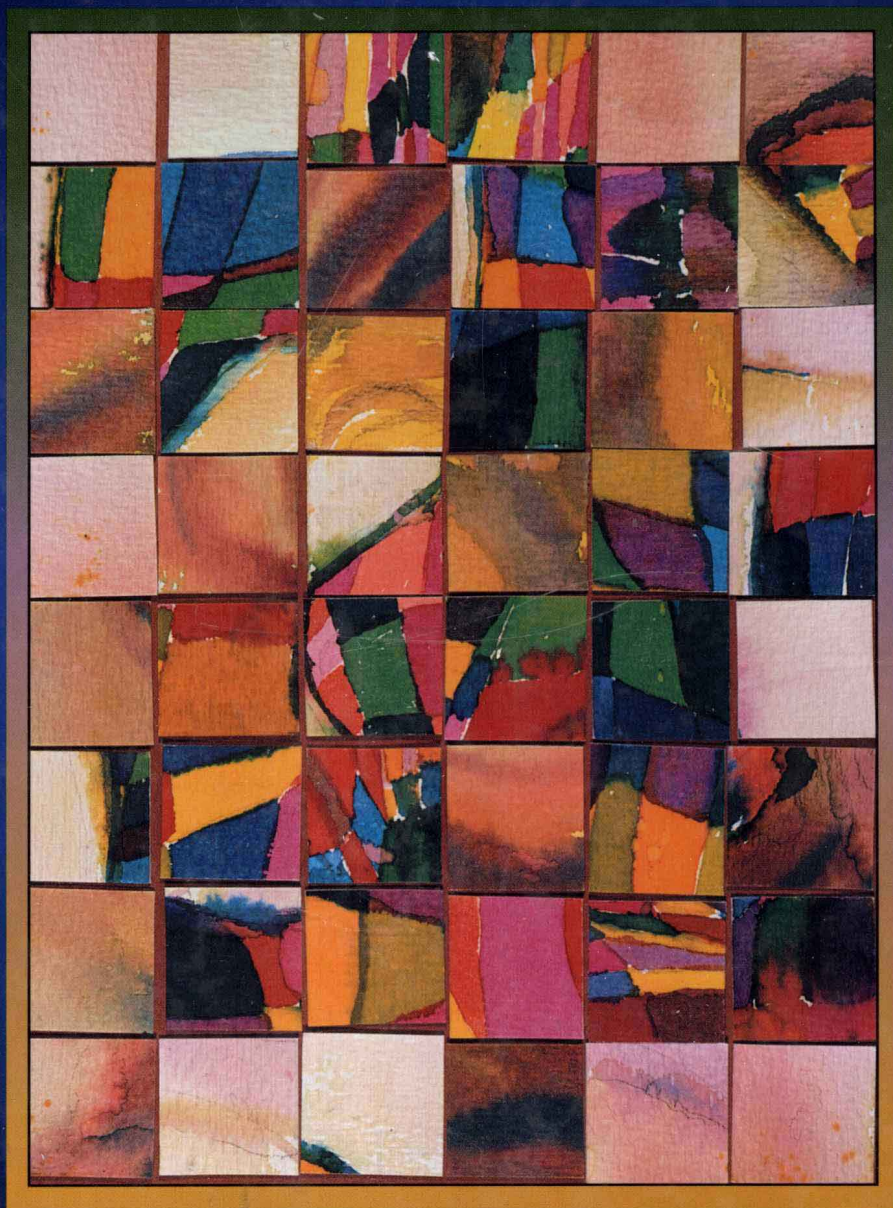


THIRD EDITION

*Introduction to*  
BEHAVIORAL RESEARCH METHODS



MARK R. LEARY

THIRD EDITION

# Introduction to Behavioral Research Methods

**Mark R. Leary**

*Wake Forest University*

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# P R E F A C E

Regardless of how good a particular class is, the students' enthusiasm for the course material is rarely, if ever, as great as the professor's. No matter how interesting the material, how motivated the students, or how skillful the professor, those who take a course are seldom as enthralled with the content as those who teach it. We've all taken courses in which an animated, nearly zealous professor faced a classroom of only mildly interested students.

In departments founded on the principles of behavioral science—psychology, communication, human development, education, marketing, social work, and the like—this discrepancy in student and faculty interest is perhaps most pronounced in courses that deal with research design and analysis. On one hand, the faculty members who teach courses in research methods are usually quite enthused about research. They typically enjoy the research process. Many have contributed to the research literature in their own areas of expertise, and some are highly regarded researchers within their fields. On the other hand, despite these instructors' best efforts to bring the course alive, students often dread taking methods courses. They find these courses dry and difficult and wonder why such courses are required as part of their curriculum. Thus, the enthused, involved instructor is often confronted by a class of disinterested, even hostile students who begrudge the fact that they must study research methods at all.

These attitudes are understandable. After all, students who choose to study psychology, education, human development, and other areas that rely on behavioral research rarely do so because they are enamored with research. Rather, they either plan to enter a profession in which knowledge of behavior is relevant (such as professional psychology, social work, teaching, or public relations) or are intrinsically interested in the subject matter. Although some students eventually come to appreciate the value of research to behavioral science, the helping professions, and society, others continue to regard it as an unnecessary curricular diversion imposed by misguided academicians. For many students, being required to take courses in methodology and statistics supplants other courses in which they are more interested.

In addition, the concepts, principles, analyses, and ways of thinking central to the study of research methods are new to most students and, thus, require extra effort to comprehend, learn, and retain. Add to that the fact that the topics covered in research methods courses are, on the whole, inherently less interesting than those covered in most other courses in psychology and related fields. If the instructor and textbook authors do not make a special effort to make the material interesting and relevant, students are unlikely to derive much enjoyment from studying research methods.

I wrote *Introduction to Behavioral Research Methods* because, as a teacher and as a researcher, I wanted a book that would help counteract students' natural tendencies

to dislike and shy away from research—a book that would make research methodology as understandable, palatable, useful, and interesting for my students as it was for me. Thus, my primary goal was to write a book that is *readable*. Students should be able to understand most of the material in a book such as this without the course instructor having to serve as an interpreter. Enhancing comprehensibility can be achieved in two ways. The less preferred way is simply to dilute the material by omitting complex topics and by presenting material in a simplified, “dumbed-down” fashion. The alternative that I chose to pursue in this text is to present the material with sufficient elaboration, explanation, and examples to render it understandable. The feedback that I have received on the two previous editions of the book make me optimistic that I have succeeded in my goal to create a rigorous yet readable book.

A second goal was to integrate the various topics covered in the book to a greater extent than is done in most methods texts, using the concept of variability as a unifying theme. From the development of a research idea, through measurement issues, to design and analysis, the entire research process is an attempt to understand variability in behavior. Because the concept of variability is woven throughout the research process, I’ve used it as a framework to provide coherence to the various topics in the book. Having taught research methods courses centered around the theme of variability for 20 years, I can attest that students find the unifying theme very useful.

Third, I tried to write a book that is interesting—that presents ideas in an engaging fashion and uses provocative examples of real and hypothetical research. This edition of the book has even more interesting examples of real research, tidbits about the lives of famous researchers, and intriguing controversies that have arisen in behavioral science. Far from being icing on the cake, these features help to enliven the research enterprise. Like most researchers, I am enthusiastic about the research process, and I hope that some of my fervor will be contagious.

Courses in research methods differ widely in the degree to which statistics are incorporated into the course. My personal view is that students’ understanding of research methodology is enhanced by familiarity with basic statistical principles. Without an elementary grasp of statistical concepts, students will find it very difficult to understand the research articles they read. Although this book is decidedly focused on research methodology and design, I’ve sprinkled essential statistical topics throughout the book that emphasize conceptual foundations and provide calculation procedures for a few basic analyses. My goal is to help students understand statistics conceptually without asking them to actually complete the calculations. With a better understanding of what becomes of the data they collect, students should be able to design more thorough and reliable research studies. Furthermore, knowing that instructors differ widely in the degree to which they incorporate statistics into their methods courses, I have made it easy for individual instructors to choose whether students will deal with the calculational aspects of the analyses that appear. For the most part, presentation of statistical calculations are confined to a few within-chapter boxes, Chapters 10 and 11, and Appendix B. These sections may easily be omitted if the instructor prefers.

This edition of *Introduction to Behavioral Research Methods* has benefitted from the feedback I have received from many instructors who have used it in their courses, as well as my experiences of using the previous editions in my own course for over 10 years. In addition to editing the entire text and adding many new examples of real research throughout the book, I have changed the third edition from the previous edition in five primary ways. First, the coverage of measurement has been reorganized and broadened. Following Chapter 3, which deals with basic measurement issues, Chapter 4 now focuses in detail on specific types of measures, including observational, physiological, self-report, and archival measures. Second, a new chapter on descriptive research (Chapter 5) has been added that deals with types of descriptive studies, sampling, and basic descriptive statistics. (This new chapter is a hybrid of Chapters 5 and 6 in the previous edition, along with new material.) Third, the section on regression analysis in Chapter 7 has been expanded; given the prevalence of regression in the published research, I felt that students needed to understand regression in greater detail. Fourth, a new sample manuscript has been included at the end of the chapter on scientific writing (Chapter 15), and this manuscript has been more heavily annotated in terms of APA style than the one in the previous edition. Fifth, at the request of several instructors who have used previous editions of the book, the number of review questions at the end of each chapter has been expanded to increase students' ability to conquer the material and test their own knowledge. I should also mention that an expanded *Instructor's Manual* is available for this edition.

As a teacher, researcher, and author, I know that there will always be some discrepancy between professors' and students' attitudes toward research methods, but I hope that the new edition of this book will help to narrow the gap.

## Acknowledgments

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## CHAPTER

# 1

# Research in the Behavioral Sciences

**The Beginnings of Behavioral Research**  
**Goals of Behavioral Research**  
**The Value of Research to the Student**  
**The Scientific Approach**  
**Behavioral Science and Common Sense**  
**Philosophy of Science**  
**The Role of Theory in Science**  
**Research Hypotheses**

**A Priori Predictions and Post Hoc Explanations**  
**Conceptual and Operational Definitions**  
**Proof and Disproof in Science**  
**Strategies of Behavioral Research**  
**Domains of Behavioral Science**  
**A Preview**

Stop for a moment and imagine, as vividly as you can, a scientist at work. Let your imagination fill in as many details as possible regarding this scene. What does the imagined scientist look like? Where is the person working? What is the scientist doing?

When I asked a group of undergraduate students to imagine a scientist and to tell me what they imagined, their answers were quite intriguing. First, virtually every student said that their imagined scientist was male. This in itself is interesting given that a high percentage of scientists are, of course, women.

Second, most of the students reported that they imagined that the scientist was wearing a white lab coat and working indoors in some kind of laboratory. The details regarding this laboratory differed from student to student, but the lab nearly always contained technical scientific equipment of one kind or another. Some students imagined a chemist, surrounded by substances in test tubes and beakers. Other students thought of a biologist peering into a microscope. Still others conjured up a physicist working with sophisticated electronic equipment. One or two students even imagined an astronomer peering through a telescope. Most interesting to me was the fact that although these students were members of a psychology class (in fact, most were psychology majors), not one of them thought of any kind of a *behavioral scientist* when I asked them to imagine a scientist.

Their responses were probably typical of what most people would say if asked to imagine a scientist. For most people, the prototypic scientist is a man wearing a white lab coat working in a laboratory filled with technical equipment. Most people do not think of psychologists and other behavioral researchers as scientists in the same way that they think of physicists, chemists, and biologists as scientists.

Instead, people tend to think of psychologists primarily in their roles as mental health professionals. If I had asked you to imagine a psychologist, you probably would have thought of a counselor talking with a client about his or her problems. You probably would not have imagined a behavioral researcher, such as a physiological psychologist studying startle responses, a social psychologist conducting an experiment on aggression, or an industrial psychologist interviewing the line supervisors at an automobile assembly plant.

Psychology, however, not only is a profession that promotes human welfare through counseling, education, and other activities, but also is a scientific discipline that studies behavior and mental processes. Just as biologists study living organisms and astronomers study the stars, behavioral scientists conduct research involving behavior and mental processes.

## The Beginnings of Behavioral Research

People have asked questions about the causes of behavior throughout written history. Aristotle (384–322 BCE) is sometimes credited for being the first individual to address systematically basic questions about the nature of human beings and why they behave as they do, and within Western culture this claim may be true. However, more ancient writings from India, including the *Upanishads* and the teachings of Gautama Buddha (563–483 BCE), offer equally sophisticated psychological insights into human thought, emotion, and behavior.

For over two millennia, however, the approach to answering these questions was entirely speculative. People would simply concoct explanations of behavior based on everyday observation, creative insight, or religious doctrine. For many centuries, people who wrote about behavior tended to be philosophers or theologians, and their approach was not scientific. Even so, many of these early insights into behavior were, of course, quite accurate.

However, many of these explanations of behavior were also completely wrong. These early thinkers should not be faulted for having made mistakes, for even modern researchers sometimes draw incorrect conclusions. Unlike behavioral scientists today, however, these early “psychologists” (to use the term loosely) did not rely on scientific research to provide answers about behavior. As a result, they had no way to test the validity of their explanations and, thus, no way to discover whether or not their interpretations were accurate.

Scientific psychology (and behavioral science more broadly) was born during the last quarter of the nineteenth century. Through the influence of early researchers such as Wilhelm Wundt, William James, John Watson, G. Stanley Hall, and others,



people began to realize that basic questions about behavior could be addressed using many of the same methods that were used in more established sciences, such as biology, chemistry, and physics.

Today, more than 100 years later, the work of a few creative scientists has blossomed into a very large enterprise, involving hundreds of thousands of researchers around the world who devote part or all of their working lives to the scientific study of behavior. These include not only research psychologists but also researchers in other disciplines such as education, social work, family studies, communication, management, health and exercise science, marketing, and a number of medical fields (such as nursing, neurology, psychiatry, and geriatrics). What researchers in all of these areas of behavioral science have in common is that they apply scientific methodologies to the study of behavior, thought, and emotion.

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## CONTRIBUTORS TO BEHAVIORAL RESEARCH

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### *Wilhelm Wundt and the Founding of Scientific Psychology*

Wilhelm Wundt (1832–1920) was the first bonafide research psychologist. Most of those before him who were interested in behavior identified themselves primarily as philosophers, theologians, biologists, physicians, or physiologists. Wundt, on the other hand, was the first to view himself as a research psychologist.

Wundt, who was born near Heidelberg, Germany, began studying medicine but switched to physiology after working with Johannes Müller, the leading physiologist of the time. Although his early research was in physiology rather than psychology, Wundt soon became interested in applying the methods of physiology to the study of psychology. In 1874, Wundt published a landmark text, *Principles of Physiological Psychology*, in which he boldly stated his plan to “mark out a new domain of science.”

In 1875, Wundt established one of the first two psychology laboratories in the world at the University of Leipzig. Although it has been customary to cite 1879 as the year in which his lab was founded, Wundt was actually given laboratory space by the university for his laboratory equipment in 1875 (Watson, 1978). William James established a laboratory at Harvard University at about the same time, thus establishing the first psychological laboratory in the United States (Bringmann, 1979).

Beyond establishing the Leipzig laboratory, Wundt made many other contributions to behavioral science. He founded a scientific journal in 1881 for the publication of research in experimental psychology—the first journal to devote more space to psychology than to philosophy. (At the time, psychology was viewed as an area in the study of philosophy.) He also conducted a great deal of research on a variety of psychological processes, including sensation, perception, reaction time, attention, emotion, and introspection. Importantly, he also trained many students who went on to make their own contributions to early psychology: G. Stanley Hall (who founded the American Psychological Association and is considered the founder of child psychology), Lightner Witmer (who established the first psychological clinic), Edward Titchener (who brought Wundt’s ideas to the United States), and Hugo Munsterberg (a pioneer in applied psychology). Also among Wundt’s students was James