CHAPTER 1

Introduction

How can our intellectual life and institutions be arranged so as to expose our beliefs, conjectures, policies, positions, sources of ideas, traditions, and the like—whether or not they are justifiable—to maximum criticism, in order to counteract and eliminate as much intellectual error as possible?

—W. W. Bartley III (1962, pp. 139–140)

Overview

This chapter is an introduction to research. Like most introductions, it is a broad overview of what is to come. Admittedly, it is also an attempt to pique your interest. You will learn what research is and what the goals of research are. You will also learn about a number of different research projects, projects that illustrate that no single research method is necessarily better than any other. Part of this process is learning about a general framework for understanding and evaluating research conducted by others so that you may inform your own plans and decisions about policy, programs, traditions, and the other aspects of life to which Bartley referred in the opening quote. You will learn how the remainder of this book fits into the overall approach toward learning about research and becoming an informed, critical consumer of research. Finally, you will learn how to begin searching for research articles.

INTRODUCTION

You may have a song (or two) to which you have attached so much meaning that you want to stop everything when you hear it and concentrate on listening and conjuring memories associated with the song. For me, that song is "Who'll Stop the Rain?" (Fogerty, 1970) performed by Credence Clearwater Revival. For those of you who have not heard the tune, the rain is a metaphor for the confusions and mysteries of life. Somewhere behind all those rain clouds is the sun, answers to the mysteries of life. Although everyone has been looking for the sun, the singer continues to wonder who'll stop the rain. As you read this, you may be wondering the same about research, the course you are taking, and this book. What you need now is some sun, but all you see is rain. I'll try to provide some sun, although I don't promise to clarify the mysteries of life.

Because you have been involved in public policy, either implementing or developing it, I need not point out how important public policy has been, is, and will be in our lives. I also need not point out that public policies and programs don't always work out the way they should; they often involve unintended consequences, are sometimes more costly than necessary, and occasionally don't do much of anything. In Fogerty's words, public programs can become "five year plans and new deals, wrapped in golden chains." Like noted methodologist Donald CampbelI (1969, 1971), I believe understanding research methods will help you to learn more about public policies, programs, and related topics sufficiently to remove some of those golden chains. In our complex and rapidly changing world, we can no longer afford the luxury of being armchair theorists—of making up explanations as we go—as we search for understanding and try to make the world a better place. We need to use research to sort out various explanations and programs we already have, as well as to point the way to more useful explanations and programs. But incorporating research into policy analysis and implementation must involve more than accepting on faith what "the experts" write. The plethora of dissemination outlets for research reports enables just about anyone to claim to have published a scientific report, often without any review, so we can no longer count on the experts to be, well, experts. We need to become experts ourselves, not in conducting research, but in critically evaluating research done by others so that we can determine whether or not the latest research is any good and is applicable to the public interest problem to which we are devoting our administrative attention.

Therefore, this book is about research: what it is, how to evaluate it, how to tell people about it, and how to use it. It is about trying to find an answer

to the question posed by Bartley, and it is about stopping the rain. As you read further, you will come to realize that research is one of the means by which people avoid making intellectual errors. That is, research is a part of life, a particularly exciting part of life that involves trying to discover the whys and wherefores of the world in which we live. As you read further, you will learn about research. I hope you will also have some fun and maybe, just maybe, you might even find the sun.

Definitions

It is always best to start at the beginning when attempting to learn a new topic, and for research that beginning is a definition of research. Unfortunately, it is not easy to arrive at a single definition of research. Just about everyone who has written about research has offered one or another definition. For example, Nachmias and Nachmias (1981) defined it as "the overall scheme of scientific activities in which scientists engage in order to produce new knowledge" (p. 22). Although research is conducted by scientists, it is also conducted by nonscientists. Of course, scientists and nonscientists tend to do research differently, a difference you will be learning about throughout this book, but that doesn't mean nonscientists necessarily do research poorly. Kerlinger (1973) doesn't restrict research to scientists in his definition, "systematic, controlled, empirical, and critical investigation of hypothetical propositions about the presumed relationships among natural phenomena" (p. 11), but he added other restrictions. Research is not always systematic, and it is not always controlled. The more systematic and controlled research is, the better it is, but even poor research is still research.

I could go on citing other definitions, but that would only end up boring you to tears. When it comes down to what is important, the definition of research is rather simple. **Research** is *a critical process for asking and attempting to answer questions about the world*. Sometimes asking and attempting to answer questions involves a questionnaire, sometimes an interview, sometimes an experiment, and sometimes an entirely different method. Simple definitions, however, can be misleading. There is more to research than its definition, or this would be the last page of the book.

Research, as a critical process, is one of the tools we use to achieve Bartley's state of maximum criticism. We do so not by pointing out only negative qualities of a particular public interest program but by examining all of its qualities—good, bad, or indifferent. Whether the program involves drug

rehabilitation, nutrition for children, educational efficiency, safety and security, or any of the other myriad issues to which public policies are directed, the ultimate subject of our criticism is human behavior, something about which all of us already know a great deal. That knowledge, however, can sometimes get in our way. If, for example, we fail to examine critically some aspect of human behavior because "everyone knows it is true," then we have fallen short of the goal of an empirical approach to policy analysis. Researchers, instead, should be like a little child who continually asks "why?" Of course, we are more sophisticated than little children, but we need to return to research to evaluate the answers we obtain to our questions. As critical questioners, we need not believe every answer we obtain. For that matter, research enables us to ascertain whether or not we have even asked the appropriate question.

One of the appropriate questions we must ask is, simply, "why pay any attention to research?" To answer this, we must make a brief foray into **epistemology**, *the study of the nature of knowledge, of how we know what we know*. In the late 19th century, Charles Peirce (1877) codified the four primary methods we use to decide how we know what we know: (1) a priori method, (2) authority, (3) tradition, and (4) science. As we consider each of the four methods, keep in mind that there are questions that are more amenable to one of these methods than another; no method of knowing is best for all questions.

Also known as logic, intuition, and sometimes faith, the **a priori method** defines knowledge as *anything that appears to make sense, to be reasonable*. There are some advantages to the a priori method, not the least of which is the ease with which we can develop certainty or relieve ourselves of doubt. Thus, Descartes (1637/1993) employed the a priori method to arrive at his famous decision about how he could be certain that he was real, that he (and the rest of us) existed: cogito ergo sum. As you might suspect, developing certainty is also the chief disadvantage of the a priori method; it is all too easy to close enquiry prematurely because we hit upon a reasonable answer. Thus, many people are certain that most medieval people believed the earth was flat (Russell, 1991), some are certain that aliens from outer space have abducted people (Carroll, 2005), and others are certain that the best way to prevent teen pregnancy is by teaching abstinence (O'Donnell et al., 2007). Of course, not all knowledge developed via the a priori method is wrong; the quality of knowledge derived in this way is a function of the quality of the reasoning employed by the individual producing the knowledge.

In the context of epistemology, **authority** involves *believing something because the source of the knowledge is accepted as inherently truthful*. As children, for example, we believed our parents because they said so. Sometimes the belief was correctly placed—stove burners can be hot—and sometimes not—tooth fairies

do not exchange our baby teeth for money or prizes. As adults, we rely on authority as an epistemological method when we accept a physician's diagnosis, or any other expert's conclusion, on the basis of the individual's status as an expert. This can lead to positive outcomes, such as a much-needed prescription for hypertension medication, or it can lead to negative outcomes, such as sterilizing people because they are "mentally defective" (Gejman & Weilbaecher, 2002). When we rely on authority for knowledge, the quality of the knowledge rests upon the quality of the authority.

Tradition involves *believing something because of historical precedent, because it has always been believed*. For example, we tend to eat oysters only in months that include an "r" in the name. The reasoning is sound; warmer weather makes safe storage and transportation more difficult, and bacteria are more plentiful in warmer water (Miliotis & Watkins, 2005), but rapid refrigeration at harvest makes the tradition less important now than it was before such techniques were developed. A very different tradition, shaking hands when meeting someone, may have its roots in demonstrating that one is not capable of holding or reaching for a weapon (Morris, 1971). Such concerns are not as relevant as they once were, but the tradition continues with a very different rationale. We now believe we can determine someone's personality from his or her handshake, and we use that belief to project a desired impression of ourselves (Chaplin, Phillips, Brown, Cianton, & Stein, 2000). We continue to engage in the behavior because "we've always done it that way," and continue to believe knowledge is produced from the tradition, even when the original reasons no longer make sense. Thus, what we know from tradition may be useful but only as long as the original reasons for the tradition are valid.

Science, *the use of systematic, empirical observation to improve theories about phenomena*, enables us to develop knowledge by testing our explanations of the world against what we can observe in the world. For example, we know that training nurses in advanced cardiac life support techniques (ACLS) increases the success of in-hospital cardiopulmonary resuscitation about fourfold (Dane, Russell-Lindgren, Parish, Durham, & Brown, 2000). The researchers systematically compared the resuscitation outcomes of people who had an ACLS-trained nurse call the code with the outcomes of people who had a nurse not yet trained in ACLS discover the patient in distress. Prior to that study, many people believed ACLS training for nurses would benefit patients who required resuscitation, but that explanation was not tested. Unlike other ways of knowing, however, science includes continual testing of explanations. As you will learn in the next chapter, no theory is ever accepted as true, never again to be examined. Similarly, science continues to develop new questions based on obtained answers. For example, other researchers have demonstrated that nurses trained

in ACLS are as capable of leading a resuscitation attempt as are physicians (Gilligan et al., 2005). Thus, while the knowledge we obtain from science is only as good as the data generated from research, the continual generation of data serves to produce an accumulation of knowledge in which misinterpretations of data are corrected instead of perpetuated.

In summary, the four different ways of knowing are equally useful, depending upon the questions being asked and the knowledge desired. Science cannot, for example, determine how we can know we are real, and a priori reasoning cannot determine whether ACLS training for nurses will increase the success rate of resuscitation attempts in hospitals. Science cannot explain why we began to shake hands, but tradition cannot determine whether ACLS-trained nurses can lead a resuscitation attempt as well as physicians. Science is best used to gain knowledge about empirically testable ideas or explanations. That covers an extremely large number of phenomena but does not cover all phenomena. I hope to convince you that science, through empirical research, is an effective way to make decisions about the utility of public service programs.

Table 1.1	A Summary of Epistemological Methods
Method	Process for Establishing Knowledge, Deciding What Is Truthful
A priori	Accepting information because it makes sense or is reasonable through the application either of intuition or deductive logic
Authority	Accepting information because the source is believed to be inherently truthful or knowledgeable
Tradition	Accepting information because it has always been accepted in one's family, government, society, culture, or other socialization unit
Science	Accepting information because it was obtained through systematic, empirical observation

GOALS OF RESEARCH

The ultimate goals of research are to formulate questions about testable phenomena and to find answers to those questions. Nestled within these are other goals toward which researchers strive. No one can ask all of the questions, and no one can find all of the answers to even a single question, so we need to find some way to limit what we attempt to do. The immediate goals of research— exploration, description, prediction, explanation, and action—provide us

with a strategy for figuring out which questions to ask and which answers to attempt to find.

Exploration

Exploratory research involves *an attempt to determine whether or not a phenomenon exists*. It is used to answer questions of the general form, "does X happen?" Exploratory research may be very simple, such as noting whether or not men or women (boys or girls) are more likely to sit toward the front of a classroom. If one or the other gender does sit in front more often, then we may have discovered a social phenomenon that merits further investigation (Okpala, 1996).

Exploratory research may also be very complex, and sometimes the object of exploratory research is the research process itself. For example, Durkheim's (1951/1897) classic study of suicide statistics involved looking for patterns among a variety of different characteristics. Religious denomination was among them, and Durkheim found Protestants were more likely to commit suicide than Catholics. He also found city people, and people living alone, were more likely to commit suicide than were rural people or those living with a family. From such patterns, Durkheim concluded that anomie, a lack of integration into a social network, was one of the major factors leading to suicide. Many social scientists continued to use existing statistics to elaborate Durkheim's initial theory. Durkheim had explored suicide and noted anomie as a major influence, and other researchers attempted to elaborate on his notions.

Jacobs (1967), however, noted that researchers were generally failing to consider another important source of information about suicide, the notes left behind by those who committed the act. His analysis of the content of such notes revealed that many people valued some degree of uncertainty in their lives. Believing that they knew what the future was going to be like—depressing—was extremely uncomfortable for them, and presumably such people preferred the uncertainty of death to the certainty that life would continue to become worse.

Jacobs's research does not replace Durkheim's monumental work, but it does add much to our understanding of suicide. Both researchers explored the same topic, and each arrived at a different answer. Durkheim's answer was anomie; Jacobs's answer was too much certainty. Just as Durkheim's initial exploration opened many new avenues for research, so does Jacobs's exploration. Neither researcher was testing a particular theory, although both researchers eventually arrived at a theoretical framework for their explorations. Neither researcher discovered suicide, but their explorations did lead to discovering systematic aspects of suicide.

Description

Descriptive research involves *examining a phenomenon to characterize it more fully or to differentiate it from other phenomena*. For example, suppose that, based on Okpala (1996), I wanted to investigate the gender differences in seating preferences more fully by defining exactly what is meant by the "front" of the room. I could partition the class into halves, quarters, and so on in order to determine the proportion of each gender in the ever-smaller front sections. Or I might visit different classrooms to determine the extent to which such behavior is related to the type of subject matter, the size of the room, or some other characteristic.

The example above may appear to be a bit innocuous, but meaningful research programs have been initiated with even less impressive beginnings. Munsterberg (1913), for example, began his inquiries into the consistency and accuracy of eyewitness testimony after wondering about his own perceptions following a burglary at his home. He wondered why he thought, and testified, that the burglars had broken through a basement window when they had actually forced open a door. Since he first questioned his own perceptions and began conducting systematic research on the topic, a number of researchers have been investigating eyewitness accuracy and applying their results to courtrooms and other settings (Greenberg & Ruback, 1982; Parker, 1980; Toglia, Read, Ross, & Lindsay, 2007; Wrightsman, 1987). Empirical attempts to describe more comprehensively the limits of eyewitness accuracy have been conducted from the time of Munsterberg's first musings to the present, and they are likely to continue well into the future. Indeed, even the most recent studies on eyewitnesses have some basis in the research Munsterberg conducted at the beginning of the previous century.

Perhaps the most extensive descriptive research is that conducted by the U.S. Bureau of the Census. The goal is to count and describe the characteristics of the entire U.S. population, and the impact of this research is extensive. Billions of dollars in federal, state, and municipal aid shift with the changing population. Congressional districts appear and disappear, and hundreds of researchers rely on these data to assess the representativeness of their own research samples (e.g., Bowen et al., 2004).

Descriptive research captures the flavor of an object or event at the time the data are collected, but that flavor may change over time. The U.S. Census Bureau, for example, repeats its very costly research every 10 years and engages in interim data collection every year (see U.S. Bureau of the Census, 2008). Other research results may change even more rapidly. Research on

unemployment is conducted monthly, and public opinion polls about certain issues may be conducted as often as every day. Research results are not timeless, simply because change is one of the complexities inherent in our world. Thus, descriptive research can be used to examine change by comparing old results with new.

Prediction

Sometimes the goal of research is prediction, *identifying relationships that enable us to speculate about one thing by knowing about some other thing*. While this may seem complicated, it really is not. We all conduct and use **predictive research** every day. We know, for example, about the relationship between hours on a clock and the probability of a certain business being open. Or we understand the relationship between a thermometer reading and the necessity of a coat when going outside. Those who create and use college entrance examinations use research to demonstrate the relationship between the scores on such tests and performance in the first year of college (Camara & Kimmel, 2005) or graduate school (Kuncel, Hezlett, & Ones, 2001). The importance of such predictive research can be inferred from the number of truth-in-testing laws passed by various states in the United States (Lennon, 1982).

Knowing someone's score on a college entrance examination enables us, as a result of predictive research, to speculate about the individual's ability to complete the first year of college. As some colleges and universities have more, or less, difficult curricula, admissions committees use the relationship between first-year performance and test scores to set lower limits for accepting entering students. Of course, there are those who obtain very high scores on such examinations and flunk out in their first year, and those who obtain low scores and do very well. Such exceptions point out that predictive research enables us to speculate, or make informed guesses, but does not lead to absolute certainties.

Explanation

Explanatory research involves *examining a cause-effect relationship between two or more phenomena*. It is used to determine whether or not an explanation (cause-effect relationship) is valid or to determine which of two or more competing explanations is more valid. For example, Sales (1972) used explanatory research to test an explanation derived from Marx's claim that

religion is the opium of the people. If religion is a form of opium (figuratively, of course), then one might expect membership in religious organizations would increase during times of economic hardship. People need opium more when things are bad than when they are good. Previous research, however, evidenced no relationship at all between economic indicators and religious membership.

Sales, after reading that research, noted that the other researchers had not made distinctions among different kinds of religions. He attempted to make distinctions between religions by using the psychological concept of **authoritarianism**. Those high in authoritarianism *submit to authority figures, are ethnocentric, and are preoccupied with strength or power* (Adorno, Frenkel-Brunswick, Levinson, & Sanford, 1950). Even though the concept was originally developed to describe people—a personality construct—Sales applied it to religions and created categories of authoritarian and nonauthoritarian religions. Using various economic indicators and church membership records, Sales was able to demonstrate that membership increased in authoritarian religions but decreased in nonauthoritarian religions during times of economic hardship. Thus, the overall effect was no change in religious membership, just what previous researchers had found, but the overall lack of relationship masked an important difference among religions. Authoritarian religions are more likely to provide definite prescriptions for living, and such prescriptions are consistent with the "opium" notion to which Marx was referring in his theory.

Sales's results do not prove that Marxist theory is correct, but the theory can be offered as a possible explanation of his results. As you will discover time and time again, it is not possible to prove that a theory is correct. However, Sales's use of psychological, sociological, and economic concepts was fruitful, and his research provides us with a better understanding of, and an interesting way to study, phenomena such as the increased popularity of fundamentalist religions and similar organizations during difficult times (Hilton, 1981; Willey, 2002).

Action

Research can also be used to attempt to do something about a particular phenomenon. **Action research** refers to *research conducted to solve a social problem* (Lewin, 1946). Action research can involve any of the previously mentioned goals but adds to such goals the requirement of finding a solution, doing something to improve conditions. For example, Becker and Seligman (1978) noted that many people continue to run their air conditioners even though the outside temperature is lower than the temperature inside their house. To address this problem, Becker

and Seligman conducted an experiment to test potential solutions to this instance of wasted energy. They created four different groups by providing some people with a chart showing them how much energy they were using, other people with a light that flashed whenever the outside temperature was lower than the inside temperature, still other people with both chart and light, and still others with neither chart nor light. They measured the amount of electricity used by each of the four groups and discovered that the charts did not alter people's energy efficiency. The signaling device, however, decreased electricity consumptions by about 16%. Through their action research, they provided a solution to the problem of wasted electricity: a simple signaling device.

There are, of course, a variety of different theories that could be used to explain why the signaling device worked and the charts did not, but testing those theories was not of interest to Becker and Seligman. They did, however, rely on such theories to implement their study. They inferred from other research, for example, that feedback can be used to alter people's behavior, and so they selected two different forms of feedback, charts and flashing lights, as possible solutions to the problem. Action research, in general, is an extremely important aspect of science, for it is through action research that we are able to test applications of other research results. We might all want to make the world a better place, but the complexity of the world requires that we test proposed solutions to problems before applying them on a large scale.

Table 1.2	The Five Goals of Research Expressed as Abstract and as Concrete Questions
Abstract Questions	**Concrete Questions**
Exploration: Does it exist?	Do suicide notes contain any information about people's motivations concerning suicide?
Description: What are its characteristics?	How accurate are eyewitnesses?
Prediction: To what is it related?	Are SAT scores related to first-year GPA in college?
Explanation: What causes it?	Do economic changes cause changes in membership in religious organizations?
Action: Can this be used to solve a problem?	Can feedback about outside temperature be used to help people to conserve energy?

Research goals affect the methods used to complete a research project, and they affect the ways in which we attempt to evaluate, and eventually apply, research. It would not be appropriate to reject research because it did not meet goals it was not designed to meet. We should not, for example, devalue Becker and Seligman's research because they did not explain why flashing lights created more efficient use of energy. Explaining why was not part of their project. We also cannot, in general, apply research results to goals different from the original goals of the research. Sales's research, for example, explored the utility of suicide notes. He discovered suicide notes provide useful information about suicide. However, we would be reaching well beyond the initial goals of the research if we used Sales's results to claim that people commit suicide only because they prefer the uncertainty of death to the certainty of depression. Thus, we need to understand the initial goals of every research project, but understanding the goals is only the beginning of evaluating research.

EVALUATION OF RESEARCH

Before we apply research results, before we accept them as reasonable, we need to be able to know whether or not they are worthwhile. We need to evaluate research results and the methods used to produce them, and we do so critically. Critical evaluation involves noting both positive and negative aspects, the good and the bad. Critical evaluation also involves noting the indifferent and irrelevant, the things to which research is not related.

For those of us who conduct formal research, the need for evaluation is obvious. We have to be able to determine whether or not our research is worthwhile, if for no other reason than to prevent wasting our time. But even if we never conducted any of our own research, we would still need to know how to evaluate research. Whether or not we conduct research, we all use research to help us understand the world around us and to make decisions about how to improve the world while we develop, change, or implement policy. As consumers of research, we need to be able to determine which research project is relevant and which is not. To construct a systematic framework for evaluating research, I have borrowed some familiar questions from journalism: who, what, where, when, how, and why. These questions will be used throughout the remainder of the text, which also allows me to provide a preview of what is to come in subsequent chapters.

Who

The "who" of a research project involves three different questions. These include asking who are the researchers, the participants, and the consumers. The answers, of course, vary from project to project, and all have something to do with how one evaluates the project.

Asking about the researchers involves more than simply discovering their names. What we really want to know is something about the characteristics of the researchers, their competence and their biases. We presume researchers are competent until we learn otherwise, but once we learn otherwise, we tend to be unwilling to consider their research seriously. For example, I know of no one willing to place a great deal of faith in research conducted by Sir Cyril Burt in light of his fraudulent research on intelligence (Hearnshaw, 1979). Few things arouse the ire of researchers more than fraudulent research reports. Because research reports are the major source of information about research, and because they serve as the basis for evaluating research, they must be as accurate as possible. Outright fraud is extremely rare, but even the most competent researchers are susceptible to biases.

Researchers' biases affect the direction of their research, just as our own biases affect the manner in which we evaluate our own and others' research. We would not be too surprised to learn, for example, that a longtime believer in extrasensory perception conducted a study that supported its existence. We might, however, be more likely to accept the same results if the study was conducted by a known critic of extrasensory perception. There is no reason to believe that one or the other researcher is any better, but we tend to believe people more when they are presenting a position counter to their known beliefs (Dane, 1988a). Whether or not we agree with the biases of other researchers, we must be aware of them and of our own biases and be sensitive to their influence in the evaluation process.

Participants in a research project are also an important consideration in the evaluation of research. Suppose we were interested in studying how jurors arrived at their verdicts in a criminal trial. It might not be particularly useful to ask college students to decide on a verdict, simply because college students are not similar to the majority of people who serve on juries (Ellison & Buckhout, 1981; Kerr & Bray, 1982; Simon, 1975). On the other hand, if we happen to be using a trial setting to investigate how people make decisions, then it would be reasonable to ask students to decide about a portion of trial evidence. There is no reason to suspect that students make decisions differently than anyone else makes decisions. Simply determining who the participants are

is not sufficient. Critical evaluation involves assessing the fit between the purpose of the research and the participants involved in it.

Sometimes, records about people, organizations, programs, or other objects are the participants in research. The data source in Jacobs's (1967) study was suicide notes, not the people who wrote them. We would not expect those writing such notes to have had an interest in the outcome of the research, but self-presentation, concern for the impression one makes upon others, may be an important aspect of any research project. Participants, or those creating records that may be used for research, have a tendency to want to make themselves look good. Even people who write suicide notes expect someone to read them, and the extent to which self-presentation plays a role in the research project should always be assessed.

The intended consumers of research also play a role in one's ability to evaluate a project. Researchers tend to write their reports for other researchers as opposed to the general public. They often use jargon that they expect readers to understand. At this point, the phrase "a 2 × 2 factorial design" probably doesn't mean much to you, but it denotes a specific research design. The design carries with it a variety of assumptions, implications, and techniques, all of which would be very time-consuming, not to mention boring, to describe every time someone wrote about it. Inability to understand jargon makes it difficult to evaluate research, which is one of the reasons for the glossary in this text.

On the other hand, too much jargon makes it difficult for anyone except another expert to understand the report. Although publicity and political differences were probably the primary motives, misinterpretation of procedures and conclusions contributed to Wisconsin Senator Proxmire's creation of the Golden Fleece Awards in the 1970s (Baron, 1980). Sometimes, consumers may want to limit research. Shaver (1981, 1982), for example, noted the Reagan administration's budget restrictions on social science research were politically motivated. Many of the budget cuts directly affected research designed to assess the impact of the administration's economic programs. Similarly, a nonscientist member of George W. Bush's administration altered scientific reports on global warming and greenhouse gases (Revkin, 2005). Sensitivity to the consumers of research is a necessary part of the evaluation process, including noting the absence of research.

What

The "what" of research concerns the topic as well as the theory on which the research is based. Theory includes the overall **worldview**, *the basic set of*

untestable assumptions underlying all theory and research. It should be obvious that different research topics require different methods. Attempting to interview people who have committed suicide is ridiculous, not to mention macabre. On the other hand, an interview or survey is entirely appropriate for a project dealing with energy use. What may not be so obvious is that different questions about the same research topic may require different methods. If researchers are interested in perceptions about electricity use, interviews may be just what they need to use. But if they are interested in actual electricity use, then they might do as Becker and Seligman (1978) did and read meters instead of asking people how much electricity they used.

Through the theory they use as they derive their research questions, researchers also affect the manner in which they conduct the research. Sales (1972), for example, specifically tested Marxist theory, so he included economic conditions, one of the major components of Marxist theory, as one of his research measures. If he instead was interested in theories about psychological depression, he probably would have used some sort of depression scale and ignored economic indicators. Both economics and depression may be related to membership in a religious organization (Jenkins, 2003), but which gets included in a single research project is determined by the theory from which the research question is derived. The evaluation of research involves assessing whether or not what is included in research is appropriate to the theory on which it is based.

Beyond the level of theory, worldview also plays an important role in research. Kamin (1974) pointed out that researchers were willing to accept the notion that men and women did not differ in intelligence, and so those developing intelligence tests generally excluded from intelligence tests items that produced gender differences. They were not, however, so willing to accept the notion that racial and ethnic minorities were as intelligent as themselves. Thus, early measures of intelligence did not exhibit a gender bias but did exhibit a number of racial and ethnic biases. Political beliefs may also affect the topic one selects for research (Frank, 1981).

Worldviews also affect the way in which research results are interpreted. A current example is the debate between those favoring the creationist (including intelligent design) and evolutionist explanations of the origin of our planet and the humans who inhabit it (Durant, 1985; Poling & Evans, 2004). I am simplifying the issues considerably, but it is fair to note that the followers of each worldview base their conclusions (more or less) on the same data, the physical world. The creationists conclude that the world is about 10,000 years old, and that it and humans result from divine intervention. They reject the scientific methods used to obtain data that are not consistent with their beliefs. Evolutionists conclude the earth is billions of years old, that humans evolved from other species, and they

reject untestable, theistic events as valid sources of data. Evolutionists do not accept what is written in religious documents as scientific evidence, and creationists do not accept the scientific data produced by evolutionists. Clearly, worldviews affect the conclusions as well as evaluations of research in this debate, just as worldviews affect evaluations of all research.

Where

The "where" of research includes the physical and social environment in which the research was conducted. Certain conditions are possible in one setting but not in another, and some settings do not allow certain types of research to be conducted at all. We cannot, for example, legally study jury deliberations in any systematic fashion by recording what occurs in the deliberation room, although some researchers have been able to do so under extraordinary circumstances (Devine, Clayton, Dunford, Seying, & Pryce, 2001; Ellison & Buckhout, 1981; Simon, 1975). Similarly, we cannot ethically examine reactions to an emergency by shouting "fire" in a theater. On the other hand, we can study simulations of juries, as well as simulations of emergencies. Bringing trials or emergencies into a research laboratory may introduce an element of artificiality, but artificiality alone is not grounds for devaluing a research project. Just as it is with other evaluation questions, it is necessary to engage in critical assessment of the relationship between the physical setting and the research goals.

The influence of the social environment may include very general aspects of the society as well as cultural biases. Someone doing research in a country without a jury system, Japan for example, might never decide to use a jury simulation to study group decision making. Similarly, the belief in the United States and Canada that beauty was in the eye of the beholder kept social scientists from systematically studying the effects of physical attractiveness until the 1960s. The first few studies about physical attractiveness, however, blew that belief right out of the water. After decades of research and its attendant publicity, few of us have any trouble responding to a question that begins with "On a scale from 1 to 10, how attractive is . . . ?" and even fewer of us doubt our rating will agree with those of many others (Adams, 1977; Rhodes, Halberstadt, Jeffery, & Palermo, 2005).

When

The time frame of a particular study may, of course, alter its utility, but it can also be the major purpose of the study. Science operates on the basis of

cumulative knowledge most of the time (see, e.g., Fleck, 1979). Each bit of information is supposed to add to what is already available. The results of a particular study may be extremely valuable at one point in time but may only bring a yawn after years of research on the topic. Demonstrating, for example, that social class exists in the United States might well bring a yawn, and perhaps questions about why one is wasting time on such trivial research. On the other hand, a demonstration that social class no longer exists in the United States would arouse considerable excitement and disagreement. Research should not occur in a vacuum but should be placed in a context of the existing information about the research topic.

Changes in conditions over time may themselves be the focus of research, particularly with respect to whether or not a particular social program is still needed. Similarly, the passage of time may have an impact on research. For example, in a study involving **deception**, *providing false information about the research project*, the longer the study lasts the more likely it is that the deception is no longer feasible. If a study involves an interview, an extremely long interview may lead to fatigue or boredom, affecting the responses of the participants or the interviewer's ability to record responses accurately. Of course, the explanation is not time, per se, but changes in other conditions that occur with the passage of time. Nevertheless, the context of a research project and its length must be considered a part of a critical evaluation of the project.

Why

We have already dealt with many of the reasons why research is done. To the goals already mentioned—exploration, description, prediction, explanation, and action—we can add contracts and curiosity to the list of whys that affect research.

Contract research is conducted because someone hires a researcher specifically for the purpose of conducting the research. The Pepsi Taste Challenge is an example, although not necessarily a representative one. Research firms were hired to conduct the taste tests, but the results belonged to Pepsi. (I've often wondered whether or not the results would have been released had they not favored Pepsi, but I think I know the answer.) The primary consumers of contract research are those who pay the bills, and they have considerably greater impact than most researcher consumers. In contract research, the consumer, rather than the contracted researcher, typically has control over the research process and almost always has control over the release of the results. In some cases, the exact methodology of the study may be kept secret, in which case it is impossible to evaluate the research critically. Nevertheless, the fact that

research was contracted by a specific organization does not, per se, mean that the research is inherently faulty.

When research is conducted only to satisfy someone's curiosity, critical evaluation is also rather difficult. On the other hand, only the researcher needs to evaluate curiosity-motivated research that is not made public. Sometimes, however, such research is also of interest to others, and the researcher ends up publishing the research in one form or another. In such cases, the research should be evaluated as critically as any other research.

How

The goals of research affect its methods, and so we turn to some of those methods as a way to preview the remainder of this text. The design and procedures are likely to be the most critically evaluated aspects of research and so deserve the greatest amount of attention.

The "hows" of research range from the manner in which one obtains an idea to the ways in which one writes about the research results, and understanding each of these is useful in our attempts to consume research conducted by others. Nestled between these two activities are issues concerning ethics, design, data analyses, and interpretations. In addition, there are many aspects of research that may or may not be relevant to a particular research project. Scale construction and obtaining large, representative samples are just two examples of such aspects.

Like most of life, research can be extremely boring if you only read about it with no particular purpose in mind. Although you may not be able to apply everything discussed in this text, you can think about the relevancy of various topics to your public policy interests throughout the text. As you continue to read, think about how you might use the information you are reading in your current position or your intended profession. Imagination cannot replace activity, but imagination is better than nothing. At some point, and I hope it is soon, you may be in a position to prepare a research-based policy paper. If you have thought about it ahead of time, you'll be able to take advantage of the opportunity.

CONDUCTING A RESEARCH REVIEW

The relationship between research and theory is an extremely strong one. Research results are always placed in the context of existing theory, and existing theory provides a framework for new ideas about what to research. There

is no official starting point in this relationship, but I have chosen to begin the discussion of how to review research with choosing a topic.

Choosing a Topic

The first step in conducting a research review is to choose a topic. There are no rules for this step, but there are some general guidelines. Sources for research topics are infinite, for anything may stimulate a research question. Indeed, anyone can come up with any number of research questions, but the trick to conducting a research review is to develop a good question, one that is likely to have been addressed by researchers. Recognizing and formulating a researchable, empirical question takes a little practice and requires some under-standing of research methods, but one does not have to be an expert in research methodology to begin the process. Perhaps the most important suggestion that can be made about deciding upon a question upon which to base your review is to limit your questions to topics that are particularly interesting to you. I can think of no more boring task than reviewing research on a topic in which I have no interest.

You may be assigned a topic for review by a supervisor who wants empirical information on a specific policy or program. Barring such an assignment, how-ever, you need to consider various sources for information about potential review topics. One excellent source is the policy manual for your place of employment. Page through the manual until you find a section on an interesting topic. Read the section and think about questions you would like to ask the author of the policy manual or think about reasons why the policy might have been developed; either will provide you with a starting point for a research review. If there are references in the manual, use them to gather more information about the topic and the research related to it. Another good source for research topics is a research jour-nal. Choose a journal relevant to your discipline or scope of activities and scan the table of contents until you find a topic of particular interest. Read the article to find out what issues and questions are being addressed. Again, think about ques-tions you would like to ask the author if you had the opportunity.

In addition to policy manuals and journals, take the time to ask coworkers or supervisors about their own questions about policy or administrative issues. If one or more of their interests coincide with yours, you have yet another source of information, but do not ask him or her to do your work for you. Discovering the policy interests of colleagues is always a good idea, but dis-covering interests and asking for major input into your own work are two very different things.

Once you have developed a question, regardless of its source, you have begun the research review process. The next step is to become familiar with your topic. This point may seem too obvious to bother making, but more than a few reviewers have begun amassing sources only to discover that they were woefully unprepared to interpret those sources. If your review involves a formal theory, read about the theory and its related research. If your interests are not tied directly to a formal theory, reading about issues related to your interests is likely to result in some familiarity with the applicable formal theory. Remember that, explicitly or implicitly, all research is based on one or more theories.

Operationalization

Once you have chosen a topic and become familiar with a theory related to it, the next step is to consider the range of **operational definitions**—*concrete representations of abstract theoretical concepts*—that could be related to your interests. Heat is a theoretical concept, for example, and the number of units on a thermometer is one operational definition of it. Sales (1972) operationalized one component of Marxist theory, "opium" or the reduction of stress, in terms of membership in a religious denomination. The operational definition of a concept is not the same as the concept itself, but it does represent the concept. A score on an intelligence test, for example, is not the same thing as intelligence. Campbell (1969) coined the term **definitional operationism** to refer to *the failure to recognize the difference between a theoretical concept and its operational definition*. Leahey (1980) used the phrase "myth of operationism" to label the same problem. Theoretical concepts must have operational definitions before we can do any research related to the theory, and we need to maintain the distinction between a concept and its operationalization. You will need to consider the variety of different ways in which the policy concepts of interest to you can be operationalized, or made concrete, through research. You do not have to know all of the possible operational definitions of concepts in which you are interested, but it helps to consider some of them before beginning your research review. Operational definitions can be extremely useful as key words in a search.

When you have an operational definition of a concept, it is called a **variable**— *a measurable entity that exhibits more than one level or value*. A thermometer reading is a variable, for it is measurable and it exhibits more than one level. Similarly, Sales's use of religious denomination is a variable; it is measurable and could be either authoritarian or nonauthoritarian. Other examples of

variables include a score on an intelligence test, a rating of 1 to 10 on a scale of physical attractiveness, words related to depression in suicide notes, and the presence or absence of a gun in an eyewitness situation. Variables need not be numeric, but they must vary; there must be more than one level, at least the presence or absence of some quality.

Once you have some operational definitions for the theoretical concepts of interest, you will soon understand how those variables are used to form **hypotheses**—*statements that are used to describe a relationship between variables*. An hypothesis is a concrete statement analogous to an abstract relationship described in a theory. Sales tested the hypothesis that economic hardship and religious membership are related; worsening economic conditions should be accompanied by increased membership in authoritarian, but not in nonauthoritarian, religious denominations.

You may recognize the phrase "reverse psychology," the name used to describe the attempt to induce someone to behave in a manner that is contrary to suggestion. Brehm (1966) proposed reactance theory to explain this phenomenon. Briefly, **reactance** refers to *the proposition that whenever someone's perceived freedom is threatened, the person is motivated to reassert that freedom*. The salesperson who tells you that several other people are interested in the last remaining item, for example, may be trying to threaten your freedom to purchase the item in hopes of motivating you to reassert that freedom by purchasing it immediately. When a freedom is completely eliminated, reasserting that freedom involves increasing the attractiveness of something that represents the freedom. If you need a particular journal article for a paper and cannot find it, the importance of the article increases as you search for it. If you discover that it is permanently lost, you may even decide that it is no longer possible to complete the paper.

Mazis (1975) conducted a test of reactance theory by capitalizing on a serendipitous opportunity. The Dade County (Florida) authorities outlawed the sale, possession, or use of cleaning products containing phosphates in the early 1970s. When the law was passed, some manufacturers were prepared and were immediately able to sell their brand-name products without phosphates. Other manufacturers were less well prepared, and it was several months before their brand names reappeared on the shelves without phosphates. Mazis compared people who were able to continue using their favorite brand of laundry detergent to those whose favorite brand was temporarily unavailable. According to his research hypothesis, people who could no longer use their favorite brand should exhibit an increase in its perceived value, whereas those who could continue to use their favorite brand should exhibit no change in its

perceived value. The results were consistent with the hypothesis; the temporary elimination of certain brand names was accompanied by an increase in their perceived value, and manufacturers unprepared for the new law actually benefited from it by an increase in customer loyalty to their products. You may not be interested in reactance theory as a psychological theory, but you may be interested in reactance theory if a policy change under consideration involves reducing perceived freedoms.

For any particular theory, the number of ways in which a concept may be operationalized is limited only by the imagination of the researcher. We cannot, however, evaluate variables solely on the basis of creativity. You probably would not want your instructor to be creative when operationalizing your knowledge of research methods in terms of your body temperature and award the highest grades to the most feverish students. This may be a creative approach, but it is not valid. **Validity**, in general, refers to *the extent to which a claim or conclusion is based on sound logic.* There are many specific kinds of validity in research, and we will eventually discuss all of them, but the relevant validity here is **construct validity,** *the accuracy with which a variable represents a theoretical concept*. Validity, including construct validity, is assessed through consensus.

If you agree with Sales's use of authoritarian versus nonauthoritarian religious denominations as a variable representing Marx's concept of "opium," then you consider it to be a valid variable. If you agree with the logic Mazis used to represent a threatened freedom with a banned laundry detergent, then Mazis's variable is valid. The consensus of science is not merely popularity—it is based on logic derived from the theory—but it is agreement. Sometimes, however, the popularity of a particular variable leads to its misuse as an operational definition. Deutsch (1980), for example, commented that extensive use of games, particularly the Prisoner's Dilemma, as an operationalization of conflict was "mindless—being done because a convenient experimental format was readily available" (p. 63). The mere existence of a valid operational definition is not sufficient reason to use it in research or to use it in a review of research; whatever research variables you include in your review should be based on a logical analysis of the theory, policy, or issue to be addressed in your research question.

By the time you have an interesting research question, have found an applicable theory, policy, or program for your question, and have (at least temporarily) decided upon some operational definitions, you have become intimately involved in the cyclical practice of science (see Figure 1.1).

Figure 1.1   The Cyclical Nature of the Practice of Science
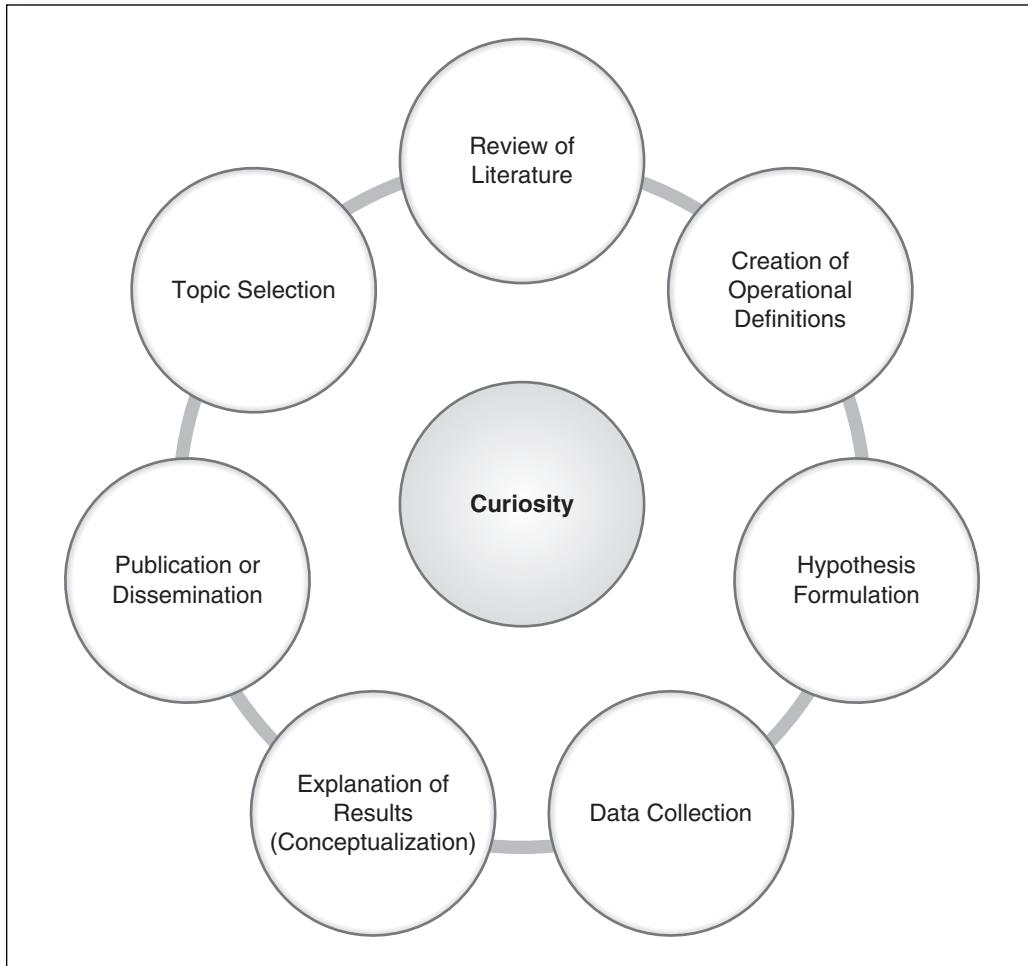
FINDING RESEARCH

Before one can use research to inform public policy decisions, one has to be able to find research reports, what researchers refer to as "the literature." Despite use of the definite article, there is no one, single literature; instead **literature** is *the generic term used to refer to any collection of articles, chapters, and books*

that are relevant to a particular topic. Knowing that "the literature" is out there, somewhere, is a beginning, but is not much help if one doesn't know where to look to find it. In this section, we will examine how to find sources.

Published Sources

Some of the best, as well as some of the most overlooked, sources for literature are introductory textbooks. They contain a great deal of information, some of which you may have forgotten since you took an introductory course, and the good ones have many pages of references. Granted, the information is usually discussed at a superficial—introductory—level, but there is usually enough information to decide whether or not a particular theory or empirical study could be related to your policy interests. Once you have identified relevant information, you can use the reference section to determine where to find the original article, chapter, or book.

Other good sources for published material are general content journals, such as *Journal of Policy Analysis and Management, Education Policy Analysis Archives,* or *Journal of Comparative Policy Analysis: Research and Practice.* These journals include material on a variety of policies and research topics, and they usually include a combination of theoretical and empirical articles. If you page through these journals, or more likely, scan their tables of contents online, you are likely to find a fair amount of information related to your policy interests. You can also peruse somewhat more specialized journals, such as those in psychology, education, political science, social work, or whatever discipline might be closely aligned with your policy interests. Your library maintains a list of the periodicals it holds, and it can usually be searched online by subject or title. The list will provide the call numbers that enable you to locate current and back issues of the journal in the library or URLs for online access.

Journals are not the only sources for relevant literature, although they are likely to be the major sources. Every year, Annual Review, Inc. publishes a series of volumes, titled *Annual Review of . . . ,* for most of the major disciplines dealing with human behavior. Other review series, often titled *Advances in . . .* can be found by perusing the library's electronic card catalog by title.

Electronic card catalogs are also useful for locating professional and trade books on specific topics. Some of these books present new theories, and others may be edited volumes that review a variety of different but related research programs. You might also want to locate and peruse the American Library Association's *Guide to Reference Books* (Balay, 1996), which contains a list of

reference volumes on almost any subject you can imagine. Don't let the 1996 copyright date deter you from using it; annual supplements keep it current.

Finally, the bookshelves of willing faculty may be one of the best starting points for your search. When you ask them for potential sources on a topic, be as specific as you can. For example, I would not know what to suggest to someone who wanted information about the general topic of jury decisions; there are too many places to begin. You need to have given your policy issue some thought and narrowed the topic before someone else can provide useful suggestions about specific books.

Skimming through new issues of journals or annual series is one way to develop your research idea and to find information related to it. Indeed, you have probably taken enough courses to have a good idea about which journals or series are likely prospects for perusal. Let us move on, then, to some very specific tactics for tracking down information you have decided you need.

Key Topics

One of the best tactics for locating relevant literature is searching for specific topics. Once again, textbooks are a great starting point. A glance at the table of contents and the index will let you know whether or not there is anything in the book that is relevant to your policy issue.

When you know some of the key topics relevant to your research idea, there are even faster methods for locating related literature. You are probably familiar with a few indexing or abstracting services available through your library's search databases, such as ProQuest, a compilation of empirical journals, newspapers, general magazines, and other publications, all of which can be searched via one or more keywords. ProQuest covers a wide range of topics, and the articles contained in it reflect such general coverage. You will need to pay close attention to the types of articles that are generated from any search you conduct.

In 1964, the U.S. Office of Education established the Educational Resource Information Center (ERIC), which is currently maintained by the National Institute of Education. ERIC is an indexing and abstracting service, available electronically through most libraries, that deals specifically with research on educational topics. Although originally established to reference only educational topics, ERIC now indexes an increasingly wider range of topics related to human behavior. With a little creative use of synonyms for topics of interest, you should have little difficulty using it.

Another, somewhat specialized indexing and abstracting service is PsycINFO, which is searchable via preselected keywords as well as everyday

words that might appear in abstracts, titles, and the like. Like psychology, just about every discipline has a searchable database of articles. Which databases are available through your library will depend upon the extent of the subscription services. It is not possible for me to describe, or even list, all of the available indexes, nor would it do much good for me to try to guess which, in print or on computer, your library might have. The easiest way to find out what is available to you is to talk to one of the reference librarians.

I have not provided very many details about how to use any of the indexes or abstracts because it is much better to find out from a person rather than a textbook. Local options vary so much on most computerized indexes, even if it is officially the same index, that my telling you about how my library's index works could be a waste of time. It is worth your effort to get the information from your local reference librarian. I have been assured that most reference librarians really do enjoy showing people how to use the services they offer. One reference librarian likened it to showing off one's favorite toys. Another said that reference librarians enjoy talking about their reference services almost as much as professors enjoy talking about their research—now that's enjoyment.

Key Authors

In almost all but the newest areas of research, there are likely to be key researchers—people whose names are known and who do a great deal of writing in the field. Milgram is a key researcher in obedience, Baron in aggression, and so on. If you have exhausted your key topics or cannot think of any key topics, one way to continue your literature search is by examining the work of key authors. You may discover key authors from perusing textbooks or general journals or by reading whatever material you were able to discover through a key topic search.

Chances are, however, that the research of key authors will be dated, just as the research by Milgram and Baron is relatively old by research standards. You may have to go back several years in a journal before noticing the regular appearance of any individual. After you have a key author's name, however, you can use the index issue of more recent journals to determine whether or not the author has published in that journal for the volume(s) included in the index issue. The index issue is usually the last issue in a given volume or the last issue of the calendar year. Alternately, you can use the search databases available through your library to search for articles by a particular author. Don't be surprised to find that most authors publish in a

variety of areas—Milgram did not limit his research only to obedience—so expect to find unrelated articles as well as related articles.

Of course, the farther back in time you have to go to find a key author, the more likely it is that the author is no longer researching in the topic in which you are interested. Milgram, for example, is no longer alive and so is obviously not currently publishing on the topic of obedience. But, as you pay attention to the authors of studies, you will begin to see a pattern of coauthors, which, over time, may help you track down the most recent articles. Even if one or more of your key authors is no longer publishing on your topic, pursuing a particular author may lead you to a key study.

Key Studies

Sooner or later in your search you will find an article that seems perfectly related to your policy issue—a key article. Once you have found them, key articles are one of the most effective bases for a comprehensive literature search. The reference section of the key study will list relevant research reports that were published before the key study was published. Consulting those references provides the means for discovering related research in the relative past.

Key articles are a great find, but I can imagine you asking "What if my key article is ten years old?" If you have found the key article through an electronic database, you can use the key terms listed for that article to discover additional articles related to the same key terms. This helps you to overcome the problem associated with any differences between the specific key terms used by the database organizers and the key terms you think they should have used when organizing the database. If it is available through your library, you also can use the *Social Science Citation Index* (SSCI). The Citation Index portion of this reference tool enables you to find related articles published after your key article.

The Citation Index consists of a list of key articles arranged alphabetically by the first author's last name. Under each key article entry is a list of additional articles, each of which included the key article in the reference section or in a footnote. Because the author(s) of the listed article included the key article in its references, you are almost guaranteed that the listed article is in some way related to your key article. By locating and reading the articles listed under one or more of your key articles, and by systematically tracking down those articles in the Citation Index, you can very quickly bring yourself up to

date on research related to your key article, even if the initial key article you used was 20 years old.

Unpublished Studies

Not all of the empirical and theoretical work related to your policy issue idea can be found in published sources. One reason is that books and journals are subject to a publication lag. The author obviously wrote the material before it was published and collected the data before the article was written. Even after an article or book is accepted for publication, it will not appear in print for at least four months, and sometimes it may take as long as two years to appear in print. Thus, there will always be research more recent than that contained in any given published article. Unfortunately, as a beginner in research you will have to accept this limitation; checking the most recent issues of appropriate journals is about as current as you can get. After you have been consuming research for a while, you will become acquainted with others who do research in the same field. Talking to your professional colleagues is about the only way to find out how to access prepublication copies of the very latest research.

Some of the references you obtain in your search will be found in either *Dissertation Abstracts International* or *Masters Abstracts International*. These publications contain abstracts of doctoral dissertations and master's theses, respectively, and have indexes through which you can find dissertations and theses related to various topics. In both publications, however, the abstracts are very short, about 300 words, and you will have to write to University Microfilms to get a copy of the entire research report. Before writing, however, check with faculty members; they may already have a copy and may be willing to lend it to you.

Finally, a caution about using the World Wide Web general search engines (e.g., Google, Yahoo, AOL). Using these will certainly produce many hits for almost all key words, and some of these may actually be research articles, but the majority of the material is likely to be more opinion than research. You might be able to find good background information, but you are likely to find more information than you are able to peruse efficiently. For example, a search via Google for the terms "abstinence," "sex," and "education" turned up nearly 700,000 hits, clearly too many to wade through in order to find research on the effectiveness of abstinence-only sex education. Adding "effectiveness" to the list of terms in hopes of reducing the number of hits backfired; the number increased to 2.9 million. In contrast, a search using the same three

terms via ProQuest, after checking the "scholarly article" option, produced only 199 hits, which was reduced to 16 documents by adding "effectiveness" to the search terms. Sixteen documents, one of which turned out to be a key article, were much easier to peruse than 2.9 million documents.

Enough reading for now; go develop a topic of interest and search for some research articles.

SUMMARY

- Research can be defined in many ways, the most general of which is a process through which questions are asked and answered systematically. As a form of criticism, research can include the question of whether or not we are asking the right question.
- The ultimate goal of research is to be able to answer the questions asked. However, exploration, description, prediction, explanation, and action are different ways to ask the same question.
- Exploration involves attempting to determine whether or not a particular phenomenon exists.
- Description involves attempting to define a phenomenon more carefully, including distinguishing between it and other phenomena.
- Prediction involves examining the relationship between two things so as to be able to make educated guesses about one by knowing something about the other.
- Explanation also involves examining the relationship between two things but specifically involves trying to determine whether or not one causes the other.
- Action involves using research to attempt to solve a social problem. Action research may involve any of the other goals of research, but it includes a specific application.
- Evaluating research involves the questions who, what, where, when, how, and why. Researchers, participants, and consumers of research may all affect the outcome of the research, as well as the manner in which the outcome is interpreted.
- The topic, theory, and worldview on which research is based are also involved in evaluating research critically, as are the physical location of the research and the social climate in which it is conducted.
- Research results are not timeless, mainly because the world itself is dynamic. Changes in research results, however, can themselves become the focus of research.

- Contract research often requires special consideration of the potential impact of those contracting the research. Similarly, research conducted for the sake of personal curiosity is rarely evaluated as critically as scientific research. However, all research that becomes public should be subjected to equally stringent evaluation and criticism.
- Searching for research reports is best done through search engines designed for scholarly publications. Using key terms, key authors, and key articles, as well as textbooks, should provide you with a comprehensive set of reports, the literature related to the policy or program in which you are interested.

EXERCISES

1. Obtain a popular-press report (newspaper, magazine, blog, etc.) about a public policy and determine whether the information in the report is based on a priori reasoning, appeal to authority, tradition, or scientific content. (Note: there may be a mixture of types of epistemological methods represented in any given report.)

2. Obtain a popular-press report containing reference to scientific research. Decide what kind of purpose is attributed to the research. (Ideally, choose a report that contains enough information about the research so that you can later track down the article[s] on which the report is based.)

3. Using a new popular-press report or one you used in the other exercises, answer as many of the who-what-where-when-how-why questions as possible.

4. Identify a public policy in which you are interested and use the resources in your library to track down at least two empirical (research) articles that are relevant to that policy.