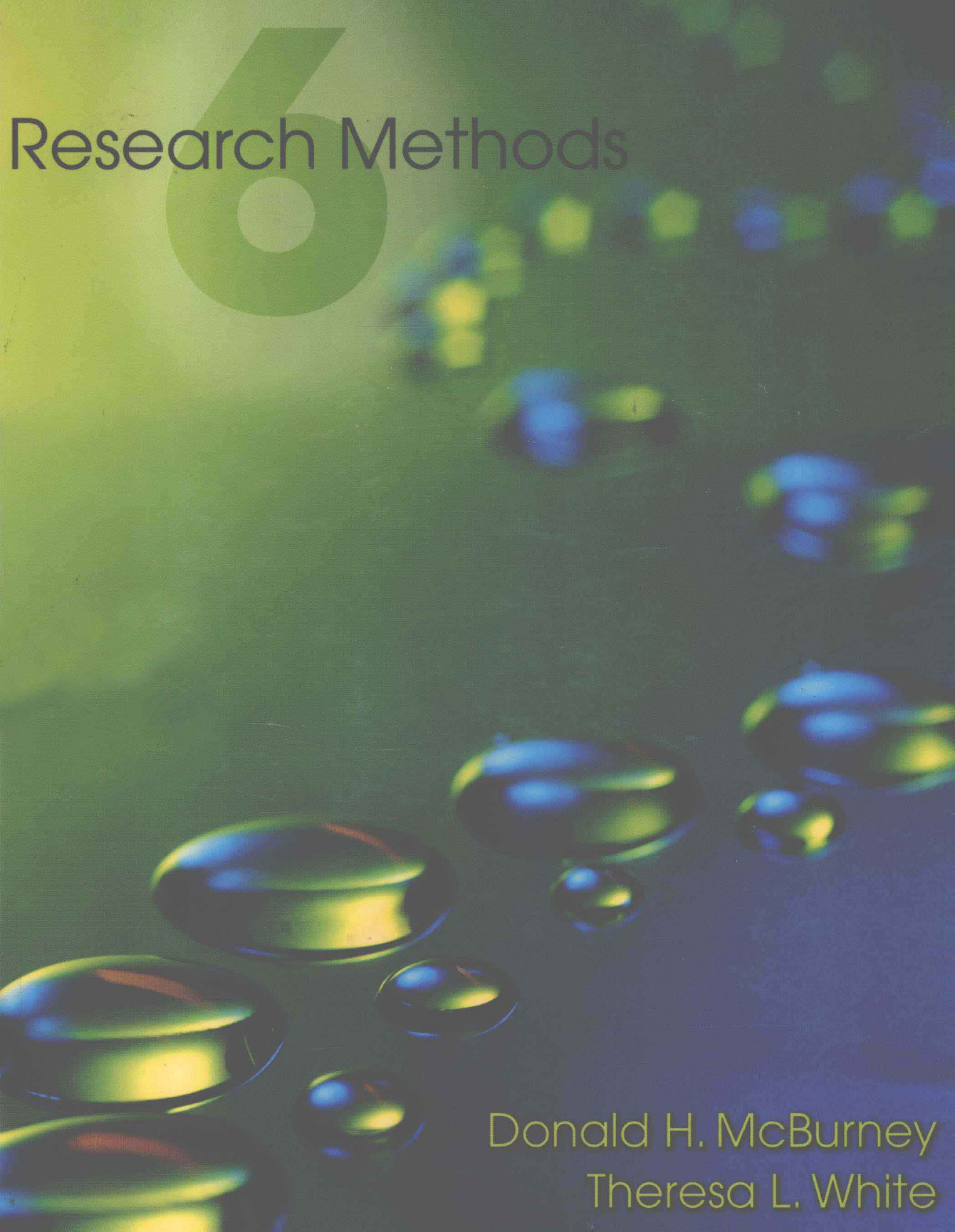
Research Methods



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Theresa L. White

Research Methods

SIXTH EDITION

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Preface

This book is intended to serve as a text for courses in research methods in psychology at the undergraduate level. I am gratified for the acceptance it has received over the previous five editions. I particularly appreciate the many comments from students who find the book interesting and clearly written because those characteristics have been high on my list of goals for the book.

The features that have made the book distinctive have been retained. My primary intention in writing this text was to put psychological research into a larger scientific context. In teaching the course and looking at possible texts to use, I felt that other books on the topic provided too little emphasis on how psychology fits into the scientific approach to understanding the world. Given the debate that exists among the behavioral, dynamic, humanistic, postmodern and other types of psychologies, as well as the confusion about the nature of science evidenced by the many popular and fringe psychologies, it is not surprising that undergraduate students have questions about how scientific psychology should be done. The first section of the book therefore deals with psychology as a science, emphasizing the similarities between.

A second section goal is to separate the discussion of research methods from its traditional dependence on statistical procedures. Many experimental psychology books are organized around particular statistical methods, especially the analysis of variance. In contrast, we have organized this book around the general problems of validity and how to control for the various threats to validity. The later chapters on true experiments, quasi experiments, and single-subject designs give examples of solutions to the problems of validity, rather than a catalog of statistical applications. With this goal in mind, it made sense to have early chapters that discuss the types of variables encountered in psychological research and how data are represented graphically.

A third goal, closely related to the second, is to convey the idea that designing and conducting research is an exercise in problem solving that can be exciting and creative. We have avoided giving the impression that psychological research involves following a set of cut-and-dried rules or selecting one of a fixed number of available designs. Our belief is that the best research derives from solving particular threats to the validity of a contemplated piece of research and only then asking what kind of design has resulted.

Throughout the book we have emphasized the considerations that are involved in designing and conducting research.

Fourth, we have chosen from the psychological literature a wide variety of problems in research and their solutions. Generally we have avoided nonpsychological examples and artificial data.

Finally, we have tried to convey a feeling for all of the stages of research, from choosing the problem to publishing the results. We have discussed the literature search, the nuts and bolts of research protocols, research ethics, and the publication process. The only major step omitted is statistical analysis, which is left to a prerequisite or corequisite course or to supplementary material, according to the instructor's choice.

I am delighted that Dr. Theresa White has become my coauthor with this edition. She shares the values that have shaped the book over the previous five editions, and brings enthusiasm, fresh insights, and excellent skills to the project.

New in this edition, we have made numerous changes throughout this edition, including suggested InfoTrac® College Edition search terms, references to Web-Based Workshops, and to Langston's laboratory manual, in appropriate chapters. Suggestions for further reading have been updated, and many new examples have been used. The Instructor's Manual now has many new features, including detailed chapter outlines. A Power Point presentation is available for all chapters.

In Chapter 1, we removed discussion of operationism, revised and updated discussion of Kuhn and postmodernism, updated the example of predicting new laws, and deleted the Masters and Johnson example.

In Chapter 2, we added new Web sites and a new section on psychological databases available on line.

Chapter 3 has been thoroughly updated to reflect changes that were made to the APA Code of Ethics in 2000.

Chapter 4 was updated to reflect changes in the *Publication Manual of the American Psychological Association: Fifth Edition.* The section on presentations now includes discussion of Power Point.

Chapter 5 has an updated example of variables.

In Chapter 6, we substituted "*y*-axis" and "*x*-axis" for "ordinate" and "abscissa," clarified the discussion of real limits, and added a section on making graphs with a computer.

In Chapter 7, we clarified two examples and removed discussion of the Hawthorne Effect.

In Chapter 8, we clarified general strategies of control and gave a new example of the concept of a preparation.

In Chapter 9, we reduced the section on hermeneutics, revised the case history section, and updated the example on mass psychogenic illness; added new discussion of publicly available data sets; updated suggested guidelines for nonexperimental research.

In Chapter 10, we added a discussion of Acquiescence, updated the section on computer administration of surveys to include the Internet, updated telephone administration section to reflect its declining popularity.

In Chapter 11, we updated example of one-group posttest only design and revised Figure 11.3 with a true logarithmic *x*-axis.

Chapter 12 has clarifying wording changes.

In Chapter 13, we substituted the preferred word "participants" for "subjects" throughout; included discussion of relationship of single-participant designs to within-subject designs; added appropriate references to Appendix A; increased discussion of baselines; added discussion, with examples, of comparison design and alternating treatment design; added a new figure for alternating treatment design; removed discussion of interaction design; moved example of multiple baselines to the section that discusses the topic; updated example of changing criterion design; and modified introduction to the examples from psychophysics.

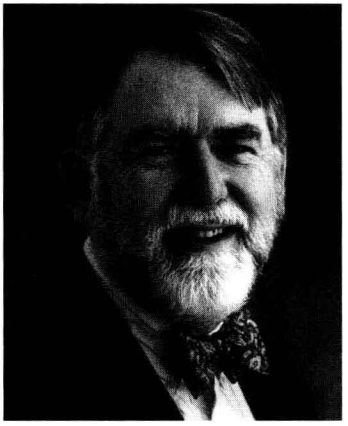
In Chapter 14, we removed example of pornography from the interrupted time-series design and added example of repeated treatments design.

In the Epilogue, we updated figures on government support of research, added new examples and discussion of limitations of science, and updated discussion of Kohlberg.

In Appendix A (Statistics), we updated the discussion of hypothesis testing to take into account new APA guidelines on reporting statistics, emphasizing effect size.

Many colleagues have contributed to the success of this project over the several editions, now too many to list here. We thank the following reviewers of the sixth edition for their constructive suggestions and comments: Keith Busby, University of Ottawa; Dennis Cogan, Texas Tech University; Lora Schlewitt-Haynes, University of Northern Colorado; Steven Horowitz, Central Connecticut State University; Page Jerzak, Trinity University; Eric Landrum, Boise State University; S. Stavros Valenti, Hofstra University. Each new reviewer adds a fresh contribution to the book. Vicki Knight and all the other people at Wadsworth have been a pleasure to work with and have been very supportive of this project.

About the Authors



Donald H. McBurney is Professor of Psychology at the University of Pittsburgh. Previously he taught at the University of Tennessee. He received his Ph.D. in experimental psychology at Brown University. He has numerous publications in his areas of interest, which include the psychophysics of taste, evolutionary psychology, a skeptical approach to the paranormal, and critical thinking. Besides research methods, he teaches sensation and perception, evolutionary psychology, and history of psychology. His professional and personal interests intersect in studying the taste of chili peppers. His hobbies include gardening, sailing, and travel.

Theresa L. White is a Research Assistant Professor of Neuroscience and Physiology at SUNY Upstate Medical University and an Assistant Professor of Psychology at Le Moyne College, both of which are in Syracuse, NY. She received both of her higher degrees in experimental psychology from English universities; her Masters of Science Degree is from Oxford University and her Ph.D. is from University of Warwick. Dr. White's research is concerned with the way that people think about and remember smells, as well as the clinical aspects of smell loss. She currently teaches Research Methods, Sensation and Perception, and Introductory Psychology. Compared to many other places in the United States, Syracuse has legendary winters, often experiencing over 180 inches of snow in a season. Whenever the lakes are not frozen, Dr. White enjoys sailing and racing her Hobie 16 boat. Once the ice is on the lake, she fills her spare time by singing in a Gospel Choir and swing dancing.

It is of the essence of teaching that it seeks to render itself superfluous.

Dietrich Bonhoeffer
The Cost of Discipleship

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CHAPTER 1

Psychology and Science

PREVIEW

Chapter 1 introduces psychology as a science. We see that science is one way of knowing among several. Science has a number of characteristics, such as reliance on objective, empirical facts. Taken together, these characteristics distinguish science from other ways of knowing. Science makes a number of working assumptions, such as that the world is real.

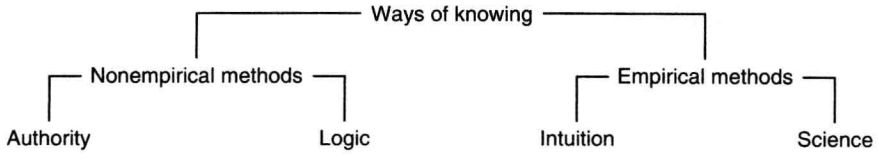
The goals of science make it different from other human activities. These goals include the description and discovery of regularities, but the main goal is developing a theory to explain facts and laws. Science may be considered a problem-solving activity. Experimental psychology is a science essentially like any other. Between psychology and biology, chemistry, or anthropology, there may be considerable difference in subject matter, but the essentials are common to all. On the one hand, the differences are fairly obvious: Because animals are more complex than trees, psychological theories may be more complicated than botanical theories; because the behavior of animals varies more than that of rocks, psychology uses statistics more than does physics. On the other hand, the similarities may not be as easy to grasp. For this reason, we devote this chapter to discussing psychology as a science. First, let us put psychology in context by talking about ways of looking at behavior.

WAYS OF KNOWING ABOUT BEHAVIOR

empirical based on experience

There is more than one way to learn about human and animal behavior. Every day all of us use several methods to learn about behavior. We can divide these methods into two broad categories: empirical methods and nonempirical methods. The term **empirical** simply means based on experience.

FIGURE 1.1
Ways of knowing.



Nonempirical Methods

First, we will consider two nonempirical methods: authority and logic. Then we will consider the empirical methods. Figure 1.1 shows the relationship among them.

Authority. We may believe something because some respected person told us it is true. Religious authorities proclaim the will of God to us about various matters, the government tells us that we should not drive faster than 65 miles per hour, and our parents tell us that we will catch cold if we get our feet wet. Because these authorities often disagree among themselves, we are inclined to reject authority as a way of knowing. How do you know that Neil Armstrong walked on the moon on July 20, 1969? You were not there. Perhaps you watched it on television if you were born before then. Yet there are people who believe that no man ever has walked on the moon and that the moon walk was a gigantic propaganda hoax perpetrated by the United States government. If you believe that Neil Armstrong walked on the moon, you do so because of your faith in the credibility of the government, the news media, and the books you have read. These sources all serve as authorities for you if you believe what they say. Yet authority has major limitations as a way of knowing. Authorities often are wrong, even when they assert their beliefs most forcefully. Galileo suffered grievously for daring to hold that the earth goes around the sun. That the history of science is in large part a struggle for intellectual freedom from the dogmas of authority is a continuing theme in the history of science from Galileo in the 16th century to the recent Soviet dissidents. If you did not have any faith in authority, though, you would not be reading this book or taking a research methods course from a college professor.

Logic. Logic is an important way of helping us know about behavior. Take the following set of statements:

> The behavior of all animals is subject to the laws of natural science.
> Humans are animals.
> Therefore, human behavior is subject to the laws of natural science.

These statements are logical. That is, if the first two are true, then the third follows logically. Use of logic is often crucial in drawing correct conclusions about the world.

Yet, as important as reasoning logically is, logic has limitations as a way of knowing. Logic can tell you that a statement is false because it draws an improper conclusion. But a statement can be logically valid and still not be true because it assumes something to be the case that is not. Suppose that the behavior of all animals is not, in fact, subject to the laws of natural science. Then the conclusion that human behavior is subject to the laws of natural science would be false.

Take another example. Suppose I say, "If it rains, then there will be no baseball game." If I look out the window and see it is raining, it is valid for me to say, "It is raining; therefore, there will be no baseball game." But the truth of the statement depends on the fact that it is raining. If it is, in fact, not raining, then the statement is false.

Logic is extremely important to science, but it cannot substitute for making the observation that it is raining, or proving that the behavior of all animals is subject to the laws of natural science. In other words, there is no substitute for empirical evidence. As any reader of science fiction can attest, there are many logically possible worlds. Logic alone cannot tell you which world actually exists.

Empirical Methods

Just as we divided ways of knowing into empirical and nonempirical on the basis of whether they depended on experience, we can divide the empirical methods into two categories: intuitive and scientific.

intuition spontaneous perception or judgment not based on reasoned mental steps

Intuition.

We size up strangers within the first few seconds of meeting them. We do this by **intuition,** a way of knowing based on spontaneous, "instinctive" processes rather than on logic or reasoning. Intuition has a powerful effect on our beliefs about other people. We may distrust a person who seems too sincere to be true. This sizing up has sometimes been called "women's intuition"; today, we are more likely to say that someone gives off "bad vibes." We use intuition continuously in making the myriad decisions necessary during the course of a day. Think for a moment how you decide whether to step off the curb in front of an oncoming car at a traffic light. You make a life-or-death decision in a split second. How do you do it? Probably your decision is based on a number of factors, including whether the traffic light has changed to red, whether the driver looks you in the eye, and whether the car is decelerating. Somehow you take all these factors into account. That "somehow" is what we call intuition.

common sense practical intelligence shared by a large group of people

Common sense is a kind of intuition because of its dependence on informal methods. It has the additional characteristic of emphasizing the agreement of a person's judgment with the shared attitudes and experiences of a larger group of people. We are familiar with the example of a recent college graduate who starts working with people who lack formal education. The graduate wants to apply his scientific knowledge to the job. The old hands may resist the ideas that don't agree with common sense. After all, their methods worked well before the newcomer arrived.

Common sense as a way of knowing has two basic limitations. First, standards of common sense differ from time to time and from place to place according to the attitudes and experiences of the culture. Years ago, a commonsense method of trying suspects for crimes was having them attempt to chew dry grain. It was believed that if they were innocent they would be able to eat the grain without difficulty; if they were guilty, their mouths would be too dry to permit swallowing. In reality, this practice does have some scientific basis: A guilty person is likely to be scared spitless. We now know, however, that innocent people can be just as nervous as guilty ones, so today we are usually more scientific in our trial practices. Again, common sense may tell us not to trust a person who will not look us in the eye. In another culture, though, the same behavior may be a sign of respect.