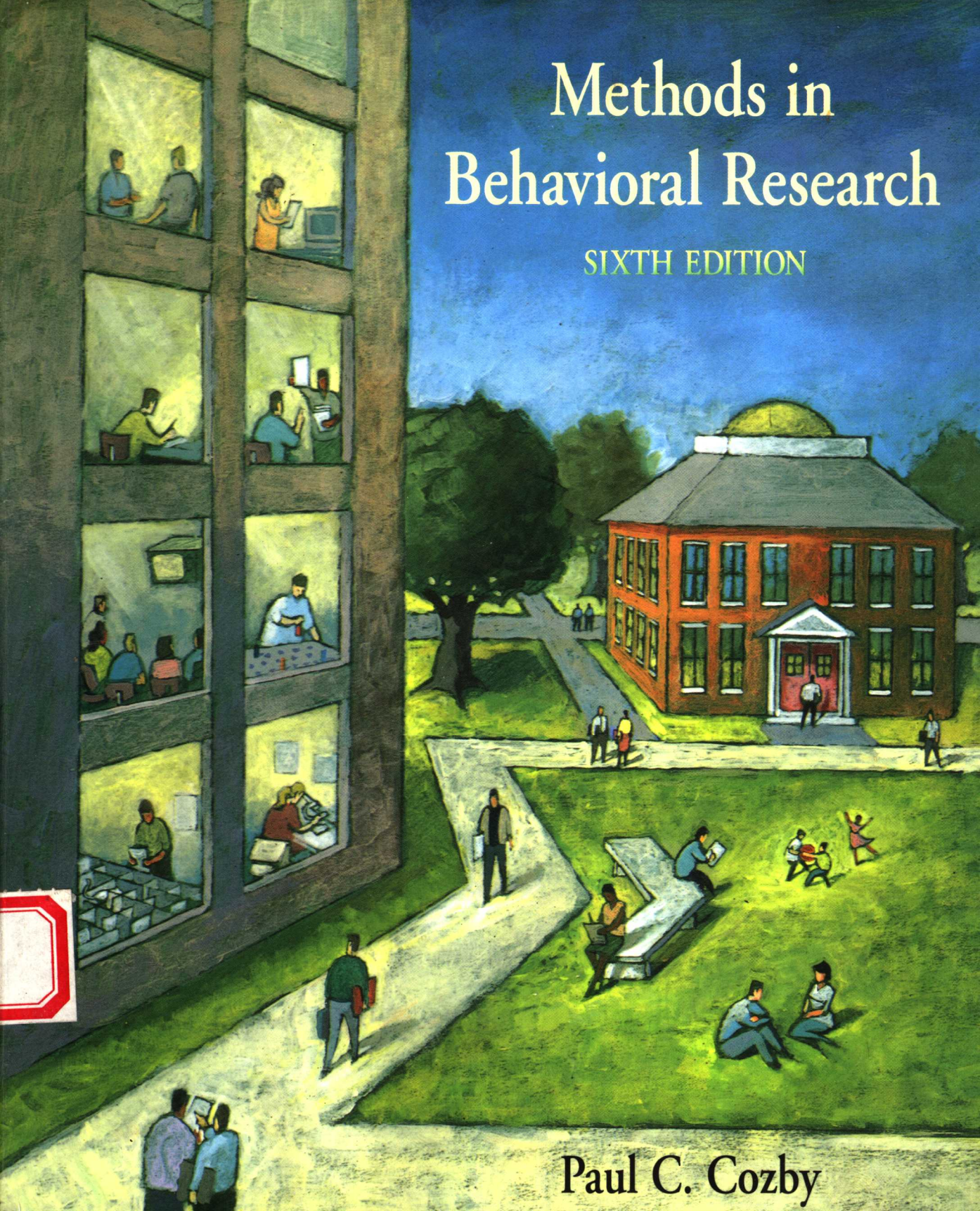

Methods in Behavioral Research

SIXTH EDITION

Paul C. Cozby

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Preface

Teaching and learning about research methods is both challenging and a great deal of fun. This new edition of *Methods in Behavioral Research* has benefited from the input of many instructors and students who have used previous editions. Clear communication of concepts to students is my highest priority. I have tried to present material clearly, use interesting examples, and mention the same concepts at numerous points throughout the text. An outline precedes each chapter; study terms and review and activity questions appear at the end of each chapter. Important terms are boldfaced in the text; and the Glossary defines these terms. The Instructor's Manual contains many student activities and homework assignments, as well as exam questions.

ORGANIZATION

The organization generally follows the sequence of planning and conducting a research investigation. However, the chapters are relatively independent to provide instructors maximum flexibility in assigning the order of chapters. Chapter 1 gives an overview of the scientific approach to knowledge and distinguishes between basic and applied research. Chapter 2 discusses sources of ideas for research and exploration of library resources. Chapter 3 focuses on issues of research ethics, a concept that is stressed here and throughout the text. Chapter 4 examines psychological variables, reliability and validity of measures, relationships among variables, and the distinction between correlational and experimental methods. Chapter 5 contains a description of both quantitative and qualitative approaches to describing behavior, including naturalistic observation, case studies, archival research, and surveys. Chapters 6 and 7 present the basics of designing and conducting experiments. Complex experimental designs and the special issues raised by the use of quasi-experimental and single-subject designs are described in Chapters 8 and 9. Chapters 10 and 11 focus on the use of statistics to understand the results of research. Finally, Chapter 12 discusses generalization issues and emphasizes the importance of replications. Appendices on writing research reports, analyzing data, and constructing Latin Squares are included as well.

CHANGES IN THIS EDITION

This edition incorporates a number of changes suggested by instructors and students who have used the previous editions. The coverage of ethical research is now earlier, in Chapter 3. Coverage of some topics has been rearranged to make assignment of topics easier for instructors. For example, quasi-experimental and single-subject designs are now combined in Chapter 9. Descriptive statistics and correlation are discussed together in Chapter 10, and inferential statistics are covered separately in Chapter 11.

I am always interested in comments and suggestions from students and instructors who are using the text. My postal address is Department of Psychology, California State University, Fullerton, CA 92834; my e-mail address is *cozby@fullerton.edu*.

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Many individuals helped to produce this and the previous editions of this book. A special note of thanks is due to Claire Palmerino, Jeanne King, Gregory Robinson, Heidi Weller, David Perkins, and Dan Kee for their help in developing the book and the Instructor's Manual. Frank Graham at Mayfield Publishing Company has been an invaluable resource. Thanks go to Tom Briggs for editing the manuscript and Robin Lockwood for production management. Most importantly, I thank the many students and instructors who have sent suggestions, and I particularly thank the following individuals who provided detailed reviews of this edition: Kellina M. Craig, University of Illinois; Leslie E. Fisher, Cleveland State University; Monica Harris, University of Kentucky; Howard S. Hock, Florida Atlantic University; Linda Petty, Hampton University; and Harold Sigall, University of Maryland.

Contents

CHAPTER

1

Scientific Understanding of Behavior

What are the causes of aggression and violence? How do we remember things, what causes us to forget, and how can memories be improved? What are the effects of stressful environments on health and social interactions? How do early childhood experiences affect later development? Curiosity about questions such as these is probably the most important reason that many students decide to take courses in the behavioral sciences. Scientific research provides us with a means of addressing such questions and providing answers. In this book, we will examine the methods of scientific research in the behavioral sciences. In this introductory chapter, we will focus on ways in which a knowledge of research methods can be useful in understanding the world around us. Further, we will review the characteristics of a scientific approach to the study of behavior and the general types of research questions that concern behavioral scientists.

USES OF RESEARCH METHODS

A knowledge of research methods is increasingly needed by informed citizens in our society. Daily newspapers, general-interest magazines, and other media are continually reporting research results: "Type A Personalities More Likely to Suffer from Heart Attacks" or "Smoking Linked to Poor Grades." Articles and books make claims about the beneficial or harmful effects of particular diets or vitamins on one's sex life, personality, or health. Survey results are frequently reported that draw conclusions about how we feel about a variety of topics. How do you evaluate such reports? Do you simply accept the findings because they are supposed to be scientific? A background in research methods will help you to read these reports critically, evaluate the methods employed, and decide if the conclusions are reasonable.

Many occupations require the use of research findings. For example, mental health professionals must make decisions about treatment methods, assignment of patients to different types of facilities, medications, and testing procedures. Such decisions are made on the basis of research; to make good decisions, the mental health professional must be able to read the research conducted by others and judge its adequacy and relevance for the particular setting in which he or she works. Similarly, people who work in business environments frequently rely on research to make decisions about marketing strategies, ways of improving employee productivity and morale, and methods of selecting and training new employees. Educators must keep up with research on topics such as the effectiveness of different teaching strategies or programs to deal with special student problems. Knowledge of research methods and the ability to evaluate research reports are useful in many fields.

It is also important to recognize that scientific research has become increasingly important in public policy decisions. Legislators and political leaders at all levels of government frequently take political positions and propose legislation based on research findings. Research may also influence judi-

cial decisions. A prime example of this is the *Social Science Brief* that was prepared by psychologists and accepted as evidence in the landmark 1954 case of *Brown v. Board of Education*, in which the U.S. Supreme Court banned school segregation in the United States. One of the studies cited in the brief was conducted by Clark and Clark (1947). The study found that when allowed to choose between light-skinned and dark-skinned dolls, both black and white children preferred to play with the light-skinned dolls (see Stephan, 1983, for a further discussion of the implications of this study). More recently, legislation and public opinion regarding the availability of pornographic materials have been informed by behavioral research investigations of this topic (see, for example, Koop, 1987; Linz, Donnerstein, & Penrod, 1987), and psychological research on sex stereotyping greatly influenced the outcome of a Supreme Court decision on sex discrimination by employers (Fiske, Bersoff, Borgida, Deaux, & Heilman, 1991). Research is also important when developing and assessing the effectiveness of pilot programs designed to achieve certain goals —for example, to increase retention of students in school or to influence people to engage in behaviors that reduce their risk of contracting AIDS. If successful, such programs may be implemented on a large scale. The fact that so many policy decisions and political positions are based on research makes knowledge of research methods particularly important for all of us as informed citizens who must ultimately evaluate the policies at the voting booth.

THE SCIENTIFIC APPROACH

We opened this chapter with several questions about human behavior and suggested that scientific research is a valuable means of answering them. How does the scientific approach differ from other ways of learning about behavior? People have always observed the world around them and sought explanations for what they see and experience. However, instead of using a scientific approach, many people rely on intuition and authority as ways of knowing.

The limitations of intuition and authority

Intuition Most of us know of a married couple who, after years of trying to conceive, adopts a child. Then, within a very short period of time, the couple finds that the woman is pregnant. This observation leads to a common belief that adoption increases the likelihood of pregnancy among couples who are having difficulties conceiving a child. Such a conclusion seems intuitively reasonable, and people usually have an explanation for this effect—for example, the adoption reduces a major source of marital stress, and the stress reduction in turn increases the chances of conception (see Gilovich, 1991).

When you rely on intuition, you accept unquestioningly what your own personal judgment tells you about the world. The intuitive approach takes

many forms. Often, it involves finding an explanation for our own behaviors or the behaviors of others. For example, you might develop an explanation for why you keep having conflicts with a co-worker, such as "that other person wants my job" or "having to share a telephone puts us in a conflict situation." Other times, intuition is used to explain intriguing events that you observe, as in the case of concluding that adoption increases the chances of conception among couples having difficulty conceiving a child.

A problem with intuition is that numerous cognitive and motivational biases affect our perceptions, and so we may draw erroneous conclusions about cause and effect (cf. Fiske & Taylor, 1984; Gilovich, 1991; Nisbett & Ross, 1980; Nisbett & Wilson, 1977). Gilovich points out that there is in fact no relationship between adoption and subsequent pregnancy according to scientific research investigations. So why do we hold this belief? Most likely it is because of a cognitive bias called *illusory correlation* that occurs when we focus on two events that stand out and occur together. When an adoption is closely followed by a pregnancy, our attention is drawn to the situation, and we are biased to conclude that there must be a causal connection. Such illusory correlations are also likely to occur when we are highly motivated to believe in the causal relationship. While this is a natural thing for us to do, it is not scientific. A scientific approach requires much more proof before drawing conclusions.

Authority The philosopher Aristotle was concerned with the factors associated with persuasion or attitude change. In his *Rhetoric*, Aristotle describes the relationship between persuasion and credibility: "Persuasion is achieved by the speaker's personal character when the speech is so spoken as to make us think him credible. We believe good men more fully and readily than others." Thus, Aristotle would argue that we are more likely to be persuaded by a speaker who seems prestigious, trustworthy, and respectable than by one who lacks such qualities.

Many of us might accept Aristotle's arguments simply because he is considered a prestigious "authority" and his writings remain important. Similarly, many people are all too ready to accept anything they learn from the news media, books, government officials, or religious figures. They believe that the statements of such authorities must be true. The problem, of course, is that the statements may not be true. The scientific approach rejects the notion that one can accept on faith the statements of any authority; again, more proof is needed before we can draw scientific conclusions.

Skepticism, science, and the empirical approach

The scientific approach to knowledge recognizes that both intuition and authority are sources of ideas about behavior. However, scientists do not unquestioningly accept anyone's intuitions—including their own. Scientists recognize that their ideas are just as likely to be wrong as are anyone else's. Also, scientists do not accept on faith the pronouncements of anyone, regard-

less of that person's prestige or authority. Thus, scientists are very skeptical about what they see and hear. They insist that scientific methods be used to evaluate assertions about the nature of behavior.

The essence of the scientific method is the insistence that all propositions be subjected to an empirical test. This means that the propositions are tested using scientific methods of observation and experimentation. This empirical approach to knowledge has two basic components. First, an idea must be studied under conditions in which it may be either supported or refuted: The empirical test allows the proposition to be shown to be false. Second, the research is done in a way that can be observed, evaluated, and replicated by others.

Thus, the scientific method, in contrast to intuition or authority, does not rely on accepting assertions generated by someone else or on one's own personal perceptions of the world. The scientific method embodies a number of rules for testing ideas through research—ways that observations are made and experiments are designed and conducted. These will be explored throughout the book.

Integrating intuition, skepticism, and authority

The advantage of the scientific approach over other ways of knowing about the world is that it provides an objective set of rules for gathering, evaluating, and reporting information, such that our ideas can be refuted or replicated by others. This does not mean that intuition and authority are not important, however. As noted previously, scientists often rely on intuition and assertions of authorities for ideas for research. Moreover, there is nothing wrong with accepting the assertions of authority as long as we don't accept them as scientific evidence. Often, scientific evidence isn't obtainable—as, for example, when religions ask us to accept certain beliefs on faith. Some beliefs cannot be tested and thus are beyond the realm of science. In contrast, scientific ideas must be testable—there must be some way of verifying or refuting them.

There is also nothing wrong with having opinions or beliefs as long as they are presented simply as opinions or beliefs. However, we should always ask whether the opinion can be tested scientifically or whether scientific evidence exists that relates to the opinion. For example, opinions on whether exposure to television violence increases aggression are only opinions until scientific evidence on the issue is gathered.

As you learn more about scientific methods, you will become increasingly skeptical of the assertions of scientists. You should be aware that scientists often become authorities when they express their ideas. When someone claims to be a scientist, should we be more willing to accept what he or she has to say? The answer depends on whether the scientist has scientific data that support his or her assertions. If there is no such evidence, the scientist is no different from any other authority; if scientific evidence is presented, you will want to evaluate the methods used to gather it. Also, there are many "pseudoscientists," who use scientific terms to substantiate their claims (e.g.,

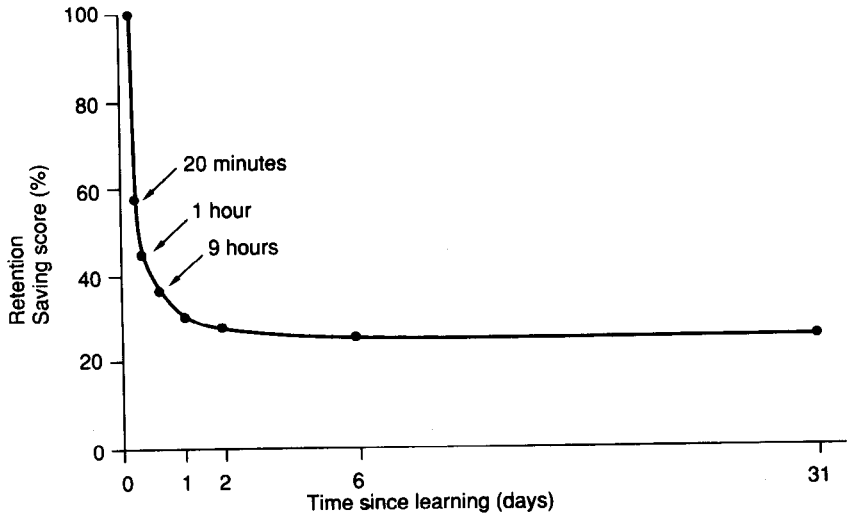

Figure 1-1
Ebbinghaus forgetting curve

astrologers or new age channelers). A general rule is to be highly skeptical whenever someone who is labeled as a scientist makes assertions that are supported by only vague or improbable evidence.

GOALS OF SCIENCE

Scientific research has four general goals: (1) to describe behavior, (2) to predict behavior, (3) to determine the causes of behavior, and (4) to understand or explain behavior.

Description of behavior

The scientist begins with careful observation, because the first goal of science is to describe events. In a classic experiment conducted in the late 19th century, experimental psychologist Hermann Ebbinghaus carefully observed his own rate of forgetting material after it had been learned. He studied the amount of retention of material (actually, nonsense syllables like *TAV*) at periods ranging from 20 minutes to 31 days after the original learning. His results produced the "forgetting curve" shown in Figure 1-1 (see Schwartz, 1986). Many questions that interest researchers concern describing the ways in which events are systematically related to one another. Does greater speaker credibility lead to greater attitude change? In what ways do intellectual abilities change throughout the life cycle? Does noise affect performance on cognitive tasks?