (1989: 5) calls concepts the “basic building blocks of theory.” *Concepts* are abstract elements representing classes of phenomena within the field of study. The concepts relevant to a theory of juvenile delinquency, for example, include “juvenile” and “delinquency,” for starters. A “peer group”—the people you hang around with and identify with—is another relevant concept. “Social class” and “ethnicity” are undoubtedly relevant concepts in a theory of juvenile delinquency. “School performance” might also be relevant.

A *variable* is a special kind of concept. Some of the concepts just mentioned refer to things, and others refer to sets of things. As we saw in Chapter 1, each variable comprises a set of attributes; thus, *delinquency*, in the simplest case, is made up of *delinquent* and *not delinquent*. A theory of delinquency would aim at explaining why some juveniles are delinquent and others are not.

Axioms or *postulates* are fundamental assertions, taken to be true, on which a theory is grounded. In a theory of juvenile delinquency, we might begin with axioms such as “Everyone desires material comforts” and “The ability to obtain material comforts legally is greater for the wealthy than for the poor.” From these we might proceed to *propositions*: specific conclusions, derived from the axiomatic groundwork, about the relationships among concepts. From our beginning axioms about juvenile delinquency, for example, we might reasonably formulate the proposition that poor youths are more likely to break the law to gain material comforts than are rich youths.

This proposition, incidentally, accords with Robert Merton’s classic attempt to account for deviance in society. Merton (1957: 139–57) spoke of the agreed-on means and ends of a society. In Merton’s model, nondeviants are those who share the societal agreement as to desired ends (such as a new car) and the means prescribed for achieving them (such as to buy it). One type of deviant—Merton called this type the “innovator”—agrees on the desired end but does not have access to the prescribed means for achieving it. Innovators find another method, such as crime, of attaining the desired end.

From propositions, in turn, we can derive hypotheses. A **hypothesis** is a specified testable expectation about empirical reality that follows from a more general proposition. Thus, a researcher might formulate the hypothesis, “Poor youths have higher delinquency rates than do rich youths.” Research is designed to test hypotheses. In other words, research will support (or fail to support) a theory only indirectly—by testing specific hypotheses that are derived from theories and propositions.

Let’s look more clearly at how theory and research come together.

Two Logical Systems Revisited

The Traditional Model of Science

Most of us have a somewhat idealized picture of “the scientific method.” It is a view gained as a result of the physical-science education we’ve received ever since our elementary school days. Although this traditional model of science tells only a part of the story, it’s helpful to understand its logic.

There are three main elements in the traditional model of science: theory, operationalization, and observation. At this point we’re already well acquainted with the idea of theory.

Theory

According to the traditional model of science, scientists begin with a thing, from which they derive testable hypotheses. For example, as social scientists we might have a theory about the causes of juvenile delinquency. Let’s assume that we have arrived at the hypothesis that delinquency is inversely related to social class. That is, as social class goes up, delinquency goes down.

Operationalization

To test any hypothesis, we must specify the meanings of all the variables involved in it, in

hypothesis A specified testable expectation about empirical reality that follows from a more general proposition; more generally, an expectation about the nature of things derived from a theory. It is a statement of something that ought to be observed in the real world if the theory is correct.

observational terms. In the present case, the variables are *social class* and *delinquency*. To give these terms specific meaning, we might define delinquency as “being arrested for a crime,” “being convicted of a crime,” or some other plausible phrase, whereas social class might be specified in terms of family income, for the purposes of this particular study.

Once we have defined our variables, we need to specify how we’ll measure them. (Recall from Chapter 1 that science, in the classical ideal, depends on measurable observations.)

Operationalization literally means specifying the exact operations involved in measuring a variable. There are many ways we can attempt to test our hypothesis, each of which allows for different ways of measuring our variables.

For simplicity, let’s assume we’re planning to conduct a survey of high school students. We might operationalize delinquency in the form of the question “Have you ever stolen anything?” Those who answer “yes” will be classified as delinquents in our study; those who say “no” will be classified as nondelinquents. Similarly, we might operationalize social class by asking respondents, “What was your family’s income last year?” and providing them with a set of family income categories: under \$10,000; \$10,000–\$24,999; \$25,000–\$49,999; \$50,000–\$99,999; \$100,000 and above.

At this point someone might object that delinquency can mean something more than or different from having stolen something at one time or another, or that social class isn’t necessarily the same as family income. Some parents might think body piercing is a sign of delinquency even if their children don’t steal, and to some, social class might include an element of prestige or community standing as well as how much money a family has. For the researcher testing a

hypothesis, however, the meaning of variables is exactly and only what the operational definition specifies.

In this respect, scientists are very much like Humpty Dumpty in Lewis Carroll’s *Through the Looking Glass* [1895] 2009. “When I use a word,” Humpty Dumpty tells Alice, “it means just what I choose it to mean—neither more nor less.”

“The question is,” Alice replies, “whether you *can* make words mean so many different things.” To which Humpty Dumpty responds, “The question is, which is to be master—that’s all” ([1895] 2009: 190)

Scientists have to be “masters” of their **operational definitions** for the sake of precision in observation, measurement, and communication. Otherwise, we would never know whether a study that contradicted ours did so only because it used a different set of procedures to measure one of the variables and thus changed the meaning of the hypothesis being tested. Of course, this also means that to evaluate a study’s conclusions about juvenile delinquency and social class, or any other variables, we need to know how those variables were operationalized.

The way we have operationalized the variables in our imaginary study could be open to other problems, however. Perhaps some respondents will lie about having stolen anything, in which cases we’ll misclassify them as nondelinquent. Some respondents will not know their family incomes and will give mistaken answers; others may be embarrassed and lie. We’ll consider issues like these in detail in Part 2.

Our operationalized hypothesis now is that the highest incidence of delinquents will be found among respondents who select the lowest family income category (under \$10,000); a lower percentage of delinquents will be found in the \$10,000–\$24,999 category; still fewer delinquents will be found in the \$25,000–\$49,999 and \$50,000–\$99,999 categories; and the lowest percentage of delinquents will be found in the \$100,000 and above category. Now we’re ready for the final step in the traditional model of science—observation. Having developed theoretical clarity and specific expectations, and having created a strategy for looking, all that remains is to look at the way things actually are.

operationalization One step beyond conceptualization. Operationalization is the process of developing operational definitions, or specifying the exact operations involved in measuring a variable.

operational definition The concrete and specific definition of something in terms of the operations by which observations are to be categorized. The operational definition of “earning an A in this course” might be “correctly answering at least 90 percent of the final exam questions.”

Observation

The final step in the traditional model of science involves actual observation, looking at the world and making measurements of what is seen.

Let's suppose our survey produced the following data:

	<i>Percent Delinquent</i>
Under \$10,000	20
\$10,000–\$24,999	15
\$25,000–\$49,999	10
\$50,000–\$99,999	5
\$100,000 and above	2

Observations producing such data would confirm our hypothesis. But suppose our findings were as follows:

	<i>Percent Delinquent</i>
Under \$10,000	15
\$10,000–\$24,999	15
\$25,000–\$49,999	15
\$50,000–\$99,999	15
\$100,000 and above	15

These findings would disconfirm our hypothesis regarding family income and delinquency. *Disconfirmability*, or the possibility of falsification, is an essential quality in any hypothesis. In other words, if there is no chance that our hypothesis will be disconfirmed, it hasn't said anything meaningful. You cannot test whether a hypothesis is true unless your test contains the possibility of deciding it is false.

For example, the hypothesis that juvenile delinquents commit more crimes than do nondelinquents cannot possibly be disconfirmed, because criminal behavior is intrinsic to the idea of delinquency. Even if we recognize that some young people commit crimes without being caught and labeled as delinquents, they couldn't threaten our hypothesis, because our actual observations would lead us to conclude they were law-abiding nondelinquents.

Figure 2-2 provides a schematic diagram of the traditional model of scientific inquiry. In it we see the researcher beginning with an interest in

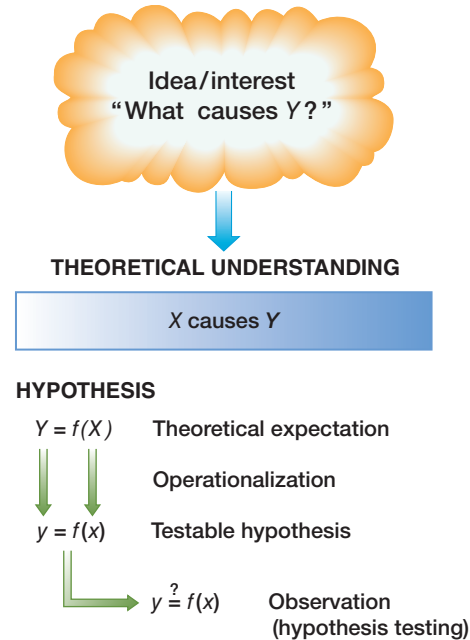


FIGURE 2-2

The Traditional Image of Science. The deductive model of scientific inquiry begins with a sometimes vague or general question, which is subjected to a process of specification, resulting in hypotheses that can be tested through empirical observations.

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a phenomenon (such as juvenile delinquency). Next comes the development of a theoretical understanding, in this case that a single concept (such as social class) might explain others. The theoretical considerations result in an expectation about what should be observed if the theory is correct. The notation $Y = f(X)$ is a conventional way of saying that Y (for example, delinquency) is a function of (depends on) X (for example, social class). At that level, however, X and Y still have rather general meanings that could give rise to quite different observations and measurements. Operationalization specifies the procedures that will be used to measure the variables. The lowercase y in Figure 2-2, for example, is a precisely measurable indicator of capital Y . This operationalization process results in the formation of a testable hypothesis: For example, self-reported theft is a function of family income. Observations aimed at finding out whether this statement accurately describes reality are part of what is typically called *hypothesis testing*. (See the Tips and Tools box, "Hints for Stating Hypotheses," for more on the process of formulating hypotheses.)



Tips and Tools

Hints for Stating Hypotheses

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A hypothesis is the basic statement that is tested in research. Typically a hypothesis states a relationship between two variables. (Although it is possible to use more than two variables, you should stick to two for now.) Because a hypothesis makes a prediction about the relationship between the two variables, it must be testable so you can determine if the prediction is right or wrong when you examine the results obtained in your study. A hypothesis must be stated in an unambiguous manner to be clearly testable. What follows are suggestions for developing testable hypotheses.

Assume you have an interest in trying to predict some phenomenon such as “attitudes toward women’s liberation,” and that you can measure such attitudes on a continuum ranging from “opposed to women’s liberation” to “neutral” to “supportive of women’s liberation.” Also assume that, lacking a theory, you’ll rely on “hunches” to come up with variables that might be related to attitudes toward women’s liberation.

In a sense, you can think of hypothesis construction as a case of filling in the blank: “_____ is related to attitudes toward women’s liberation.” Your job is to think of a variable that might plausibly be related to such attitudes, and then to word a hypothesis that states a relationship between the two variables (the one that fills in the “blank” and “attitudes toward women’s liberation”). You need to do so in a precise manner so that you can determine clearly whether the hypothesis is supported or not when you examine the results (in this case, most likely the results of a survey).

The key is to word the hypothesis carefully so that the prediction it makes is quite clear to you as well as others. If you use age, note that saying “Age is related to attitudes toward women’s liberation” does not say precisely how you think the two are related (in fact, the only way this hypothesis could be falsified is if you fail to find a statistically significant relationship of any type between age and attitudes toward women’s liberation). In this case a couple of steps are necessary. You have two options:

1. “Age is related to attitudes toward women’s liberation, with younger adults being more supportive than older adults.” (Or, you could state the opposite, if you believed older people are likely to be more supportive.)
2. “Age is negatively related to support for women’s liberation.” Note here that I specify “support” for women’s liberation (SWL) and then predict a negative relationship—that is, as age goes up, I predict that SWL will go down.

In this hypothesis, note that both of the variables (*age*, the independent variable or likely “cause,” and *SWL*, the dependent variable or likely “effect”) range from low to high. This feature of the two variables is what allows you to use “negatively” (or “positively”) to describe the relationship.

Notice what happens if you hypothesize a relationship between *gender* and SWL. Because gender is a nominal variable (as you’ll learn in Chapter 5), it does not range from low to high—people are either male or female (the two attributes of the variable *gender*). Consequently, you must be careful in stating the hypothesis unambiguously:

1. “Sex is positively (or negatively) related to SWL” is not an adequate hypothesis, because it doesn’t specify how you expect sex to be related to SWL—that is, whether you think men or women will be more supportive of women’s liberation.
2. It’s tempting to say something like “Women are positively related to SWL,” but this really doesn’t work, because *female* is only an attribute, not a full variable (*sex* is the variable).
3. “Sex is related to SWL, with women being more supportive than men” would be my recommendation. Or, you could say, “with men being less supportive than women,” which makes the identical prediction. (Of course, you could also make the opposite prediction, that men are more supportive than women are, if you wished.)
4. Equally legitimate would be “Women are more likely to support women’s liberation than are men.” (Note the need for the second “are,” or you could be construed as hypothesizing that women support women’s liberation more than they support men—not quite the same idea.)

The previous examples hypothesized relationships between a “characteristic” (age or sex) and an “orientation” (attitudes toward women’s liberation). Because the causal order is pretty clear (obviously age and sex come before attitudes, and are less alterable), we could state the hypotheses as I’ve done, and everyone would assume that we were stating causal hypotheses.

Finally, you may run across references to the **null hypothesis**, especially in statistics. Such a hypothesis predicts no relationship (technically, no statistically significant relationship) between the two variables, and it is always implicit in testing hypotheses. Basically, if you have hypothesized a positive (or negative) relationship, you are hoping that the results will allow you to reject the null hypothesis and verify your hypothesized relationship.

Deductive and Inductive Reasoning: A Case Illustration

In Chapter 1, I introduced deductive and inductive reasoning, with a promise that we would return to them later. It's later.

As you probably recognized, the traditional model of science just described is a nice example of deductive reasoning: From a general theoretical understanding, the researcher derives (deduces) an expectation and finally a testable hypothesis. This picture is tidy, but in reality, science uses inductive reasoning as well. Let's consider a real research example as a vehicle for comparing the deductive and inductive linkages between theory and research. Years ago, Charles Glock, Benjamin Ringer, and I (1967) set out to discover what caused differing levels of church involvement among U.S. Episcopalians. Several theoretical or quasi-theoretical positions suggested possible answers. I'll focus on only one here: what we came to call the "Comfort Hypothesis."

In part, we took our lead from the Christian injunction to care for "the halt, the lame, and the blind" and those who are "weary and heavy laden." At the same time, ironically, we noted the Marxist assertion that religion is an "opiate for the masses." Given both, it made sense to expect the following, which was our hypothesis: "Parishioners whose life situations most deprive them of satisfaction and fulfillment in the secular society turn to the church for comfort and substitute rewards" (Glock, Ringer, and Babbie 1967: 107–8).

Having framed this general hypothesis, we set about testing it. Were those deprived of satisfaction in the secular society in fact more religious than those who received more satisfaction from the secular society? To answer this, we needed to distinguish who was deprived. The questionnaire, which was constructed for the purpose of testing the Comfort Hypothesis, included items that seemed to offer indicators of whether parishioners were relatively deprived or gratified in secular society.

To start, we reasoned that men enjoy more status than women do in our generally male-dominated society. Though hardly novel, this conclusion laid the groundwork for testing the Comfort Hypothesis. If we were correct in our

hypothesis, women should appear more religious than men. Once the survey data had been collected and analyzed, our expectation about gender and religion was clearly confirmed. On three separate measures of religious involvement—ritual (such as church attendance), organizational (such as belonging to church organizations), and intellectual (such as reading church publications)—women were more religious than men. On our overall measure, women scored 50 percent higher than men.

In another test of the Comfort Hypothesis, we reasoned that in a youth-oriented society, old people would be more deprived of secular gratification than the young would. Once again, the data confirmed our expectation. The oldest parishioners were more religious than the middle-aged, who were more religious than young adults.

Social class—measured by education and income—afforded another test of the Comfort Hypothesis. Once again, the test succeeded. Those with low social status were more involved in the church than those with high social status were.

The hypothesis was even confirmed in a test that went against everyone's commonsense expectations. Despite church posters showing worshipful young families and bearing the slogan "The Family That Prays Together Stays Together," the Comfort Hypothesis suggested that parishioners who were married and had children—the clear American ideal at that time—would enjoy secular gratification in that regard. As a consequence, they should be less religious than those who lacked one or both family components. Thus, we hypothesized that parishioners who were both single and childless should be the most religious; those with either spouse or child should be somewhat less religious; and those married with children—representing the ideal pictured on all those posters—should be the least religious of all. That's exactly what we found.

null hypothesis In connection with hypothesis testing and tests of statistical significance, that hypothesis that suggests there is no relationship among the variables under study. You may conclude that the variables are related after having statistically rejected the null hypothesis.

Finally, the Comfort Hypothesis suggested that the various kinds of secular deprivation should be cumulative: Those with all the characteristics associated with deprivation should be the most religious; those with none should be the least. When we combined the four individual measures of deprivation into a composite measure, the theoretical expectation was exactly confirmed. Comparing the two extremes, we found that single, childless, elderly, lower-class female parishioners scored more than three times as high on the measure of church involvement than did young, married, upper-class fathers. Thus was the Comfort Hypothesis confirmed.

I like this research example because it so clearly illustrates the logic of the deductive model. Beginning with general, theoretical expectations about the impact of social deprivation on church involvement, one could derive concrete hypotheses linking specific measurable variables, such as *age* and *church attendance*. The actual empirical data could then be analyzed to determine whether empirical reality supported the deductive expectations.

I say this example shows how it was possible to address the issue of religiosity deductively, but, alas, I've been fibbing. To tell the truth, although we began with an interest in discovering what caused variations in church involvement among Episcopalians, we didn't actually begin with a Comfort Hypothesis, or any other hypothesis for that matter. The study is actually an example of the inductive model. (In the interest of further honesty, Glock and Ringer initiated the study, and I joined it years after the data had been collected.) A questionnaire was designed to collect information that might shed a bit of light on why some parishioners participated in the church more than others, but it was not guided by any precise, deductive theory.

Once the data were collected, the task of explaining differences in religiosity began with an analysis of variables that have a wide impact on people's lives, including *gender*, *age*, *social class*, and *family status*. Each of these four variables was found to relate strongly to church involvement, in the ways already described. Indeed, they had a cumulative effect, also already described. Rather than being good news, however, this presented a dilemma.

Glock recalls discussing his findings with colleagues over lunch at the Columbia faculty club. Once he had displayed the tables illustrating the impact of each individual variable as well as their powerful composite effect, a colleague asked, "What does it all mean, Charlie?" Glock was at a loss. Why *were* those variables so strongly related to church involvement?

That question launched a process of reasoning about what the several variables had in common, aside from their impact on religiosity. Eventually we saw that each of the four variables also reflected *differential status in the secular society*. He then had the thought that perhaps the issue of comfort was involved. Thus, the inductive process had moved from concrete observations to a general theoretical explanation.

It seems easier to lay out the steps involved in deductive than inductive research. Deductive research begins with a theory, from which we may derive hypotheses—which are then tested through observations. Inductive research begins with observations and proceeds with a search for patterns in what we have observed. In a quantitative study, we can search for correlations or relationships between variables (discussed further in Chapter 16). Thus, once a relationship has been discovered between gender and religiosity, our attention turns to figuring out logical reasons why that is so.

Most qualitative research is oriented toward the inductive rather than the deductive approach. However, qualitative research does not, by definition, allow us to use statistical tools to find correlations that point toward patterns in need of explanation (see Chapter 14). Although there are computer programs designed for recording and analyzing qualitative data, the qualitative inductive analyst needs a strong reserve of insight and reflection to tease important patterns out of a body of observations.

A Graphic Contrast

As the preceding case illustration shows, theory and research can usefully be done both inductively and deductively. Figure 2-3 shows a graphic comparison of the two approaches as applied to an inquiry into study habits and performance on exams. In both cases, we are interested in the relationship between the number of hours

spent studying for an exam and the grade earned on that exam. Using the deductive method, we would begin by examining the matter logically. Doing well on an exam reflects a student's ability to recall and manipulate information. Both of these abilities should be increased by exposure to the information before the exam. In this fashion, we would arrive at a hypothesis suggesting a positive relationship between the number of hours spent studying and the grade earned on the exam. We say "positive" because we expect grades to increase as the hours of studying

increase. If increased hours produced decreased grades, that would be called a "negative," or "inverse," relationship. The hypothesis is represented by the graph line in part 1(a), representing the deductive model in Figure 2-3. In part (a) we see the expectation of a simple, positive, linear relationship between the two variables. Part (b) represents what we observe when we study the two variables. Finally, part (c) is the need to decide whether the observations are close enough to what was expected to justify accepting the hypothesis.

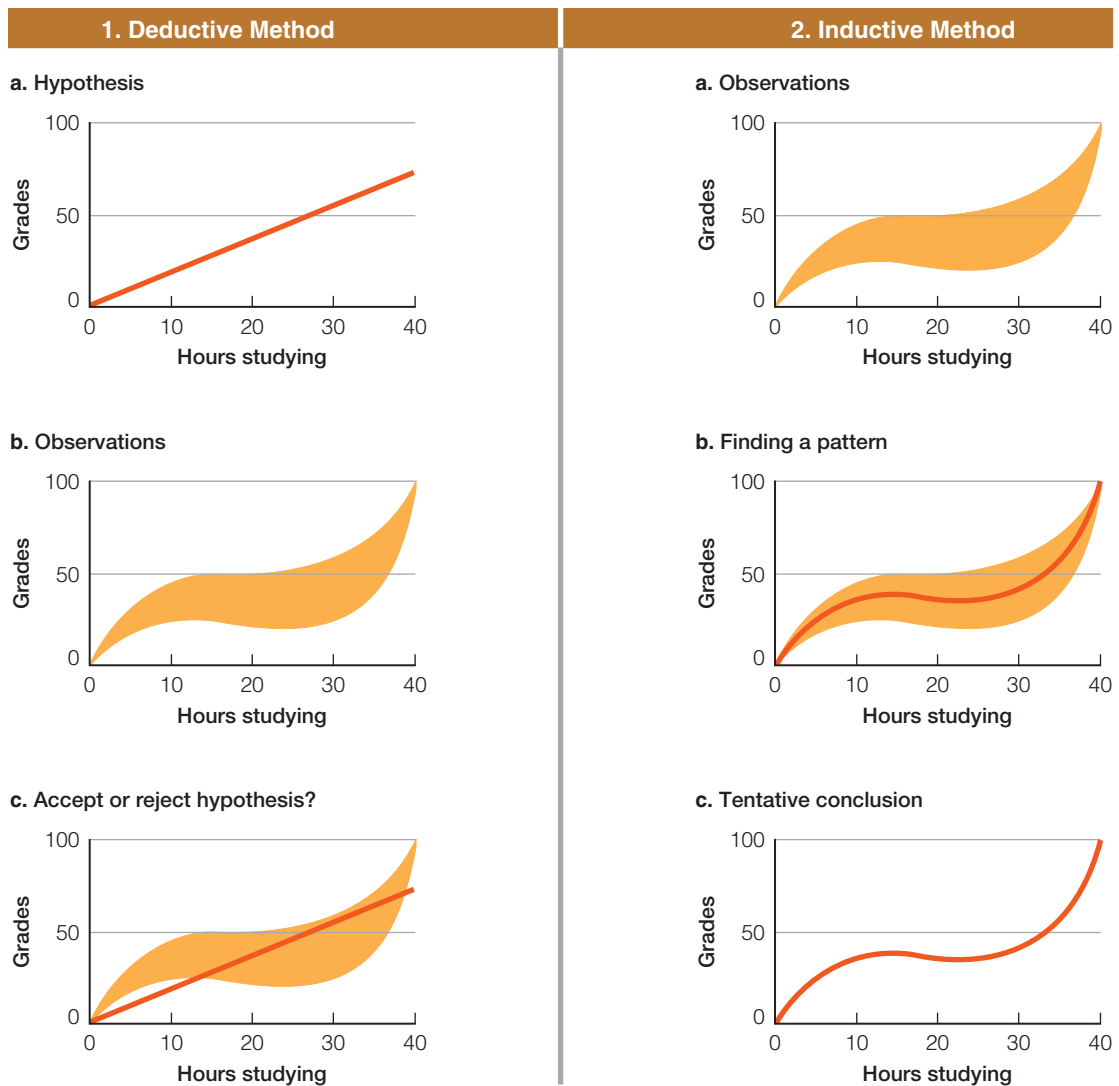


FIGURE 2-3

Deductive and Inductive Methods. Both deduction and induction are legitimate and valuable approaches to understanding. Deduction begins with an expected pattern that is tested against observations, whereas induction begins with observations and seeks to find a pattern within them.

Our next step would be to make observations relevant to testing our hypothesis. The shaded area in part 1(b) of the figure represents perhaps hundreds of observations of different students, specifically, how many hours they studied and what grades they received. Finally, in part 1(c), we compare the hypothesis and the observations. Because observations in the real world seldom, if ever, match our expectations perfectly, we must decide whether the match is close enough to consider the hypothesis confirmed. Stated differently, can we conclude that the hypothesis describes the general pattern that exists, granting some variations in real life? Sometimes, answering this question necessitates methods of statistical analysis, which will be discussed in Part 4 of this book.

Now suppose we used the inductive method to address the same research question. In this case, we would begin with a set of observations, as in part 2(a) of Figure 2-3. Curious about the relationship between hours spent studying and grades earned, we might simply arrange to collect relevant data. Then we'd look for a pattern that best represented or summarized our observations. In part 2(b) of the figure, the pattern is shown as a curved line running through the center of our observations.

The pattern found among the points in this case suggests that with 1 to 15 hours of studying, each additional hour generally produces a higher grade on the exam. With 15 to about 25 hours, however, more study seems to lower the grade slightly. Studying more than 25 hours, on the other hand, results in a return to the initial pattern: More hours produce higher grades. Using the inductive method, then, we end up with a tentative conclusion about the pattern of the relationship between the two variables. The conclusion is tentative because the observations we have made cannot be taken as a test of the pattern—those observations are the source of the pattern we've created.

As I discussed in Chapter 1, in actual practice, theory and research interact through a

never-ending alternation of deduction and induction. A good example is the classic work of Emile Durkheim on suicide ([1897] 1951). When Durkheim pored over table after table of official statistics on suicide rates in different areas, he was struck by the fact that Protestant countries consistently had higher suicide rates than Catholic ones did. Why should that be the case? His initial observations led him to create inductively a theory of religion, social integration, anomie, and suicide. His theoretical explanations in turn led deductively to further hypotheses and further observations.

The suicide data analyzed by Durkheim pale in comparison with what is now referred to as **big data**, enormous data sets created through the automatic monitoring of ongoing processes. If you have purchased books, CDs, or anti-itch lotions from Amazon.com or a similar online seller, those purchases were recorded in a huge data set containing the online purchases of everyone else. Hence, you may find yourself looking at a message such as, "Other people who bought this book also bought . . ." Or your web surfing may be spiced with ads for products or services vaguely related to actions you have previously taken online. If you've ever contributed to a political campaign or signed an online petition, you're very likely to have received related notifications and requests subsequently.

Similarly, you have probably read about the controversial bulk data-collection programs of the National Security Administration (NSA), monitoring telephone calls and Internet communications for the purpose of identifying possible terrorist connections and activities. The rise in big data collection and processing by commercial, governmental, and other agencies raises serious debates over the prospects for privacy in modern society.

In summary, the scientific norm of logical reasoning provides a two-way bridge between theory and research. Scientific inquiry in practice often alternates between deduction and induction. Both methods involve an interplay of logic and observation. And both are routes to the construction of social theories.

Although both inductive and deductive methods are valid in scientific inquiry, individuals may feel more comfortable with one approach than the other. Consider this exchange

big data Extremely large data sets generated through the automatic monitoring of ongoing processes, such as Amazon monitoring purchases or the National Security Administration's monitoring of telephone and Internet communications.

in Sir Arthur Conan Doyle’s story “A Scandal in Bohemia,” as Sherlock Holmes answers Dr. Watson’s inquiry (Doyle [1891] 1892: 13):

“What do you imagine that it means?”

“I have no data yet. It is a capital mistake to theorise before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.”

Some social scientists would more or less agree with this inductive position (see especially the discussion of grounded theory in Chapter 10), whereas others would take a more deductive stance. Most, however, concede the legitimacy of both approaches.

With this understanding of the deductive and inductive links between theory and research in hand, let’s now delve more deeply into how theories are constructed using either of these two different approaches.

Deductive Theory Construction

To see what’s involved in deductive theory construction and hypothesis testing, imagine that you’re going to construct a deductive theory. How would you go about it?

Getting Started

The first step in deductive theory construction is to pick a topic that interests you. The topic can be very broad, such as “What is the structure of society?” or it can be narrower, as in “Why do people support or oppose the idea of a woman’s right to an abortion?” Whatever the topic, it should be something you’re interested in understanding and explaining.

Once you’ve picked your topic, the next step is to undertake an inventory of what’s already known or thought about it. In part, this means writing down your own observations and ideas. Beyond that, it means learning what other scholars have said about it. You can talk to other people, and you’ll want to read the scholarly literature on the topic. Appendix A provides guidelines for using the library—you’ll likely spend a lot of time there.

Your preliminary research will probably uncover consistent patterns discovered by prior

scholars. For example, religious and political variables will stand out as important determinants of attitudes about abortion. Findings such as these will be very useful to you in creating your own theory. We’ll return to techniques of the *literature review* in more detail as the book continues.

In this process, don’t overlook the value of introspection. Whenever we can look at our own personal processes—including reactions, fears, and prejudices—we may gain important insights into human behavior in general. I don’t mean to say that everyone thinks like you or me, but introspection can provide a useful source of insights that can inform our inquiries.

Constructing Your Theory

Now that you’ve reviewed previous work on the topic, you’re ready to begin constructing your theory. Although theory construction is not a lockstep affair, the process generally involves something like the following steps.

1. Specify the topic.
2. Specify the range of phenomena your theory addresses. Will your theory apply to all of human social life, will it apply only to U.S. citizens, only to young people, or what?
3. Identify and specify your major concepts and variables.
4. Find out what is known (propositions) about the relationships among those variables.
5. Reason logically from those propositions to the specific topic you’re examining.

We’ve already discussed items (1) through (3), so let’s focus now on (4) and (5). As you identify the relevant concepts and discover what’s already been learned about them, you can begin to create a propositional structure that explains the topic under study.

Let’s look now at an example of how these building blocks fit together in deductive theory construction and empirical research.

An Example of Deductive Theory: Distributive Justice

A topic of interest to scholars is the concept of distributive justice, people’s perceptions of whether they are being treated fairly by

life, whether they are getting “their share.” Guillermina Jasso describes the theory of distributive justice more formally, as follows:

The theory provides a mathematical description of the process whereby individuals, reflecting on their holdings of the goods they value (such as beauty, intelligence, or wealth), compare themselves to others, experiencing a fundamental instantaneous magnitude of the justice evaluation (J), which captures their sense of being fairly or unfairly treated in the distributions of natural and social goods.

(Jasso 1988: 11)

Notice that Jasso has assigned a symbolic representation for her key variable: J will stand for distributive justice. She does this to support her intention of stating her theory in mathematical formulas. Though theories are often expressed mathematically, we’ll not delve too deeply into that practice here.

Jasso indicates that there are three kinds of postulates in her theory. “The first makes explicit the fundamental axiom which represents the substantive point of departure for the theory.” She elaborates as follows: “The theory begins with the received Axiom of Comparison, which formalizes the long-held view that a wide class of phenomena, including happiness, self-esteem, and the sense of distributive justice, may be understood as the product of a comparison process” (Jasso 1988: 11).

Thus, your sense of whether you’re receiving a fair share of the good things of life comes from comparing yourself with others. If this seems obvious to you, that’s not a shortcoming of the axiom. Remember, axioms are the taken-for-granted beginnings of theory.

Jasso continues to do the groundwork for her theory. First, she indicates that our sense of distributive justice is a function of “Actual Holdings (A)” and “Comparison Holdings (C)” of some good. Let’s consider money, for example. My sense of justice in this regard is a function of how much I actually have, compared with how much others have. By specifying the two components of the comparison, Jasso can use them as variables in her theory.

Next, Jasso offers a “measurement rule” that further specifies how the two variables, A and C ,

will be conceptualized. This step is needed because some of the goods to be examined are concrete and commonly measured (such as money), whereas others are less tangible (such as respect). The former kind, she says, will be measured conventionally, whereas the latter will be measured “by the individual’s relative rank . . . within a specially selected comparison group.” The theory will provide a formula for making that measurement (Jasso 1988: 13).

Jasso continues in this fashion to introduce additional elements, weaving them into mathematical formulas to be used in deriving predictions about the workings of distributive justice in a variety of social settings. Here is just a sampling of where her theorizing takes her (1988: 14–15).

- Other things [being] the same, a person will prefer to steal from a fellow group member rather than from an outsider.
- The preference to steal from a fellow group member is more pronounced in poor groups than in rich groups.
- In the case of theft, informants arise only in cross-group theft, in which case they are members of the thief’s group.
- Persons who arrive a week late at summer camp or for freshman year of college are more likely to become friends of persons who play games of chance than of persons who play games of skill.
- A society becomes more vulnerable to deficit spending as its wealth increases.
- Societies in which population growth is welcomed must be societies in which the set of valued goods includes at least one quantity-good, such as wealth.

Jasso’s theory leads to many other propositions, but this sampling should provide a good sense of where deductive theorizing can take you. To get a feeling for how she reasons her way to these propositions, let’s look briefly at the logic involved in two of the propositions that relate to theft within and outside one’s group.

- Other things [being] the same, a person will prefer to steal from a fellow group member rather than from an outsider.

Beginning with the assumption that thieves want to maximize their relative wealth, ask

yourself if that goal would be best served by stealing from those you compare yourself with or from outsiders. In each case, stealing will increase your Actual Holdings, but what about your Comparison Holdings?

A moment's thought should suggest that stealing from people in your comparison group will lower their holdings, further increasing your relative wealth. To simplify, imagine there are only two people in your comparison group: you and I. Suppose we each have \$100. If you steal \$50 from someone outside our group, you will have increased your relative wealth by 50 percent compared with me: \$150 versus \$100. But if you steal \$50 from me, you will have increased your relative wealth 200 percent: \$150 to my \$50. Your goal is best served by stealing from within the comparison group.

- In the case of theft, informants arise only in cross-group theft, in which case they are members of the thief's group.

Can you see why it would make sense for informants (1) to arise only in the case of cross-group theft and (2) to come from the thief's comparison group? This proposition again depends on the fundamental assumption that everyone wants to increase his or her relative standing. Suppose you and I are in the same comparison group, but this time the group contains additional people. If you steal from someone else within our comparison group, my relative standing in the group does not change. Although your wealth has increased, the average wealth in the group remains the same (because someone else's wealth has decreased by the same amount). So my relative standing remains the same. I have no incentive to inform on you.

If you steal from someone outside our comparison group, however, your nefarious income increases the total wealth in our group. Now my own wealth relative to that total is diminished. Because my relative wealth has suffered, I'm more likely to inform on you in order to bring an end to your stealing. Hence, informants arise only in cross-group theft.

This last deduction also begins to explain why these informants come from the thief's own comparison group. We've just seen how your theft decreased my relative standing. How about members of the other group (other than

the individual you stole from)? Each of them actually profits from the theft, because you have reduced the total with which they compare themselves. Hence, they have no reason to inform on you. Thus, the theory of distributive justice predicts that informants arise from the thief's own comparison group.

This brief peek into Jasso's derivations should give you some sense of the enterprise of deductive theory. Of course, the theory guarantees none of the given predictions. The role of research is to test each of them to determine whether what makes sense (logic) actually occurs in practice (observation).

See the Tips and Tools box, "Generating a Hypothesis from a Theory," for a look at creating hypotheses for deductive purposes.

Inductive Theory Construction

As we have seen, quite often social scientists begin constructing a theory through the inductive method by first observing aspects of social life and then seeking to discover patterns that may point to relatively universal principles. Barney Glaser and Anselm Strauss (1967) coined the term *grounded theory* in reference to this method.

Field research—the direct observation of events in progress—is frequently used to develop theories through observation. In a long and rich tradition, anthropologists have used this method to good advantage.

Among modern social scientists, no one has been more adept at seeing the patterns of human behavior through observation than Erving Goffman, in a research career that stretched from the 1950s to the 1970s:

A game such as chess generates a habitable universe for those who can follow it, a plane of being, a cast of characters with a seemingly unlimited number of different situations and acts through which to realize their natures and destinies. Yet much of this is reducible to a small set of interdependent rules and practices. If the meaningfulness of everyday activity is similarly dependent on a closed, finite set of rules, then explication of them would give one a powerful means of analyzing social life.

(1974: 5)



Tips and Tools

Generating a Hypothesis from a Theory

As we have seen, the deductive method of research typically focuses on the testing of a hypothesis. Let's take a minute to look at how to create a hypothesis for testing.

Hypotheses state an expected causal relationship between two (or more) variables. Let's suppose you're interested in student political orientations, and your review of the literature and your own reasoning suggest to you that college major will play some part in determining students' political views. Already, we have two variables: *college major* and *political orientation*. Moreover, *political orientation* is the dependent variable—you believe it depends on something else, on the independent variable, which in this case is *college major*.

Now we need to specify the attributes comprising each of these variables. For simplicity's sake, let's assume political orientation includes only liberal or conservative. And to simplify the matter of major, let's suppose your research interests focus on the presumed differences between business students and those in the social sciences.

Even with these simplifications, you would need to specify more concretely how you would recognize a liberal or a conservative when you came across them in your study. This process of specification will be discussed at length in Chapter 5. For now, let's assume you will ask student-subjects whether they consider themselves liberals or conservatives, letting each student report on what the terms mean to

them. (As we'll see later, this simple dichotomy is unlikely to work in practice, as some students would want to identify themselves as independents or something else.)

Identifying students' majors isn't as straightforward as you might think. For example, what disciplines compose the social sciences in your study? Also, must students be declared majors or simply be planning to major in one of the relevant fields?

Once these issues have been settled, you are ready to state your hypothesis. For example, it might be the following:

"Students majoring in the social sciences will be more likely to identify themselves as liberals than are those majoring in business."

In addition to this basic expectation, you may wish to specify "more likely" in terms of how *much* more likely. Chapter 16 will provide some options in this regard.

Deductive theory construction and hypothesis testing offer a clear example of what philosopher Karl Popper (1934) described as the principle of *falsifiability* in science. No conclusion can be considered "scientific" unless it is possible to state observations that would contradict or disprove it. This is what distinguishes scientific conclusions from religious, political, or philosophical *beliefs*. A belief you hold dear may very well be true, but unless we can agree on circumstances that would disprove it, it cannot be considered proven.

In a variety of research efforts, Goffman uncovered the rules of such diverse behaviors as living in a mental institution (1961) and managing the "spoiled identity" of being disfigured (1963). In each case, Goffman observed the phenomenon in depth and teased out the rules governing behavior. Goffman's research provides an excellent example of qualitative field research as a source of grounded theory.

Our earlier discussion of the Comfort Hypothesis and church involvement shows that qualitative field research is not the only method of observation appropriate to the development of inductive theory. Here's another detailed example to illustrate further the construction of inductive theory using quantitative methods.

An Example of Inductive Theory: Why Do People Smoke Marijuana?

During the 1960s and 1970s, marijuana use on U.S. college campuses was a subject of

considerable discussion in the popular press. Some people were troubled by marijuana's popularity; others welcomed it. What interests us here is why some students smoked marijuana and others didn't. A survey of students at the University of Hawaii by David Takeuchi (1974) provided the data to answer that question. While the reasons and practices regarding pot may have changed, the subtle redefinition of what needed explaining is still instructive.

At the time of the study, a huge number of explanations were being offered for drug use. People who opposed drug use, for example, often suggested that marijuana smokers were academic failures trying to avoid the rigors of college life. Those in favor of marijuana, on the other hand, often spoke of the search for new values: Marijuana smokers, they said, were people who had seen through the hypocrisy of middle-class values.

Takeuchi's analysis of the data gathered from University of Hawaii students, however, did not

support any of the explanations being offered. Those who reported smoking marijuana had essentially the same academic records as those who didn't smoke it, and both groups were equally involved in traditional "school spirit" activities. Both groups seemed to feel equally well integrated into campus life.

There were other differences between the groups, however:

1. Women were less likely than men to smoke marijuana.
2. Asian students (a large proportion of the student body) were less likely to smoke marijuana than non-Asians were.
3. Students living at home were less likely to smoke marijuana than those who were living in their own apartments.

As in the case of religiosity, the three variables independently affected the likelihood of a student's smoking marijuana. About 10 percent of the Asian women living at home had smoked marijuana, in contrast to about 80 percent of the non-Asian men living in apartments. And, as in the religiosity study, the researchers discovered a powerful pattern of drug use before they had an explanation for that pattern.

In this instance, the explanation took a peculiar turn. Instead of explaining why some students smoked marijuana, the researchers explained why some didn't. Assuming that all students had some motivation for trying drugs, the researchers suggested that students differed in the degree of "social constraints" preventing them from following through on that motivation.

U.S. society is, on the whole, more permissive with men than with women when it comes to deviant behavior. Consider, for example, a group of men getting drunk and boisterous. We tend to dismiss such behavior with references to "camaraderie" and "having a good time," whereas a group of women behaving similarly would probably be regarded with disapproval. We have an idiom, "Boys will be boys," but no comparable idiom for girls. The researchers reasoned, therefore, that women would have more to lose by smoking marijuana than men would. In other words, being female provided a constraint against smoking marijuana.

Students living at home had obvious constraints against smoking marijuana, compared

with students living on their own. Quite aside from differences in opportunity, those living at home were seen as being more dependent on their parents—hence more vulnerable to additional punishment for breaking the law.

Finally, the Asian subculture in Hawaii has traditionally placed a higher premium on obedience to the law than other subcultures have, so Asian students would have more to lose if they were caught violating the law by smoking marijuana.

Overall, then, a "social constraints" theory was offered as the explanation for observed differences in the likelihood of smoking marijuana. The more constraints a student had, the less likely he or she would be to smoke marijuana. It bears repeating that the researchers had no thoughts about such a theory when their research began. The theory came from an examination of the data.

The Links between Theory and Research

Throughout this chapter, we have seen various aspects of the links between theory and research in social science inquiry. In the deductive model, research is used to test theories. In the inductive model, theories are developed from the analysis of research data. This final section looks more closely into the ways theory and research are related in actual social science inquiry.

Whereas we have discussed two idealized logical models for linking theory and research, social science inquiries have developed a great many variations on these themes. Sometimes theoretical issues are introduced merely as a background for empirical analyses. Other studies cite selected empirical data to bolster theoretical arguments. In neither case do theory and research really interact for the purpose of developing new explanations. Some studies make no use of theory at all, aiming specifically, for example, at an ethnographic description of a particular social situation, such as an anthropological account of food and dress in a particular society.

As you read social research reports, however, you'll often find that the authors are conscious of the implications of their research for social theories and vice versa.

Research Ethics and Theory

In Chapter 1, I introduced the subject of research ethics and said we would return to that topic throughout the book. At this point, what ethical issues do you suppose theory engenders?

In this chapter, we have seen how the paradigms and theories that guide research inevitably impact what is observed and how it is interpreted. Choosing a particular paradigm or theory does not guarantee a particular research conclusion, but it will affect what you look for and what you ignore. Whether you choose a functionalist or a conflict paradigm to organize your research on police–community relations, for example, will make a big difference.

This is a difficult issue to resolve in practice. Choosing a theoretical orientation for the purpose of encouraging a particular conclusion would be regarded as unethical as a general matter, but when research is linked to an intention to bring about social change, the researcher will likely choose a theoretical orientation appropriate to that intention. Let’s say you’re concerned about the treatment of homeless people by the police in your community. You might organize your research in terms of interactionist or conflict paradigms and theories that would reveal any instances of mistreatment that may occur.

Two factors counter the potential problem of bias from theoretical orientation. First, as we’ll see in the remainder of the book, social science research techniques—the various methods of observation and analysis—place a damper on our simply seeing what we expect. Even if you expect to find the police mistreating the homeless and use theories and methods that will reveal such mistreatment, you will not observe what isn’t there if you apply those theories and methods appropriately.

Second, the collective nature of social research offers further protection. As we’ll discuss more in Chapter 17, *peer review* in which researchers evaluate each other’s efforts will point to instances of shoddy and/or biased research. Moreover, with several researchers studying the same phenomenon, perhaps using different paradigms, theories, and methods, the risk of biased research findings is further reduced.

MAIN POINTS

Introduction

- Theories function in three ways in research: (1) helping to avoid flukes, (2) making sense of observed patterns, and (3) shaping and directing research efforts.

Some Social Science Paradigms

- Social scientists use a variety of paradigms to organize how they understand and inquire into social life.
- A distinction between types of theories that cut across various paradigms is macrotheory (theories about large-scale features of society) versus microtheory (theories about smaller units or features of society).
- The positivistic paradigm assumes that we can scientifically discover the rules governing social life.
- The Social Darwinist paradigm sees a progressive evolution in social life.
- The conflict paradigm focuses on the attempt of individuals and groups to dominate others and to avoid being dominated.
- The symbolic interactionist paradigm examines how shared meanings and social patterns develop in the course of social interactions.
- Ethnomethodology focuses on the ways people make sense out of social life in the process of living it, as though each were a researcher engaged in an inquiry.
- The structural functionalist (or social systems) paradigm seeks to discover what functions the many elements of society perform for the whole system.
- Feminist paradigms, in addition to drawing attention to the oppression of women in most societies, highlight how previous images of social reality have often come from, and reinforced, the experiences of men.
- Like feminist paradigms, critical race theory both examines the disadvantaged position of a social group (African Americans) and offers a different vantage point from which to view and understand society.
- Some contemporary theorists and researchers have challenged the long-standing belief in an objective reality that abides by rational rules. They point out that it is possible to agree on an “intersubjective” reality, a view that characterizes postmodernism.

Elements of Social Theory

- The elements of social theory include observations, facts, and laws (which relate to the reality being observed), as well as concepts, variables, axioms

or postulates, propositions, and hypotheses (which are logical building blocks of the theory itself).

Two Logical Systems Revisited

- In the traditional image of science, scientists proceed from theory to operationalization to observation. But this image does not accurately depict how scientific research is actually done.
- Social scientific theory and research are linked through the two logical methods of deduction (the derivation of expectations and hypotheses from theories) and induction (the development of generalizations from specific observations).
- In practice, science is a process involving an alternation of deduction and induction.

Deductive Theory Construction

- Guillermina Jasso's theory of distributive justice illustrates how formal reasoning can lead to a variety of theoretical expectations that can be tested by observation.

Inductive Theory Construction

- David Takeuchi's study of factors influencing marijuana smoking among University of Hawaii students illustrates how collecting observations can lead to generalizations and an explanatory theory.

The Links between Theory and Research

- In practice, there are many possible links between theory and research and many ways of going about social inquiry.

Research Ethics and Theory

- Researchers should not use paradigm and theory selection as a means of achieving desired research results.
- The collective nature of social research offers protection against biased research findings.

KEY TERMS

The following terms are defined in context in the chapter and at the bottom of the page where the term is introduced, as well as in the comprehensive glossary at the back of the book.

big data	null hypothesis
conflict paradigm	operational definition
critical race theory	operationalization
critical realism	paradigm
feminist paradigms	positivism
hypothesis	postmodernism
interest convergence	structural functionalism
macrotheory	symbolic interactionism
microtheory	

PROPOSING SOCIAL RESEARCH: THEORY

As this chapter has indicated, social research can be pursued within numerous theoretical paradigms—each suggesting a somewhat different way to approach the research question. In this portion of your proposal, you should identify the paradigm(s) that will shape the design of your research.

We have also seen that paradigms provide frameworks within which causal theories may be developed. Perhaps your research project will explore or test an existing theory. Or more ambitiously, you may propose a theory or hypothesis for testing. This is the section of the proposal in which to describe this aspect of your project.

Not all research projects are formally organized around the creation and/or testing of theories and hypotheses. However, your research will involve theoretical concepts, which should be described in this section of the proposal. As we'll see more fully in Chapter 17, this portion of your proposal will reflect the literature on previous theory and research that has shaped your own thinking and research plans.

REVIEW QUESTIONS AND EXERCISES

1. Consider the possible relationship between education and prejudice that was mentioned in Chapter 1. Describe how you might examine that relationship through (a) deductive and (b) inductive methods.
2. Review the relationships between theory and research discussed in this chapter. Select a research article from an academic journal and classify the relationship between theory and research you find there.
3. Using one of the many search engines (such as Google, Bing, Yahoo, Chrome, or another of your choosing), find information on the web concerning at least three of the following paradigms: functionalism, symbolic interactionism, conflict paradigm, ethnomethodology, feminist paradigms, critical race theory, rational objectivity. Give the web locations and report on the theorists discussed in connection with the information you found.
4. See if you can locate Judith A. Howard (2000), "Social Psychology of Identities," *Annual Review of Sociology* 26:367–93. doi: 10.1146. What paradigm does Howard find most useful for the study of social identities? Explain why she feels that it is the appropriate paradigm. Do you agree? Why or why not?