



# *Introduction*

## CHAPTER OUTLINE

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### THINKING LIKE A RESEARCHER

Evaluating Research Findings Reported in the Media  
Getting Started Doing Research

### SCIENCE IN CONTEXT

Historical Context  
Social and Cultural Context  
Moral Context

## THINKING LIKE A RESEARCHER

Let's get right down to work. Consider the following headlines drawn from local newspapers and decide what kinds of evidence you think are implied by each statement.

- 1 A man from California is suspected of arson in the recent school fire.
- 2 Chicago police arrested a company vice president for embezzling \$250,000.
- 3 A couple from Dubuque were arraigned in court today on a charge of parental neglect.
- 4 A reclusive woman in upstate New York was convicted of manslaughter in the case involving the death of her neighbor.

The specific evidence in these four cases would likely vary because the alleged crimes vary from arson to manslaughter. In addition, the evidence implied in the four statements would likely vary systematically on another dimension. The quality and the extent of the evidence required to *convict* a person of a crime, as in the fourth statement, are greater than those required for each of the first three statements. For instance, a person might be suspected of a crime based on the personal opinion of an investigator and might be arrested based on circumstantial evidence. For arraignment and conviction, however, more definitive evidence such as physical evidence is often necessary. The "tightest" cases involve converging evidence from a variety of sources. Even in cases that result in conviction, we recognize that our conclusion is based on a decision that is "beyond a reasonable doubt." The legal system strives for truth, but certainty is often beyond its grasp.

Having examined a set of statements in the context of legal cases, we turn now to a second set of statements. Again, consider the statements and decide what kinds of evidence you think are implied by each statement.

- 1 In a survey of U.S. adults, 96% of married people reported they had been faithful to their spouse during the past year.
- 2 Research has shown that whether a teen begins to smoke is more related to whether the teen's friends smoke than to whether the teen's parents smoke.
- 3 Experimental research demonstrates that writing about emotional experiences associated with beginning college (compared with superficial writing) causes college students to have better health and academic outcomes.
- 4 Over many replications of the same false-memory experiment, researchers consistently found that about three-fourths of the time participants falsely reported that certain words were presented when, in fact, the words were never presented in the experiment.

You likely noticed that these four statements cover a range of research topics in psychology from marital fidelity to the formation of false memories. The measures that researchers use to gather evidence vary because of the specific area of psychology they are investigating. As you considered the four research statements, you may have noticed that they also varied systematically in terms of the extent and quality of the evidence. Just as legal professionals must have

different types of evidence to suspect and convict a person of a crime, researchers must have different types of evidence to be able to describe behavior and to identify factors that cause a behavior to occur.

As you proceed in your study of research methods, you will find that there are important—and different—scientific principles that apply to obtaining a reliable and accurate estimate of marital fidelity, identifying relationships between peer and parental smoking and a teen’s likelihood of beginning to smoke, and establishing a causal link between writing about emotional experiences and health and academic outcomes for college students. The strongest scientific evidence is akin to the converging evidence needed in a trial to obtain a conviction. For instance, when the same procedure is used to induce false memories in several experiments and comparable results are obtained, our confidence in the conclusion that people can form false memories is increased. Even when researchers have strong evidence for their conclusions from replications of an experiment, they are in a similar situation as juries that have found a person guilty beyond a reasonable doubt. Researchers and juries both seek the truth, but their conclusions are ultimately probabilistic. Certainty is beyond the grasp of both jurors and scientists.

While you were considering the evidence described in the four research statements, you may have found yourself reacting to the findings. Perhaps you were encouraged by the high rate of reported marital fidelity or perhaps you found it hard to believe that marital fidelity could be so high. If so, you are already beginning to think like a researcher. Like detectives and journalists, researchers follow hunches and leads as they seek evidence in support of the theories they are testing. Jurors and researchers also share initial impressions and preconceptions as they evaluate the evidence. But, legal decisions and research conclusions are ultimately supposed to be based on the evidence and not on our subjective judgments. The scientific method can be viewed as a way to constrain our subjective judgment to allow us to draw conclusions based on the evidence.

Researchers use the scientific method to guide their thinking in two general ways. First, researchers use the scientific method to generate knowledge. Once that knowledge is generated, researchers seek to communicate to others what they have found. Thus, a second way researchers rely on the scientific method is to guide their thinking when they evaluate claims reported by other researchers. We began our discussion of the scientific process by drawing an analogy with the way evidence is gathered and decisions are made in our legal system. We can extend that analogy further.

Researchers behave like detectives when they gather evidence and develop a theory about a phenomenon. They act like lawyers when they present a case to the “jury” of the scientific community and “cross-examine” reports of other researchers. Researchers serve as judges when they decide if the evidence meets scientific standards. And they are also like juries who decide if the evidence is warranted “beyond a reasonable [scientific] doubt.”

By learning to think like a researcher you can develop two important sets of skills. The first skill will enable you to learn how to do research so that you can contribute to the science of psychology. The second skill will enable you to become a more effective consumer of scientific findings so that you can make

more informed personal and professional decisions. We will be fleshing out these two aspects of the scientific method throughout the text. We will briefly outline them in this chapter. We will first describe an illustration of why it is important to think like a researcher when evaluating research claims made in the media. We will then describe how researchers get started when they want to gather evidence using the scientific method.

## Evaluating Research Findings Reported in the Media

Researchers in psychology report their findings in professional journals that are available in printed and electronic form. Most people who encounter psychological research findings, however, do so by learning about research findings in the media—on the Internet, in newspapers and magazines, and on radio and TV. Much of this research is worthwhile. Psychological research can help people learn ways to communicate with a relative with Alzheimer's, avoid arguments, or learn how to forgive. Two serious problems can arise, however, when research is reported in the media. The first problem is that the research reported in the media is not always good research. A critical reader needs to sort out the good research from the bad—what are solid findings and which have not yet been confirmed. We must also decide which findings are worth applying in our lives and which require a wait-and-see attitude. It is fair to say that much of the research is not very good given all the different media in which psychological research is reported. So we have good reason to question the research we read or hear about in the media.

A second problem that can arise when scientific research is reported in the media is that “something can be lost in the translation.” Media reports are typically summaries of the original research, and critical aspects of the method, results, or interpretation of the research may be missing in the media summary. The more you learn about the scientific method the better your questions will be for discerning the quality of research reported in the media and for determining the critical information that is lacking in the media report. For now, we can give you a taste of the types of questions you will want to ask by looking at an example of research reported in the media.

A few years ago there was a widely publicized phenomenon called the “Mozart effect.” Headlines such as “Classical Music Good for Babies’ Brains” were common at the time. These headlines caught people’s attention, especially the attention of new parents. Media reports indicated that parents were playing classical music to infants in the hope of raising their children’s intelligence. One million new mothers were given a free CD called “Smart Symphonies” along with free infant formula. Clearly the distributors and many new parents were persuaded that the Mozart effect was real.

The idea that listening to music might raise the intelligence scores of newborns is an intriguing idea. When you encounter intriguing ideas in the media such as this one, a good first step is to *go to the original source in which the research was reported*. In this case the original article was reported in a respectable journal, *Nature*. Rauscher, Shaw, and Ky (1993) described an experiment in which a single group of college students listened to a 10-minute Mozart piece, sat in

silence for 10 minutes, or listened to relaxation instructions for 10 minutes before taking a spatial reasoning test. Performance was better after listening to Mozart than in the other two conditions, but the effect disappeared after a 10- to 15-minute period.

A million women were being encouraged to play “smart symphonies” for their infants on the basis of an effect demonstrated on a very specific type of reasoning test with college students and the effect lasted 15 minutes at most! Although some studies with children were done, the ambiguous results of all the research studies indicate that something had been lost in the “translation” (by the media) from the original research reports to the widespread application of the Mozart effect. People who are skeptical enough to ask questions when they read reports of research in the media and knowledgeable enough to read research in the original sources are less likely to be misinformed. Your job is to be skeptical; our job is to provide the knowledge in this text to allow you to read critically original sources that report research findings.

## Getting Started Doing Research

As you begin learning about how researchers in psychology gather evidence, we will pass along advice from several expert researchers about one of the most fundamental aspects of research—getting started. We will organize this section around three questions that researchers ask themselves as they begin a research project:

- What should I study?
- How do I develop a hypothesis to test in my research?
- Is my research question a good one?

There are many decisions that must be made before beginning to do research in psychology. The first one, of course, is what to study. Ask yourself, “In what area of psychology do I want to do research?” Many students approach the field of psychology with interests in psychopathology and issues associated with mental health. Others are intrigued with the puzzles surrounding human cognition, such as memory, problem solving, and decision making. Still others are interested in problems of developmental and social psychology. Psychology provides a smorgasbord of research possibilities to explore, as is illustrated by the literally hundreds of scientific journals that publish the results of psychological research. You can quickly find information about the many research areas within psychology by reviewing the contents of a standard introductory psychology textbook. More specific information can be found, of course, in the many classes offered by the psychology department of your college or university, such as abnormal psychology, cognitive psychology, and social psychology.

The next decision is a bit harder. As researchers get started, they ask themselves, “How do I come up with a research hypothesis?” McGuire (1997) identified 49 simple rules (“heuristics”) for generating a hypothesis to be tested scientifically. We can not review all 49 suggestions here, but we can give you some insight into McGuire’s thinking about scientific thinking by listing some

of these heuristics. He suggests, for example, that we might generate a hypothesis for a research study by:

- thinking about deviations (oddities, exceptions) from a general trend or principle;
- imagining how we would behave in a task or faced with a specific problem;
- considering similar problems whose solution is known;
- making sustained, deliberate observations of a person or phenomenon (e.g., performing a “case study”);
- generating counterexamples for an obvious conclusion about behavior;
- borrowing ideas or theories from other disciplines.

No matter how or where you begin to develop a hypothesis for your research, at some point you will need to explore the published literature of psychological research. There are several reasons why you must search the psychology literature before beginning to do research. One obvious reason is that the answer to your research question may already be there. Someone else may have entertained the same question and provided an answer, or at least a partial one. It is very likely that you will discover research findings that are related to your research question. Finding that other people have done research on the same or similar idea affirms the importance of your idea. Doing research without a careful examination of what is already known may be interesting or fun (it certainly may be easy); perhaps you could call it a “hobby,” but we can’t call it science. *Science is a cumulative affair—current research builds on previous research.*

Once you have identified a body of literature related to your research idea, your reading may lead you to discover inconsistencies or contradictions in the published research. You may also find that the research findings are limited in terms of the nature of the participants studied or the circumstances under which the research was done, or that there is a psychological theory in need of testing. Having made such a discovery, you have found a solid research lead, a path to follow.

When reading the psychological literature and thinking about possible research questions, you might also consider how the results of psychological studies might be applied to societal problems. As you learn how to do research in psychology, you may consider ways this knowledge can be used to generate research that will make humankind just a little better off.

Searching the psychology literature is not the tedious task that it once was; computer-aided literature searches, including use of the Internet, have made identifying psychological research a relatively easy, even exciting task. In Chapter 14 of this book, we outline how to search the psychology literature, including ways to use computer databases for your search.

Finally, as Sternberg (1997) points out, choosing a question to investigate should not be taken lightly. Some questions are simply not worth asking because their answers offer no hope of advancing the science of psychology. The questions are, in a word, meaningless, or at best, trivial. The best way to avoid asking trivial questions is to ask yourself: “How do I know if my research question is a good one?” Sternberg (1997) suggests that students new to the field of

psychological research consider several questions before deciding they have a good research question:

- Why might this question be scientifically important?
- What is the scope of this question?
- What are likely outcomes if I carry out this research project?
- To what extent will psychological science be advanced by knowing the answer to this question?
- Why would anyone be interested in the results obtained by asking this question?

As you begin the research process, finding answers to these questions may require guidance from research advisors and others who have successfully conducted their own research. We also hope that your ability to answer these questions will be enhanced as you learn more about theory and research in psychology, and as you read about the many examples of interesting and meaningful psychological research that we describe in this book.

Of course, identifying a research problem doesn't necessarily tell you how to do the research. What is it exactly that you want to know? Answering this question will mean that you must make other decisions as well. As a researcher, you will ask yourself questions such as, "Should I do a qualitative or quantitative research study? What is the nature of the variables I wish to investigate? How do I find reliable and valid measures of behavior? What is the research method best suited to my research question? What kinds of statistical analyses will be needed? Do the methods I choose meet accepted moral and ethical standards?"

A major goal of this book is to provide you with the knowledge and conceptual tools that will help you make these decisions and many others associated with the research process. We will describe essential characteristics of the scientific method—the foundation of research in psychology in Chapter 2. We now want to consider the broader contexts in which the scientific method is carried out.

## SCIENCE IN CONTEXT

The scientific method is an abstract concept. Science itself, though, is very much a human activity. Human activities are influenced heavily by the context in which they occur and scientific activity is no exception. At least three contexts play a critical role in influencing science: historical context, social-cultural context, and moral context. We will briefly describe each of these contexts in turn.

### Historical Context

We don't really know exactly when psychology first became an independent discipline. Psychology emerged gradually, with roots in the thinking of Aristotle (Keller, 1937), in the writings of later philosophers such as Descartes and Locke, and later, in the work of early 19th-century physiologists and physicists. The official beginning of psychology is often marked as occurring in 1879 when Wilhelm Wundt established a formal psychology laboratory in Leipzig, Germany.

Psychology has changed significantly since its beginnings. Wundt and his colleagues were primarily interested in questions of sensation and perception—for instance, visual illusions and imagery. In the early 20th century, psychology in the United States was heavily influenced by a behaviorist approach introduced by John B. Watson. Psychological theories focused on learning and psychologists relied mostly on experiments with animals to test their theories. Behaviorism was the dominant perspective in psychology well into the middle of the 20th century. By the time Ulric Neisser's book, *Cognitive Psychology*, was published in 1967, psychology had returned to an interest in mental processes. Cognitive psychologists also returned to the use of reaction time experiments that were used in early psychology laboratories to investigate the nature of cognitive processes. The cognitive perspective is still dominant in psychology, and cognition recently has been a major topic within the field of neuroscience as investigators study the biology of the mind. There is great potential for the development of psychology in the early 21st century.

These broad trends in the historical development of psychology, from behaviorism to cognitive neuroscience, represent the “bigger picture” of what happened in psychology in the 20th century. A closer look, however, reveals the myriad topics investigated in the science of psychology. Psychologists today do research in such general areas as clinical, social, organizational, counseling, physiological, cognitive, educational, developmental, and health psychology. Investigations in all of these areas help us to understand the complexity of behavior and mental processes.

Science in general—and psychology in particular—has changed because of the brilliant ideas of exceptional individuals. The ideas of Galileo, Darwin, and Einstein not only changed the way scientists viewed their disciplines; their ideas changed the way people understand themselves and their world. Science, and even self-understanding, also changes in less dramatic ways that are the result of the cumulative efforts of many individuals. One way to describe these more gradual changes is by describing the growth of the profession of psychology. The American Psychological Association (APA) was formed in 1892. The APA had only a few dozen members in its first year; in 1992, when the APA celebrated its 100th birthday, there were approximately 70,000 members. Promotion of psychological research is a concern of the APA as well as the American Psychological Society (APS). APS was formed in 1988 to emphasize scientific issues in psychology. APA and APS both sponsor annual conventions, which psychologists attend to learn about the most recent developments in their fields; each organization also publishes scientific journals in order to communicate the latest research findings to its members and to society in general.

You can become part of psychology's history in the making. Both APA and APS encourage student affiliation, which provides educational and research opportunities for both undergraduate and graduate psychology students. Information about joining APA and APS as a regular member or as a student affiliate can be obtained by consulting their World Wide Web pages on the Internet at:

(APA) <http://www.apa.org>

(APS) <http://www.psychologicalscience.org>

Both the APA and APS websites provide news about important recent psychological research findings, information about psychology publications (including relatively low-cost student subscription rates for major psychology journals), and links to many psychology organizations. Take a look!

## Social and Cultural Context

Science is influenced not only by its historical context but also by the prevailing social and cultural context. This prevailing context is sometimes referred to as the *zeitgeist*—spirit of the times. The social and cultural context can influence what researchers choose to study, the resources available to support their research, and society's acceptance of their findings. Researchers have developed new research programs because of an increasing emphasis in society on women's issues (and because of increasing numbers of women doing research). Researchers are investigating impediments to women's advancement in corporate organizations (the glass ceiling), the interplay and spillover between work and family for dual career couples, and the effects of the availability of quality child care on productivity in the workforce and on the development of children. Social and cultural attitudes can affect not only what researchers study but how they choose to do their research. Society's attitude toward bilingualism, for instance, can affect whether researchers emphasize *problems* that arise for children in bilingual education or the *benefits* that children gain from bilingual education.

In the summer of his first year in office, President George W. Bush issued an executive order allowing federal funding for stem cell research only when the stem cells were obtained from 60 existing stem cell cultures. Competing social values heavily influenced this decision about allocating resources to support research. Some lobbied against stem cell research in an effort to protect the human status of the embryo while others lobbied in favor of stem cell research because of its potential as a cure for currently incurable diseases such as Parkinson's disease. Social and cultural values can also affect how people react to reported findings from psychological research. Reports of research on controversial topics such as sexual orientation, recovered memories of childhood sexual abuse, and televised violence receive more media attention because of the public's interest in these issues. At times, however, this greater interest engenders public debate about the interpretation of the findings and the implications of the findings for social policy. Public reaction can be extreme as illustrated by the response to an article on child sexual abuse published in *Psychological Bulletin* (Rind et al., 1998). The U.S. House of Representatives responded to negative media attention by passing unanimously a resolution of censure of the research reported in this article.

Psychologists' sensitivity to societal needs is one reason why psychology has not developed strictly as a laboratory science. Although laboratory investigation remains at the heart of psychological inquiry, psychologists and other behavioral scientists do research in schools, clinics, businesses, hospitals, and other nonlaboratory settings, including the Internet. For example, social psychologists Greenwald, Banaji, Nosek, and Bhaskar have established an Internet site for demonstrating the implicit association test they use to measure people's

attitudes in their research on social cognition and discrimination. People who visit the site also have the option to participate in ongoing research projects [<http://buster.cs.yale.edu/implicit/index.html>].

Social and cultural values can also influence the practices of psychologists and other mental health professionals. Panksepp (1998) reported that the prevalence of attention deficit and hyperactivity disorder (ADHD) among children was no more than 1% when it was first diagnosed in 1902. More than 5% of children were diagnosed with ADHD in 1990, and Panksepp estimated that as many as 15% of children (about 8 million) could be diagnosed with ADHD by the year 2000. There are several possible reasons for this increase. More children may, in fact, have the disorder now than previously. Or, the number of children with ADHD has remained constant, but our ability to diagnose the disorder may have improved such that we are better able to identify children with ADHD. Or, as Panksepp (1998) suggests, the diagnostic trend may “be emerging from our changing social structure and mores” (p. 91). Psychological research and its application exist in a reciprocal relationship with society; research has an effect on and is affected by society.

If we acknowledge that science is influenced by social and cultural values, a question still remains as to whose culture is having—and whose culture should have—an influence (Figure 1.1). A potential problem occurs when we attempt to understand the behavior of individuals in a *different* culture through the framework or views of our *own* culture. This potential source of bias is called ethnocentrism. As an example of ethnocentrism, let’s consider the controversy concerning theories of moral development. In his six-stage theory of moral development, Kohlberg (1981, 1984) identified the highest stage of moral development (postconventional morality) as one in which individuals make moral decisions based on their self-defined ethical principles and their recognition of individual rights. Research evidence suggests that Kohlberg’s theory provides a good description of moral development for American and European males—cultures emphasizing individualism. In contrast, people who live in cultures that emphasize collectivism, such as communal societies in China or Papua, New Guinea, do not fit Kohlberg’s description. Collectivist cultures value the well-being of the community over that of the individual. We would be demonstrating ethnocentrism if we were to use Kohlberg’s theory to declare that individuals from such collectivist cultures were less morally developed. We would be interpreting their behavior through an inappropriate cultural lens, namely, individualism. Cross-cultural research is one way to help us avoid studying only one dominant culture and to remind us that we need to be careful to use cultural lenses beyond our own in our research.

## **Moral Context**

Science is a search for truth. Individual scientists and the collective enterprise of science need to ensure that the moral context in which scientific activity takes place meets the highest of standards. Fraud, lies, and misrepresentations should play no part in a scientific investigation. But science is also a human

**FIGURE 1.1** By removing our cultural lenses, we gain new ideas for research topics that investigate (a) strengths in aging, (b) abilities rather than disabilities, and (c) nurturing fathers and career mothers.



endeavor, and frequently much more is at stake than truth. Both scientists and the institutions that hire them compete for rewards in a game with jobs, money, and reputations on the line. The number of scientific publications authored by a university faculty member, for instance, is usually a major factor influencing decisions regarding professional advancement through promotion and tenure. Under these circumstances, there are unfortunate, but seemingly inevitable, cases of scientific misconduct.

A variety of activities constitute violations of scientific integrity. They include data fabrication, plagiarism, selective reporting of research findings, failure to acknowledge individuals who made significant contributions to the research, misuse of research funds, and unethical treatment of humans or animals (see Adler, 1991). Some transgressions are easier to detect than others. Out-and-out fabrication of data, for instance, can be revealed when, in the normal course of

science, results are not able to be reproduced by independent researchers, or when logical inconsistencies appear in published reports. However, more subtle transgressions, such as reporting only data that meet expectations or misleading reports of results, are difficult to detect. The dividing line between intentional misconduct and simply bad science is also not always clear.

To educate researchers about the proper conduct of science, and to help guide them around the many ethical pitfalls that are present, most scientific organizations have adopted formal codes of ethics. In Chapter 3 we will introduce you to the APA ethical principles governing research with humans and animals. As you will see, ethical dilemmas often arise. Consider research by Heath and Davidson (1988) who asked groups of university women to help prepare a new rape-prevention pamphlet. However, the researchers did not actually intend to produce a new rape-prevention pamphlet. Participants in this research were deceived regarding the true purpose of the study: to investigate how perceived controllability of rape influences women's perceptions of vulnerability to rape. Under what conditions should researchers be allowed to deceive research participants?

Deception is just one of many ethical issues that researchers must confront. As yet another illustration of ethical concerns, consider that animal subjects sometimes are used to help understand human psychopathology. This may mean exposing animal subjects to stressful and even painful conditions. Again, we must ask about the ethical issues involved with this type of research. Under what conditions should research with animal subjects be permitted? The list of ethical questions raised by psychological research is a lengthy one. Thus, it is of the utmost importance that you become familiar with the APA ethical principles and their application at an early stage in your research career, and that you participate (as research participant, assistant, or principal investigator) only in research that meets the highest standards of scientific integrity. Our hope is that your study of research methods will allow you to do good research and to discern what research is good to do.

### QUESTIONS FOR DISCUSSION

- 1 Consider times you have heard or read media reports about psychological research, or look through a current newspaper or magazine in search of articles about psychology.
  - a What reasons would you give another person as to why they shouldn't accept uncritically the results of psychological research as it is reported in the news media (e.g., television, magazines)?
  - b Do you remember ever being skeptical after reading or hearing about a research finding in the media? Why were you skeptical? What type of information could have been provided that would have made you less skeptical?
- 2 What research topics in psychology interest you? What are some questions you have about behavior and mental processes? To get started, fill in the blank to this statement: I have often wondered why \_\_\_\_\_.

- a** What hypothesis can you form about your topic?
  - b** Consider the ways your cultural background influences your choice of topic and the hypothesis you developed. How might your topic or hypothesis differ if viewed from a different cultural lens?
- 3** What research topics and theories are currently popular among psychologists? You may want to page through some psychology journals or interview some of your psychology instructors.
  - a** How might our current social and cultural context be related to the prominence of these research topics?
  - b** To what extent could ethnocentrism play a role in the prominence of these research topics?