CHAPTER 1

The Research Process

- Why was science developed?
- What are the characteristics of the political science research method?
- Are qualitative and quantitative scientific research the only methods available to address political questions?

Curiosity and necessity drive human inquiry. We may seek to understand the world around us for the sake of knowledge, or we may seek to understand it so that we may protect or improve our lot in it. Whichever is the case, the more we learn about our social and physical environment, the better equipped we are to adapt to our conditions or to manipulate them. This is just as true of our knowledge of politics as it is of other fields. The key to understanding and altering our political environment is, most simply, knowing more about it.

- The Quest for Knowledge

But this simple idea of knowing raises two far less simple questions: How do we know? How should we use what we know? The first is a question of method; the second, one of ethics and preference. In the first instance we are interested in obtaining and structuring knowledge or understanding; in the second we are concerned with the moral obligations that accompany it. Both questions require the exercise of judgment and both draw upon our experience, but each demands its own distinct kind of intellectual effort.

Obtaining Knowledge. To decide how we know, we must set forth certain hard-and-fast rules for defining political reality. For example, we might define political reality as our experience with, and observations of, the political system. That seems straightforward enough. But what is the political system? What kind of observations are we speaking about? Have we witnessed all possible political events, or is our definition unduly limiting? Is political reality a product of the observer, as our definition suggests, or of the system itself? With a definition such as this, different observers, having had different experiences and perspectives, will arrive not only at different understandings of political reality but at different ways of understanding as well. The result might be a highly individualized body of knowledge with no mechanism for sharing it. The problem of deciding how we know, then, is a problem of arriving at a generally accepted way of defining reality, at a common language of inquiry, so that anyone who learns the rules or "speaks the language" can communicate on the basis
of shared understanding with all others who have been similarly trained. At least in the abstract, if all of us can agree on how we know, then eventually we should agree on the higher-order question of what we know.

**Using Knowledge.** Deciding how we should use what we know is a different process. Here there is no need for orthodoxy or a common preference, although we still need a common language to permit communication and debate. Ultimately, deciding the best or most desirable application of knowledge is a subjective, individual activity. We all have certain wants or needs that will lead us to value one outcome of applying our knowledge over another, and it is not necessary—although it may be desirable—that we arrive at some common value judgment. If taxes are lowered, middle-income people will live more comfortably, but social services targeted primarily at the poor, the aged, and the infirm will be reduced. Should taxes be reduced? The answer, clearly, depends not on what we know, but on how that knowledge is related to our own social position and value structure. Ideologies and political systems provide the means for structuring and aggregating the preferences of various individuals, but the decisions themselves are made by individuals, one by one, without resorting to a to a common perspective.

**Empirical versus Normative Analysis.** Political scientists distinguish between obtaining knowledge and using knowledge. Dealing with how (and what) we know is termed empirical analysis. Dealing with how we should use our knowledge is termed normative analysis. Empirical analysis is concerned with developing and using a common, objective language to describe and explain political reality. It can be quantitative, based on statistical comparisons of the characteristics of the various objects or cases that are being studied, or it can be qualitative, based on the researcher’s informed understanding of those same objects or cases. Normative analysis is concerned with developing and examining subjective goals, values, and moral rules to guide us in applying what we have learned of that reality.

Thus, although our emphasis in this book is on empirical political analysis, our goal is to develop—in addition to a facility with various aspects of empirical technique—an appreciation of the larger, normative perspective within which knowledge is interpreted. Carried to the extreme, normative analysis without empirical foundation can lead to value judgments that are out of touch with reality. Empirical analysis in the absence of a sensitivity to normative concerns, on the other hand, can lead to the creation of a fact structure in a vacuum, a collection of observations whose significance we are not prepared to understand fully. The object, then, in undertaking political inquiry is to draw upon both types of analysis—empirical and normative—so as to maximize not only our knowledge but also our understanding of political reality.

**Scientific Knowledge.** In this context, we can see scientific research as a way of knowing and as a common language of inquiry. Scientific research is certainly not the only way of knowing, but it is in many instances and for many purposes the most effective. People can know things through experience, but not everyone shares the same experiences. People can know things by keeping their eyes open, but they
cannot be sure that through such unstructured observation they will note all or even a representative group of relevant events. Some people can "know" things by seeing visions or hearing disembodied voices, and others may accept their descriptions and accounts as valid, but not everyone can be trained in visionary methods. Each of these ways of knowing serves a purpose and each has its uses, but none allows for the total sharing both of facts or conclusions and of the knowledge of how those facts or conclusions were obtained. Each allows communication, but none helps us reach a comprehensive, shared understanding.

**The Scientific Method.** Scientific research is *explicit, systematic,* and *controlled.* It is explicit in that all the rules for defining and examining reality are clearly stated. Nothing is hidden from view and nothing is taken on faith. Scientific research is systematic in that each item of evidence is linked by reason or observation to other items of evidence. No *ad hoc* explanations are tolerated and no carelessness of method is permitted. It is controlled in that the phenomena under analysis are, to the extent possible, observed in as rigorous a manner as the state of the art allows. Generalized conclusions are reached only after the most thorough and painstaking assessment, and caution (in the larger sense of exercising great care and attention to detail) is a watchword. Yet for all its constraints, or, indeed, precisely because of them, scientific research opens for those versed in its ways a whole new level of understanding reality. It is for this reason that the scientific method is applied to the study of politics.

Scientific research, meaning inquiry guided by the scientific method, permits us to know reality and to evaluate the ways in which we know, but—because those ways are commonly understood by those trained in the method—it also permits us to improve upon our means of inquiry. Scientific research is a self-correcting, continuously developing way of knowing.

As a discipline, political science is not always "scientific." The earliest political scientists were trained in philosophy rather than in social science (which did not exist). Much of the earliest empirical work was interpretive and relatively unstructured, and even today there are differences of opinion over what contemporary practitioners can or should accomplish. In recent years, the political science discipline has seen sharp cleavages between researchers who offer differing answers to the question "is science the best way of knowing?" In an effort to alleviate this conflict, the American Political Science Association initiated a new journal, *Perspectives on Politics,* in 2003 as an alternative publication source to its flagship *American Political Science Review.* The *Review* is generally regarded as requiring its authors to use scientific methods in their research, whereas *Perspectives* offers researchers using alternative knowledge systems a widely distributed publication outlet.

Beginning in the 1940s the application of the scientific approach to describing and understanding political phenomena has predominated in the discipline of political science as a whole. Particularly in the United States, more and more political scientists have become convinced that science yields important insights into the behaviors of individuals, political organizations, and governments, and offers distinct advantages in the replication of results.

**Scientific research,** or for our purposes, *social scientific research,* is a *method of testing theories and hypotheses by applying certain rules of analysis to the observation*
and interpretation of reality under strictly delineated circumstances. These are the rules and constraints that we must learn in order to gain and communicate knowledge in the science of politics.

**The Research Process.** Political science research is best thought of as a process of gathering and interpreting information. This research process consists of six distinct but highly interrelated stages: (1) the formulation of theory, (2) the operationalization of that theory, (3) the selection of appropriate research techniques, (4) the observation of behavior, (5) the analysis of data, and (6) the interpretation of the results. These six stages provide the organizing rationale for much of this book and for much of your research.

### The Formulation of Theory

The first step in undertaking political science research is the selection of an appropriate research question, and here we can readily see the importance of mixing normative with empirical considerations. What criteria make one research question more appropriate than another? Although a number of such criteria come to mind, ranging from the personal interests of the researcher to the collective interests of society, most fall into one of two major categories. A question is worthy of research either because it fulfills a scientific need—that is, because its answer will further our theoretical understanding of some phenomenon—or because it fulfills a societal need—that is, because its answer may help us to deal with one or another of the problems faced by our society.

Although these two types of research questions, frequently termed basic research and applied research, are not mutually exclusive (asking one does not necessarily mean you cannot ask the other), they do frequently compete with one another. For example, should we study the hypothetical determinants of aggression under conditions of stress in order to develop a sophisticated predictive model of human behavior, or should we instead focus on the reasons riots occur and on ways to prevent them? Should we examine at length the decision-making processes of national leaders to help us understand leadership, or should we instead concentrate on identifying and avoiding the types of decisions that lead to war? Because too few scientific resources (money, time, and trained personnel) are available to study all potentially interesting or important research questions, there is often a conflict between the need to perform basic research—whose practical payoffs, however great, are almost always felt only indirectly and far in the future—and the need to use our scientific knowledge in the present for the immediate benefit of humanity, even though we may, in the process, delay or prevent the further development of our science. The choice must be made by individual researchers in accordance with their own values.

Once you have identified the problem you wish to tackle and the type of contribution you wish to make, then you need to frame a more specific research question. First, you should identify which aspect of the problem interests you most. Since research projects may be lengthy and no research question can be answered adequately without hard work, you should not take on a task in which you have little interest.
Second, you must sift through the various elements or components of the research topic to identify those that may be important to your research. Draw on your powers of observation, reasoning, and on past research to identify the major factors that bear on the behavior you are seeking to understand.

**A Research Example.** Let us imagine that in the middle of the desert there is a town called Little America that consists of several miles of service stations and restaurants stretching from the exit ramp of an interstate highway to the edge of the horizon. One can do nothing in Little America except eat and buy gas.

Now, suppose we have decided to study the voting behavior of Little Americans in presidential elections so that we may explain why one person votes Democratic while another votes Republican. In this simplified example, the subjects of our analysis (Little Americans) differ from one another in only two ways besides their voting preferences: each is either an owner or a worker, and each is associated with either a service station or a restaurant. Each of these factors, which political scientists term variables, represents a characteristic of a particular individual. One citizen of Little America might be (1) an employee of (2) a restaurant (3) who votes Democratic, whereas another is (1) an owner of (2) a service station (3) who votes Republican.

We wish to explain differences in voting behavior in terms of other kinds of differences among the voters, so we must focus on all the factors that might bear on a person's electoral preference. In this instance, we have only two to choose from: employee or owner status and service station or restaurant affiliation. Let us refer to these respectively as *socioeconomic status* (SES)—with ownership representing higher status than employment—and business affiliation. Is there any reason to expect that knowing either characteristic of a particular person will help us to predict his or her voting preference?

To answer that question, we must do two things. First, we must think. We must ask ourselves: Is there any logical reason to expect either of these factors to influence voting behavior? Second, we must consult the political science literature: Is there, in previous studies of this or related topics, any empirical evidence that one or the other of these factors influences voting behavior? In reality, there is little reason to expect the business-affiliation variable to make much difference in voting behavior in this instance. Differences may well exist between those associated with service stations and those with restaurants, but these differences are not likely to have much impact on presidential voting preferences. Few presidential candidates run on a pro-service station, antirestaurant platform (or vice versa), and, other things being equal, this variable is not likely to help us explain voting behavior. The second variable, SES, however, is a different story. The Democratic Party is popularly identified as the party of labor and the Republican Party as the party of business, and since persons of higher SES are more likely than those of lower SES to vote Republican, we might well expect that employees will be more likely to vote for the Democratic candidate and owners for the Republican. Indeed, the research literature is replete with examples of precisely this kind of relationship. Thus, logical reasoning and empirical evidence both point in the same direction. Our research question might then become, "does the SES of a voter in Little America influence voting preference in a presidential election?"
In the real world, of course, people differ from one another on more than two or three characteristics, but the problem we face in framing a research question is essentially the same. Because no one has the resources to measure every possible variable, we must choose, from among the thousands of human (or institutional) characteristics, those few that we expect will help us to explain whatever pattern of behavior interests us. With the aid of both logic and literature we try to anticipate and identify the factors that might be related to the behavior of interest. In so doing, we are not prejudging our results, but rather refining our thinking about the research problem to identify those avenues of inquiry most likely to lead to successful explanation. This process of refining our research question through informed selection is what we mean by the term formulation of theory.

The Operationalization of Theory

Once we have arrived at one or more research questions and the theory needed to direct our search for answers, we must progress to the next step, that of operationalization—the conversion or redefinition of our relatively abstract theoretical notions into concrete terms that will allow us actually to measure what we are after. Operationalization involves moving from the conceptual level (thinking about a problem) to the operational level (deciding how to solve it); it involves learning to think in practical terms.

Defining Terms. Suppose, to continue our example, that we have a hypothesis—a statement of the answer we expect to find for our research question—that Little Americans of higher SES (owners) are more likely than those of lower SES (employees) to vote Republican in the next presidential election. This is in line with the findings of countless other voting studies and is a reasonable expectation in the present instance as well. But how do we find out for sure? We cannot simply walk up to a Little American and say, “Good evening. Are you of higher or lower socioeconomic status?” To begin with, the person we are interviewing probably will not understand what we are talking about, since socioeconomic status is a technical term with many variations of meaning. And second, even if we get an answer, we will probably not be able to interpret it. Suppose the respondent replied, “Yes, I am of higher socioeconomic status.” Higher than whom? How high? How does that person define socioeconomic status? Does it mean the same thing to the respondent as it does to the researcher? Once we have an abstract concept in mind, we must find a way to define more explicitly what we mean by that concept and then we must form our definition into as clear a question or measure as possible.

The problem here is to make intelligent yet arbitrary choices among numerous shades of meaning. When we use the variable SES, are we thinking about respondents’ level of income, occupation, or perhaps even subjective notions of which social class they belong to? Each might be a component of SES, but each has a somewhat different meaning, and each must be measured differently: What was the total income of your family last year? What is your occupation? Would you say that you consider yourself to be a member of the working class, the middle class, or the upper class?

In other words, once we arrive at some hypothesis or research question, we have to examine very closely just what it is that we mean by each phrase we use, and we
have to translate that more precise definition into measurable indicators. We seek, in effect, the lowest common denominator of meaning. (Although not everyone would, for example, assign the same meaning to the term socioeconomic status, almost everyone would understand total annual income in dollars.) In the process our concepts are narrowed and shades of meaning are lost, but because of this our thinking becomes much more precise, and our ability to communicate in clear, unambiguous terms what we have done is greatly enhanced. This process of translation and simplification, which we term operationalization, is the single most important key to conducting meaningful research.

The Selection of Appropriate Research Techniques

Once we have decided what we want to measure, we must decide how we will measure it. We must devise a research strategy, a plan of attack. Two considerations are of primary importance here.

First, we must select a technique or a combination of techniques that will enable us to ask the particular questions— to measure the particular variables—that interest us, and we must do so in ways that are consistent with our operationalizations. We cannot, for example, measure the attitudes of individual voters by analyzing the content of newspaper coverage of a given election, because newspaper content may reflect the views of an editor or of those few people whose letters to that editor are published, without necessarily reflecting the views of most voters. Moreover, analyzing news or editorial content does not permit us to differentiate among different types of voters, such as those of higher or lower SES. Thus, content analysis would not allow us to answer our research question—that is, to test our hypothesis; survey research would be more useful. On the other hand, suppose that we wish to assess the coverage given by a newspaper to a political campaign. We might simply analyze the content of the newspaper itself, counting references to the candidates and so forth, or we might survey readers of the newspaper to measure what information they remember reading about the campaign. In the first instance, we would have a direct measure of content from which we are forced to infer impact; in the second instance, we would have a direct measure of impact from which we are forced to infer content. Depending on the precise formulation of our research question, one or the other or the combination of both strategies might be useful. The point is that the appropriateness of a given research technique is, in large part, determined by the particular problem we have selected for study.

The second consideration is feasibility. This is the stage of the research process at which we prepare to leave our ivory tower and actually go out into the real world. For that reason, we must assure ourselves that whatever method or technique we select can be employed properly under the particular set of conditions we are likely to face. For example, since there is no newspaper in our Little America (only service stations and restaurants), we cannot use content analysis even if we want to. Similarly, the most direct way to measure the level of tension between the leaders of Iraq and those of Turkey might be through a series of personal interviews with the leaders themselves, but such interviews are, to say the least, difficult to arrange. In each instance, we have to find less-than-ideal ways of measuring the key variables. A feasible technique, then, is one that will be maximally effective given the constraints of the research situation.
For student and professional researchers alike, feasibility is most often determined by time and resource constraints. The length of a given term or the years of funding for graduate research or the number years on the tenure clock are time limits. Resources include money to fund original research or lengthy, direct observation fieldwork or personnel to hand code thousands of pages of text. Ultimately, then, researchers choose techniques that fit within their available time and resources.

To summarize, we must find a way to measure those variables we wish to measure that will be (1) consistent with our working definitions of the variables and (2) practicable. We must be as scientific as possible, but we can only be as scientific as the circumstances allow.

II. The Observation of Behavior

The fourth stage of the research process involves actually carrying out the research strategy developed in stage 3. Many factors must be taken into account here, but two in particular are worthy of note. The first is the notion of generalizability; the second that of reactivity.

Generalizability refers to the ability to generalize or extend our conclusions with some confidence from the observed behavior of a few cases to the presumed behavior of an entire population. It is a concern we must take into account in selecting the particular cases (people, decisions, organizations, or nations) that we wish to study. The problem here is basically one of scale. If there are only, say, four or five occurrences of an event or subjects in a group we wish to study, we can examine each of those occurrences or subjects individually and make various general statements about them, with reasonable confidence that our conclusions apply to all the cases. However, if—as is much more frequently the situation—we have so many hundreds or thousands or millions of cases that it is impossible to examine each firsthand, we will have much less confidence that a study of a relative few of these cases—perhaps fewer than 1 in 1,000—will allow us to make accurate statements about the entire group. In such circumstances we must develop a strategy, often termed a sampling procedure, by which we can select from the many cases a few to study and come to conclusions that might apply to the entire population of cases. In doing so, we must decide how many cases to study and how these cases should be selected, and we must try to estimate the representativeness of these few cases. The key to generalizability lies in selecting for observation those cases that are likely to represent, or be most typical of, the larger population.

Once we have selected our cases for analysis, we must exercise great care in observing them. We must avoid measuring political phenomena or behavior in ways that display reactivity—a situation in which either the person who is doing a study or the actual methods of the study somehow interfere with and alter the way those under observation would behave or think in the absence of the researcher. In other words, a danger exists that the act of observation may itself cause those being observed to change their behavior so that the results of the observation are misleading.

Hawthorne Effect. The classic case of reactive observation was a 1939 study of the effects that changes in working conditions at a particular factory had on worker productivity. During the 1920s and early 1930s, such factors as hours of work, rest
periods, lighting, and methods of pay were varied for a small group of workers. Regardless of what conditions they worked under, whether long or short hours, few or frequent rest periods, or some other variant, this group of workers continually out-produced all other workers in the same factory. The most influential factor in their productivity, it turned out, was an unusually high level of morale associated with the fact that members of this group knew they were being observed and experimented upon (Roethlisberger and Dickson 1939). This so-called Hawthorne effect, named for the factory where it was first observed, meant that no conclusion could be drawn regarding the relationship between working conditions and productivity because the act of observation created a false reality, a work environment unlike the normal one.

Sometimes in undertaking political science research, we encounter similar, obvious examples of reactivity. An overbearing or unfriendly interviewer, a leading question, or a meddlesome observer can so damage the research situation that no confidence can be vested in its outcome. As often as not, however, the process is more subtle. We might, for example, properly train the perfect interviewer to ask a perfectly good question, yet still incur reactivity: Q: “Do you favor or oppose the president’s economic policy?” A: “I’m in favor of it; I think it is a good idea.” But how do we know for sure that our respondent has really given any thought to the president’s economic policy before being interviewed? Is it not possible that the interview itself acted as a catalyst, in effect crystallizing the respondent’s thoughts and creating an opinion where none had previously existed? This, too, is reactivity, but of a type that is much more difficult to detect and to avoid.

It is not enough simply to march into the field armed with a few questions and start looking around for answers. We must exercise great care in deciding how and where we shall enter the field and how and whom we shall observe. The best theory and the best plan of attack can be squandered if we are careless in our observation.

The Analysis of Data

The bits of information about each case that we gather during our observations are called data, and once we have them in hand, the end is in sight. The object at this point is to ascertain what answers we have found to our research question. This may be done in many instances by answering three questions. First, is there some association between, on the one hand, the behavior we are hoping to explain or to understand better and, on the other hand, the factors we think will help us to do so?

Is There a Relationship? Suppose, for example, that we expect to find that people who differ in their level of formal education will differ systematically in the likelihood that they will vote. Our first question must be, does this happen? Do people who differ from one another on one of these variables tend to differ consistently on the other as well? Are the more educated people consistently either more or less likely to vote than the less educated people? We might find in examining our data, for instance, that less educated people tend to vote about as often as more educated people and that knowing a person’s level of education does not help us to predict or explain the difference between that person’s likelihood of voting and someone else’s. If this is the case, we say that one’s level of education does not influence the likelihood
of voting or, alternatively, that there is no association between the two variables. Our expectation is not supported by our analysis. If, on the other hand, we discover that six or seven times out of ten, knowing the level of education does allow us to predict accurately the likelihood of a person's voting, this constitutes evidence supporting our expectation that the two variables are related. It tells us that more educated people are *systematically different* from less educated people when it comes to voting and helps us understand our subjects' voting behavior. The first thing to look for in assessing a hypothesis, then, is whether the two variables are *statistically related*.

**What Type of Relationship?**  *How* are the two variables related? Are more educated people more likely than less educated people to vote? Alternatively, are they less likely to vote? Or is the relationship between the variables even more complex? If we have thought through our hypothesis so that we have some reasons to expect the level of education to be related to voting, we probably have one or another of these possibilities in mind.

We might argue, for example, that having more formal education increases the likelihood of someone having the skills and information needed to support an interest in politics. Accordingly, a more educated person is more likely to vote than is a less skilled or less informed person. Thus, we might expect voting to be more frequent or more common among the more educated of the people we study. This type of relationship is illustrated in Figure 1.1(a), where points on the line represent corresponding values on the two variables.

We might also argue, however, that the more educated one becomes, the more one comes to believe that political activity is futile. Education, in this view, gives rise to disillusionment, which in turn reduces the inclination to vote. Here we expect

---

**Figure 1.1**

Possible relationships between individuals' level of education and their likelihood of voting.
voting to be more frequent among the less educated of our subjects. This type of relationship is illustrated in Figure 1.1(b).

Or, we might even argue that education contributes to skills and interests to a point, but that those who are educated beyond that point (for example, those who attend college) become increasingly disillusioned and less interested in politics. Here we expect voting to be most frequent among those of moderate educational attainment, with lower levels of voting at either extreme. This more complex relationship is illustrated in Figure 1.1(c).

In each instance a relationship exists between a person's level of education and likelihood of voting, but clearly the implications of these varying relationships are vastly different. It is possible, then, to find a strong relationship between the two variables and yet fail to substantiate our hypothesis.

Confidence in Findings? How likely is it that the relationships we find in a sample also occur in the population from which those cases were drawn? This is simply a statistical way of asking how good a job we have done in ensuring that our small sample is representative, or typical, of the larger population. If we have properly selected the cases to be studied, then we can say with confidence that our conclusions, though based on but a few cases, may be applied to all. If we have made errors, we may be less confident. Unfortunately, as will be emphasized in Chapter 7, when conclusions are based on a sample of the population, we can never be totally certain of them.

Interpretation of the Results

Finally, we reach a point where we must put all the pieces together. Have we succeeded in actually asking the research question that we set out to ask? What have we discovered? What is the substantive importance of our findings? How do these results square with our expectations? In essence, we have by this time reduced some aspect of political behavior to a set of numbers, which may or may not reveal statistical relationships. We must decide what any such relationships, as well as other things we have learned along the way, tell us about the answer to our research question. But there is more, for we must also look back with a critical eye on our research itself. Have we made some fundamental error along the way that may invalidate our findings? Have we managed to keep a close relationship between our theory and our research on the one hand and the reality of political activity on the other? Can we credit any of our apparent findings about the real world to the things we have done (or have failed to do) in our research, rather than to actual events? These are difficult questions to answer, but good researchers will always try to do so, because only when they are answered can researchers know how much confidence to place in the product of the research.

Ethical Considerations

At each stage of the research process, and in each chapter of this book, you will confront choices that present ethical challenges. As you conduct your research (and live
your life), you should keep the potential consequences of your actions in mind. Maintaining this awareness is acutely important for you as a budding political scientist, because in social research people may be harmed. Throughout this book, you will detect the tension that exists in our discipline between our interest in learning about human behavior, and our concern that we are affecting humans through our research. Sometimes your research may directly impact a human when you ask a survey subject about her attitude toward abortion policy, and she recalls a personal experience. Other times, your research may influence human lives more indirectly, such as when your findings are employed in debates among policy makers considering new legislation or by judges as they wrestle to interpret the law.

The foregoing examples noting the real human impact of political science research should make it clear why you will find a discussion titled "Ethical Considerations" in each chapter. If you still have doubts, though, consider the weight that others in society and government give to the importance of ethical conduct. In class, unethical use of others' research in your writings is called plagiarism, and may cause you to receive a failing grade in the course, or even cause you to be expelled by your college. In academic research, failing to obtain prior permission to carry out research or not fully protecting human or animal research subjects will lead to sanctions against you, and may well cost you both your reputation and your livelihood. In business, using others' copyrighted material without permission may be punishable with a fine amounting to hundreds of thousands of dollars, and a decade in prison—per offense! Clearly, our society values your ethical behavior; in this text we will do our part to promote ethical studies at each stage of the research process by suggesting specific strategies you can use to foster and develop your ethical compass.

Conclusion

This chapter's brief overview of the six stages of the research process will give you a good idea of what scientific research into politics is like and what this book is about. We shall devote a good many of our pages to learning to perform and evaluate each of these tasks. We realize, of course, that most who read these pages will never become political science researchers. But we know, too, that the same skills that go into creating quality research may also be applied to developing more thorough and critical skills in reading and evaluating the research done by others. This is an ability that anyone with an interest in the study of politics will do well to possess. Social scientific research is increasingly used as a basis for both public policy and legal decisions. It is, therefore, increasingly important that citizens be able to judge the merits of research in order to discharge their responsibilities in a democratic society.

The body of knowledge that we call political science was not handed down on stone tablets in antiquity. It is constantly growing, changing, and being refined. Every piece of research is a potential extension of our knowledge and understanding. But that potential can be met only if the research itself can withstand critical scrutiny—only if it comes up to accepted standards. Those standards are what this book is about, and learning them, whether for research of your own or for critical reading, will provide you with a basis both for understanding the literature of political science and for making a contribution to it.
Summary Points

- Science was developed to search for objective knowledge.
- The political science research method is a progression of steps: building a theory, defining terms and operationalization, choosing a research technique, observing behavior, analyzing data, and interpreting results.
- Scientific research, using qualitative or quantitative methods, is but one of many ways to explore politics and explore our political environment.

Suggested Readings and Examples

Research Examples. Rarely is every part of the research process described in great detail in published work, because many authors reserve scarce printed space for their findings. However, explicit identifying each of the components of a published research report may serve to guide the reader through the work and make it accessible to a wider audience. For example, in their article on the relationship between the increasing number of naturalized Latinos in California and the growth of the Latino electorate, Matt Barreto, Richardo Ramirez, and Nathan Woods (2005) begin by noting each facet of the work in the abstract (i.e., objectives, methods, results, conclusions). Throughout the article, the authors clearly explain each step in the development of the project, from building the theory from the existing literature, to data coding and merging, to interpreting the results.

Methodological Readings. Worth a close reading by both experienced and novice researchers, a path-breaking argument against the artificial barriers between qualitative and quantitative empirical political science research is found in Designing Social Inquiry: Scientific Inference in Qualitative Research (King, Keohane, and Verba 1994). Forming the basis for our modern understanding of study reactivity, the official company report on the experiments done by the Western Electric Company at its Hawthorne assembly plant in Illinois is documented in the book Management and the Worker (Roethlisberger and Dickson 1939).

References


Research Exercises

1. Write a paragraph describing why you think the authors of this book have characterized operationalization as “the single most important key to conducting meaningful research.”
2. Use your academic library’s online resources to find one example each of basic research and applied research reported in a newspaper or magazine published within the past month. Write a brief summary of each.
CHAPTER 2

Theory Building: Concepts and Hypotheses in Political Research

- Why develop a theory before beginning to research a relationship?
- What roles do induction and deduction play in developing theory?
- What are the characteristics of useful theories?
- How do covariation and causation differ?
- How are theories elaborated using hypotheses?

The first chapter explained the motivations behind social science research: We want to understand the complex world around us, either for the satisfaction of knowing or because we want to be able to anticipate or even control events. Scientific research, then, starts with something we want to know. This is our research question. It is usually quite general. We might want to know, for example, why some people actively support environmental protection while others are opposed or indifferent to it. The most effective way to find an accurate (and therefore useful) answer to this question is to employ established methods of empirical research to investigate the relationships we see in the world. Before we can employ scientific procedures in an attempt to find a generally agreed-upon answer to our question, we have to reduce this highly general question to one or more highly specific ones. Unless we do this, we will not know what to observe in order to seek an answer to the question, and we cannot understand how what we observe is related to our research question.

The Purpose of Theory. Transforming our general research question into one or several specific ones requires developing some plausible explanations for what we observe. We might, for instance, reason that people's position on environmental protection is influenced by the nature of their job. Some occupations, for example, benefit from environmental protection measures whereas others are hurt by them (at least in the short run). We might also think that age influences people's attitude toward environmental issues, because younger people have grown up with an awareness of the problems of pollution while older people grew up before these problems were understood.

This reasoning helps us to reduce the complexity of social life and puts us in a position to begin scientific inquiry. We can apply logic and information that we already have about empirical relationships to reason out a set of things we expect to be true if our tentative explanation is valid. Now we can ask questions like
these: Do younger people support environmental legislation more often than older people? Do white-collar and professional people support environmental measures more often than blue-collar people? We can devise ways to make observations that will allow us to answer these questions and, when we have explored enough small questions, to answer our initial research question.

When we attempt to create possible explanations for events, we are theorizing, or developing a theory. Theories are created in our effort to gain understanding. They help direct the research to determine if our understanding of events is correct. This is why theory building is the first stage in the research process and why it is essential that we understand the relationship between theory and research.

**Theories Aid Interpretation.** Without a sound theory we will not be able to tell why our research "findings" provide an answer to the research question. Suppose we begin research with only the general question posed earlier. If we ask a properly selected sample of 2,000 Americans about their position on environmental protection and a series of questions about their personal characteristics, we can use our results to describe the kinds of people who support and oppose environmental legislation, but we cannot tell why they support or oppose it.

If, on the other hand, we start with a theory that offers an explanation of why people support or oppose environmental protection policies and ask questions to check on the accuracy of the expectations that logically follow from this theory, our results will contribute to our understanding of why people take the positions they do.

To illustrate, say that we theorize that people's first concern is their economic well-being and that their position on environmental protection is determined totally by their perception of how proposed legislation will affect their income. One expectation or prediction that logically follows from this line of reasoning is that people who expect to be financially hurt by environmental protection laws will oppose them, whereas those who expect to be helped by these laws will support them. If our theory is an adequate explanation of how people develop attitudes about environmental protection, then this prediction should be an accurate statement about real-world relationships. We can then get some idea of the usefulness of our theory by checking on the empirical accuracy of the prediction that logically follows from it. For example, we might ask people about their position on environmental protection and their perception of its effect on their income to find out whether the prediction is borne out by what we learn about actual relationships.

Regardless of the outcome, our research can then tell us something about why people feel as they do about this issue. If the research is correctly done and the prediction is supported, we are encouraged both to believe that we have developed a sound explanation for the behavior in question and to search for further evidence of its utility. If the prediction is shown to be wrong, we at least have reason to believe that this is not likely to be a useful theory for understanding people's position on this matter, and we can begin to explore other possible explanations.

Whether we start our research with a theory or without a theory, it may produce the same facts. But the facts will contribute to our understanding only if we can tie them together through a theory. For example, knowing that white-collar people tend
to support environmental protection more often than blue-collar people do will provide an explanation of why people take the positions they do only if we can give some reason why occupation and position on ecology should be related. Otherwise, the fact could be a coincidence, and knowing it will add nothing to our ability to explain people's attitudes. Theories provide sets of reasons why facts should be connected in given ways. Therefore, theories make facts useful by providing us with a framework for interpreting them and seeing their relationships to one another.

This chapter is designed to help you understand how theories are developed and how they are used to guide research. We will discuss the nature of social science theorizing, the elements of theories, and the relationship of theory to the rest of the research process. When you have finished the chapter, you should be able to begin thinking about political questions that interest you in ways that will prepare you to undertake systematic empirical research in order to find valid answers to those questions.

### The Nature of Social Science Theory

**Usefulness of Theories.** First, theories help simplify reality so that we might understand it in order to control it or adapt to it better. Second, once we have developed such an understanding, theories can guide us in testing its accuracy. Theories do this by providing a logical basis for expectations or predictions about the world that can be compared with reality through research. When our predictions are supported by evidence, the understanding that provides a basis for those predictions is also supported, and our confidence that we have a grasp of the way things work is increased. When our predictions are inaccurate, we begin to question our understanding of events and to look for ways to improve it.

Theories are sets of logically related symbols that represent what we think happens in the world. They are simply intellectual tools. Understanding this is important, because it helps us realize that theories are neither true nor false in any absolute sense, but only more or less useful. You cannot expect to discover a theory the way an explorer discovers a new island. Why? Because theories do not exist "out there" for discovery. They are the products of human imagination, hard work, and sometimes good fortune.

If theories are essential to sound research but cannot be discovered by simply looking at accumulated data, how can we go about building a theory to guide our quest for an understanding of those aspects of political life that interest us? What processes are involved? The answer is not neat or simple, because theories are developed in a variety of ways. We cannot outline a set of procedures to produce a useful theory in the same way as we might describe how to build a table. We can, however, provide an explanation of the major ideas and stages commonly involved in theory construction. The first of these stages is the conceptualization of the problem.

### The Logic of Theory Building

Beginning with the event or behavior we want to understand, we must first ask ourselves what we know about the phenomenon that might help us explain it. Insights might be gained from personal experience, casual observation, or creative thinking.
More often we will find it useful to investigate systematically what others have found about the subject. Useful theories begin from a thorough knowledge of the events we want to explain. Without such knowledge, we might fail to understand what is to be explained or might not have a clue where to begin looking for relationships that can be used to explain the events. An example might highlight the importance of having a thorough knowledge of the facts to aid our research conceptualization.

**An Example.** The massive riots that took place in many U.S. cities in the late 1960s deeply worried many Americans. Political scientists and other social scientists were asked to investigate the causes of the riots. When the riots first occurred, many public officials said they were the acts of a group of poor citizens without stable ties to society. If we had accepted this interpretation and sought to understand the riots, we would have defined our task as one of explaining why so many of these “riffraff” were concentrated in our cities at that time and how they were moved to riot. Many public officials turned to the alleged presence of “outside agitators” as an explanation. As social scientists conducted interviews in the riot-torn cities, however, we learned that rioting was not restricted to riffraff. In fact, as a group, rioters differed very little from the general black population of these cities (Fogelson and Hill 1986). This fact presents us with a very different research task from that suggested by the riffraff interpretation. We must now seek to understand how average citizens with jobs, families, and other ties to society were motivated to riot. Subsequent explanations have focused on variables such as African Americans’ reaction to white racism rather than “outside agitators.”

In this case, an inadequate knowledge of the facts could have fundamentally misdirected our theory-building efforts. This is why exploratory research, which is designed to establish the facts in a given case, is important. It is also the reason why we must search the literature for information on the phenomena we seek to explain if we hope to develop sound theories.

But once we have as many facts we can find, how do we construct a theory to explain these observations? We generally begin by searching the facts for patterns that can account for the observed events.

For example, we might want to know what causes political protests on college campuses. Answering this question involves explaining what leads students to take part in protests. Having been or having known protesters might provide us with some insights into their motivation, but to develop an explanation of why large numbers of students participate would require information on a much larger number of people. We would be wise to seek data on the characteristics and motives of student protesters in general in order to frame our explanation. If we found among protesters commonalities that set them apart from nonprotesters, we might reason that these characteristics led to their participation in demonstrations. The prominence of these characteristics among college students then becomes part of our explanation of why protests occur.

**Induction.** The process of generalizing from what we have observed to what we have not or cannot observe is called induction. It forms the basis of scientific theory. Theories built through inductions from observations are said to be empirically grounded.
In the process of induction, we reason from what we know to be the case in some situations to what might be the case in other, similar situations; we make a logical leap from what we have seen to a prediction about what we have not seen, based on the assumption that there is some constant underlying pattern to events in the world. We all use induction in our daily life. If we observe five consecutive times that the elevator door opens after our pushing a button on the wall, we will quickly draw the conclusion that pushing the button causes the door to open. This is an inductive generalization from the few cases we have observed (pushing the button five times) to cases we have not (pushing the button more times or pushing elevator buttons in other buildings). The process of induction is diagrammed in Figure 2.1(a). This diagram suggests how inductively constructed theories are grounded in facts.

![Diagrams of induction and deduction](image)

Figure 2.1
Diagrammatic representation of inductive and deductive reasoning
There is more to theory building than induction, however, because pointing out facts does not provide an explanation unless we can show why those facts have led to the observed results. Let us return to the example of student protest. Suppose we find that protesters tend to be more dissatisfied with public policies than nonprotesters and that protesters also tend to have far less faith in the effectiveness of conventional politics in getting policies changed. Stating this fact constitutes an explanation of protest only if we are able to show why such attitudes should lead to protest behavior. Showing this might involve making some *assumptions* about political behavior. Specifically, it might involve assuming that people will act to change policies they strongly oppose and that they will resort to protest behavior if they feel that conventional political participation (voting, letter writing, etc.) will not alter the policies.

These assumptions (sometimes called *axioms* or *postulates*) then become part of our theory. Assumptions describe the conditions under which we expect the tentative explanation we have reached to be supported by evidence. They tell why we expect student protest from what we know about students on college campuses by making general statements about political behavior under certain conditions. We can now explain specific behavior (protest) by showing that it follows logically from a set of theoretical assumptions.

**Deduction.** This process is the reverse of inductive reasoning. Deductive reasoning moves from abstract statements about general relationships to concrete statements about specific behaviors. This process of reasoning from the abstract and general to the concrete and specific is known as **deduction**. We all use deductive logic in everyday life. If we assume that elevators work on a system of wall-mounted buttons and find ourselves confronted with an elevator, we will generally deduce that the way to enter the elevator is to push the appropriate button. We have moved from a generalization to the prediction of a specific event by deduction. This process is diagramed in Figure 2.1(b).

Deduction is the process that enables us to use theories to explain real-world events. If we can show by a process of deduction that some observed event can be logically predicted from the set of assumptions that constitute our theory, then the theory provides an explanation for the observed event. The theory helps us to understand the event by giving a reason why it is as it is. The role of deduction is to provide this link between the theory and our observations.

**Theory Construction.** The process of theory construction involves the interaction of both inductive and deductive logic in the following stages: (1) we use induction to translate what we have observed into assumptions; (2) we employ deduction to derive predictions; (3) we test these predictions against new observations; and (4) we revise our assumptions to make them consistent with the results of our observations. Then we repeat the process in an effort to make the theory increasingly useful as a tool for understanding events.

Merely devising a theory, however, does not make it valid. We can generally come up with many theories to explain a given event. The question we must ask is, which of these theories is most useful in helping us understand the world? Answering this question will require that we test alternative theories against reality.

Before we can discuss theory testing, it is important to understand two things. First, we have to know what features make a theory useful so that we can know how
to go about building theories. Second, we must know how the components of a theory are related to each other and to empirical research.

**Characteristics of Useful Theories.** For a theory to be useful in explaining observations, it must meet several standards:

1. **It must be testable.** Can we reason from the theory to expectations about reality that are concrete and specific enough for us to make observations that either support the expectations or fail to support them? Can the theory be related to the world in systematic ways, or is it only a set of abstractions?

2. **It must be logically sound.** Is the theory internally consistent? Are its assumptions compatible, and the terms it contains unambiguous?

3. **It must be communicable.** Can other, properly trained people understand the theory in ways that allow them to use it to explain events and to test hypotheses derived from it?

4. **It must be general.** Is it possible to use it to explain a variety of events in different times and places? Can we deduce predictions from it that can be tested in different circumstances, or is it tied too closely to one set of observations?

5. **It must be parsimonious.** Is it simple enough to be readily applied and understood, or is it so complex, so filled with conditions and exceptions, that it is difficult to derive explicit expectations about real-world events from it?

Theories can have each of these desirable characteristics in different degrees, and sometimes we have to choose among them in developing a particular theory. We may have to sacrifice some parsimony in order to obtain more generality or testability, for instance. We have to keep all these desirable features in mind when formulating theories if the products of our labors are to be truly useful.

**Components of Social Science Theory**

Theories are composed of sets of concepts that are related by propositions logically derived from a set of assumptions. This is the logical structure of a theory. It is this structure that allows us to use the theory to explain events, because it allows us to give reasons why we can logically expect things to be as they are.

**Defining Concepts.** The quest for useful theory begins with the decisions we make about the building blocks of theories: concepts. A concept is merely a word or symbol that represents some idea. There is nothing mystical about concepts. We use them every day to help us cope with the complexity of reality by categorizing the things we encounter according to some of their properties that are relevant to us. We classify the four-legged creatures we see into cows, cats, dogs, and other species, and that classification alone provides a basis for some important expectations (for example, dogs are not a good source of milk). Assigning a name to something allows us to predict certain things about it, because the name is a symbol for particular combinations of properties.

Social science concepts serve the same purpose. They point to the properties of objects (people, political systems, elections) that are relevant to a particular inquiry. One observer might be interested in a person's personality structure, another is interested
in partisan identification, and a third focuses on the person's level of political alienation. The person has all of these properties (a personality, a party identification, and a degree of alienation) and many more, but only certain of the properties are relevant to any given piece of research. All three observers are dealing with the same reality; they simply choose to organize their perceptions of it differently. Concepts help us to decide which of many traits or attributes are important to our research.

**Making Concepts Useful.** Concepts, like theories, are tools that we create for specific purposes and that cannot be labeled true or false, but only more or less useful. What makes a concept useful? There are three major considerations.

First, since we are involved in *empirical* inquiry the concept must refer to phenomena that are at least potentially observable. In medieval times, the concept of divine will played an important role in explanations of events. We cannot verify such explanations, however, because we cannot observe divine will to tell whether it is present or absent in any given case. If it is to have any scientific value, a concept must refer to something that can be measured with our ordinary senses.

This does not mean that all concepts must refer to *directly* observable things. Some of the most useful concepts in the social sciences refer to properties we cannot observe directly. For example, people do not have a class status in the way that they have red hair, but if we know certain things about them (their income or their occupation, for example), we can infer what their class status is. Similarly, nations do not have authoritarian or democratic political systems in the way that they have mountains or deserts, but we can *infer* the degree of democracy that exists in a nation by observing certain things about its political life (the nature of elections and provisions for civil liberties, for instance).

The question is: Can we devise a set of procedures for using our senses to gather information that will allow us to judge the presence or absence or magnitude in the real world of the thing to which the concept refers? If we can do this for a concept, it is said to have *empirical referents*; it refers to something that is directly or indirectly observable.

Second, in addition to having empirical referents, concepts must be *precise*. They must refer to one and only one set of properties of some phenomenon. We must be able to know exactly what we are talking about when using a concept to describe an object. For instance, is the degree of inequality of distribution of wealth part of what we are referring to when describing a nation's political system as democratic or authoritarian, or is the nature of the political system determined exclusively by other factors? Precision is important because *it tells us* what to observe in order to see how a concept is manifested in any given case. Only if we can determine this can we use the concept in empirically grounded explanations.

Precision also helps us identify our empirical referents and make distinctions among observed phenomena. If democracy means *only* the presence or absence of popular elections for public officials, then the former Soviet Union and the United States both were democracies. Do we want to treat these two nations as examples of the same kind of political system for purposes of our research? If not, then we need to refine the concept, making it more precise, so that we can draw a distinction in our study between the two nations.
Finally, useful concepts have **theoretical importance**. A concept has *theoretical importance* when it is related to enough other concepts in the theory that it plays an essential role in the explanation of observed events.

In our hypothetical explanation of student protest, we employed two concepts. One was *intensity of policy preferences*, and the other was *perception of the effectiveness of conventional political action in changing policies*. These two concepts were tied together by the assumptions that people will act to change policies with which they strongly disagree and that they will turn to protest when they feel that other means of influence will not bring results. Given these assumptions, finding the particular combination of attitudes we have referred to will lead us to expect protest behavior. Each concept is essential to the explanation and is linked both to the theoretical assumptions and to the other concept. Each concept has theoretical importance because it plays a necessary role in our explanation.

### Relationships in Social Science Theory

Now we can begin to see that theory makes concepts useful by tying them together so that they can be used in formulating explanations. Theory ties concepts to one another by stating relationships between them. These statements take the form of propositions derived from our assumptions. Propositions generally posit one of two major types of relationship among concepts. These are **covariation** and **causation**.

**Covariational relationships** indicate that two or more concepts tend to change together. As one increases (or decreases) the other increases (or decreases). Covariational relationships tell us nothing about what causes the two concepts to change together. For instance, we might predict that level of political information and likelihood of voting covary, so that as one increases so does the other. But are people more likely to vote because they have more information, or do they gain information because they intend to vote and want to make a sound decision, or are both information level and likelihood of voting the products of some third factor, such as interest in politics or perceived civic duty? The covariational proposition does not tell us.

**Causal relationships** exist when changes in one or more concepts lead to or cause changes in one or more other concepts. For example, the stronger one’s party identification, we might argue, the more likely one is to vote. Feeling oneself to be a member of a party can lead one to vote, but the likelihood of voting does not create one’s party identification.

We are accustomed to thinking in terms of cause and effect in our everyday life, and generally use these concepts loosely. In scientific research it is often very difficult to identify the causes or consequences of human behavior; the more important the event, the more difficult isolation of its causes can be. What brings on a war, a social movement, or the creation of a new political party?

**Testing Causation.** Because of such complexities, we must be careful to postulate causal relationships only when four conditions are simultaneously met. First, the postulated cause and effect must change together, or covary. Second, the cause must precede the effect. Third, we must be able to identify a *causal linkage* between the supposed cause and effect (meaning, we must be able to identify the *process* by which
changes in one factor cause changes in another). Fourth, the covariance of the cause-and-effect phenomena must not be due to their simultaneous relationship to some third factor—a condition we discuss next.

Spurious relationships occur when A and B vary together only because they are both caused by C. If they would not covary in the absence of C, the apparent relationship between A and B is termed spurious. We must carefully examine the assumptions we are making in an effort to uncover possible spuriousness in relationships before we build them into our theories as though they were the product of causal interaction. A classic instance of spuriousness is the case in which an investigator first finds that the price of imported rum and the salaries of ministers fluctuate together and then reasons that changes in the price of rum cause changes in ministers' salaries. It is more likely that both rum prices and ministers' salaries change in response to changes in general economic conditions and overall price level. The relationship between the first two variables is covariational, but it is not causal.

It is important to recognize two other features of social causation. First, one phenomenon may cause another either directly or indirectly. For example, A may cause B only in that it is the cause of C, which directly causes B. We must be alert to the role of indirect causation in attempting to make our theories as complete as possible. Second, we must be sensitive to the fact that human behavior generally has more than one cause. In theorizing, we should avoid oversimplifying and thus recognize the role of multiple causation in social life. This simply means that any one event may have several different causes, and that many events sometimes must come together to cause a given occurrence.

To cope with all of these complexities, it is generally a good idea to draw a causal model of the theory. This is simply a diagram that clearly specifies all the relationships posited in the theory so that it is easier to see the implications of our arguments. Figure 2.2 presents an example of such a model. Each arrow in the model represents a causal influence, and the direction in which it is pointing indicates which variable is theorized as dependent and which as independent. The theory diagrammed in Figure 2.2 asserts that a variety of factors influence a representative's decision to vote for or against welfare legislation in both direct and indirect ways. For instance, the size of the poor population in the representative's congressional district is depicted as influencing welfare voting both directly (independently) and indirectly through the electoral competitiveness of the district and the seniority level of the representative.

At this point, we should note that although our theories typically specify a causal relationship between our concepts, we rarely encounter social science data that can establish definite causation. Later in this text, we will highlight the exceptional degree of control the experimental setting offers, which helps to identify causal relationships.

Positive and Negative Relationships. Both covariational and causal relationships can be either positive or negative. This means that the two concepts can change either in the same direction or in opposite directions, respectively. An example of a positive relationship is: The higher the relative deprivation of minority groups within a society, the higher the likelihood of political violence. A negative relationship may be posited as follows: The higher the degree of political alienation one feels, the lower the likelihood that one will take part in conventional political activities. Our theories must specify whether we expect positive or negative relationships among
Figure 2.1
Causal model of the determinants of representatives' support for welfare legislation in the U.S. Congress

This information can be added to causal diagrams by placing a plus (1) or minus (2) sign on each path in order to indicate whether the relationship is thought to be positive or negative.

Theory Testing and Elaboration

Theories must never be regarded as finished products, but always as tools that should occasionally be inspected and can often be improved. We start with a research question that asks for an explanation of observed events, select concepts that promise to be useful in explaining those events, and relate the concepts through propositions logically derived from a set of assumptions we choose to make in order to secure an explanation. Now our backs are against the wall. Is this lovely...
structure any good? It seems to explain what we want to understand, but can we check it in some way? Can we test its utility so that we can know how much confidence to place in it and persuade others of its value?

Theory testing is at the center of the research process. Because our theories are generally developed from bits of knowledge about actual relationships, the tasks of theory testing are essentially those of using the theory to formulate some expectations about other relationships we have not observed and then checking to see whether actual observations are consistent with what we expect to find. We cannot rely on relationships we have already observed, because showing that the theory leads us to expect the very relationships the theory was built to explain would be no test at all.

In our example of the elevator, after observing the elevators in one building, we will be quite confident that the elevators in that building operate in response to a system of wall-mounted buttons. We might even be willing to generalize from our observations to reach the conclusion that all elevators work this way. We can check the validity of that conclusion only by actually trying it out in other buildings. It does not help to double-check the elevators in the building we started in, because we already know that they respond to the buttons and showing that they do does not make us feel any more secure that other elevators do as well. We have to go to other buildings to see how their elevators operate.

We can never actually prove that our theory of elevator operation is correct because we can never observe all the elevators in the world. As we see more and more elevators that do work this way and we never encounter any that do not, our confidence in the validity of our generalization will increase. If we cannot find any other elevators that work by buttons, however, we will quickly conclude that we have been mistaken in generalizing from the initial observations to all other elevators.

Theory testing in the social sciences works by the same principle. We must move from what we have observed in devising the theory to what we have not observed, in order to discover whether or not the theory provides us with an accurate set of expectations about the world.

Suppose, for example, that we want to construct a theory to explain voting behavior. We review previous research on the subject and discover that, for citizens of the United States, higher education is positively related to the propensity to vote. On the basis of these observations, we include in our theory an assumption that higher educational levels lead to a greater likelihood of voting. We know that these factors are related in the United States, but what about in other nations? Could there be something unique to the educational system or the informational complexity of voting in the United States that causes this relationship? The only way we can find out is to observe people and the political systems in other nations, because, as political scientists, we are interested in finding general relationships in human behavior.

From the assumption that education increases the likelihood of voting, we might deduce the prediction that people with some college education are more likely to vote than people with no more than a high school diploma. We can test this prediction by seeing whether it accurately reflects relationships found in data from a variety of countries. The more often we find evidence consistent with the prediction, the more confident we will feel that our theory is useful in predicting human behavior. We can never be absolutely certain that the theory is "true," because we can neither observe
all cases nor be sure how the empirical relationships might change with time. But we
can acquire more or less confidence in the utility of the theory by comparing the
predictions derived from it with observations. If it allows us to accurately predict
things we have not previously observed, then it is useful.

Theories, as sets of concepts, assumptions, and propositions, are never finally
proved or disproved. Rather, our confidence in the usefulness of a theory builds as
we accumulate observations that are consistent with the expectations or hypotheses
derived from it. Alternatively, our confidence diminishes as we accumulate observa-
tions that are inconsistent with theoretically derived hypotheses.

■ The Role of Hypotheses

The above section’s theory elaboration is based largely on a process of comparing
hypothesized conditions with reality and, once we have the results, modifying our
theory so that the hypotheses that can be derived from it are more and more
consistent with what we observe. Now we consider how our research questions are
translated into hypotheses that can guide empirical investigations and provide us
with clues to the adequacy of our theoretical explanations.

Hypotheses Defined. A hypothesis is essentially a statement of what we believe
to be factual. It tells what we expect to find when we make properly organized ob-
servations of reality. Hypotheses are declarative sentences stating expected rela-
tionships between the phenomena to which our concepts refer. They are usually stated in
the following general form:

The higher (lower, greater, larger, slower, etc.) the _____, the higher (lower, greater,
larger, slower, etc.) the _____.

The blanks are filled in with the names of the phenomena that we expect will change
together. For example, working from the theory modeled in Figure 2.2, we might
hypothesize the following:

The larger the proportion of a district’s population that is poor, the more likely that
district’s representative is to vote in favor of welfare legislation.

This is a covariational hypothesis. It does not tell us how roll-call voting is deter-
dined, but it does point us to something that we can observe in an effort to acquire
some evidence on the fit between our theory and reality.

Acquiring that evidence through empirical observation requires that we move from
the very general level of theory to a more specific level from which to organize obser-
vations. In doing this, we have to begin to think in terms of variables. A variable may
be defined as an empirically observable characteristic of some phenomenon that can
take on more than one value. Sex and nationality are two variables that can take on only
a limited number of values and can be “measured” only qualitatively by designations
such as “male” or “British.” Age and gross national product are two variables that can
take on a much wider range of values; they can be measured quantitatively by counting.

Concepts into Variables. To facilitate empirical testing, abstract concepts must
be translated into statements with more precisely defined variables. For instance,
the concept of pluralism is important in political science, but its empirical referents are not particularly clear. In order to test the empirical accuracy of any statement relating pluralism to anything else, we have to translate the concept into some variable or set of variables with clear empirical referents. We might want to use the number of organized interest groups in a nation as a variable to represent the concept of pluralism in our research. We can then reason backward from our observation of relationships among variables to evaluate the empirical validity of statements about relationships between concepts. If we are willing to assume that the variable number of organized groups captures the essential meaning of the concept pluralism, we will be willing to take evidence that this variable is related to some other variable (such as the level of government expenditures) as evidence that pluralism is also related to that other variable or the concept it represents.

Independent and Dependent Variables. Variables have a central place in the research process for two reasons. First, they help us identify what we will have to observe to test our theory by providing more precise empirical referents. Second, we can organize our observations by knowing the role variables play in hypotheses. Variables that are thought to change value in response to changes in the value of other variables are referred to as dependent variables. Their value depends on the value of other variables. Variables that influence the value of other variables through changes in their own values are referred to as independent variables.

An Example. Whether a variable is dependent or independent is determined by the relationship asserted by the hypotheses containing it. The same variable might be dependent in one study and independent in another. For example, a theorist observing the lobbying efforts of interest groups might reason that the larger the number of organized interest groups in a nation is, the higher the level of government expenditures will be. In this case, the number of groups is the independent variable and the level of expenditure is the dependent variable. This relationship is described in Figure 2.3.

An independent variable’s change in value must precede changes in the dependent variable. For example, following the above hypothesized relationship, we might observe an increase in government spending between 1980 and 1990 and also see a positive change in the number of organized groups between 1990 and 2000. Logically, this subsequent surge in interest group formation cannot have been responsible for a level of expenditures that preceded it. In fact, these observed data should prompt a

```
| Formation of interest groups | Lobbying efforts | Increases in government spending |
```

Figure 2.3
Interest group activity (independent variable) leads to higher government spending levels (dependent variable)
reconsideration and (perhaps) a theoretical reformulation that accounts for this phenomenon.

**Intervening Variables.** A close look at Figure 2.3 alerts us to another type of variable important in social analysis. In the theory summarized by the diagram in Figure 2.3, lobbying activity is an intervening variable; it comes into play between the number of organized interest groups and the level of government spending. Intervening variables provide the link between independent and dependent variables. In this case, interest groups would not affect the level of government spending if they did not engage in lobbying to get funds appropriated to their cause.

Intervening variables condition the relationships between other variables. This means that the value attained by intervening variables can affect the strength and direction of relationships between other variables. If lobbying activity is slight in Figure 2.3, then the relationship of interest group organization to public spending is weak. If lobbying is extensive, the relationship between the other variables will be strong.

Because intervening variables condition relationships between other variables, our knowledge of the role they play will affect our expectations about relationships between variables. If we are theorizing that lobbying intervenes between group organization and increases in spending, then we can make the following predictions:

- Interest group organization will be positively related to increases in government spending when lobbying activity is vigorous.
- Interest group organization will be related only weakly to increases in government spending when lobbying activity is highly limited.

We will not be satisfied to predict simply that interest group organization will be related to increases in government spending, because we believe that whether the two variables are related depends on the value of the intervening variable—lobbying. For this reason, we must specify the order of relationships and the role played by each variable in our theories.

**Antecedent Variables.** Whereas intervening variables come between independent and dependent variables, antecedent variables come into play before the independent variable does. For instance, we know that studies of voting behavior in the United States show that people who identify strongly with a political party are more likely to vote than those who do not. We might then want to theorize that party identification leads to or causes voting frequency. But what causes some people to identify strongly with a party while others do not? We might reason that the strength of their parents' party identification plays an important role in people's development of such party identification. Parents' party identification then is an antecedent variable in the causal chain that produces voting frequency.

Using both intervening and antecedent variables in our theories helps to clarify the *causal chains* at work in creating the phenomena we want to explain. It gives us more of a basis for deriving hypotheses through which we can test the utility of our theories, because hypotheses are essentially *statements of relationships between variables*. Hypotheses provide a basis for collecting evidence about the empirical utility
of our theoretical structure. The more numerous and the more detailed the relationships we postulate, the more predictions we can make about the world and therefore the more potential tests we have of our theory.

This leads to the question of how we decide what relationships to assert in the form of hypotheses around which to build research projects.

Formulating Hypotheses

We arrive at hypotheses by either inductive or deductive reasoning. Which one we use depends on the stage we have reached in the research process. If we are still using trial and error to construct a theory, we might develop hypotheses by a process of inductive generalization. For example, we might observe that among the states in the United States the level of popular political participation varies directly with the extent of industrialization, and we might generalize that this relationship between variables is also found when comparing nations. If we find evidence to support the hypothesis, we will be more confident in including industrialization as a variable in a theory designed to explain political participation. Until we have a theory that shows why industrialization and participation are related, however, we cannot use the fact of their relationship as an explanation of political participation.

Hypotheses arrived at inductively can be important in exploratory research, which helps us construct theories, but they do not help us explain phenomena. Once we have stated a theory relating our variables in a logically coherent system, we can derive hypotheses from that theory by deductive reasoning. Because these hypotheses are predictions about the world that are logically implied by the theory with which we are working, finding support for them does help us explain events, because such findings reflect the validity of the theoretical system from which the hypotheses have been derived.

We cannot learn anything new about relationships from deduction alone. Deductive logic is a process by which the information contained in a set of statements can be made explicit. We use deduction to clarify the implications of our assumptions, and it is that clarification that produces hypotheses.

The deduction contained in Figure 2.1(b) shows this. If the assumption stated there is correct, that is, if the Republican Party attracts only conservatives, then any subset of the members of that party will be conservative also, and since the Republicans in Middletown are members of that party, they too will be conservative. This is the kind of reasoning referred to when we say that one conclusion "logically follows" from another. The conclusion that all Republicans in Middletown will be conservative is logically implied in the assumption that the Republican Party attracts only conservatives.

Since hypotheses are derived from theories, testing hypotheses indirectly tests our theories. Returning to our example, if we interview a properly drawn sample of Middletown Republicans and find that not all are conservative, we will have good reason to question the validity of our assumption. Finding liberals among Middletown Republicans shows that the party does not attract only conservatives. We will then want to modify our assumption so that the theory can more closely
reflect reality. We may want to change it to read, “The Republican Party tends to attract more conservatives than liberals.” From this assumption we can derive the hypothesis “There will be more conservatives than liberals among the members of the Middletown Republican Party.”

If we find a few liberals and many conservatives among Middletown Republicans, we can say that the evidence is consistent with the hypothesis and the modified assumption from which it has been drawn. We still cannot put much faith in the general accuracy of the assumption until it is supported by evidence about the conservative or liberal character of a larger sample of the national Republican Party. After all, Middletown may be unique in some way. Perhaps, for example, there are only ten liberals in the entire city, and the fact that only a few of the Republican Party’s members are liberal is a result of this more than of the relative attractiveness of the party to liberals and conservatives.

Indirect Theory Testing. The important point here is that evidence about the accuracy of hypotheses represents evidence about the accuracy of a theory only when the hypotheses are linked to the theory by deductive logic. Only when this is the case can we safely reason backward from evidence of the validity of a hypothesis to any judgment about the parent theory. Theories are developed, expanded, and improved by this process of logically deriving hypotheses, checking them against reality, and evaluating the theory in the light of the results.

One type of hypothesis that plays an especially crucial role in this process is the alternative rival hypothesis. There are many possible explanations for any event. Some of these explanations are fully consistent with one another; more than one may be correct. In some cases, however, the explanations are opposed to one another: if one is correct, the other cannot be. If we state our explanations as hypotheses, then those which are inconsistent with one another are termed alternative rival hypotheses. They are alternatives because they provide different ways of looking at or understanding the event to be explained. They are rivals because they cannot both be valid. If one is accurate, the other has to be inaccurate. We cannot test and compare all possible alternative hypotheses relating to any event, but if we are to have faith in the accuracy of any one hypothesis, we must attempt to test the major rival hypotheses to be sure that we are not being misled by our observations.

One common form of alternative rival hypothesis is that which states that the relationship between any two variables is spurious and that changes in both are in fact due to some third factor. This type of alternative rival hypothesis is especially useful in theory testing because it suggests a research finding that gives us a solid basis for judging which of the two hypotheses in question is more accurate.

An Example. In our illustration inferring a causal relationship between rum prices and ministers’ salaries, one major alternative rival hypothesis is that fluctuations in both measures are caused by changes in general economic conditions, as represented by general price levels. If this hypothesis is correct, then the relationship between rum prices and ministers’ salaries will disappear when we “control for” (that is, hold constant) the effect of the overall prices on each of these variables. If the statistical
association between rum prices and ministers' salaries vanishes when we control for general price level, we will have a basis for rejecting the original hypothesis in favor of its rival. If the relationship between rum prices and salaries remains even after our imposition of controls for general price level, we have more confidence in the hypothesis that these variables are genuinely related.

### Ethical Considerations

Scientific theory is inherently value-free. Science is a process of discovery, rather than a normative exercise of determining what is best for people. When critiqued during the arms race, the scientists who developed the nuclear bomb during World War II defended themselves by pointing out that they simply identified atomic properties and capabilities that have always existed. They further suggested that it is up to others—specifically, policy makers—to decide how scientific discoveries are used.

Although science lacks control over its use, scientists decide what to research and how to pursue that research. You should consider the implications of your research choices, as you develop theories that are general and seek to explain and, perhaps even, predict human behavior. Implicitly or explicitly, political science always involves humans. Thus, it is unrealistic to pretend that people's lives could never be affected by your research, whether it explores media messages, or interest groups, or executive power. How would you feel if someone used your research to manipulate voters through the media during a political campaign? What if a government in a developing nation realized, through your research findings, that its environmental groups' voices may be silenced without popular backlash, as long as the government maintains economic development? Would it make you feel good if, based upon your research findings that people are greatly comforted by a strong executive during times of popular fear, a democratic regime sharply limited judicial oversight in favor of concentrating power in the executive? Although these are intended to represent hypothetical examples, you should never assume that your own research cannot have consequences for real people's lives—for good or ill.

### Conclusion

Theories gain acceptance as useful intellectual tools as we find evidence consistent with predictions derived from them and eliminate alternative rival hypotheses. We must keep in mind, however, that no single piece of research provides sufficient evidence for accepting or rejecting any theory or part of a theory that pertains to phenomena beyond those included in the study. There is always the possibility that future research will produce evidence against the theory's validity. We must always be open to contrary findings and willing to return to inductive methods to build new evidence into more useful theories.

Theory building is a process of constant interaction between conjecture and evidence, and between reasoning and research. It calls for both creative ingenuity and hardheaded empiricism. Although you must provide the former, we hope to provide a good dose of the latter in the chapters that follow.