2 The Art of Theory Building

OVERVIEW

In this chapter we discuss the art of theory building. Unfortunately there is no magical formula or cookbook for developing good theories about politics. But there are strategies that will help you to develop good theories. We discuss these strategies in this chapter.

2.1 GOOD THEORIES COME FROM GOOD THEORY-BUILDING STRATEGIES

In Chapter 1 we discussed the role of theories in developing scientific knowledge. From that discussion, it is clear that a "good" theory is one that, after going through the rigors of the evaluation process, makes a contribution to scientific knowledge. In other words, a good theory is one that changes the way that we think about some aspect of the political world. We also know from our discussion of the rules of the road that we want our theories to be causal, not driven by data alone, empirical, non-normative, general, and parsimonious. This is a tall order, and a logical question to ask at this point is "How do I come up with such a theory?"

Unfortunately, there is neither an easy answer nor a single answer. Instead, what we can offer you is a set of strategies. "Strategies?" you may ask. Imagine that you were given the following assignment: "Go out and get struck by lightning."[1] There is no cut-and-dried formula that will show you how to get struck by lightning, but certainly there are actions that you can take that will make it more likely. The first step is to look at a weather map and find an area where there is thunderstorm activity, and if you were to go to such an area, you would increase your likelihood of getting struck.

[1] Our lawyers have asked us to make clear that this is an illustrative analogy and that we are in no way encouraging you to go out and try to get struck by lightning.

You would be even more likely to get struck by lightning if, once in the area of thunderstorms, you climbed to the top of a tall barren hill. But you would be still more likely to get struck if you carried with you a nine iron and, once on top of the barren hill, in the middle of a thunderstorm, you held that nine iron up to the sky. The point here is that, although there are no magical formulae that make the development of a good theory (or getting hit by lightning) a certain event, there are strategies that you can follow to increase the likelihood of it happening.

2.2 PROMISING THEORIES OFFER ANSWERS TO INTERESTING RESEARCH QUESTIONS

In the sections that follow, we discuss a series of strategies for developing theories. A reasonable question to ask before we depart on this tour of theory-building strategies is, "How will I know when I have a good theory?" Another way that we might think about this is to ask "What do good theories do?" We know from Chapter 1 that theories get turned into hypothesis tests, and then, if they are supported by empirical tests, they contribute to our scientific knowledge about what causes what. So a reasonable place to begin to answer the question of how one evaluates a new theory is to think about how that theory, if supported in empirical testing, would contribute to scientific knowledge. One of the main ways in which theories can be evaluated is in terms of the questions that they answer. If the question being answered by a theory is interesting and important, then that theory has potential.

Most of the influential research in any scientific field can be distilled into a soundbite-sized statement about the question to which it offers an answer, or the puzzle for which it offers a solution. Consider, for example, the 10 most-cited articles published in the *American Political Science Review* between 1945 and 2005.[2] Table 2.1 lists these articles together with their research question. It is worth noting that, of these 10 articles, all but one has as its main motivation the answer to a question or the solution to a puzzle that is of interest to not just political science researchers.[3] This provides us with a valuable clue about what we should aim to do with our theories. It also provides a useful way of evaluating any theory that we are developing. If our theory doesn't propose an answer to an interesting question, it probably

[2] This list comes from an article (Sigelman et al., 2006) published by the editor of the journal in which well-known researchers and some of the original authors reflected on the influence of the 20 most-cited articles published in the journal during that time period.

[3] The Beck and Katz paper, which is one of the most influential technical papers in the history of political science, is the exception to this.

Table 2.1. Research Questions of the 10 most-cited papers in the *American Political Science Review*, 1945–2005

Article	Research Question
1) Bachrach & Baratz 1962	How is political power created?
2) Hibbs 1977	How do the interests of their core supporters effect governments' economic policies?
3) Walker 1969	How do innovations in governance spread across U.S. states?
4) Kramer 1971	How do economic conditions impact U.S. national elections?
5) Miller & Stokes 1963	How do constituent attitudes influence the votes of U.S. representatives?
6) March & Olsen 1984	How do institutions shape politics?
7) Lipset 1959	What are the necessary conditions for stable democratic politics?
8) Beck & Katz 1995	What models should researchers use when they have pooled time-series data?
9) Cameron 1978	Why has the government share of economic activity increased in some nations?
10) Deutsch 1961	How does social mobilization shape politics in developing nations?

needs to be redeveloped. As we consider different strategies for developing theories, we will refer back to this basic idea of answering questions.

2.3 IDENTIFYING INTERESTING VARIATION

A useful first step in theory building is to think about phenomena that vary and to focus on general patterns. Because theories are designed to explain variation in the dependent variable, identifying some variation that is of interest to you is a good jumping-off point. In Chapter 4 we present a discussion of two of the most common research designs – cross-sectional and time-series observational studies – in some detail. For now it is useful to give a brief description of each in terms of the types of variation in the dependent variable. These should help clarify the types of variation to consider as you begin to think about potential research ideas.

When we think about measuring our dependent variable, the first things that we need to identify are the time and spatial dimensions over which we would like to measure this variable. The **time dimension** identifies the point or points in time at which we would like to measure our variable. Depending on what we are measuring, typical time increments for political science data are annual, quarterly, monthly, or weekly measures. The **spatial dimension**

identifies the physical units that we want to measure. There is a lot of variability in terms of the spatial units in political science data. If we are looking at survey data, the spatial unit will be the individual people who answered the survey (known as survey respondents). If we are looking at data on U.S. state governments, the typical spatial unit will be the 50 U.S. states. Data from international relations and comparative politics often take nations as their spatial units. Throughout this book, we think about measuring our dependent variable such that one of these two dimensions will be static (or constant). This means that our measures of our dependent variable will be of one of two types. The first is a **time-series measure**, in which the spatial dimension is the same for all cases and the dependent variable is measured at multiple points in time. The second is a **cross-sectional measure**, in which the time dimension is the same for all cases and the dependent variable is measured for multiple spatial units. Although it is possible for us to measure the same variable across both time and space, we strongly recommend thinking in terms of variation across only one of these two dimensions as you attempt to develop a theory about what causes this variation.[4] Let's consider an example of each type of dependent variable.

2.3.1 Time-Series Example

In Figure 2.1 we see the average monthly level of U.S. presidential approval displayed from 1995 to 2005. We can tell that this variable is measured as a time series because the spatial unit is the same (the United States), but the variable has been measured at multiple points in time (each month). This measure is comparable across the cases; for each month we are looking at the percentage of people who reported that they approved of the job that the president was doing. Once we have a measure like this that is comparable across cases, we can start to think about what independent variable might *cause* the level of the dependent variable to be higher or lower. In other words, we are looking for answers to the research question, "What causes presidential approval to go up and down?"

If you just had a mental alarm bell go off telling you that we seemed to be violating one of our rules of the road from Chapter 1, then congratulations – you are doing a good job paying attention. Our second rule of the road is "don't let data alone drive your theories." Remember that we also can phrase this rule as "try to develop theories before examining the data on which you will perform your tests." Note, however, that in this example

[4] As we mentioned in Chapter 1, we will eventually theorize about multiple independent variables simultaneously causing the same dependent variable to vary. Confining variation in the dependent variable to a single dimension helps to make such multivariate considerations tractable.

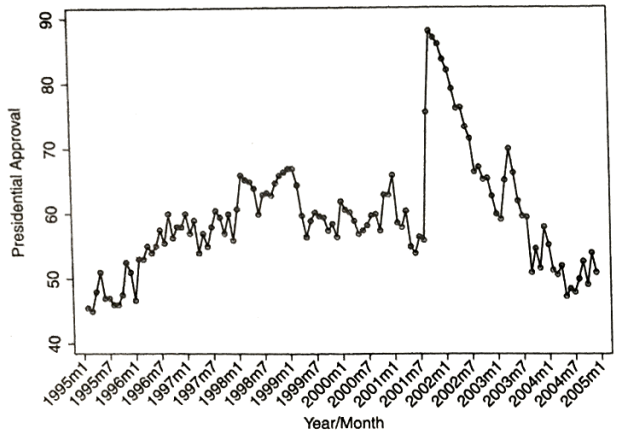

Figure 2.1. Presidential approval, 1995–2005.

we are only examining variation in one of our variables, in this case the dependent variable. We would start to get into real problems if we plotted pairs of variables and then developed a theory only once we observed a pair of variables that varied together. If this still seems like we are getting to close to our data before developing our theory, we could develop a theory about U.S. presidential approval using Figure 2.1, but then test that theory with a different set of data that may or may not contain the data depicted in Figure 2.1.

2.3.2 Cross-Sectional Example

In Figure 2.2 we see military spending as a percentage of gross domestic product (GDP) in 2005 for 22 randomly selected nations. We can tell that this variable is measured cross-sectionally, because it varies across spatial units (nations) but does not vary across time (it is measured for the year 2005 for each case). When we measure variables across spatial units like this, we have to be careful to choose appropriate measures that are comparable across spatial units. To better understand this, imagine that we had measured our dependent variable as the amount of money that each nation spent on its military. The problem would be that country currencies – the Albanian Lek, the Bangladeshi Taka, and Chilean Peso – do not take on the same value. We would need to know the currency exchange rates in order to make these comparable across nations. Using currency exchange rates, we would be able to convert the absolute amounts of money that

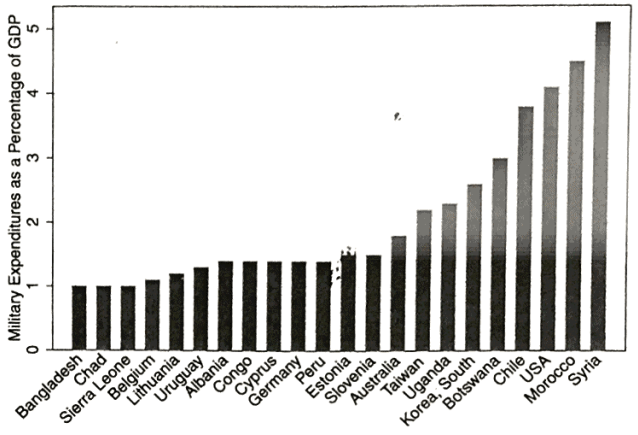

Figure 2.2. Military spending in 2005.

each nation had spent into a common measure. We could think of this particular measure as an operationalization of the concept of relative military "might." This would be a perfectly reasonable dependent variable for theories about what makes one nation more powerful than another. Why, you might ask, would we want to measure military spending as a percentage of GDP? The answer is that this comparison is our attempt to measure the percentage of the total budgetary effort available that a nation is putting into its armed forces. Some nations have larger economies than others, and this measure allows us to answer the question of how much of their total economic activity each nation is putting toward its military. With this variation in mind, we develop a theory to answer the question "What *causes* a nation to put more or less of its available economic resources toward military spending?"

2.4 LEARNING TO USE YOUR KNOWLEDGE

One of the common problems that people have when trying to develop a theory about a phenomenon of interest is that they can't get past a particular political event in time or a particular place about which they know a lot. It is helpful to know some specifics about politics, but it is also important to be able to distance yourself from the specifics of one case and to think more broadly about the underlying causal process. To use an analogy, it's fine to know something about trees, but we want to theorize about the forest.

Remember, one of our rules of the road is to try to make our theories general.

2.4.1 Moving from a Specific Event to More General Theories

For an example of this, return to Figure 2.1. What is the first thing that you think most people notice when they look at Figure 2.1? Once they have figured out what the dimensions are in this figure (U.S. presidential approval over time), many people look at the fall of 2001 and notice the sharp increase in presidential approval that followed the terrorist attacks on the United States on September 11, 2001. This is a period of recent history about which many people have detailed memories. In particular, they might remember how the nation rallied around President Bush in the aftermath of these attacks. There are few people who would doubt that there was a causal linkage between these terrorist attacks and the subsequent spike in presidential approval.

At first glance, this particular incident might strike us as a unique event from which general theoretical insights cannot be drawn. After all, terrorist attacks on U.S. soil are rare events, and attacks of this magnitude are even more rare. The challenge to the scientific mind when we have strong confidence about a causal relationship in one specific incident is to push the core concepts around in what we might call thought experiments: How might a less-effective terrorist attack affect public opinion? How might other types of international incidents shape public opinion? Do we think that terrorist attacks lead to similar reactions in public opinion toward leaders in other nations? Each of these questions is posed in general terms, taking the specific events of this one incident as a jumping-off point. The answers to these more general questions should lead us to general theories about the causal impact of international incidents on public opinion.

In the 1970s John Mueller moved from the specifics of particular international incidents and their influence on presidential approval toward a general theory of what causes rallies (or short-term increases) in presidential approval.[5] Mueller developed a theory that presidential approval would increase in the short term any time that there was international conflict. Mueller thought that this would occur because, in the face of international conflict, people would tend to put their partisan differences and other critiques that they may have of the president's handling of his job aside and support him as the commander in chief of the nation. In Mueller's statistical analysis of time-series data on presidential approval, he found that there was substantial support for his hypothesis that international conflicts would

[5] See Mueller (1973).

raise presidential approval rates, and this in turn gave him confidence in his theory of public opinion rallies.

2.4.2 Know Local, Think Global: Can You Drop the Proper Nouns?

Physicists don't have theories that apply only in France, and neither should we. Yet many political scientists write articles with one particular geographic context in mind. Among these, the articles that have the greatest impact are those that advance general theories from which the proper nouns have been removed.[6] An excellent example of this is Michael Lewis-Beck's "Who's the Chef?" Lewis-Beck, like many observers of French politics, had observed the particularly colorful period from 1986 to 1988 during which the president was a socialist named François Mitterand and the prime minister was Jacques Chirac, a right-wing politician from the Gaullist RPR party. The height of this political melodrama occurred when both leaders showed up to international summits of world leaders claiming to be the rightful representative of the French Republic. This led to a famous photo of the leaders of the G7 group of nations that contained eight people.[7] Although many people saw this as just another colorful anecdote about the ever-changing nature of the power relationship between presidents and prime ministers in Fifth Republic France, Lewis-Beck moved from the specifics of such events to develop and test a general theory about political control and public opinion.

His theory was that changing the political control of the economy would cause public opinion to shift in terms of who was held accountable for the economy. In France, during times of unified political control of the top offices, the president is dominant, and thus according to Lewis-Beck's theory the president should be held accountable for economic outcomes. However, during periods of divided control, Lewis-Beck's theory leads to the expectation that the prime minister, because of his or her control of economic management during such periods, should be held accountable for economic outcomes. Through careful analysis of time-series data on political control and economic accountability, Lewis-Beck found that his theory was indeed supported.

Although the results of this study are important for advancing our understanding of French politics, the theoretical contribution made by Lewis-Beck was much greater because he couched it in general terms and

[6] By "proper nouns," we mean specific names of people or countries. But this logic can and should be pushed further to include specific dates, as we subsequently argue.

[7] The G7, now the G8 with the inclusion of Russia, is an annual summit meeting of the heads of government from the world's most powerful nations.

without proper nouns. We also can use this logic to move from an understanding of a specific event to general theories that explain variation across multiple events. For example, although it might be tempting to think that every U.S. presidential election is entirely unique – with different candidates (proper names) and different historical circumstances – the better scientific theory does *not* explain only the outcome of the 2012 U.S. presidential election, but of U.S. presidential elections in general. That is, instead of asking "Why did Obama beat Romney in the 2012 election?" we should ask either "What causes the incumbent party to win or lose in U.S. presidential elections?" or "What causes Republican candidates to fare better or worse than Democratic candidates in U.S. presidential elections?"

2.5 EXAMINE PREVIOUS RESEARCH

Once you have identified an area in which you want to conduct research, it is often useful to look at what other work has been done that is related to your areas of interest. As we discussed in Chapter 1, part of taking a scientific approach is to be skeptical of research findings, whether they are our own or those of other researchers. By taking a skeptical look at the research of others, we can develop new research ideas of our own and thus develop new theories.

We therefore suggest looking at research that seems interesting to you and, as you examine what has been done, keep the following list of questions in mind:

- What (if any) other causes of the dependent variable did the previous researchers miss?
- Can their theory be applied elsewhere?
- If we believe their findings, are there further implications?
- How might this theory work at different levels of aggregation (micro⟺macro)?

2.5.1 What Did the Previous Researchers Miss?

Any time that we read the work of others, the first thing that we should do is break down their theory or theories in terms of the independent and dependent variables that they claim are causally related to each other. We cannot overstate the importance of this endeavor. We understand that this can be a difficult task for a beginning student, but it gets easier with practice. A good way to start this process is to look at the figures or tables in an article and ask yourself, "What is the dependent variable here?" Once we have done this and also identified the key independent variable, we should think about whether the causal arguments that other researchers have advanced seem reasonable. (In Chapter 3 we present a detailed four-step process for doing this.) We should also be in the habit of coming up with other independent variables that we think might be causally related to the same dependent variable. Going through this type of mental exercise can lead to new theories that are worth pursuing.

2.5.2 Can Their Theory Be Applied Elsewhere?

When we read about the empirical research that others have conducted, we should be sure that we understand which specific cases they were studying when they tested their theory. We should then proceed with a mental exercise in which we think about what we might find if we tested the same theory on other cases. In doing so, we will probably identify some cases for which we expect to get the same results, as well as other cases for which we might have different expectations. Of course, we would have to carry out our own empirical research to know whether our speculation along these lines is correct, but replicating research can lead to interesting findings. The most useful theoretical development comes when we can identify systematic patterns in the types of cases that will fit and those that will not fit the established theory. These systematic patterns are additional variables that determine whether a theory will work across an expanded set of cases. In this way we can think about developing new theories that will subsume the original established theory.

2.5.3 If We Believe Their Findings, Are There Further Implications?

Beginning researchers often find themselves intimidated when they read convincing accounts of the research carried out by more established scholars. After all, how can we ever expect to produce such innovative theories and find such convincingly supportive results from extensive empirical tests? Instead of being intimidated by such works, we need to learn to view them as opportunities – opportunities to carry their logic further and think about what other implications might be out there. If, for example, another researcher has produced a convincing theory about how voters behave, we could ask how might this new understanding alter the behavior of strategic politicians who understand that voters behave in this fashion?

One of the best examples of this type of research extension in political science comes from our previous example of John Mueller's research on rallies in presidential popularity. Because Mueller had found such convincingly supportive evidence of this "rally 'round the flag effect" in his empirical testing, other researchers were able to think through the strategic

consequences of this phenomenon. This led to a new body of research on a phenomenon called "diversionary use of force" (Richards et al. 1993). The idea of this new research is that, because strategic politicians will be aware that international conflicts temporarily increase presidential popularity, they will choose to generate international conflicts at times when they need such a boost.

2.5.4 How Might This Theory Work at Different Levels of Aggregation (Micro⟺Macro)?

As a final way to use the research of others to generate new theories, we suggest considering how a theory might work differently at varying levels of aggregation. In political science research, the lowest level of aggregation is usually at the level of individual people in studies of public opinion. As we saw in Subsection 2.5.3, when we find a trend in terms of individual-level behavior, we can develop new theoretical insights by thinking about how strategic politicians might take advantage of such trends. Sometimes it is possible to gain these insights by simply changing the level of aggregation. As we have seen, political scientists have often studied trends in public opinion by examining data measured at the national level over time. This type of study is referred to as the study of macro politics. When we find trends in public opinion at higher (macro) levels of aggregation, it is always an interesting thought exercise to consider what types of patterns of individual-level or "micro-" level behavior are driving these aggregate-level findings.

As an example of this, return to the rally 'round the flag example and change the level of aggregation. We have evidence that, when there are international conflicts, public opinion toward the president becomes more positive. What types of individual-level forces might be driving this observed aggregate-level trend? It might be the case that there is a uniform shift across all types of individuals in their feelings about the president. It might also be the case that the shift is less uniform. Perhaps individuals who dislike the president's policy positions on domestic events are willing to put these differences aside in the face of international conflicts, whereas the opinions of the people who were already supporters of the president remain unchanged. Thinking about the individual-level dynamics that drive aggregate observations can be a fruitful source of new causal theories.

2.6 THINK FORMALLY ABOUT THE CAUSES THAT LEAD TO VARIATION IN YOUR DEPENDENT VARIABLE

Thus far in this book we have discussed thinking about the political world in an organized, systematic fashion. By now, we hope that you are starting to

think about politics in terms of independent variables and dependent variables and are developing theories about the causal relationships between them. The theories that we have considered thus far have come from thinking rigorously about the phenomena that we want to explain and deducing plausible causal explanations. One extension of this type of rigorous thinking is labeled "**formal theory**" or "**rational choice.**"[8] Researchers have used this approach to develop answers to research questions about how people make strategic decisions. Put another way, if politics is a game, how do we explain the way that people play it?

To answer questions along these lines, the formal-theory approach to social science phenomena starts out with a fairly basic set of assumptions about human behavior and then uses game theory and other mathematical tools to build models of phenomena of interest. We can summarize these assumptions about human behavior by saying that formal theorists assume that all individuals are **rational utility maximizers** – that they attempt to maximize their self-interest. Individuals are faced with a variety of choices in political interactions, and those choices carry with them different consequences – some desirable, others undesirable. By thinking through the incentives faced by individuals, users of this approach begin with the strategic foundations of the decisions that individuals face. Formal theorists then deduce theoretical expectations of what individuals will do given their preferences and the strategic environment that they confront.

That sounds like a mouthful, we know. Let's begin with a simple example: If human beings are self-interested, then (by definition) members of a legislature are self-interested. This assumption suggests that members will place a high premium on reelection. Why is that? Because, first and foremost, a politician must be in office if she is going to achieve her political goals. And from this simple deduction flows a whole set of hypotheses about congressional organization and behavior.[9]

This approach to studying politics is a mathematically rigorous attempt to think through what it would be like to be in the place of different actors involved in a situation in which they have to choose how to act. In essence, formal theory is a lot like the saying that we should not judge a person until we have walked a mile in his or her shoes. We use the tools of formal theory to try to put ourselves in the position of imagining that we are in someone else's shoes and thinking about the different choices that he or she

[8] The terms "formal theory" and "rational choice" have been used fairly interchangeably to describe the application of game theory and other formal mathematical tools to puzzles of human behavior. We have a slight preference for the term "formal theory" because it is a more overarching term describing the enterprise of using these tools, whereas "rational choice" describes the most critical assumption that this approach makes.

[9] See Mayhew (1974) and Fiorina (1989).

has to make. In the following subsections we introduce the basic tools for doing this by using an **expected utility** approach and then provide a famous example of how researchers used this framework to develop theories about why people vote.

2.6.1 Utility and Expected Utility

Think about the choice that you have made to read this chapter of this book. What are your expected benefits and what are the costs that you expect to incur? One benefit may be that you are genuinely curious about how we build theories of politics. Another expected benefit may be that your professor is likely to test you on this material, and you expect that you will perform better if you have read this chapter. There are, no doubt, also costs to reading this book. What else might you be doing with your time? This is the way that formal theorists approach the world.

Formal theorists think about the world in terms of the outcome of a collection of individual-level decisions about what to do. In thinking about an individual's choices of actions, formal theorists put everything in terms of **utility**. Utility is an intentionally vague quantity. The utility from a particular action is equal to the sum of all benefits minus the sum of all costs from that action. If we consider an action Y, we can summarize the utility from Y for individual i with the following formula:

$$U_i(Y) = \sum B_i(Y) - \sum C_i(Y),$$

where $U_i(Y)$ is the utility for individual i from action Y, $\sum B_i(Y)$ is the sum of the benefits B_i from action Y for individual i, and $\sum C_i(Y)$ is the sum of the costs C_i from action Y for individual i. When choosing among a set of possible actions (including the decision not to act), a rational individual will choose that action that maximizes their utility. To put this formally,

$$\text{given a set of choices } Y = Y_1, Y_2, Y_3, \ldots, Y_n,$$
$$\text{individual } i \text{ will choose } Y_a \text{ such that } U_i(Y_a) > U_i(Y_b)\ \forall\ b \neq a,$$

which translates into, "given a set of choices of action Y_1 through Y_n, individual i will choose that action (Y_a) such that the utility to individual i from that action is greater than the utility to individual i from any action (Y_b) for all ($\forall$) actions b not equal to a." In more straightforward terms, we could translate this into the individual choosing that action that he deems best for himself.

At this point, it is reasonable to look around the real world and think about exceptions. Is this really the way that the world works? What about

altruism? During the summer of 2006, the world's second-richest man, Warren Buffet, agreed to donate more than 30 billion dollars to the Bill and Melinda Gates Foundation. Could this possibly have been rational utility-maximizing behavior? What about suicide bombers? The answers to these types of questions show both the flexibility and a potential problem of the concept of utility. Note that, in the preceding formulae, there is always a subscripted i under each of the referenced utility components, (U_i, B_i, C_i). This is because different individuals have *different* evaluations of the benefits (B_i) and costs (C_i) associated with a particular action. When the critic of this approach says, "How can this possibly be utility-maximizing behavior?" the formal theorist responds, "Because this is just an individual with an unusual utility structure."

Think of it another way. Criticizing formal theory because it takes preferences as "given" – that is, as predetermined, rather than the focus of inquiry – strikes us as beside the point. Other parts of political science can and should study preference formation; think about political psychology and the study of public opinion. What formal theory does, and does well, is to say, "Okay, once an individual has her preferences – regardless of where they came from – how do those preferences interact with strategic opportunities and incentives to produce political outcomes?" Because formal theory takes those preferences as given does not mean that the preference-formation process is unimportant. It merely means that formal theory is here to explain a different portion of social reality.

From a scientific perspective, this is fairly unsettling. As we discussed in Chapter 1, we want to build scientific knowledge based on real-world observation. How do we observe people's utilities? Although we can ask people questions about what they like and don't like, and even their perceptions of costs and benefits, we can never truly observe utilities. Instead, the assumption of utility maximization is just that – an assumption. This assumption is, however, a fairly robust assumption, and we can do a lot if we are willing to make it and move forward while keeping the potential problems in the back of our minds.

Another potentially troubling aspect of the rational-actor utility-maximizing assumption that you may have thought of is the assumption of **complete information**. In other words, what if we don't know exactly what the costs and benefits will be from a particular action? In the preceding formulae, we were operating under the assumption of complete information, for which we knew exactly what would be the costs, benefits, and thus the utility from each possible action. When we relax this assumption, we move our discussion from utility to expected utility. We represent this change in the assumptions about information by putting an "E" and brackets around each term to which it applies. This type of transformation is known as

"putting expectations" in front of all utilities. For example, the term $U_i(Y)$, which is read as "the utility for individual 'i' from action Y," becomes $E[U_i(Y)]$ under **incomplete information,** which is read as "the expected utility for individual 'i' from action Y." So, returning to our rational actor assumption, under incomplete information, for an individual action Y,

$$E[U_i(Y)] = \sum E[B_i(Y)] - \sum E[C_i(Y)],$$

and a rational actor will maximize his expected utility thus:

$$\text{given a set of choices } Y = Y_1, Y_2, Y_3, \ldots, Y_n,$$

individual i will choose Y_a such that $E[U_i(Y_a)] > E[U_i(Y_b)] \forall b \neq a$.

2.6.2 The Puzzle of Turnout

One of the oldest and most enduring applications of formal theory to politics is known as the "paradox of voting." William Riker and Peter Ordeshook set out the core arguments surrounding this application in their influential 1968 article in the *American Political Science Review* titled "A Theory of the Calculus of Voting." Their paper was written to weigh in on a lively debate over the rationality of voting. In particular, Riker and Ordershook presented a theory to answer the research question "Why do people vote?" In Riker and Ordeshook's notation (with subscripts added), the expected utility of voting was summarized as

$$R_i = (B_i P_i) - C_i,$$

where R_i is the reward that an individual receives from voting, B_i is the differential benefit that an individual voter receives "from the success of his more preferred candidate over his less preferred one" (Riker and Ordeshook 1968, p. 25), P_i is the probability that that voter will cast the deciding vote that makes his preferred candidate the winner, and C_i is the sum of the costs that the voter incurs from voting.[10] If R_i is positive, the individual votes; otherwise, he abstains.[11]

We'll work our way through the right-hand side of this formula and think about the likely values of each term in this equation for an individual eligible voter in a U.S. presidential election. The term B_i is likely to be greater than zero for most eligible voters in most U.S. presidential elections. The reasons for this vary widely from policy preferences to gut feelings about

[10] For simplicity in this example, consider an election in which there are only two candidates competing. Adding more candidates makes the calculation of B_i more complicated, but does not change the basic result of this model.

[11] For clarity, we follow Riker and Ordeshook's convention of using masculine pronouns.

the relative character traits of the different candidates. Note, however, that the B_i term is multiplied by the P_i term. What is the likely value of P_i? Most observers of elections would argue that P_i is extremely small and effectively equal to zero for every voter in most elections. In the case of a U.S. presidential election, for one vote to be decisive, that voter must live in a state in which the popular vote total would be *exactly* tied if that individual did not vote, and this must be a presidential election for which that particular state would swing the outcome in the Electoral College to either candidate. Because P_i is effectively equal to zero, the entire term $(B_i P_i)$ is effectively equal to zero.

What about the costs of voting, C_i? Voting takes time for all voters. Even if a voter lives right next door to the polling place, he has to take some time to walk next door, perhaps stand in a line, and cast his ballot. The well-worn phrase "time is money" certainly applies here. Even if the voter in question is not working at the time that he votes, he could be doing something other than voting. Thus it is pretty clear that C_i is greater than zero. If C_i is greater than zero and $(B_i P_i)$ is effectively equal to zero, then R_i must be negative. How then, do we explain the millions of people that vote in U.S. presidential elections, or, indeed, elections around the world? Is this evidence that people are truly not rational? Or, perhaps, is it evidence that millions of people systematically overestimate P_i? Influential political economy scholars, including Anthony Downs and Gordon Tullock, posed these questions in the early years of formal theoretical analyses of politics.

Riker and Ordeshook's answer was that there must be some other benefit to voting that is not captured by the term $(B_i P_i)$. They proposed that the voting equation should be

$$R_i = (B_i P_i) - C_i + D_i,$$

where D_i is the satisfaction that individuals feel from participating in the democratic process, regardless of the impact of their participation on the final outcome of the election. Riker and Ordeshook argued that D_i could be made up of a variety of different efficacious feelings about the political system, ranging from fulfilling one's duties as a citizen to standing up and being counted.

Think of the contribution that Riker and Ordeshook made to political science, and that, more broadly, formal theory makes to political science, in the following way: Riker and Ordeshook's theory leads us to wonder why any individual will vote. And yet, empirically, we notice that close to half of the adult population votes in any given presidential election in recent history. What formal theory accomplishes for us is that it helps us to focus

in on exactly *why* people do bother, rather than to assert, normatively, that people *should*.[12]

2.7 THINK ABOUT THE INSTITUTIONS: THE RULES USUALLY MATTER

In the previous section we thought about individuals and developing theoretical insights by thinking about their utility calculations. In this section we extend this line of thinking to develop theories about how people will interact with each other in political situations. One particularly rich source for theoretical insights along these lines comes from formal thinking about institutional arrangements and the influence that they have in shaping political behavior and outcomes. In other words, researchers have developed theories about politics by thinking about the rules under which the political game is played. To fully understand these rules and their impact, we need to think through some counterfactual scenarios in which we imagine how outcomes would be altered if there were different rules in place. This type of exercise can lead to some valuable theoretical insights. In the subsections that follow, we consider two examples of thinking about the impact of institutions.

2.7.1 Legislative Rules

Considering the rules of the political game has yielded theoretical insights into the study of legislatures and other governmental decision-making bodies. This has typically involved thinking about the **preference orderings** of expected utility-maximizing actors. For example, let's imagine a legislature made up of three individual members, X, Y, and Z.[13] The task in front of X, Y, and Z is to choose between three alternatives A, B, and C. The

[12] Of course, Riker and Ordeshook did not have the final word in 1968. In fact, the debate over the rationality of turnout has been at the core of the debate over the usefulness of formal theory in general. In their 1994 book titled *Pathologies of Rational Choice Theory*, Donald Green and Ian Shapiro made it the first point of attack in their critique of the role that formal theory plays in political science. One of Green and Shapiro's major criticisms of this part of political science was that the linkages between formal theory and empirical hypothesis tests were too weak. In reaction to these and other critics, the National Science Foundation launched a new program titled "Empirical Implications of Theoretical Models" (EITM) that was designed to strengthen the linkage between formal theory and empirical hypothesis tests.

[13] We know that, in practice, legislatures tend to have many more members. Starting with this type of miniature-scaled legislature makes formal considerations much easier to carry out. Once we have arrived at conclusions based on calculations made on such a small scale, it is important to consider whether the conclusions that we have drawn would apply to more realistically larger-scaled scenarios.

preferences orderings for these three rational individuals are as follows:

$$X : ABC,$$
$$Y : BCA,$$
$$Z : CAB.$$

An additional assumption that is made under these circumstances is that the preferences of rational individuals are **transitive**. This means that if individual X likes A better than B and B better than C, then, for X's preferences to be transitive, he or she must also like A better than C. Why is this an important assumption to make? Consider the alternative. What if X liked A better than B and B better than C, but liked C better than A? Under these circumstances, it would be impossible to discuss what X wants in a meaningful fashion because X's preferences would produce an infinite cycle. To put this another way, no matter which of the three choices X chose, there would always be some other choice that X prefers. Under these circumstances, X could not make a rational choice.

In this scenario, what would the group prefer? This is not an easy question to answer. If they each voted for their first choice, each alternative would receive one vote. If these three individuals vote between pairs of alternatives, and they vote according to their preferences, we would observe the following results:

A vs. B, X&Z vs. Y, A wins;

B vs. C, X&Y vs. Z, B wins;

C vs. A, Y&Z vs. X, C wins.

Which of these three alternatives does the group collectively prefer? This is an impossible question to answer because the group's preferences cycle across the three alternatives. Another way of describing this group's preferences is to say that they are **intransitive** (despite the fact that, as you can see, each individual's preferences are transitive).

This result should be fairly troubling to people who are concerned with the fairness of democratic elections. One of the often-stated goals of elections is to "let the people speak." Yet, as we have just seen, it is possible that, even when the people involved are all rational actors, their collective preferences may not be rational. Under such circumstances, a lot of the normative concepts concerning the role of elections simply break down. This finding is at the heart of Arrow's theorem, which was developed by Kenneth Arrow in his 1951 book titled *Social Choice and Individual Values*. At the time of its publication, political scientists largely ignored this book. As formal theory became more popular in political science, Arrow's mathematical approach

to these issues became increasingly recognized. In 1982 William Riker popularized Arrow's theorem in his book *Liberalism Against Populism*, in which he presented a more accessible version of Arrow's theorem and bolstered a number of Arrow's claims through mathematical expositions.

2.7.2 The Rules Matter!

Continuing to work with our example of three individuals, X, Y, and Z, with the previously described preferences, now imagine that the three individuals will choose among the alternatives in two different rounds of votes between pairs of choices. In the first round of voting, two of the alternatives will be pitted against each other. In the second round of voting, the alternative that won the first vote will be pitted against the alternative that was not among the choices in the first round. The winner of the second round of voting is the overall winning choice.

In our initial consideration of this scenario, we will assume that X, Y, and Z will vote according to their preferences. What if X got to decide on the order in which the alternatives got chosen? We know that X's preference ordering is *ABC*. Can X set things up so that *A* will win? What if X made the following rules:

1st round: *B* vs. C;

2nd round: 1st round winner vs. *A*.

What would happen under these rules? We know that both X and Y prefer *B* to C, so *B* would win the first round and then would be paired against *A* in the second round. We also know that X and Z prefer *A* to *B*, so alternative *A* would win and X would be happy with this outcome.

Does voting like this occur in the real world? Actually, the answer is "yes." This form of pairwise voting among alternatives is the way that legislatures typically conduct their voting. If we think of individuals X, Y, and Z as being members of a legislature, we can see that whoever controls the ordering of the voting (the rules) has substantial power. To explore these issues further, let's examine the situation of individual Y. Remember that Y's preference ordering is *BCA*. So Y would be particularly unhappy about the outcome of the voting according to X's rules, because it resulted in Y's least-favorite outcome. But remember that, for our initial consideration, we assumed that X, Y, and Z will vote according to their preferences. If we relax this assumption, what might Y do? In the first round of voting, Y could cast a strategic vote for C against *B*.[14] If both X and Z continued

[14] The concept of a "strategic" vote is often confusing. For our purposes, we define a strategic vote as a vote that is cast with the strategic context in mind. Note that for a particular individual in a particular circumstance, it might be the case that the best strategic decision for them is to vote according to their preferences. The casting of a strategic vote becomes particularly interesting, however, when the strategic context leads to the casting of a vote that is different from the individual's preferences.

to vote (sincerely) according to their preferences, then C would win the first round. Because we know that both X and Z prefer C to *A*, C would win the second round and would be the chosen alternative. Under these circumstances, Y would be better off because Y prefers alternative C to *A*.

From the perspective of members of a legislature, it is clearly better to control the rules than to vote strategically to try to obtain a better outcome. When legislators face reelection, one of the common tactics of their opponents is to point to specific votes in which the incumbent appears to have voted contrary to the preferences of his constituents. It would seem reasonable to expect that legislator Y comes from a district with the same or similar preferences to those of Y. By casting a strategic vote for C over *B*, Y was able to obtain a better outcome but created an opportunity for an electoral challenger to tell voters that Y had voted against the preferences of his district.

In *Congressmen in Committees*, Richard Fenno's classic study of the U.S. House of Representatives, one of the findings was that the Rules Committee – along with the Ways and Means and the Appropriations Committees – was one of the most requested committee assignments from the individual members of Congress. At first glance, the latter two committees make sense as prominent committees and, indeed, receive much attention in the popular media. By contrast, the Rules Committee very rarely gets any media attention. Members of Congress certainly understand and appreciate the fact that the rules matter, and formal theoretical thought exercises like the preceding one help us to see why this is the case.

2.8 EXTENSIONS

These examples represent just the beginning of the uses of formal theory in political science. We have not even introduced two of the more important aspects of formal theory – spatial models and game theory – that are beyond the scope of this discussion. In ways that mirror applications in microeconomics, political scientists have used spatial models to study phenomena such as the placement of political parties along the ideological spectrum, much as economists have used spatial models to study the location of firms in a market. Likewise, game theory utilizes a highly structured sequence of moves by different players to show how any particular actor's utility depends not only on her own choices, but also on the choices made

by the other actors. It is easy to see hints about how game theory works in the preceding simple three-actor, two-stage voting examples: X's best vote in the first stage likely depends on which alternative Y and Z choose to support, and vice versa. Game theory, then, highlights how the strategic choices made in politics are interdependent.

2.9 HOW DO I KNOW IF I HAVE A "GOOD" THEORY?

Once you have gone through some or all of the suggested courses of action for building a theory, a reasonable question to ask is, "How do I know if I have a 'good' theory?" Unfortunately there is not a single succinct way of answering this question. Instead, we suggest that you answer a set of questions about your theory and consider your honest answers to these questions as you try to evaluate the overall quality of our theory. You will notice that some of these questions come directly from the "rules of the road" that we developed in Chapter 1:

- Does your theory offer an answer to an interesting research question?
- Is your theory causal?
- Can you test your theory on data that you have not yet observed?
- How general is your theory?
- How parsimonious is your theory?
- How new is your theory?
- How nonobvious is your theory?

2.9.1 Does Your Theory Offer an Answer to an Interesting Research Question?

As we discussed at the beginning of this chapter, promising theories offer answers to interesting research questions. Any time that you formulate a theory, it's worth turning it around and asking what is the research question for which it offers an answer. If you can't give a straightforward answer to this question, you probably need to rethink your theory. A related question that you should also ask is whether anyone would care if you found support for your theory. If the answer to this question is "no," then you probably need to rethink your theory as well.

2.9.2 Is Your Theory Causal?

Remember that our first rule of the road to scientific knowledge about politics is "Make your theories causal." If your answer to the question "Is your theory causal?" is anything other than "yes," then you need to go back to the drawing board until the answer is an emphatic "yes."

As scientists studying politics, we want to know why things happen the way that they happen. As such, we will not be satisfied with mere correlations and we demand causal explanations. We know from Chapter 1 that one way initially to evaluate a particular theory is to think about the causal explanation behind it. The causal explanation behind a theory is the answer to the question "Why do you think that this independent variable is causally related to this dependent variable?" If the answer is reasonable, then you can answer this first question with a "yes."

2.9.3 Can You Test Your Theory on Data That You Have Not Yet Observed?

Our second rule of the road is "Don't let data alone drive your theories," which we restated in a slightly longer form as "Try to develop theories before examining the data on which you will perform your tests." If you have derived your theory from considering a set of empirical data, you need to be careful not to have observed all of the data on which you can test your theory. This can be a somewhat gray area, and only you know whether your theory is entirely data driven and whether you observed all of your testing data before you developed your theory.

2.9.4 How General Is Your Theory?

We could rephrase this question for evaluating your theory as "How widely does your theory apply?" To the extent that your theory is not limited to one particular time period or to one particular spatial unit, it is more general. Answers to this question vary along a continuum – it's not the end of the world to have a fairly specific theory, but, all else being equal, a more general theory is more desirable.

2.9.5 How Parsimonious Is Your Theory?

As with the question in the preceding subsection, answers to this question also vary along a continuum. In fact, it is often the case that we face a trade-off between parsimony and generality. In other words, to make a theory more general, we often have to give up parsimony, and to make a theory more parsimonious, we often have to give up generality. The important thing with both of these desirable aspects of a theory is that we have them in mind as we evaluate our theory. If we can make our theory more general or more parsimonious and without sacrifice, we should do so.

2.9.6 How New Is Your Theory?

At first it might seem that this is a pretty straightforward question to answer. The problem is that we cannot know about all of the work that has been done before our own work in any particular area of research. It also is often the case that we may think our theory is really new, and luckily we have not been able to find any other work that has put forward the same theory on the same political phenomenon. But then we discover a similar theory on a related phenomenon. There is no simple answer to this question. Rather, our scholarly peers usually answer this question of newness for us when they evaluate our work.

2.9.7 How Nonobvious Is Your Theory?

As with the question "How new is your theory?" the question "How nonobvious is your theory?" is best answered by our scholarly peers. If, when they are presented with your theory, they hit themselves in the head and say, "Wow, I never thought about it like that, but it makes a lot of sense!" then you have scored very well on this question.

Both of these last two questions illustrate an important part of the role of theory development in any science. It makes sense to think about theories as being like products and scientific fields as being very much like markets in which these products are bought and sold. Like other entrepreneurs in the marketplace, scientific entrepreneurs will succeed to the extent that their theories (products) are new and exciting (nonobvious). But, what makes a theory "new and exciting" is very much dependent on what has come before it.

2.10 CONCLUSION

We have presented a series of different strategies for developing theories of politics. Each of these strategies involves some type of thought exercise in which we arrange and rearrange our knowledge about the political world in hopes that doing so will lead to new causal theories. You have, we're certain, noticed that there is no simple formula for generating a new theory and hopefully, as a result, appreciate our description of theory building as an "art" in the chapter's title. Theoretical developments come from many places and being critically immersed in the ongoing literature that studies your phenomenon of choice is a good place to start.

CONCEPTS INTRODUCED IN THIS CHAPTER

- complete information – the situation in which each actor in a game knows the exact payoffs from each possible outcome.
- cross-sectional measure – a measure for which the time dimension is the same for all cases and the cases represent multiple spatial units.
- expected utility – a calculation equal to the sum of all expected benefits minus the sum of all expected costs from that action. Under this calculation, the exact benefits and costs are not known with certainty.
- formal theory – the application of game theory and other formal mathematical tools to puzzles of human behavior. (Used interchangeably with "rational choice.")
- incomplete information – the situation in which each actor in a game does not know the exact payoffs from each possible outcome.
- intransitive – an illogical mathematical relationship such that, despite the fact that A is greater than B and B is greater than C, C is greater than A.
- preference orderings – the ranking from greatest to least of an actor's preferred outcomes.
- rational choice – the application of game theory and other formal mathematical tools to puzzles of human behavior. (Used interchangeably with "formal theory.")
- rational utility maximizers – an assumption about human behavior that stipulates that individuals attempt to maximize their self-interest.
- spatial dimension – the physical units on which a variable is measured.
- strategic vote – a vote cast with a strategic context in mind.
- time dimension – the point or points in time at which a variable is measured.
- time-series measure – a measure for which the spatial dimension is the same for all cases and the cases represent multiple time units.
- transitive – a mathematical relationship such that if A is greater than B and B is greater than C, then A must also be greater than C.
- utility – a calculation equal to the sum of all benefits minus the sum of all costs from that action.

EXERCISES

1. Table 2.2 contains the 11th through 20th most-cited papers from the *American Political Science Review*. Obtain a copy of one of these articles and figure out what is the research question.

Table 2.2. The 11th through 20th most-cited papers in the *American Political Science Review*, 1945–2005

Article	Title
Riker & Ordeshook 1968	"A Theory of the Calculus of Voting"
Shapley & Shubik 1954	"A Method for Evaluating the Distribution of Power in a Committee System"
McClosky 1964	"Consensus and Ideology in American Politics"
Miller 1974	"Political Issues and Trust in Government: 1964–1970"
Axelrod 1986	"An Evolutionary Approach to Norms"
Doyle 1986	"Liberalism and World Politics"
Polsby 1968	"The Institutionalization of the U.S. House of Representatives"
Inglehart 1971	"The Silent Revolution in Europe: Intergenerational Change in Post-Industrial Societies"
Maoz & Russett 1993	"Normative and Structural Causes of Democratic Peace, 1946–1986"
Tufte 1975	"Determinants of the Outcome of Midterm Congressional Elections"

2. Figure 2.3 shows gross U.S. government debt as a percentage of GDP from 1960 to 2011. Can you think of a theory about what causes this variable to be higher or lower?
3. Figure 2.4 shows the percentage of a nation's members of parliament who were women for 20 randomly selected nations in 2004. Can you think of a theory about what causes this variable to be higher or lower?
4. Think about a political event with which you are familiar and follow these instructions:
   (a) Write a short description of the event.
   (b) What is your understanding of why this event happened the way that it happened?
   (c) *Moving from local to global*: Reformulate your answer to part (b) into a general causal theory without proper nouns.
5. Find a political science journal article of interest to you, and of which your instructor approves, and answer the following items:
   (a) What is the main dependent variable in the article?
   (b) What is the main independent variable in the article?
   (c) Briefly describe the causal theory that connects the independent and dependent variables.
   (d) Can you think of another independent variable that is not mentioned in the article that might be causally related to the dependent variable? Briefly explain why that variable might be causally related to the dependent variable.
6. Imagine that the way in which the U.S. House of Representatives is elected was changed from the current single-member district system to a system of national proportional representation in which any party that obtained at least 3% of

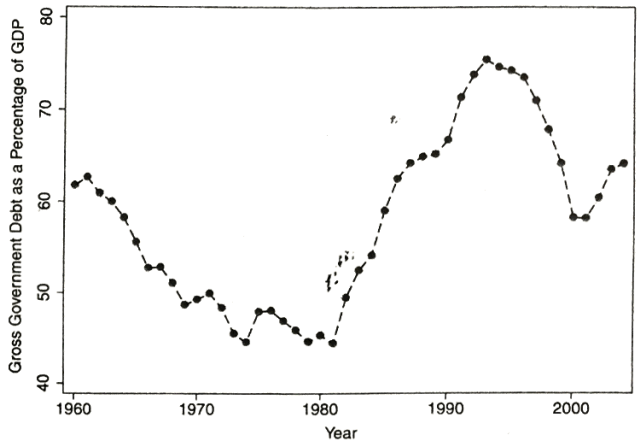

Figure 2.3. Gross U.S. government debt as a percentage of GDP, 1960–2011.

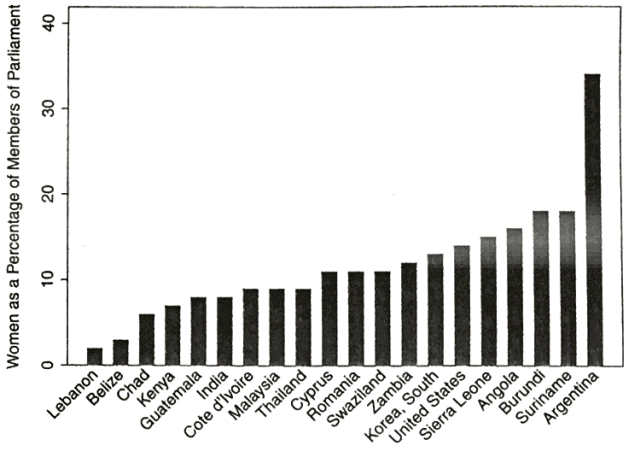

Figure 2.4. Women as a percentage of members of parliament, 2004.

the vote nationally would get a proportionate share of the seats in the House. How many and what types of parties would you expect to see represented in the House of Representatives under this different electoral system? What theories of politics can you come up with from thinking about this hypothetical scenario?

7. *Applying formal theory to something in which you are interested.* Think about something in the political world that you would like to better understand. Try to think about the individual-level decisions that play a role in deciding the outcome of this phenomenon. What are the expected benefits and costs that the individual who is making this decision must weigh?

For exercises 8 through 11, read Robert Putnam's 1995 article "Tuning In, Tuning Out: The Strange Disappearance of Social Capital in America."

8. What is the dependent variable in Putnam's study?
9. What other possible causes of the dependent variable can you think of?
10. Can Putnam's theory be applied in other countries? Why or why not?
11. If we believe Putnam's findings, are there further implications?

3 Evaluating Causal Relationships

OVERVIEW

Modern political science fundamentally revolves around establishing whether there are *causal relationships* between important concepts. This is rarely straightforward, and serves as the basis for almost all scientific controversies. How do we know, for example, if economic development causes democratization, or if democratization causes economic development, or both, or neither? To speak more generally, if we wish to evaluate whether or not some X causes some Y, we need to cross four causal hurdles: (1) Is there a credible causal mechanism that connects X to Y? (2) Can we eliminate the possibility that Y causes X? (3) Is there covariation between X and Y? (4) Have we controlled for all confounding variables Z that might make the association between X and Y spurious? Many people, especially those in the media, make the mistake that crossing just the third causal hurdle – observing that X and Y covary – is tantamount to crossing all four. In short, finding a relationship is not the same as finding a *causal* relationship, and causality is what we care about as political scientists.

I would rather discover one causal law than be King of Persia.
– Democritus (quoted in Pearl 2000)

3.1 CAUSALITY AND EVERYDAY LANGUAGE

Like that of most sciences, the discipline of political science fundamentally revolves around evaluating causal claims. Our theories – which may be right or may be wrong – typically specify that some independent variable causes some dependent variable. We then endeavor to find appropriate empirical evidence to evaluate the degree to which this theory is or is not supported. But how do we go about evaluating causal claims? In this chapter and the next, we discuss some principles for doing this. We focus on the logic of

causality and on several criteria for establishing with some confidence the degree to which a causal connection exists between two variables. Then, in Chapter 4, we discuss various ways to design research that help us to investigate causal claims. As we pursue answers to questions about causal relationships, keep our "rules of the road" from Chapter 1 in your mind, in particular the admonition to consider only empirical evidence along the way.

It is important to recognize a distinction between the nature of most scientific theories and the way the world seems to be ordered. Most of our theories are limited to descriptions of relationships between a *single* cause (the independent variable) and a *single* effect (the dependent variable). Such theories, in this sense, are very simplistic representations of reality, and necessarily so. In fact, as we noted at the end of Chapter 1, theories of this sort are laudable in one respect: They are parsimonious, the equivalent of bite-sized, digestible pieces of information. We cannot emphasize strongly enough that almost all of our theories about social and political phenomena are **bivariate** – that is, involving just two variables.

But social reality is *not* bivariate; it is **multivariate**, in the sense that any interesting dependent variable is caused by more than one factor. ("Multivariate" simply means "many variables," by which we mean involving more than two variables.) So although our theories describe the proposed relationship between some cause and some effect, we always have to keep in the forefront of our minds that the phenomenon we are trying to explain surely has many other possible causes. And when it comes time to design research to test our theoretical ideas – which is the topic of Chapter 4 – we have to try to account for, or "control for," those other causes. If we don't, then our causal inferences about whether our pet theory is right – whether X causes Y – may very well be wrong.[1] In this chapter we lay out some practical principles for evaluating whether or not, indeed, some X does cause Y. You also can apply these criteria when evaluating the causal claims made by others – be they a journalist, a candidate for office, a political scientist, a fellow classmate, a friend, or just about anyone else.

Nearly everyone, nearly every day, uses the language of causality – some of the time formally, but far more often in a very informal manner. Whenever we speak of how some event changes the course of subsequent events, we invoke causal reasoning. Even the word "because" implies that a causal process is in operation.[2] Yet, despite the ubiquitous use of the words

[1] Throughout this book, in the text as well as in the figures, we will use arrows as a shorthand for "causality." For example, the text "$X \rightarrow Y$" should be read as "X causes Y." Oftentimes, especially in figures, these arrows will have question marks over them, indicating that the existence of a causal connection between the concepts is uncertain.

[2] This use of terms was brought to our attention by Brady (2002).

"because," "affects," "impacts," "causes," and "causality," the meanings of these words are not exactly clear. Philosophers of science have long had vigorous debates over competing formulations of "causality."[3]

Although our goal here is not to wade too deeply into these debates, there is one feature of the discussions about causality that deserves brief mention. Most of the philosophy of science debates originate from the world of the physical sciences. The notions of causality that come to mind in these disciplines mostly involve **deterministic relationships** – that is, relationships such that if some cause occurs, then the effect will occur *with certainty*. In contrast, though, the world of human interactions consists of **probabilistic relationships** – such that increases in X are associated with increases (or decreases) in the probability of Y occurring, but those probabilities are not certainties. Whereas physical laws like Newton's laws of motion are deterministic – think of the law of gravity here – the social sciences (including political science) more closely resemble probabilistic causation like that in Darwin's theory of natural selection, in which random mutations make an organism more or less fit to survive and reproduce.[4]

What does it mean to say that, in political science, our conceptions of causality must be probabilistic in nature? When we theorize, for example, that an individual's level of wealth causes her opinions on optimal tax policy, we do not at all mean that *every* wealthy person will want lower taxes, and *every* poor person will prefer higher taxes. Consider what would happen if we found a single rich person who favors high taxes or a single poor person who favors low taxes. (Perhaps you are, or know, such a person.) One case alone does not decrease our confidence in the theory. In this sense, the relationship is probabilistic, not deterministic. Instead of saying deterministically that "wealthy people will prefer lower taxes, and poorer people will prefer higher taxes," we say, probabilistically, that "wealthy people are more likely to prefer lower taxes, whereas poorer individuals are more likely to prefer higher taxes."

Take another example: Scholars of international conflict have noticed that there is a statistical relationship between the type of regime a country has and the likelihood of that country going to war. To be more precise, in a series of studies widely referred to as the "democratic peace" literature,

[3] You can find an excellent account of the vigor of these debates in a 2003 book by David Edmonds and John Eidinow titled *Wittgenstein's Poker: The Story of a Ten Minute Argument Between Two Great Philosophers*.

[4] Nevertheless, in reviewing three prominent attempts within the philosophy of science to elaborate on the probabilistic nature of causality, the philosopher Wesley Salmon (1993, p. 137) notes that "In the vast philosophical literature on causality [probabilistic notions of causality] are largely ignored." We borrow the helpful comparison of probabilistic social science to Darwinian natural selection from Brady (2004).

many researchers have noticed that wars are much less likely to break out between two regimes that are democracies than pairs of countries where at least one is a non-democracy. To be perfectly clear, the literature does not suggest that democracies do not engage in warfare at all, but that democracies don't fight other democracies. A variety of mechanisms have been suggested to explain this correlation, but the point here is that, if two democracies start a war with one another next year, it would be a mistake to discard the theory. A deterministic theory would say that "democracies don't go to war with one another," but a more sensible probabilistic theory would say that "democracies are highly unlikely to go to war with one another."

In political science there will always be exceptions because human beings are not deterministic robots whose behaviors always conform to lawlike statements. In other sciences in which the subjects of study do not have free will, it may make more sense to speak of laws that describe behavior. Consider the study of planetary orbits, in which scientists can precisely predict the movement of celestial bodies hundreds of years in advance. The political world, in contrast, is extremely difficult to predict. As a result, most of the time we are happy to be able to make statements about probabilistic causal relationships.

What all of this boils down to is that the entire notion of what it means for something "to cause" something else is far from a settled matter. In the face of this, should social scientists abandon the search for causal connections? Not at all. What it means is that we should proceed cautiously and with an open mind, rather than in some exceedingly rigid fashion.

3.2 FOUR HURDLES ALONG THE ROUTE TO ESTABLISHING CAUSAL RELATIONSHIPS

If we wish to investigate whether some independent variable, which we will call X, "causes" some dependent variable, which we will call Y, what procedures must we follow before we can express our degree of confidence that a causal relationship does or does not exist? Finding some sort of covariation (or, equivalently, correlation) between X and Y is not sufficient for such a conclusion.

We encourage you to bear in mind that establishing causal relationships between variables is not at all akin to hunting for DNA evidence like some episode from a television crime drama. Social reality does not lend itself to such simple, cut-and-dried answers. In light of the preceding discussion about the nature of causality itself, consider what follows to be guidelines as to what constitutes "best practice" in political science. With any theory

about a causal relationship between X and Y, we should carefully consider the answers to the following four questions:

1. Is there a credible causal mechanism that connects X to Y?
2. Can we rule out the possibility that Y could cause X?
3. Is there covariation between X and Y?
4. Have we controlled for all **confounding variables** Z that might make the association between X and Y **spurious**?[5]

First, we must consider whether it is believable to claim that X *could* cause Y. In effect, this hurdle represents an effort to answer the "how" and "why" questions about causal relationships. To do this, we need to go through a thought exercise in which we evaluate the mechanics of how X would cause Y. What is the process or mechanism that, logically speaking, suggests that X might be a cause of Y? In other words, what is it specifically about having more (or less) of X that will in all probability lead to more (or less) of Y? The more outlandish these mechanics would have to be, the less confident we are that our theory has cleared this first hurdle. Failure to clear this first hurdle is a very serious matter; the result being that either our theory needs to be thrown out altogether, or we need to revise it after some careful rethinking of the underlying mechanisms through which it works. It is worth proceeding to the second question only once we have a "yes" answer to this question.

Second, and perhaps with greater difficulty, we must ask whether we can rule out the possibility that Y might cause X. As you will learn from the discussion of the various strategies for assessing causal connections in Chapter 4, this poses thorny problems for some forms of social science research, but is less problematic for others. Occasionally, this causal hurdle can be crossed logically. For example, when considering whether a person's gender (X) causes him or her to have particular attitudes about abortion policy (Y), it is a rock-solid certainty that the reverse-causal scenario can be dismissed: A person's attitudes about abortion does not "cause" them to be male or female. If our theory does not clear this particular hurdle, the race is not lost. Under these circumstances, we should proceed to the next question, while keeping in mind the possibility that our causal arrow might be reversed.

Throughout our consideration of the first two causal hurdles, we were concerned with only two variables, X and Y. The third causal hurdle can

[5] A "confounding variable" is simply a variable that is both correlated with both the independent and dependent variable and that somehow alters the relationship between those two variables. "Spurious" means "not what it appears to be" or "false."

involve a third variable Z, and the fourth hurdle always does. Often it is the case that there are several Z variables.

For the third causal hurdle, we must consider whether X and Y covary (or, equivalently, whether they are correlated or associated). Generally speaking, for X to cause Y, there must be some form of measurable association between X and Y, such as "more of X is associated with more of Y," or "more of X is associated with less of Y." Demonstrating a simple bivariate connection between two variables is a straightforward matter, and we will cover it in Chapters 7 and 8. Of course, you may be familiar with the dictum "Correlation does not prove causality," and we wholeheartedly agree. It is worth noting, though, that correlation is normally an essential component of causality. But be careful. It is possible for a causal relationship to exist between X and Y even if there is no bivariate association between X and Y. Thus, even if we fail to clear this hurdle, we should not throw out our causal claim entirely. Instead, we should consider the possibility that there exists some confounding variable Z that we need to "control for" before we see a relationship between X and Y. Whether or not we find a bivariate relationship between X and Y, we should proceed to our fourth and final hurdle.

Fourth, in establishing causal connections between X and Y, we must face up to the reality that, as we noted at the outset of this chapter, we live in a world in which most of the interesting dependent variables are caused by more than one – often many more than one – independent variable. What problems does this pose for social science? It means that, when trying to establish whether a particular X causes a particular Y, we need to "control for" the effects of other causes of Y (and we call those other effects Z). If we fail to control for the effects of Z, we are quite likely to misunderstand the relationship between X and Y and make the wrong inference about whether X causes Y. This is the most serious mistake a social scientist can make. If we find that X and Y are correlated, but that, when we control for the effects of Z on both X and Y, the association between X and Y disappears, then the relationship between X and Y is said to be spurious.

3.2.1 Putting It All Together – Adding Up the Answers to Our Four Questions

As we have just seen, the process for evaluating a theoretical claim that X causes Y is complicated. Taken one at a time, each of the four questions in the introduction to this section can be difficult to answer with great clarity. But the challenge of evaluating a claim that X causes Y involves summing the answers to all four of these questions to determine our overall confidence about whether X causes Y. To understand this, think about the

analogy that we have been using by calling these questions "hurdles." In track events that feature hurdles, runners must do their best to try to clear each hurdle as they make their way toward the finish line. Occasionally even the most experienced hurdler will knock over a hurdle. Although this slows them down and diminishes their chances of winning the race, all is not lost. If we think about putting a theory through the four hurdles posed by the preceding questions, there is no doubt our confidence will be greatest when we are able to answer all four questions the right way ("yes," "yes," "yes," "yes") and without reservation. As we described in the introduction to this section, failure to clear the first hurdle should make us stop and rethink our theory. This is also the case if we find our relationship to be spurious. For the second and third hurdles, however, failure to clear them completely does not mean that we should discard the causal claim in question. Figure 3.1 provides a summary of this process. In the subsections that follow, we will go through the process described in Figure 3.1 with a series of examples.

As we go through this process of answering the four questions, we will keep a **causal hurdles scorecard** as a shorthand for summarizing the answers to these four questions in square brackets. For now, we will limit our answers to "*y*" for "yes," "*n*" for "no," and "*?*" for "maybe." If a theory has cleared all four hurdles, the scorecard would read [*y y y y*] and the causal claim behind it would be strongly supported. As we described above, these hurdles are not all the same in terms of their impact on our assessments of causality. So, for instance, a causal claim for which the scorecard reads [*n y y y*] could be thrown out instantly. But, a claim for which it reads [*y n y y*] would have a reasonable level of evidence in its favor.

3.2.2 Identifying Causal Claims Is an Essential Thinking Skill

We want to emphasize that the logic just presented does not apply merely to political science research examples. Whenever you see a story in the news, or hear a speech by a candidate for public office, or, yes, read a research article in a political science class, it is almost always the case that some form of causal claim is embedded in the story, speech, or article. Sometimes those causal claims are explicit – indented and italicized so that you just can't miss them. Quite often, though, they are harder to spot, and most of the time not because the speaker or writer is trying to confuse you. What we want to emphasize is that spotting and identifying causal claims is a thinking skill. It does not come naturally to most people, but it can be practiced.

In our daily lives, we are often presented with causal claims by people trying to persuade us to adopt their point of view. Advocacy and attempts at persuasion, of course, are healthy features of a vibrant democracy. The health of public debate, though, will be further enhanced when citizens

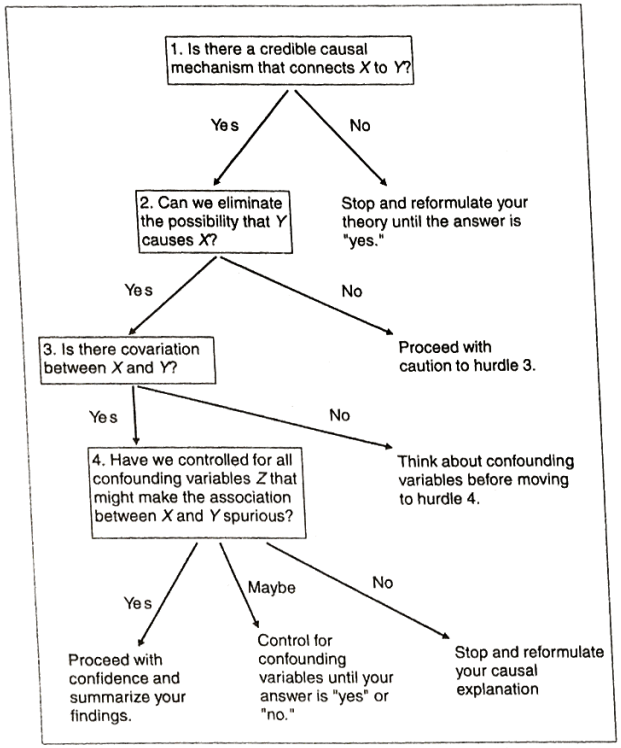

Figure 3.1. The path to evaluating a causal relationship.

actively scrutinize the claims with which they are presented. Take, for example, debates in the media about the merits of private school choice programs, which have been implemented in several school districts. Among the arguments in favor of such programs is that the programs will improve student performance on standardized tests. Media reports about the successes and failures of programs like this are quite common. For example, an article in the *Washington Post* discusses a study that makes the argument that:

> African American students in the District [of Columbia] and two other cities have moved ahead of their public school classmates since they transferred to private schools with the help of vouchers, according to a new study.... The study showed that those moving to private schools scored 6 percentile points higher than those who stayed in public schools in New York City, Dayton, Ohio, and the District. The effect was biggest in the District, where students with vouchers moved 9 percentile points ahead of public school peers.[6]

Notice the causal claim here, which is: Participation (or not) in the school choice program (X) causes a child's test scores (Y) to vary. Often, the reader is presented with a bar chart of some sort in support of the argument. The reader is encouraged to think, sometimes subtly, that the differing heights of the bars, representing different average test scores for school choice children and public school children, means that the program *caused* the school choice children to earn higher scores. When we take such information in, we might take that nugget of evidence and be tempted to jump to the conclusion that a causal relationship exists. The key lesson here is that this is a premature conclusion.

Let's be clear: School choice programs may indeed cause students to do better on standardized tests. Our objective here is not to wade into that debate, but rather to sensitize you to the thinking skills required to evaluate the causal claim made in public by advocates such as those who support or oppose school choice programs. Evidence that students in school choice programs score higher on tests than do public school students is *one piece* of the causal puzzle – namely, it satisfies crossing hurdle three above, that there is covariation between X and Y. At this point in our evaluation, our score card reads [? ? *y* ?]. And thus, before we conclude that school choice does (or does not) cause student performance, we need to subject that claim to all four of the causal hurdles, not just the third one.

So let's apply all four causal hurdles to the question at hand. First, is there a mechanism that we can use to explain how and why attending a particular type of school – public or a voucher-sponsored private school – might affect a student's test scores? Certainly. Many private schools that participate in voucher programs have smaller class sizes (among other benefits), and smaller class sizes can translate to more learning and higher test scores. *The answer to the first question is "yes"* [*y* ? *y* ?]. Second, is it possible that the causal arrow might be reversed – that is, can we rule out the possibility that test scores cause a person to participate or not participate in a school choice program? Since the test scores occur months or even years after the person chooses a school to attend, this is not possible. *The answer to the second question is "yes"* [*y y y* ?]. Third, is there a correlation between participation in the program and test scores? The article quoted above just noted that, in the three cities considered, there is – voucher

[6] Mathews, Jay. "Scores Improve for D.C. Pupils With Vouchers" *Washington Post*, August 28, 2000, A1.

school students scored higher on standardized tests than their public school peers. *The answer to the third question is "yes"* [*y y y* ?]. Finally, have we controlled for all confounding variables that might make the association between participation in the program and test scores spurious? Remember, a potentially confounding variable is simply a variable that is related to the independent variable and is also a cause of the dependent variable. So, can we think of something that is both related to the type of school a child attends and is also a likely cause of that child's test scores? Sure. The variable "parental involvement" is a natural candidate to be a *Z* variable in this instance. Some children have highly involved parents – parents who read to their children, help them with homework, and take an active role in their education – while other children have parents who are much less involved. Highly involved parents are more likely than their uninvolved counterparts to learn about the existence of school choice programs in their cities, and are more likely to apply for such programs. (So *Z* is almost surely related to *X*.) And highly involved parents are more likely to create high expectations among their children, and to instill in their children a sense that achievement in school is important, all of which probably translate into having children who score better on standardized tests. (So *Z* is likely to be a cause of *Y*.) The key question then becomes: Did the study in question manage to *control for* those effects? We're a little ahead of the game here, because we haven't yet talked about the strategies that researchers employ to control for the effects of potentially confounding variables. (That task comes in Chapter 4.) But we hope you can see why controlling for the effects of parental involvement is so key in this particular situation (and in general): If our comparison of school choice children and public school children basically amounts to a comparison between the children of highly motivated parents and the children of poorly motivated parents, then it becomes very problematic to conclude that the difference between the groups' test scores was *caused by* the program. Without a control for parental involvement (*Z*), in other words, the relationship between school type (*X*) and test scores (*Y*) might be spurious. So, until we see evidence that this important *Z* has been controlled for, our scorecard for this causal claim is [*y y y n*] and we should be highly suspicious of the study's findings. More informally, without such a control, the comparison between those sets of test scores is an unfair one, because the groups would be so different in the first place. As it happens, the article from the *Washington Post* that we mentioned did include a control for parental involvement, because the students were chosen for the program by a random lottery. We'll wait until Chapter 4 to describe exactly why this makes such a big difference, but it does.

The same process can be applied to a wide variety of causal claims and questions that we encounter in our daily lives. Does drinking red wine

as many causes of the dependent variable as possible. When we discuss multiple regression (in Chapters 9, 10, and 11), which is the most common statistical technique that political scientists use in their research, the entire point of those chapters is to learn how to control for other possible causes of the dependent variable. We will see that failures of research design, such as failing to control for all relevant causes of the dependent variable, have statistical implications, and the implications are always bad. Failures of research design produce problems for statistical analysis, but hold this thought. What is important to realize for now is that good research design will make statistical analysis more credible, whereas poor research design will make it harder for any statistical analysis to be conclusive about causal connections.

3.3 WHY IS STUDYING CAUSALITY SO IMPORTANT? THREE EXAMPLES FROM POLITICAL SCIENCE

Our emphasis on causal connections should be clear. We turn now to several active controversies within the discipline of political science, showing how debates about causality lie at the heart of precisely the kinds of controversies that got you (and most of us) interested in politics in the first place.

3.3.1 Life Satisfaction and Democratic Stability

One of the enduring controversies in political science is the relationship between *life satisfaction in the mass public* and *the stability of democratic institutions*. Life satisfaction, of course, can mean many different things, but for the current discussion let us consider it as varying along a continuum, from the public's being highly unsatisfied with day-to-day life to being highly satisfied. What, if anything, is the causal connection between the two concepts?

Political scientist Ronald Inglehart (1988) argues that life satisfaction (X) *causes* democratic system stability (Y). If we think through the first of the four questions for establishing causal relationships, we can see that there is a credible causal mechanism that connects X to Y – if people in a democratic nation are more satisfied with their lives, they will be less likely to want to overthrow their government. *The answer to our first question is "yes"* [*y* ? ? ?]. Moving on to our second question: Can we eliminate the possibility that democratic stability (Y) is what causes life satisfaction (X)? We can not. It is very easy to conceive of a causal mechanism in which citizens living in stable democracies are likely to be more satisfied with their lives than citizens living in nations with a history of government instability and less-than-democratic governance. *The answer to our second question is "no"* [*y n* ? ?]. We now turn to the third question. Using an impressive amount of data from a wide variety of developed democracies, Inglehart and his colleagues have shown that there is, indeed, an association between average life satisfaction in the public and the length of uninterrupted democratic governance. That is, countries with higher average levels of life satisfaction have enjoyed longer uninterrupted periods of democratic stability. Conversely, countries with lower levels of life satisfaction have had shorter periods of democratic stability and more revolutionary upheaval. *The answer to our third question is "yes"* [*y n y* ?]. With respect to the fourth question, it is easy to imagine a myriad of other factors (Z's) that lead to democratic stability, and whether Inglehart has done an adequate job of controlling for those other factors is the subject of considerable scholarly debate. *The answer to our fourth question is "maybe"* [*y n y* ?]. Inglehart's theory has satisfactorily answered questions 1 and 3, but it is the answers to questions 2 and 4 that have given skeptics substantial reasons to doubt his causal claim.

3.3.2 Race and Political Participation in the United States

Political participation – the extent to which individual citizens engage in voluntary political activity, such as voting, working for a campaign, or making a campaign contribution – represents one of the most frequently studied facets of mass political behavior, especially in the United States. And with good reason: Participation in democratic societies is viewed by some as one measure of the health of a democracy. After decades of studying the variation in Americans' rates of participation, several demographic characteristics consistently stood out as being correlated with participation, including an individual's racial classification. Anglos, surveys consistently showed, have participated in politics considerably more frequently than either Latinos or African Americans. A comprehensive survey, for example, shows that during a typical election cycle, Anglos engaged in 2.22 "participatory acts" – such as voting, working for a campaign, making a campaign contribution, attending a protest or demonstration, and similar such activities – whereas comparable rates for African Americans and Latino citizens were 1.90 and 1.41 activities (see Verba et al. 1993, Figure 1).

Is the relationship between an individual's race (X) and the amount that the individual participates in politics (Y) a causal one? Before we accept the evidence above as conclusively demonstrating a *causal* relationship, we need to subject it to the four causal hurdles. Is there a reasonable mechanism that answers the "how" and "why" questions connecting race and political participation? There may be reason to think so. For long portions of American history, after all, some formal and many informal barriers existed prohibiting or discouraging the participation of non-Anglos. The

notion that there might be residual effects of such barriers, even decades after they have been eradicated, is entirely reasonable. *The answer to our first question is "yes"* [y ? ? ?]. Can we eliminate the possibility that varying rates of participation cause an individual's racial classification? Obviously, yes. *The answer to our second question is "yes"* [y y ? ?]. Is there a correlation between an individual's race and their level of participation in the United States? The data above about the number of participatory acts among Anglos, African Americans, and Latinos clearly shows that there is a relationship; Anglos participate the most. *The answer to our third question is "yes"* [y y y ?]. Finally, have we controlled for all possible confounding variables Z that are related to both race (X) and participation (Y) that might make the relationship spurious? Verba and his colleagues suggest that there might be just such a confounding variable: socio-economic status. Less so today than in the past, socio-economic status (Z) is nevertheless still correlated with race (X). And unsurprisingly, socio-economic status (Z) is also a cause of political participation (Y); wealthy people donate more, volunteer more, and the like, than their less wealthy counterparts. Once controlling for socio-economic status, the aforementioned relationship between race and political participation entirely vanishes (see Verba et al.'s Table 8). In short, the correlation that we observe between race and political participation is spurious, or illusory; it is not a function of race, but instead a function of the disparities in wealth between Anglos and other races. Once we control for those socio-economic differences, the connection between race and participation goes away. *The answer to our fourth question is "no."* In this case, the effort to answer the fourth question actually changed our answer to the third question, moving our scorecard from [y y y ?] to [y y *n n*]. This is one of the important ways in which our conclusions about relationships can change when we move from a bivariate analysis in which we measure the relationship between one independent variable, X, and our dependent variable, Y, to a multiple variable analysis in which we measure the relationship between X and Y controlling for a second independent variable, Z. It is also possible for a lot of other things to happen when we move to controlling for Z. For instance, it is also possible for our scorecard to change from [y y *n n*] to [y y y y].

3.3.3 Evaluating Whether Head Start Is Effective

In the 1960s, as part of the War on Poverty, President Lyndon Johnson initiated the program Head Start to give economically underprivileged children a preschool experience that – the program hoped – would increase the chances that these poor children would succeed once they reached kindergarten and beyond. The program is clearly well intended, but, of course, that

alone does not make it effective. Simply put: Does Head Start work? In this case, "work" would mean that Head Start could increase the chances that participants in the program would have better educational outcomes than nonparticipants.

It would be tempting, in this case, to simply compare some standardized test scores of the children who participated in Head Start with those who did not. If Head Start participants scored higher, then – voila – case closed; the program works. If not, then not. But, as before, we need to stay focused on all four causal hurdles. First, is there some credible causal mechanism that would answer the "how" and "why" questions that connect Head Start participation (X) to educational outcomes (Y)? Yes. The theory behind the program is that exposure to a preschool environment that anticipates the actual school setting helps prepare children for what they will encounter in kindergarten and beyond. Head Start, in this sense, might help reduce discipline problems, and prepare students for reading and counting, among other skills. *The answer to our first question is "yes"* [y ? ? ?]. Is it possible, secondly, that the causal arrow might be reversed – in other words, can we rule out the possibility that educational outcomes (Y) could cause participation in Head Start (X)? Because testing would take place years after participation in the program, yes. *The answer to our second question is "yes"* [y y ? ?]. Is there an association between participation in the program and learning outcomes? Study after study has shown that Head Start participants fare better when tested, and have fewer instances of repeating a grade, than those who have no preschool experience. For example, a widely cited study shows that Head Start children do better on a vocabulary test suitable for young children than do students who have no preschool experience (Currie and Thomas 1995). *The answer to our third question is "yes"* [y y y ?]. But, as was the case with the school-voucher example discussed previously, a potentially confounding variable – parental involvement (Z) – lurks nearby. Highly involved parents (Z) are more likely to seek out, be aware of, and enroll their children (X) in programs like Head Start that might benefit their children. Parents who are less involved in their childrens' lives are less likely to avail themselves of the potential opportunities that Head Start creates. And, as before, highly involved parents (Z) are likely to have positive effects on their children's educational outcomes. The key question, then, becomes: Do parental effects (Z) make the relationship between Head Start and later educational outcomes spurious? The aforementioned study by Currie and Thomas uses both statistical controls as well as controls in the design of their research to account for parental factors, and they find that Head Start has lasting educational effects only for Anglo children, but not for African American children (see their Table 4). Again, that phrase "statistical controls" may not be quite as transparent as it will

be later on in this book. For now, suffice it to say that these researchers used all of the techniques available to them to show that Head Start does, indeed, have positive effects for some, but not all, children. *The answer to our fourth question is a highly qualified "yes"* [y y y y].

3.4 WRAPPING UP

Learning the thinking skills required to evaluate causal claims as conclusively as possible requires practice. They are intellectual habits that, like a good knife, will sharpen with use.

Translating these thinking skills into actively designing new research that helps to address causal questions is the subject of Chapter 4. All of the "research designs" that you will learn in that chapter are strongly linked to issues of evaluating causal claims. Keeping the lessons of this chapter in mind as we move forward is essential to making you a better consumer of information, as well as edging you forward toward being a producer of research.

CONCEPTS INTRODUCED IN THIS CHAPTER

- bivariate – involving just two variables.
- causal hurdles scorecard – a shorthand for summarizing evidence about whether an independent variable causes a dependent variable.
- confounding variable – a variable that is correlated with both the independent and dependent variables and that somehow alters the relationship between those two variables.
- deterministic relationship – if some cause occurs, then the effect will occur with certainty.
- multivariate – involving more than two variables.
- probabilistic relationship – increases in X are associated with increases (or decreases) in the probability of Y occurring, but those probabilities are not certainties.
- spurious – not what it appears to be, or false.

EXERCISES

1. Think back to a history class in which you learned about the "causes" of a particular historical event (for instance, the Great Depression, the French Revolution, or World War I). How well does each causal claim perform when you try to answer the four questions for establishing causal relationships?

2. Go to your local newspaper's web site (if it has one; if not, pick the web site of any media outlet you visit frequently). In the site's "Search" box, type the words "research cause" (without quotes). (*Hint*: You may need to limit the search time frame, depending on the site you visit.) From the search results, find two articles that make claims about causal relationships. Print them out, and include a brief synopsis of the causal claim embedded in the article.
3. For each of the following examples, imagine that some researcher has found the reported pattern of covariation between X and Y. Can you think of a variable Z that might make the relationship between X and Y spurious?
   (a) The more firefighters (X) that go to a house fire, the greater property damage that occurs (Y).
   (b) The more money spent by an incumbent member of Congress's campaign (X), the lower their percentage of vote (Y).
   (c) Increased consumption of coffee (X) reduces the risk of depression among women (Y).
   (d) The higher the salaries of Presbyterian ministers (X), the higher the price of rum in Havana (Y).
4. For each of the following pairs of independent and dependent variables, write about both a probabilistic and a deterministic relationship to describe the likely relationship:
   (a) A person's education (X) and voter turnout (Y).
   (b) A nation's economic health (X) and political revolution (Y).
   (c) Candidate height (X) and election outcome (Y).
5. Take a look at the codebook for the data set "BES 2005 Subset" and write about your answers to the following items:
   (a) Develop a causal theory about the relationship between an independent variable (X) and a dependent variable (Y) from this data set. Is it the credible causal mechanism that connects X to Y? Explain your answer.
   (b) Could Y cause X? Explain your answer.
   (c) What other variables (Z) would you like to control for in your tests of this theory?
6. Imagine causal claims for which the scorecards are listed below. Which of these clams would you evaluate as most strongly supported? Explain your answer.
   (a) [y *n* y y]
   (b) [y y y *n*]
   (c) [? y y y]
7. Researcher A and Researcher B are having a scientific debate. What are they arguing about if their argument is focused on:
   (a) causal hurdle 1
   (b) causal hurdle 2
   (c) causal hurdle 3
   (d) causal hurdle 4

8. Find a political science journal article of interest to you, and of which your instructor approves, and answer the following items (be sure to provide a full citation to the chosen article with your answers):
   (a) Briefly describe the causal theory that connects the independent and dependent variables.
   (b) Create a causal hurdles scorecard for this theory and write an explanation for each of your entries in the scorecard.

4 Research Design

OVERVIEW

Given our focus on causality, what research strategies do political scientists use to investigate causal relationships? Generally speaking, the controlled experiment is the foundation for scientific research. And some political scientists use experiments in their work. However, owing to the nature of our subject matter, most political scientists adopt one of two types of "observational" research designs that are intended to mimic experiments. The cross-sectional observational study focuses on variation across individual units (like people or countries). The time-series observational study focuses on variation in aggregate quantities (like presidential popularity) over time. What is an "experiment" and why is it so useful? How do observational studies try to mimic experimental designs? Most importantly, what are the strengths and weaknesses of each of these three research designs in establishing whether or not causal relationships exist between concepts? That is, how does each one help us to get across the four causal hurdles identified in Chapter 3? Relatedly, we introduce issues concerning the selection of samples of cases to study in which we are not able to study the entire population of cases to which our theory applies. This is a subject that will feature prominently in many of the subsequent chapters.

4.1 COMPARISON AS THE KEY TO ESTABLISHING CAUSAL RELATIONSHIPS

So far, you have learned that political scientists care about causal relationships. You have learned that most phenomena we are interested in explaining have multiple causes, but our theories typically deal with only one of them while ignoring the others. In some of the research examples in the previous chapters, we have noted that the multivariate nature of the world can make our first glances at evidence misleading. In the example