THE FUNDAMENTALS OF

Political Science Research

Third Edition

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CAMBRIDGE
UNIVERSITY PRESS

1 The Scientific Study of Politics

OVERVIEW

Most political science students are interested in the substance of politics and not in its methodology. We begin with a discussion of the goals of this book and why a scientific approach to the study of politics is more interesting and desirable than a "just-the-facts" approach. In this chapter we provide an overview of what it means to study politics scientifically. We begin with an introduction to how we move from causal theories to scientific knowledge, and how a key part of this process is thinking about the world in terms of *models* in which the concepts of interest become variables that are causally linked together by theories. We then introduce the goals and standards of political science research that will be our rules of the road to keep in mind throughout this book. The chapter concludes with a brief overview of the structure of this book.

Doubt is the beginning, not the end, of wisdom.
—Chinese proverb

1.1 POLITICAL *SCIENCE*?

"Which party do you support?" "When are you going to run for office?" These are questions that students often hear after announcing that they are taking courses in political science. Although many political scientists are avid partisans, and some political scientists have even run for elected offices or have advised elected officials, for the most part this is not the focus of modern political science. Instead, political science is about the scientific study of political phenomena. Perhaps like you, a great many of today's political scientists were attracted to this discipline as undergraduates because of intense interests in a particular issue or candidate. Although we are often drawn into political science based on political passions, the most respected political science research today is conducted in a fashion that makes it impossible to tell the personal political views of the writer.

Many people taking their first political science research course are surprised to find out how much science and, in particular, how much math are involved. We would like to encourage the students who find themselves in this position to hang in there with us – even if your answer to this encouragement is "but I'm only taking this class because they require it to graduate, and I'll never use any of this stuff again." Even if you never run a regression model after you graduate, having made your way through these materials should help you in a number of important ways. We have written this book with the following three goals in mind:

- *To help you consume academic political science research in your other courses.* One of the signs that a field of research is becoming scientific is the development of a common technical language. We aim to make the common technical language of political science accessible to you.
- *To help you become a better consumer of information.* In political science and many other areas of scientific and popular communication, claims about causal relationships are frequently made. We want you to be better able to evaluate such claims critically.
- *To start you on the road to becoming a producer of scientific research on politics.* This is obviously the most ambitious of our goals. In our teaching we often have found that once skeptical students get comfortable with the basic tools of political science, their skepticism turns into curiosity and enthusiasm.

To see the value of this approach, consider an alternative way of learning about politics, one in which political science courses would focus on "just the facts" of politics. Under this alternative way, for example, a course offered in 1995 on the politics of the European Union (EU) would have taught students that there were 15 member nations who participated in governing the EU through a particular set of institutional arrangements that had a particular set of rules. An obvious problem with this alternative way is that courses in which lists of facts are the only material would probably be pretty boring. An even bigger problem, though, is that the political world is constantly changing. In 2016 the EU was made up of 28 member nations and had some new governing institutions and rules that were different from what they were in 1995. Students who took a facts-only course on the EU back in 1995 would find themselves lost in trying to understand the EU of 2016. By contrast, a theoretical approach to politics helps us to better understand why changes have come about and their likely impact on EU politics.

In this chapter we provide an overview of what it means to study politics scientifically. We begin this discussion with an introduction to how we move from causal theories to scientific knowledge. A key part of this process is thinking about the world in terms of *models* in which the concepts of interest become **variables**[1] that are causally linked together by theories. We then introduce the goals and standards of political science research that will be our rules of the road to keep in mind throughout this book. We conclude this chapter with a brief overview of the structure of this book.

1.2 APPROACHING POLITICS SCIENTIFICALLY: THE SEARCH FOR CAUSAL EXPLANATIONS

I've said, I don't know whether it's addictive. I'm not a doctor. I'm not a scientist.

—Bob Dole, in a conversation with Katie Couric about tobacco during the 1996 US presidential campaign

The question of "how do we know what we know" is, at its heart, a philosophical question. Scientists are lumped into different disciplines that develop standards for evaluating evidence. A core part of being a scientist and taking a scientific approach to studying the phenomena that interest you is always being willing to consider new evidence and, on the basis of that new evidence, change what you thought you *knew* to be true. This willingness to always consider new evidence is counterbalanced by a stern approach to the evaluation of new evidence that permeates the scientific approach. This is certainly true of the way that political scientists approach politics.

So what do political scientists do and what makes them scientists? A basic answer to this question is that, like other scientists, political scientists develop and test theories. A **theory** is a tentative conjecture about the causes of some phenomenon of interest. The development of **causal** theories about the political world requires thinking in new ways about familiar phenomena. As such, theory building is part art and part science. We discuss this in greater detail in Chapter 2, "The Art of Theory Building."

[1] When we introduce an important new term in this book, that term appears in boldface type. At the end of each chapter, we will provide short definitions of each bolded term that was introduced in that chapter. We discuss variables at great length later in this and other chapters. For now, a good working definition is that a variable is a definable quantity that can take on two or more values. An example of a variable is voter turnout; researchers usually **measure** it as the percentage of voting-eligible persons in a geographically defined area who cast a vote in a particular election.

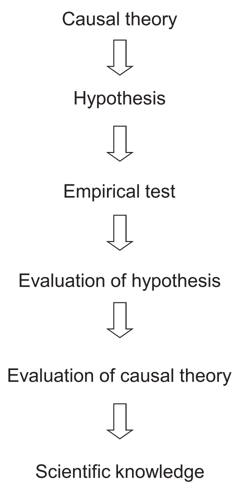

Figure 1.1 The road to scientific knowledge

Once a theory has been developed, like all scientists, we turn to the business of testing our theory. The first step in testing a particular theory is to restate it as one or more testable hypotheses. A **hypothesis** is a theory-based statement about a relationship that we expect to observe. For every hypothesis there is a corresponding **null hypothesis**. A null hypothesis is also a theory-based statement but it is about what we would observe if there were no relationship between two variables of interest. **Hypothesis testing** is a process in which scientists evaluate systematically collected evidence to make a judgment of whether the evidence favors their hypothesis or favors the corresponding null hypothesis. The process of setting up hypothesis tests involves both logical reasoning and creative design. In Chapter 3, "Evaluating Causal Relationships," we focus on the logical reason side of this process. In Chapter 4, "Research Design," we focus on the design part of this process. If a hypothesis survives rigorous testing, scientists start to gain confidence in that hypothesis rather than in the null hypothesis, and thus they also gain confidence in the theory from which they generated their hypothesis.

Figure 1.1 presents a stylized schematic view of the path from theories to hypotheses to scientific knowledge.[2] At the top of the figure, we begin with a causal theory to explain our phenomenon of interest. We then derive one or more hypotheses about what our theory leads us to expect when we measure our concepts of interest (which we call variables – as was previously discussed) in the real world. In the third step, we conduct **empirical** tests of our hypotheses.[3] From what we find, we evaluate our hypotheses relative to corresponding null hypotheses. Next, from the results of our hypothesis tests, we evaluate our causal theory. In light of our evaluation of our theory, we then think about how, if at all, we should revise what we consider to be scientific knowledge concerning our phenomenon of interest.

A core part of the scientific process is skepticism. On hearing of a new theory, other scientists will challenge this theory and devise further tests. Although this process can occasionally become quite combative, it is

[2] In practice, the development of scientific knowledge is frequently much messier than this step-by-step diagram. We show more of the complexity of this approach in later chapters.

[3] By "empirical" we simply mean "based on observations of the real world."

a necessary component in the development of scientific knowledge. Indeed, a core component of scientific knowledge is that, as confident as we are in a particular theory, we remain open to the possibility that there is still a test out there that will provide evidence that makes us lose confidence in that theory.

It is important to underscore here the nature of the testing that scientists carry out. One way of explaining this is to say that scientists are *not* like lawyers in the way that they approach evidence. Lawyers work for a particular client, advocate a particular point of view (like "guilt" or "innocence"), and then accumulate evidence with a goal of proving their case to a judge or jury. This goal of *proving* a desired result determines their approach to evidence. When faced with evidence that conflicts with their case, lawyers attempt to ignore or discredit such evidence. When faced with evidence that supports their case, lawyers try to emphasize the applicability and quality of the supportive evidence. In many ways, the scientific and legal approaches to evidence couldn't be further apart. Scientific confidence in a theory is achieved only after hypotheses derived from that theory have run a gantlet of tough tests. At the beginning of a trial, lawyers develop a strategy to *prove* their case. In contrast, at the beginning of a research project, scientists will think long and hard about the most rigorous tests that they can conduct. A scientist's theory is never *proven* beyond the shadow of a doubt because scientists are always willing to consider new evidence.

The process of hypothesis testing reflects how hard scientists are on their own theories. As scientists evaluate systematically collected evidence to make a judgment of whether the evidence favors their hypothesis or favors the corresponding null hypothesis, they *always* favor the null hypothesis. Statistical techniques allow scientists to make probability-based statements about the empirical evidence that they have collected. You might think that, if the evidence was 50–50 between their hypothesis and the corresponding null hypothesis, the scientists would tend to give the nod to the hypothesis (from their theory) over the null hypothesis. In practice, though, this is not the case. Even when the hypothesis has an 80–20 edge over the null hypothesis, most scientists will still favor the null hypothesis. Why? Because scientists are very worried about the possibility of falsely rejecting the null hypothesis and therefore making claims that others ultimately will show to be wrong.

Once a theory has become established as a part of scientific knowledge in a field of study, researchers can build upon the foundation that this theory provides. Thomas Kuhn (1962) wrote about these processes in his famous book *The Structure of Scientific Revolutions*. According to Kuhn, scientific fields go through cycles of accumulating knowledge based on a set of shared assumptions and commonly accepted theories about the way that the world works. Together, these shared assumptions and accepted theories form what we call a **paradigm**. Once researchers in a scientific field have widely accepted a paradigm, they can pursue increasingly technical questions that make sense only because of the work that has come beforehand. This state of research under an accepted paradigm is referred to as **normal science**. When a major problem is found with the accepted theories and assumptions of a scientific field, that field will go through a revolutionary period during which new theories and assumptions replace the old paradigm to establish a new paradigm. One of the more famous of these scientific revolutions occurred during the sixteenth century when the field of astronomy was forced to abandon its assumption that the Earth was the center of the known universe. This was an assumption that had informed theories about planetary movement for thousands of years. In his book *De revolutionibus orbium coelestium* of 1543 (translated 2004 as *On the Revolutions of Heavenly Spheres*), Nicolaus Copernicus presented his theory that the Sun was the center of the known universe. Although this radical theory met many challenges, an increasing body of evidence convinced astronomers that Copernicus had it right. In the aftermath of this **paradigm shift**, researchers developed new assumptions and theories that established a new paradigm, and the affected fields of study entered into new periods of normal scientific research.

It may seem hard to imagine that the field of political science has gone through anything that can compare with the experiences of astronomers in the sixteenth century. Indeed, Kuhn and other scholars who study the evolution of scientific fields of research have a lively and ongoing debate about where the social sciences, like political science, are in terms of their development. The more skeptical participants in this debate argue that political science is not sufficiently mature to have a paradigm, much less a paradigm shift. If we put aside this somewhat esoteric debate about paradigms and paradigm shifts, we can see an important example of the evolution of scientific knowledge about politics from the study of public opinion in the United States.

In the 1940s the study of public opinion through mass surveys was in its infancy. Prior to that time, political scientists and sociologists assumed that US voters were heavily influenced by presidential campaigns – and, in particular, by campaign advertising – as they made up their minds about the candidates. To better understand how these processes worked, a team of researchers from Columbia University set up an in-depth study of public opinion in Erie County, Ohio, during the 1944 presidential election. Their study involved interviewing the same individuals at multiple time periods across the course of the campaign. Much to the researchers' surprise, they found that voters were remarkably consistent from interview to interview in terms of their vote intentions. Instead of being influenced by particular events of the campaign, most of the voters surveyed had made up their minds about how they would cast their ballots long before the campaigning had even begun. The resulting book by Paul Lazarsfeld, Bernard Berelson, and Hazel Gaudet (1948), titled *The People's Choice*, changed the way that scholars thought about public opinion and political behavior in the United States. If political campaigns were not central to vote choice, scholars were forced to ask themselves what *was* critical to determining how people voted.

At first other scholars were skeptical of the findings of the 1944 Erie County study, but as the revised theories of politics of Lazarsfeld et al. were evaluated in other studies, the field of public opinion underwent a change that looks very much like what Thomas Kuhn calls a "paradigm shift." In the aftermath of this finding, new theories were developed to attempt to explain the origins of voters' long-lasting attachments to political parties in the United States. An example of an influential study that was carried out under this shifted paradigm is Richard Niemi and Kent Jennings' seminal book from 1974, *The Political Character of Adolescence: The Influence of Families and Schools*. As the title indicates, Niemi and Jennings studied the attachments of schoolchildren to political parties. Under the pre-Erie County paradigm of public opinion, this study would not have made much sense. But once researchers had found that voters' partisan attachments were quite stable over time, studying them at the early ages at which they form became a reasonable scientific enterprise. You can see evidence of this paradigm at work in current studies of party identification and debates about its stability.

1.3 THINKING ABOUT THE WORLD IN TERMS OF VARIABLES AND CAUSAL EXPLANATIONS

So how do political scientists develop theories about politics? A key element of this is that they order their thoughts about the political world in terms of concepts that scientists call *variables* and causal relationships between variables. This type of mental exercise is just a more rigorous way of expressing ideas about politics that we hear on a daily basis. You should think of each variable in terms of its *label* and its *values*. The **variable label** is a description of what the variable is, and the **variable values** are the denominations in which the variable occurs. So, if we're talking about the variable that reflects an individual's age, we could simply label this variable "Age" and some of the denominations in which this variable occurs would be years, days, or even hours.

It is easier to understand the process of turning concepts into variables by using an example of an entire theory. For instance, if we're thinking about US presidential elections, a commonly expressed idea is that the incumbent president will fare better when the economy is relatively healthy. If we restate this in terms of a political science theory, the state of the economy becomes the **independent variable**, and the outcome of presidential elections becomes the **dependent variable**. One way of keeping the lingo of theories straight is to remember that the value of the "dependent" variable "depends" on the value of the "independent" variable. Recall that a theory is a tentative conjecture about the causes of some phenomenon of interest. In other words, a theory is a conjecture that the independent variable is causally related to the dependent variable; according to our theory, change in the value of the independent variable *causes* change in the value of the dependent variable.

This is a good opportunity to pause and try to come up with your own causal statement in terms of an independent and dependent variable.[4]

YOUR TURN: Come up with your own causal statement

Try filling in the following blanks with some political variables:

______________________________ causes ______________________________

Sometimes it's easier to phrase causal propositions more specifically in terms of the values of the variables that you have in mind. For instance,

higher ______________________ causes lower ______________________

or, as the case may be,

higher ______________________ causes higher ______________________

Once you learn to think about the world in terms of variables, you will be able to produce an almost endless slew of causal theories. In Chapter 4 we will discuss at length how we design research to evaluate the causal claims in theories, but one way to initially evaluate a particular theory is to think

[4] Periodically in this book, you will find "Your Turn" boxes which ask you a question or ask you to try something. These boxes are designed to help you see if you are understanding the material that we have covered up to the point where they appear.

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 the theory has possibilities. In addition, if the answer is original and thought provoking, then you may really be on to something. Let's return now to our working example in which the state of the economy is the independent variable and the outcome of presidential elections is our dependent variable. The causal explanation for this theory is that we believe that the state of the economy is *causally related* to the outcome of presidential elections *because* voters hold the president responsible for management of the national economy. As a result, when the economy has been performing well, more voters will vote for the incumbent. When the economy is performing poorly, fewer voters will support the incumbent candidate. If we put this in terms of the preceding fill-in-the-blank exercise, we could write

economic performance causes presidential election outcomes,

or, more specifically, we could write

higher economic performance causes higher incumbent vote.

For now we'll refer to this theory, which has been widely advanced and tested by political scientists, as "the theory of economic voting."

To test the theory of economic voting in US presidential elections, we need to derive from it one or more testable hypotheses. Figure 1.2 provides a schematic diagram of the relationship between a theory and one of its hypotheses. At the top of this diagram are the components of the causal theory. As we move from the top part of this diagram (Causal theory) to the bottom part (Hypothesis), we are moving from a general statement about how we think the world works to a more specific statement about a relationship that we expect to find when we go out in the real world and measure (or **operationalize**) our variables.[5]

At the theory level at the top of Figure 1.2, our variables do not need to be explicitly defined. With the economic voting example, the independent variable, labeled "Economic Performance," can be thought of as a concept that ranges from values of very strong to very poor. The dependent variable, labeled "Incumbent Vote," can be thought of as a concept that ranges from values of very high to very low. Our causal theory is that a stronger economic performance causes the incumbent vote to be higher.

[5] Throughout this book we will use the terms "measure" and "operationalize" interchangeably. It is fairly common practice in the current political science literature to use the term "operationalize."

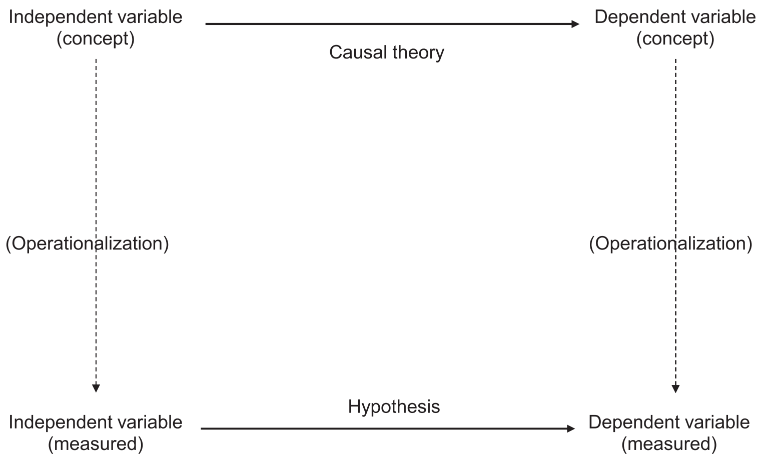

Figure 1.2 From theory to hypothesis

Because there are many ways in which we can measure each of our two variables, there are many different hypotheses that we can test to find out how well our theory holds up to real-world **data**. We can measure economic performance in a variety of ways. These measures include inflation, unemployment, real economic growth, and many others. "Incumbent Vote" may seem pretty straightforward to measure, but here there are also a number of choices that we need to make. For instance, what do we do in the cases in which the incumbent president is not running again? Or what about elections in which a third-party candidate runs? Measurement (or operationalization) of concepts is an important part of the scientific process. We will discuss this in greater detail in Chapters 5 and 6, which are devoted entirely to evaluating different variable measurements and variation in variables. For now, imagine that we are operationalizing economic performance with a variable that we will label "One-Year Real Economic Growth Per Capita." This measure, which is available from official US government sources, measures the one-year rate of inflation-adjusted (thus the term "real") economic growth per capita at the time of the election. The adjustments for inflation and population (per capita) reflect an important part of measurement – we want our measure of our variables to be comparable across cases. The values for this variable range from negative values for years in which the economy shrank to positive values for years in which the economy expanded. We operationalize our dependent variable with a variable that we label "Incumbent-Party Percentage of Major Party Vote." This variable takes on values based on the percentage of the popular vote, as reported in official election results, for the party that controlled the presidency at the time of the election, and thus has a possible range from 0 to 100.

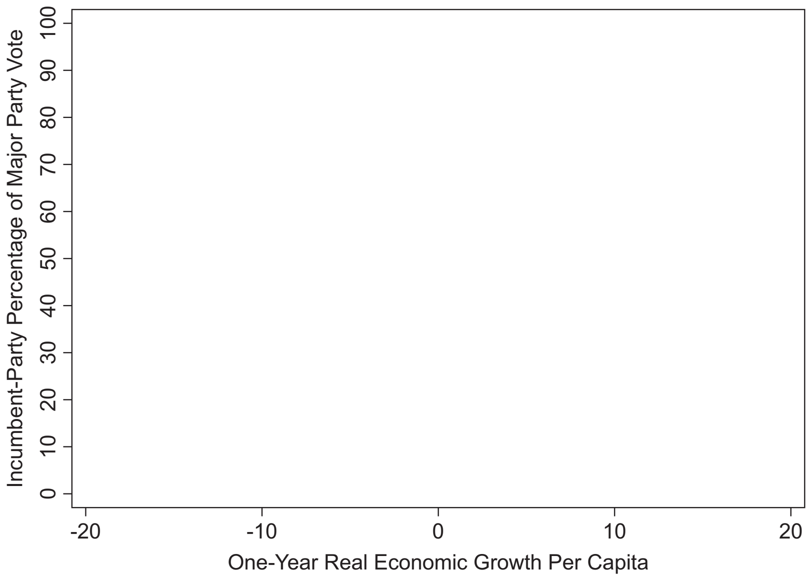

Figure 1.3 Economic growth. What would you expect to see based on the theory of economic voting?

In order to make our measure of this dependent variable comparable across cases, votes for third-party candidates have been removed from this measure.[6]

Figure 1.3 shows the axes of the graph that we could produce if we collected the measures of these two variables. We could place each US presidential election on the graph in Figure 1.3 by identifying the point that corresponds to the value of both "One-Year Real Economic Growth" (the horizontal, or x, axis) and "Incumbent-Party Vote Percentage" (the vertical, or y, axis). For instance, if these values were (respectively) 0 and 50, the position for that election year would be exactly in the center of the graph. Based on our theory, what would you expect to see if we collected these measures for all elections? Remember that our theory is that a stronger *economic performance* causes the *incumbent vote* to be higher. And we can restate this theory in reverse such that a weaker *economic performance* causes the *incumbent vote* to be lower. So, what would this lead us to expect to see if we plotted real-world data onto Figure 1.3? To get this answer right, let's make sure that we know our way around this graph. If we move from left to right on the horizontal axis, which is labeled

[6] If you're questioning the wisdom of removing votes for third-party candidates, you are thinking in the right way – any time you read about a measurement you should think about different ways in which it might have been carried out. And, in particular, you should focus on the likely consequences of different measurement choices on the results of hypothesis tests. Evaluating measurement strategies is a major topic in Chapter 5.

"One-Year Real Economic Growth Per Capita," what is going on in real-world terms? We can see that, at the far left end of the horizontal axis, the value is –20. This would mean that the US economy had shrunk by 20 percent over the past year, which would represent a very poor performance (to say the least). As we move to the right on this axis, each point represents a better economic performance up to the point where we see a value of +20, indicating that the real economy has grown by 20 percent over the past year. The vertical axis depicts values of "Incumbent-Party Percentage of Major Party Vote." Moving upward on this axis represents an increasing share of the popular vote for the incumbent party, whereas moving downward represents a decreasing share of the popular vote.

Now think about these two axes together in terms of what we would expect to see based on the theory of economic voting. In thinking through these matters, we should always start with our independent variable. This is because our theory states that the value of the independent variable exerts a causal influence on the value of the dependent variable. So, if we start with a very low value of *economic performance* – let's say −15 on the horizontal axis – what does our theory lead us to expect in terms of values for the *incumbent vote*, the dependent variable? We would also expect the value of the dependent variable to be very low. This case would then be expected to be in the lower-left-hand corner of Figure 1.3. Now imagine a case in which economic performance was quite strong at +15. Under these circumstances, our theory would lead us to expect that the incumbent-vote percentage would also be quite high. Such a case would be in the upper-right-hand corner of our graph. Figure 1.4 shows two such hypothetical points plotted on the same graph as Figure 1.3. If we draw a line between these two points, this line would slope upward from the lower left to the upper right. We describe such a line as having a positive slope. We can therefore hypothesize that the relationship between the variable labeled "One-Year Real Economic Growth Per Capita" and the variable labeled "Incumbent-Party Percentage of Major Party Vote" will be a **positive relationship**. A positive relationship is one for which higher values of the independent variable tend to coincide with higher values of the dependent variable.

Let's consider a different operationalization of our independent variable. Instead of economic growth, let's use "Unemployment Percentage" as our operationalization of economic performance. We haven't changed our theory, but we need to rethink our hypothesis with this new measurement or operationalization. The best way to do so is to draw a picture like Figure 1.3 but with the changed independent variable on the horizontal axis. This is what we have in Figure 1.5. As we move from left to right on the horizontal axis in Figure 1.5, the percentage of the members of the

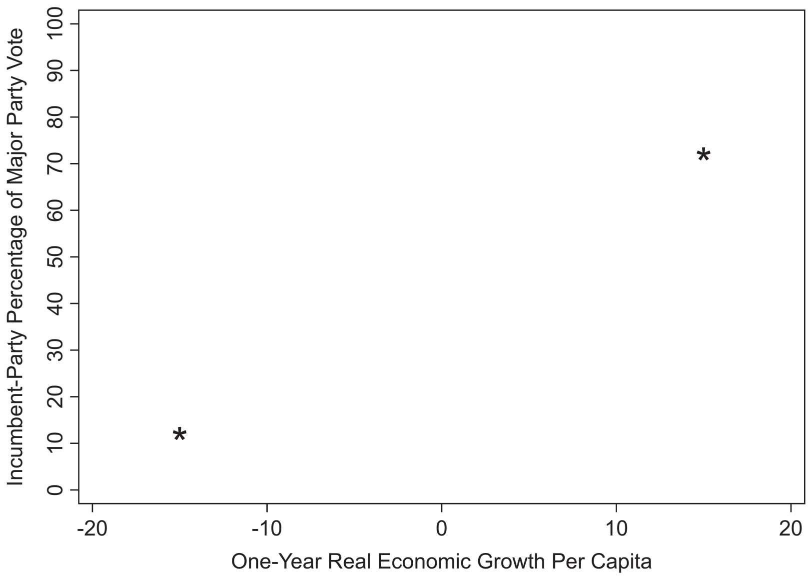

Figure 1.4 Economic growth. What would you expect to see based on the theory of economic voting? Two hypothetical cases

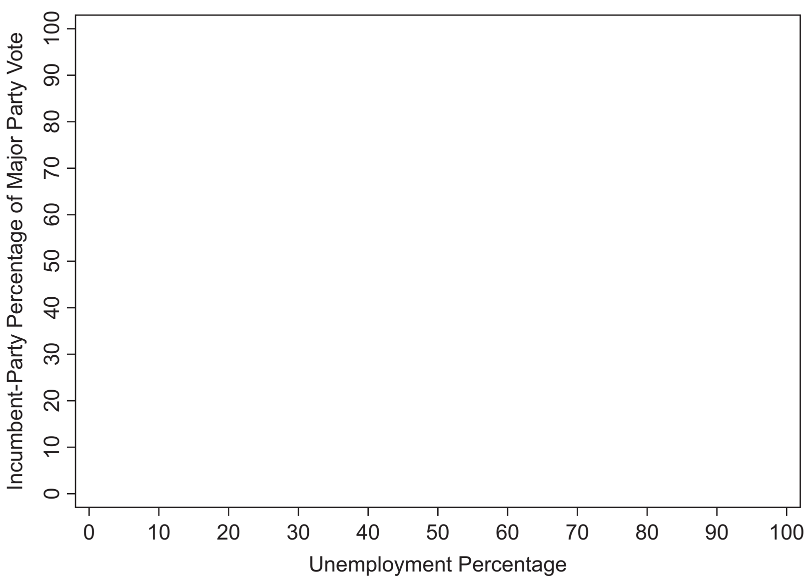

Figure 1.5 Unemployment. What would you expect to see based on the theory of economic voting?

workforce who are unemployed goes up. What does this mean in terms of economic performance? Rising unemployment is generally considered a poorer economic performance whereas decreasing unemployment is considered a better economic performance.

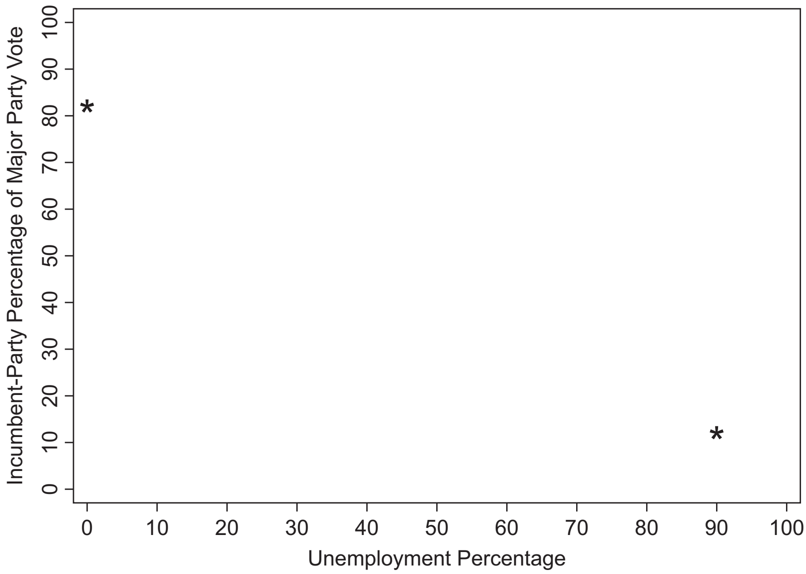

Figure 1.6 Unemployment. What would you expect to see based on the theory of economic voting? Two hypothetical cases

YOUR TURN: What would you expect?

Based on our theory, what should we expect to see in terms of incumbent vote percentage when unemployment is high? What about when unemployment is low?

Figure 1.6 shows two such hypothetical points plotted on our graph of unemployment and incumbent vote from Figure 1.5. The point in the upper-left-hand corner represents our expected vote percentage when unemployment equals zero. Under these circumstances, our theory of economic voting leads us to expect that the incumbent party will do very well. The point in the lower-right-hand corner represents our expected vote percentage when unemployment is very high. Under these circumstances, our theory of economic voting leads us to expect that the incumbent party will do very poorly. If we draw a line between these two points, this line would slope downward from the upper left to the lower right. We describe such a line as having a negative slope. We can therefore hypothesize that the relationship between the variable labeled "Unemployment Percentage" and the variable labeled "Incumbent-Party Percentage of Major Party Vote" will be a **negative relationship**. A negative relationship is one for which higher values of the independent variable tend to coincide with lower values of the dependent variable.

In this example we have seen that the same theory can lead to a hypothesis of a positive or a negative relationship. The theory to be tested, together with the operationalization of the independent and the dependent variables, determines the direction of the hypothesized relationship. The best way to translate our theories into hypotheses is to draw a picture like Figure 1.4 or 1.6. The first step is to label the horizontal axis with the variable label for the independent variable (as operationalized) and then label the left and right ends of the axis with appropriate value labels. The second step in this process is to label the vertical axis with the variable label for the dependent variable and then label the low and high ends of that axis with appropriate value labels. Once we have such a figure with the axes and minimum and maximum values for each properly labeled, we can determine what our expected value of our dependent variable should be if we observe both a low and a high value of the independent variable. And, once we have placed the two resulting points on our figure, we can tell whether our hypothesized relationship is positive or negative.

YOUR TURN: Developing another hypothesis to test the theory of economic voting

Think of a measure of the economy that is different from the two, economic growth and unemployment, that we have considered so far. Draw a picture like those in Figures 1.3 to 1.6 to decide whether you would expect a positive or negative relationship between this new independent variable and our dependent variable in this example.

Once we have figured out our hypothesized relationship, we can collect data from real-world cases and see how well these data reflect our expectations of a positive or negative relationship. This is a very important step that we can carry out fairly easily in the case of the theory of economic voting. Once we collect all of the data on economic performance and election outcomes, we will, however, still be a long way from confirming the theory that economic performance *causes* presidential election outcomes. Even if a graph like Figure 1.4 produces compelling visual evidence, we will need to see more rigorous evidence than that. Chapters 8–12 focus on the use of statistics to evaluate hypotheses. The basic logic of statistical hypothesis testing is that we assess the probability that the relationship we find could be due to random chance. The stronger the evidence that such a relationship *could not* be due to random chance, the more confident we would be in our hypothesis. The stronger the evidence that such a relationship *could* be due to random chance, the more confident we would be in the corresponding null hypothesis. This in turn reflects on our theory.

We also, at this point, need to be cautious about claiming that we have "confirmed" our theory, because social scientific phenomena (such as elections) are usually complex and cannot be explained completely with a single independent variable. Take a minute or two to think about what other variables, aside from economic performance, you believe might be causally related to US presidential election outcomes. If you can come up with at least one, you are on your way to thinking like a political scientist. Because there are usually other variables that matter, we can continue to think about our theories two variables at a time, but we need to qualify our expectations to account for other variables. We will spend Chapters 3 and 4 expanding on these important issues.

YOUR TURN: What other variables might matter?

What other variables, aside from economic performance, might be causally related to US presidential election outcomes?

1.4 MODELS OF POLITICS

When we think about the phenomena that we want to better understand as dependent variables and develop theories about the independent variables that causally influence them, we are constructing **theoretical models**. Political scientist James Rogers (2006) provides an excellent analogy between models and maps to explain how these abstractions from reality are useful to us as we try to understand the political world:

> The very unrealism of a model, if properly constructed, is what makes it useful. The models developed below are intended to serve much the same function as a street map of a city. If one compares a map of a city to the real topography of that city, it is certain that what is represented in the map is a highly unrealistic portrayal of what the city actually looks like. The map utterly distorts what is *really* there and leaves out numerous details about what a particular area looks like. But it is precisely *because* the map distorts reality – because it abstracts away from a host of details about what is really there – that it is a useful tool. A map that attempted to portray the full details of a particular area would be too cluttered to be useful in finding a particular location or would be too large to be conveniently stored. (Rogers, 2006, p. 276, emphasis in original)

The essential point is that models *are* simplifications. Whether or not they are useful to us depends on what we are trying to accomplish with the particular model. One of the remarkable aspects of models is that they are often more useful to us when they are inaccurate than when they are accurate. The process of thinking about the failure of a model to explain one or more cases can generate a new causal theory. Glaring inaccuracies often point us in the direction of fruitful theoretical progress.

1.5 RULES OF THE ROAD TO SCIENTIFIC KNOWLEDGE ABOUT POLITICS

In the chapters that follow, we will focus on particular tools of political science research. As we do this, try to keep in mind our larger purpose – trying to advance the state of scientific knowledge about politics. As scientists, we have a number of basic rules that should never be far from our thinking:

- Focus on causality.
- Don't let data alone drive your theories.
- Consider only empirical evidence.
- Avoid normative statements.
- Pursue both generality and parsimony.

1.5.1 Focus on Causality

All of Chapter 3 deals with the issue of causality and, specifically, how we identify causal relationships. When political scientists construct theories, it is critical that they always think in terms of the causal processes that drive the phenomena in which they are interested. For us to develop a better understanding of the political world, we need to think in terms of causes and not mere **covariation**. The term covariation is used to describe a situation in which two variables vary together (or **covary**). If we imagine two variables, A and B, then we would say that A and B covary if it is the case that, when we observe higher values of variable A, we generally also observe higher values of variable B. We would also say that A and B covary if it is the case that, when we observe higher values of variable A, we generally also observe lower values of variable B.[7] It is easy to assume that when we observe covariation we are also observing causality, but it is important not to fall into this trap. (More on this in Chapter 3.)

1.5.2 Don't Let Data Alone Drive Your Theories

This rule of the road is closely linked to the first. A longer way of stating it is "try to develop theories before examining the data on which you will perform your tests." The importance of this rule is best illustrated by a silly example. Suppose that we are looking at data on the murder rate (number

[7] A closely related term is **correlation**. For now we use these two terms interchangeably. In Chapter 8, you will see that there are precise statistical measures of covariance and correlation that are closely related to each other but produce different numbers for the same data.

of murders per 1000 people) in the city of Houston, Texas, by months of the year. This is our dependent variable, and we want to explain why it is higher in some months and lower in others. If we were to take as many different independent variables as possible and simply see whether they had a relationship with our dependent variable, one variable that we might find to strongly covary with the murder rate is the amount of money spent per capita on ice cream. If we perform some verbal gymnastics, we might develop a "theory" about how heightened blood sugar levels in people who eat too much ice cream lead to murderous patterns of behavior. Of course, if we think about it further, we might realize that both ice cream sales and the number of murders committed go up when temperatures rise. Do we have a plausible explanation for why temperatures and murder rates might be causally related? It is pretty well known that people's tempers tend to fray when the temperature is higher. People also spend a lot more time outside during hotter weather, and these two factors might combine to produce a causally plausible relationship between temperatures and murder rates.

What this rather silly example illustrates is that we don't want our theories to be crafted based entirely on observations from real-world data. We are likely to be somewhat familiar with empirical patterns relating to the dependent variables for which we are developing causal theories. This is normal; we wouldn't be able to develop theories about phenomena about which we know nothing. But we need to be careful about how much we let what we see guide our development of our theories. One of the best ways to do this is to think about the underlying causal process as we develop our theories and to let this have much more influence on our thinking than patterns that we might have observed. Chapter 2 is all about strategies for developing theories. One of these strategies is to identify interesting variation in our dependent variable. Although this strategy for theory development relies on data, it should not be done without thinking about the underlying causal processes.

1.5.3 Consider Only Empirical Evidence

As we previously outlined, we need to always remain open to the possibility that new evidence will come along that will decrease our confidence in even a well-established theory. A closely related rule of the road is that, as scientists, we want to base what we know on what we see from *empirical* evidence, which, as we have said, is simply "evidence based on observing the real world." Strong logical arguments are a good start in favor of a theory, but before we can be convinced, we need to see results from rigorous hypothesis tests.[8]

In science, empirical observation is the only admissible form of evidence in evaluating an argument. A logical extension of this is that your ideology or partisan identification or metaphysics cannot be a source of proof that something is or is not true. And closely related to this, as scientists, we should avoid **normative statements**. Normative statements are statements about how the world *ought* to be.

1.5.4 Check Your Ideology at the Door and Avoid Normative Statements

Whereas politicians make and break their political careers with normative statements, political scientists need to avoid them at all costs. Most political scientists care about political issues and have opinions about how the world ought to be. On its own, this is not a problem. But when normative preferences about how the world "should" be structured creep into their scientific work, the results can become highly problematic. The best way to avoid such problems is to conduct research and report your findings in such a fashion that it is impossible for the reader to tell what are your normative preferences about the world.

This does not mean that good political science research cannot be used to change the world. To the contrary, advances in our scientific knowledge about phenomena enable policy makers to bring about changes in an effective manner. For instance, if we want to rid the world of wars (normative), we need to understand the systematic dynamics of the international system that produce wars in the first place (empirical and causal). If we want to rid the United States of homelessness (normative), we need to understand the pathways into and out of being homeless (empirical and causal). If we want to help our favored candidate win elections (normative), we need to understand what characteristics make people vote the way they do (empirical and causal).

[8] It is worth noting that some political scientists use data drawn from experimental settings to test their hypotheses. There is some debate about whether such data are, strictly speaking, empirical or not. We discuss political science experiments and their limitations in Chapter 4. In recent years some political scientists have also made clever use of simulated data to gain leverage on their phenomena of interest, and the empirical nature of such data can certainly be debated. In the context of this textbook we are not interested in weighing in on these debates about exactly what is and is not empirical data. Instead, we suggest that one should always consider the overall quality of data on which hypothesis tests have been performed when evaluating causal claims.

1.5.5 Pursue Both Generality and Parsimony

Our final rule of the road is that we should always pursue generality and parsimony. These two goals can come into conflict. By "generality," we mean that we want our theories to be applied to as general a class of phenomena as possible. For instance, a theory that explains the causes of a phenomenon in only one country is less useful than a theory that explains the same phenomenon across multiple countries. Additionally, the more simple or **parsimonious** a theory is, the more appealing it becomes.[9] The term "parsimonious" is often used in a relative sense. So, if we are comparing two theories, the theory that is simpler would be the more parsimonious.

In the real world, however, we often face trade-offs between generality and parsimony. This is the case because, to make a theory apply more generally, we need to add caveats. The more caveats that we add to a theory, the less parsimonious it becomes.

1.6 A QUICK LOOK AHEAD

You now know the rules of the road. As we go through the next 11 chapters, you will acquire an increasingly complicated set of tools for developing and testing scientific theories about politics, so it is crucial that, at every step along the way, you keep these rules in the back of your mind. The rest of this book can be divided into three different sections. The first section, which includes this chapter through Chapter 4, is focused on the development of theories and research designs to study causal relationships about politics. In Chapter 2, "The Art of Theory Building," we discuss a range of strategies for developing theories about political phenomena. In Chapter 3, "Evaluating Causal Relationships," we provide a detailed explanation of the logic for evaluating causal claims about relationships between an independent variable, which we call "X," and a dependent variable, which we call "Y." In Chapter 4, "Research Design," we discuss the research strategies that political scientists use to investigate causal relationships.

In the second section of this book, we expand on the basic tools that political scientists need to test their theories. Chapter 5, "Measuring Concepts of Interest," is a detailed discussion of how we measure (or operationalize) our variables. Chapter 6, "Getting to Know Your Data," provides an introduction to a set of tools that can be used to summarize the characteristics of variables one at a time and thus get to know them.

[9] We use the words "parsimony" and "parsimonious" because they are widely used to describe theories.

Chapter 7, "Probability and Statistical Inference," introduces both the basics of probability theory as well as the logic of statistical hypothesis testing. In Chapter 8, "Bivariate Hypothesis Testing," we begin to apply the lessons from Chapter 7 to a series of empirical tests of the relationship between pairs of variables.

The third and final section of this book introduces the critical concepts of the regression model. Chapter 9, "Two-Variable Regression Models," introduces the two-variable regression model as an extension of the concepts from Chapter 8. In Chapter 10, "Multiple Regression: the Basics," we introduce the multiple regression model, with which researchers are able to look at the effects of independent variable X on dependent variable Y while controlling for the effects of other independent variables. Chapter 11, "Multiple Regression Model Specification," and Chapter 12, "Limited Dependent Variables and Time-Series Data," provide in-depth *discussions of* and *advice for* commonly encountered research scenarios involving multiple regression models.

CONCEPTS INTRODUCED IN THIS CHAPTER

- causal – implying causality; a central focus of this book is on theories about "causal" relationships
- correlation – a statistical measure of covariation which summarizes the direction (positive or negative) and strength of the linear relationship between two variables
- covary (or covariation) – when two variables vary together, they are said to "covary;" the term "covariation" is used to describe circumstances in which two variables covary
- data – a collection of variable values for at least two observations
- dependent variable – a variable for which at least some of the variation is theorized to be caused by one or more independent variables
- empirical – based on real-world observation
- hypothesis – a theory-based statement about what we would expect to observe if our theory is correct a hypothesis is a more explicit statement of a theory in terms of the expected relationship between a measure of the independent variable and a measure of the dependent variable
- hypothesis testing – the act of evaluating empirical evidence in order to determine the level of support for the hypothesis versus the null hypothesis
- independent variable – a variable that is theorized to cause variation in the dependent variable
- measure – a process by which abstract concepts are turned into real-world observations

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.

Amat victoria curam. (Victory loves preparation.)

—Latin proverb

If I have seen further, it is by standing on the shoulders of giants.

—Isaac Newton

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

[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 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. 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. That's what this chapter is about.

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 ten 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 ten articles, all but one has as its main motivation the answer to a question or the solution

[2] This list comes from an article (Sigelman, 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.

Table 2.1 Research questions of the ten most-cited papers in the *American Political Science Review*, 1945–2005

Article	Research question
1) Bachrach and 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 US states?
4) Kramer (1971)	How do economic conditions impact US national elections?
5) Miller and Stokes (1963)	How do constituent attitudes influence the votes of US representatives?
6) March and Olsen (1984)	How do institutions shape politics?
7) Lipset (1959)	What are the necessary conditions for stable democratic politics?
8) Beck and 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?

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 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

[3] The Beck and Katz (1995) paper, which is one of the most influential technical papers in the history of political science, is the exception to this.

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 US state governments, the typical spatial unit will be the 50 US 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 **cross-sectional measure**, in which the time dimension is the same for all cases and the dependent variable is measured for multiple spatial units. The second 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. 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 Cross-Sectional Example

In Figure 2.1 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

[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.

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 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?"

YOUR TURN: What causes military spending?

Thinking about data like those displayed in Figure 2.1, come up with some answers to the question: "What *causes* a nation to put more or less of its available economic resources toward military spending?"

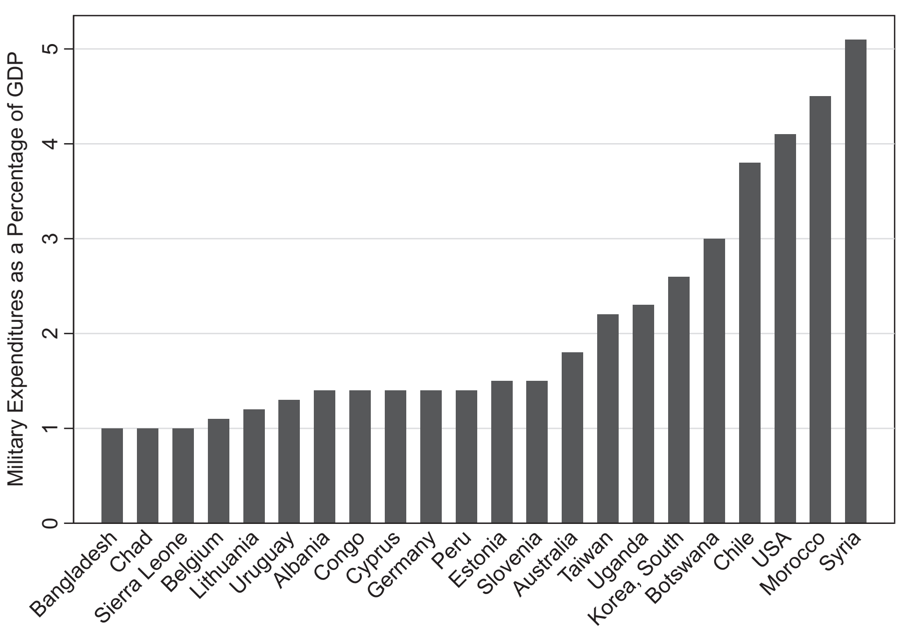

Figure 2.1 Military spending in 2005

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 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 too close to our data before developing our theory, we could develop a theory about military spending 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 Time-Series Example

In Figure 2.2 we see the monthly level of US 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 across all observations (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

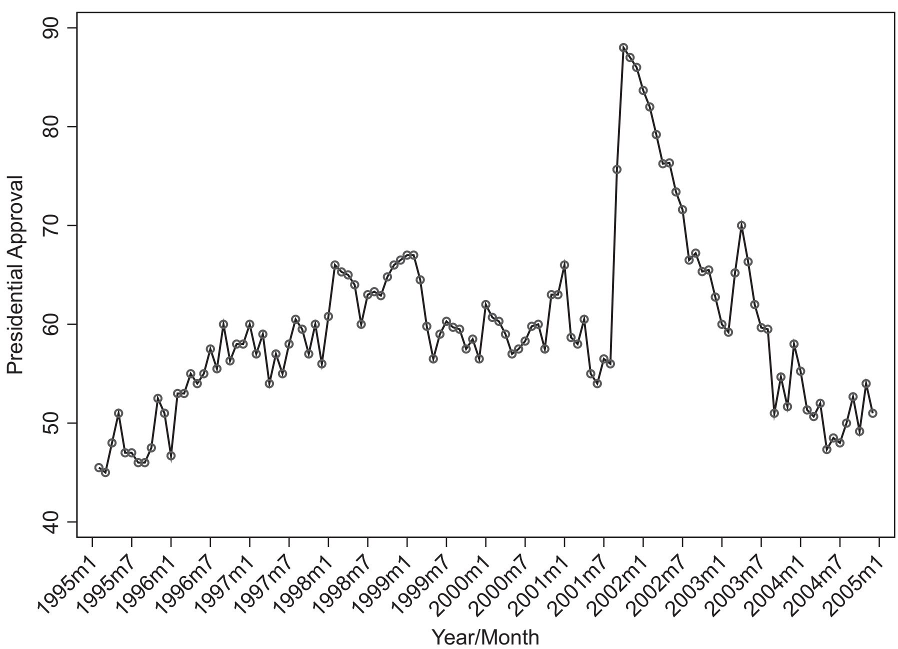

Figure 2.2 Presidential approval, 1995–2005

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?"

YOUR TURN: What causes presidential approval?

Thinking about data like those displayed in Figure 2.2, come up with some answers to the question: "What *causes* presidential approval to go up and down?"

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 2.2. What is the first thing that you think most people notice when they look at Figure 2.2? Once they have figured out what the dimensions are in this figure (US 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 US 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 aside their partisan differences and other critiques that they may have of the president's handling of his job 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 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 (1997) "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]

[5] See Mueller (1973).

[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.

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 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 US 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 2016 US presidential election, but of US presidential elections in general. That is, instead of asking "Why did Trump beat Clinton in the 2016 election?" we should ask either "What causes the incumbent party to win or lose in US presidential elections?" or "What causes Republican candidates to fare better or worse than Democratic candidates in US presidential elections?"

2.5 THREE STRATEGIES TOWARD DEVELOPING AN ORIGINAL THEORY

One of the best ways to think about developing an original theory is to break the process down with a little mathematical notation. When we do this, we can see that most works in political science follow one of three strategies for developing a new theory. These strategies, to be sure, represent a simplification of the ways in which political scientists generate their own research programs. But sometimes simplifying things is helpful, especially when faced with a possibly daunting task.

Before we introduce these strategies, we will introduce some new notational conventions and a third variable type. Remember from Chapter 1 that we introduced the idea of thinking about the world in terms of variables. We also discussed theories as being about the causal relationship between an independent variable and a dependent variable. Moving forward in the book, we will find it useful to use notational shorthand in which we will represent independent variables as X or Z and dependent variables as Y. We can summarize a typical theory as "$X \rightarrow Y$," short for "X causes Y."

Using this notational shorthand, we can summarize the three strategies for developing a new theory as follows:

1. A new Y (and an existing X).
2. An existing Y and a new X.
3. A new Z which modifies an established $X \rightarrow Y$.

We take them in turn.

2.5.1 Theory Type 1: a New *Y* (and Some *X*)

The first type of theory involves the creation of, invention of, or discovery of some new type of dependent variable, and then theorizing about some independent variable that might cause the dependent variable to vary. What makes projects like this distinctive – and difficult! – is the word "new." A research project of this type is exceedingly creative, and also rather rare. Political scientists don't just arrive in their offices in the morning, take that first swig of coffee, and confront the day with the thought, "Okay, here we go. Today I'm going to create another new dependent variable to analyze." If only it were that simple!

The burden of creating a new concept to represent a brand-new dependent variable is considerable. Moreover, because research never occurs in a metaphorical vacuum, it has to be a concept that other scholars will find interesting. Otherwise, your work is unfortunately quite likely to be ignored.

If you can conceptualize something genuinely new, and then proceed to measure it, then the next (and critical) step is to theorize about some X that might cause this new Y to vary. Again, this is sometimes a formidable task, but, on the other hand, it's likely that, if you are able to imagine a new dependent variable, you might already have a clue about what force or forces might cause it to vary.

Projects of this type can break new paths toward scientific knowledge – paths that other scholars can follow, and that can lead to new theories and findings about how the world works. An example of a project like this is shown in Nelson Polsby's article "The Institutionalization of the U.S. House of Representatives," which appeared in the *American*

Political Science Review in 1968. Polsby developed a new variable, which he referred to as the "institutionalization" of an organization. As an organization becomes increasingly institutionalized, three things happen, he claimed. First, the organization becomes more clearly separated from the environment around it. Second, the organization becomes increasingly complex, with functions and roles that cannot simply be interchanged. Finally, the organization develops increasingly complex rules and procedures for handling its internal business. On all three levels, Polsby was able to show that, since the founding of the republic, the US Congress has become increasingly institutionalized. That is, his newly introduced concept became an interesting over-time variable that begged for scientific explanation – in other words: Why has the House become more institutionalized? In his article, Polsby offers some theoretical speculation about the causes of this phenomenon. The article exemplifies this type of project, since no previous scholars had thought of this as a possible dependent variable that needed explaining. And the article has been cited nearly one thousand times by subsequent scholars.

YOUR TURN: Thinking about the causes of institutionalization

Some states in the US have more institutionalized legislatures than do others. Can you think of any possible causes of this phenomenon?

So how do you find a new Y? First, you have to know that it is, indeed, *new*, by which we mean that no previous scholar has already conducted research on this particular dependent variable. This requires conducting a thorough research of the existing literature, likely using Google Scholar and some variations on keywords.[8] Beyond that, there is no magical formula, no recipe to follow that will lead to a new dependent variable that begs explanation. What we can say, to hark back to our analogy earlier in this chapter, is that the best way to get struck by metaphorical lightning is to read academic works. Read with a hunger that points toward questions like, "What *don't* we know yet?" This is a theme we'll return to later in this chapter.

2.5.2 Project Type 2: an Existing Y and a New X

Perhaps you will find that creating a new dependent variable from scratch is too challenging for now. If so, you're in very good company. Many researchers come to the conclusion that all of the good dependent variables

[8] Google Scholar is found at scholar.google.com, and is distinct from the main Google search engine, found at www.google.com. Be careful not to confuse the two. We discuss the use of Google Scholar to get a sense of the literature on a particular subject in Section 2.6.1.

are already taken. And if you find yourself in this position, perhaps it's time to consider our second type of new theory: taking an existing Y and theorizing how a new X might cause it.

You'll note that theories like these also have the word "new" in them – though this time, what's new isn't the dependent variable, but the independent variable. The burden of producing something new – by which we mean, a relationship between X and Y that some other scholar has not already examined in the same way that you're proposing – is still considerable. But in projects like this, the sense that a new scholar is "standing on the shoulders of giants" is far more evident. Previous scholars may have already examined a particular dependent variable, proposing several causes that might explain its variation. Those causes, to be sure, might be competing with one another, or they might complement one another. The heart of projects of this type is identifying some *other* possible cause of Y that has not been adequately examined.

The burden of novelty requires thorough canvassing of the existing literature on the particular phenomenon that interests you. For example, if you are interested in explaining cross-national variation in why citizens in some countries seem more trusting of government, whereas others seem less trusting of government, this means that you will have to consume that literature, systematically noting what independent variables – or categories of independent variables (like "the economy") – have already been examined by previous researchers.

2.5.3 A New Z which Modifies an Established $X \rightarrow Y$

A third path to an original theory is to start with an established $X \rightarrow Y$ relationship and think about how that relationship might vary across the values of a third variable Z. The first step is to figure out what the established $X \rightarrow Y$ relationship is and then to think about what factors might make that relationship different across cases. Those factors can then be thought of as your new variable, Z. So, if the established relationship is that X is positively related to Y, you might begin by thinking about circumstances in which it might be the case that that relationship is stronger or weaker. You might also imagine cases for which we wouldn't expect any relationship between X and Y or where the relationship between X and Y is negative. When you do so, whatever it is that you would use to describe what it is that causes the $X \rightarrow Y$ relationship to be different becomes your new variable Z. Again, notice the word "new" here; in order for your work to make an original contribution, something has to be new.

So, how do we come up with ideas about new modifying Z variables? One strategy is to think about a previously examined $X \rightarrow Y$ relationship in different contexts. Three ways to start your thinking along these lines would be to think about how $X \rightarrow Y$ might be different across different time periods, different types of individuals, or different geographic contexts. As you do so, it is important to ask yourself the question "What is it about these different times/individuals/geographic contexts that makes $X \rightarrow Y$ different?" Once you answer this question, you have your new variable Z, and once you have an explanation for *why* you think that Z modifies the $X \rightarrow Y$ connection, you have a new theory.

To take an example where the newness comes from a new time, consider that, at least since the work of Converse (1964), it has been noticed that among members of the American public there was not a particularly strong relationship between an individual's party identification (X) and their policy attitudes (Y). That is, researchers had found that Republicans express more conservative policy attitudes and Democrats express more liberal attitudes, but the established positive $X \rightarrow Y$ relationship was pretty weak. More recent research, though, particularly by Levendusky (2009), that investigates this same $X \rightarrow Y$ connection has shown that the relationship is quite a bit stronger in recent years. That is, in what Levendusky calls "the partisan sort," something has happened to make the relationship between an individual's partisanship and their policy preferences much more strong. This led Levendusky, of course, to ask what made this happen, and opened up considerable space for additional research in the study of American public opinion. Levendusky proposed that increasingly ideological behavior by elites in national politics, his Z, had provided partisan clarity and thus strengthened the established $X \rightarrow Y$ relationship between party identification and policy attitudes.

Other projects investigate an existing $X \rightarrow Y$ connection in different geographic contexts. Throughout this book we have used the example of the relationship between the US economy and incumbent-party electoral fortunes as one of our running examples. Indeed, much of the pioneering work on what is called economic voting took place in the US context. Those findings show that a strong economy clearly benefits the candidate of the incumbent party, and a weak economy hurts the incumbent party's electoral fortunes. Scholars naturally wondered if these patterns would also be found in other democracies. Fascinatingly, in some countries, an $X \rightarrow Y$ connection existed similar to that in the United States, but in others, no such connection could be found. Naturally, that led scholars to wonder why evidence of economic voting was strong in some countries, and absent in others. Powell and Whitten (1993) show that the strength of the economic vote is driven by a third variable, their Z, that they call the "clarity of responsibility" of the governing party's handling of the economy. In countries with coalition governments where multiple parties share power, for example, it's much less clear who deserves credit or blame for the health of the economy than it is in a country where control over the economic policy is concentrated in the hands of a single party.

YOUR TURN: Thinking about the impact of gender on the relationship between education and support for abortion rights

The literature on US public opinion toward abortion rights has established that there is a positive relationship between number of years of education and support for abortion rights. How do you think this established $X \rightarrow Y$ relationship might be different for men and women (i.e., treating gender as Z)?

2.6 USING THE LITERATURE WITHOUT GETTING BURIED IN IT

To assess the "newness" of a theory, you first have to be aware of what scholarly work has already been done in that area of inquiry. How do you go about doing that? This section is devoted to how to identify the giants whose shoulders you would like to stand upon.

2.6.1 Identifying the Important Work on a Subject – Using Citation Counts

One of the most daunting tasks faced by a researcher starting out is to identify what has been done before. Most keyword searches will yield a phone book-sized return of articles and other publications. Even the most avid reader will be overwhelmed. Thankfully, citations provide a powerful shortcut for sorting out which of the many published works on a topic are the most important.

By now you have probably had some experience with having to produce a written work with citations of sources. Citations are one of the most valued currencies in which scientific researchers conduct their business. To be cited is to be relevant; to be uncited is to be ignored. For this reason, citations have formed the basis for a wide range of indices by which individual scientists, scientific journals, academic departments, and even entire universities are ranked relative to each other. We can safely say that in academia today citations are very important.

As such, we recommend taking advantage of the fact that citations are a powerful tool for distinguishing among the many articles any time that you do a search using Google Scholar or similar tools. So, an obvious next question is: "How many citations does a publication need for it to be regarded as having a substantial impact?" As a rough rule of thumb, we suggest that you use 20 citations. Of course, as you might imagine, the number of citations that a publication has is, in part, a function of time.

Thus, an article that was published in 2015 that already has ten citations in 2017 is probably going to have a substantial influence.

2.6.2 Oh No! Someone Else Has Already Done What I Was Planning to Do. What Do I Do Now?

One of the most frustrating things that can happen during a search of the literature is that you find that someone else has already done what you had in mind and published an article or book testing your theory or something close to it. As frustrating as this may be at first, it is actually a good sign, because it means that what you had in mind was in fact a good idea. If this happens to you, you should read the work and think about how it can be improved upon. In Chapter 4, after we have introduced some critical concepts for doing so, we have an extensive section titled "Dissecting the Research by Other Scholars" (Section 4.4) which provides a roadmap for doing this.

2.6.3 Critically Examining Previous Research to Develop an Original Theory

Once you have identified an area in which you want to conduct research and dissected the influential works in that area, it is useful to ask a series of critical questions. 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, after you have done dissection of some of the most influential works along the lines described in Section 4.4, try to answer the following questions:

- 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 $\Longleftrightarrow$ macro)?

Let's elaborate on these.

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

(X and Z) and dependent variables (Y) 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.

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. As we discussed in Section 2.5, these systematic patterns can be the result of additional variables, Z, that shape how an established $X \rightarrow Y$ relationship works across an expanded set of cases.

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 (1973) 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.

How Might This Theory Work at Different Levels of Aggregation (Micro $\Longleftrightarrow$ 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 Section 2.6.3, 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.

YOUR TURN: Thinking about time series ↔ cross-section

Think about what the data from Figure 2.1 would look like for a single country over multiple years. What do you think *causes* military spending to go up and down over time?

Think about what the data from Figure 2.2 would look like for multiple countries in the same year. What do you think *causes* presidential approval to be higher or lower across countries?

Notice how changing the type of data changes the research question?

2.7 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**."[9] 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.

[9] 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.