

RESEARCH METHODS



Jack R. Nation

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RESEARCH METHODS

This book is dedicated to Patricia and Derek Nation
and Shannon, and Hunter Harris.

Preface

For more than 20 years, I have been intensively involved in research. My topics of interest have included learning models of human depression, sport psychology, and behavioral pharmacology and toxicology. The levels of analysis I have selected have varied from global behavioral measures to molecular mechanisms in neurochemical function. Despite my seemingly diverse research experiences, I have maintained a central theme—curiosity.

Grappling with an uncertain world and wanting to know more about how that world is fashioned is basic to human existence. People inherently just want to know. Consequently, it has been no surprise to me that the scores of undergraduate and graduate students that have assisted me in the laboratory over the years have demonstrated a keen intellectual and practical interest in our shared research. Indeed, I have never had a student in my laboratory who professed anything other than enthusiasm when it came to “finding out.”

Research is vital, exciting, and fetches innovative thought, but it has to be brought to life in the same way as any other subject matter. Students will respond to any topic area if it is presented properly, and it is my aim to present research methods properly. To the extent that I am successful in this regard, my role as a teacher is enhanced and my commitment to research is expanded. Following are some features of this book I hope will assist in communicating the essence of research methodology and the thrill of scientific investigation.

DISTINGUISHING FEATURES

A major objective of this book is to demonstrate the relevance of behavioral research. Working closely with the editorial staff at Prentice Hall, I have incorporated a number of features into the text that underscore the relevance of

behavioral inquiry, while maintaining the needed balance between basic and applied research. In this final product, content and application are each given high priority. As we will see, they work in concert, not opposition.

The Model Experiment

Over the chapters of this book, a model experiment is developed systematically. Commencing with the formulation of an original hypothesis, together we build an experimental framework that leads to a novel, programmatic project that is designed to assess the appropriateness of certain forms of cognitive therapy for treating pediatric oncology patients. Each chapter serves as a building block and vehicle for introducing new terms and concepts. As we see the model experiment unfold over the course of this text, we learn about the elements of research, how they are combined, and how they are related. To my knowledge, no other textbook has ever attempted such an undertaking. By the end of the course, you will see that, with our task accomplished and our journey ended, we will have proudly produced something that could advance our awareness of issues relating to chronically ill children in some small but meaningful way. After all, this is where the real thrill in research comes from—not from achieving a major breakthrough, but from participating.

Thinking About Research

In this book you will find sections entitled “Thinking About Research.” These sections pose questions about particular topics or issues in behavioral research and give you a chance to think about resolutions, alternatives, implications, and other aspects of research that present opportunities for creative thinking. In most cases, there are no clear-cut responses, but you will find the coverage provocative nonetheless. Ultimately, these sections ask you to reflect on current or timeless scholastic arguments or on approaches to conducting behavioral research.

Spotlight on Research

Another feature presented in each chapter is a special section entitled “Spotlight on Research.” These sections highlight some of the more interesting studies in behavioral research and address matters that are likely to be of general interest. These sections range from discussing ethics to potential confounds in the research of biological determinants of human homosexuality. These sections go beyond simple description and engage you on a more personal level.

Multiculturalism

Cultural and ethnic diversity is increasing in North America, and behavioral researchers are becoming increasingly sensitive to the need to incorporate multicultural variables into mainstream activities. Where appropriate, this book discusses the unique ways that multiculturalism has changed the way we think about research and the implications some of these findings have on policy, decision making, and the growth of psychology and the social sciences.

I hope the discussion of cultural diversity in behavioral research elevates our collective consciousness of the need to examine all dimensions of human conduct. As the color and ambitions of the world change, we as investigators must also change and keep pace with the evolutionary phenomena that affect the way we all live.

Currency

In the information age, each of us is obligated to remain current, and this textbook is no exception. I have integrated recent research examples, mentioned the latest computer search programs, and identified some of the more important changes in recording and analytical hardware. In addition, I used the fourth edition of the American Psychological Association (APA) (1994) *Publication Manual* to develop this text. Referencing, writing style, sensitivity to gender issues, and other matters relating to exposition follow the recommendations of APA.

PEDAGOGICAL ELEMENTS

Several other features of this book are more directly related to the learning process and the accessibility of material.

Chapter Outlines

Each chapter begins with a chapter outline that profiles the major headings and subheadings of the chapter. The objective of the outlines is to provide information on the overall organization of the chapters. These may help you as you read through your chapter assignments.

Graphs, Illustrations, and Tables

The coverage is enhanced with graphic representations of selected data and tabular summaries and descriptions of important items or ideas. These elements highlight areas of focus and accent certain points in the discussion.

Key Terms

In the margins of the pages of this book, you will find key terms and definitions. Give them special attention because they are important to understanding the chapters in which they appear, as well as later chapters.

Within Chapter Review and Study Questions

At the end of each major section in each chapter, you will also find review statements and study questions. Your responses to these comments and questions can be used to identify areas of strength and weakness with respect to your understanding of the content of the chapter.

Index

An alphabetized index of topics is at the end of the book. Refer to this index when you need information on a particular topic.

Acknowledgments

The idea for this book grew out of several conversations I had with Chris Cardone, who was then an editor with Macmillan Publishing Company. She guided the development of the book in its early stages and continued to encourage the project until Macmillan and Prentice Hall merged in 1993. At that time, Peter Janzow and Nicole Signoretti assumed the editorial responsibilities for completing the book, and I am indebted to them for their many helpful suggestions regarding details of the final product.

In addition to the cooperative editorial staff at Prentice Hall, several reviewers of the original manuscript should be recognized. They are: Mike Knight, University of Central Oklahoma; Bernard Beins, Ithaca College; Diane Mello-Goldner, Pine Manor College.

These reviewers provided thoughtful, instructive comments on the suitability of the content and style of the book, and I greatly appreciate their willingness to work with me to complete this project. Surely, the quality of this book has been enhanced by their efforts.

Finally, I would like to express my appreciation to Patricia L. Nation for providing the research idea that forms the basis for the model experiment that integrates this book. My understanding of the boundaries for conducting research in an unfamiliar area has increased, and I have gained accordingly as a student of behavior. Once again, I am reminded of the teacher/student covenant—share.

Jack R. Nation

Author Biography

Jack Nation is currently professor of psychology at Texas A&M University. He received his Ph.D. in psychology from the University of Oklahoma in 1974 and has written over 80 scientific papers on a variety of topics ranging from the personality profiles of college football players to the neurochemical determinants of drug abuse. Since 1995, Nation has contributed articles to such journals as *Brain Research*, *Experimental and Clinical Psychopharmacology*, and *Drug and Alcohol Dependence*. He recently received several grants from the National Institutes of Health (NIH) to support his research into the effects of environmental pollution on drug abuse. In 1995 Texas A&M University honored Nation with a Distinguished Achievement Award where he ranked first out of 2,500 faculty members in teaching performance.

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Introduction to Research Methodology

Common Attempts at Interpreting Information

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- Authority
- Empiricism

Understanding Psychology: The Scientific Approach

- The Scientific Community
- Characteristics of Scientific Psychology

Naturalistic Observation

Laboratory Research

- Historical Roots of the Psychological Laboratory
- The Structure of the Psychological Laboratory

Basic and Applied Research

Theory and Research

Overview of the Text

- Building an Experiment
- Thinking About Research
- Spotlight on Research

Through memory, each of us is able to fetch moments of our youth. For me, this process often involves recalling my time spent as a young boy growing up in rural Oklahoma and remembering languid summer days free of responsibility, each day buoyed by the promise of discovery. It is in this context that I can recount a childhood episode which I acted out in one form or another as a matter of routine.

My morning walk had taken me across an open pasture and toward a small pond that had been cast by a natural clay embankment. As I approached the pond, I noticed one of the all-too-familiar great-red-ant beds that pock the southwestern region of the United States. Looking down on the teeming center of the bed, I watched the worker ants move in and about the mound with considerable curiosity and soon discovered a pattern. Each insect would come off the mound and move a foot or so toward a second active mound not more than a couple of feet away. Invariably, the ant would then turn in a direction opposite the second mound and travel at least 20 yards toward a third mound along a trail that had been beaten into the land by low-impact ant treading.

I began to examine the activities of other ants in neighboring communities, and it seemed that much the same pattern would occur. Rather than do what would seem sensible to a nonant observer, the insects would forsake the local environment and hike cross-country to accomplish what could have been achieved closer to their home.

Now, this ant deal caused me considerable discomfort for a few days. In an orderly world, abiding ant phenomena that defy logic and reason can be a source of palpable anxiety. What on earth was going on here? What could produce such a strange behavior in a feral bug which, by definition, should be committed to a life of simplicity? There had to be an answer, and I was bent on getting it.

I read the meager materials on ant behavior from our unpretending home library, but they were of no help. In addition, I inquired among the local sages whom I felt might qualify as ant specialists, but they were equally uninformative. Finally, I placed a phone call to a legitimate entomologist at a nearby university and obtained an answer. The answer was ultimately a chemical one. The ants were responding to chemical tags that had been set down by the queen ant. Each ant in a colony is constrained by a biological imperative to serve only the queen that produces it. Thus the seemingly inappropriate behavior of the worker ants arose—the adjacent mounds I had observed were the beds of different queens; the distant mound was of a common origin.

The nuances of ant life may not be judged by most readers to be in the realm of high theater. However, this ant example illustrates a basic human quality. Each of us has an insatiable curiosity and an irrepressible desire to gather data. For some, the information search may focus on identifying the precise combination of ingredients that yields the ideal cheesecake. Another person may be concerned about recent market declines in pork belly futures and the impact such