Research Methods: A Tool for Life

Fourth Edition

Research Methods is an introduction to the importance of scientific research in everyday life and uses familiar examples to keep students engaged. The text analyzes controversies in psychology to stimulate student interest while explaining crucial methodological concepts. It presents ethical issues related to research, as well as social and cultural factors that might affect it, and provides a comprehensive introduction to a wide variety of methodologies. Through this book, students will learn how to generate research questions and select appropriate methodology, as well as to write a successful research report.

Bernard C. Beins is Professor of Psychology at Ithaca College. He has been President of the New England Psychological Association and the Society for the Teaching of Psychology.
RESEARCH METHODS
A Tool for Life
Fourth Edition

Bernard C. Beins
Ithaca College
Once again, I dedicate this book to the most important people in my life: Linda, Agatha, Simon, Jenny, Evie, and Julian.
# BRIEF CONTENTS

*Preface*  xix

## Part I Understanding Research

1. Psychology, Science, and Life  1
2. Ethics in Research  38
3. Planning Research: Generating a Research Question  67
4. Practical Issues in Planning Your Research  103
5. Measurement and Sampling  127

## Part II Experimental Approaches

6. Conducting An Experiment: General Principles  160
7. Experiments with One Independent Variable  181
8. Experiments with Multiple Independent Variables  208
9. Expanding on Experimental Designs: Repeated Measures and Quasi-experiments  229

## Part III Correlational and Nonexperimental Designs

10. Principles of Survey Research  258
11. Correlational Research  287
12. Studying Patterns in The Natural World: Observational Approaches  311
13. Research in Depth: Longitudinal and Single-case Studies  333

## Part IV Culture and Research

14. People are Different: Considering Cultural and Individual Differences in Research  361

*Appendix A – Writing a Research Report*  395
*Appendix B – Statistics Review*  415
*Appendix C – Statistical Tables*  441
*References*  451
*Index*  495
CONTENTS

Preface xix

Part I Understanding Research

1 Psychology, Science, and Life 1
   Learning Objectives 1
   Key Terms 1
   Chapter Preview 1
   Why are Research Methods Important Tools for Life? 3
   Why Learning About Research is Important 5
   Answering Important Questions 6
   Why We Do Research 7
   Description 8
   Prediction 9
   Explanation 10
   Control 12
   Research Applied to Life: Suicide 12
   What Should You Believe? 13
   Characteristics of Science 14
   Science is Objective 15
   Science is Data-driven 18
   Scientific Methods are Replicable and Results are Verifiable 19
   Science is Public 20
   Culture and Research 21
   The Interaction of Science and Society 22
   The Government's Role in Science 23
   Societal Values and Science 24
   Scientific Literacy 25
   What Would it Take to Change Your Mind? 26
   Science and Pseudoscience 27
   Warning Signs of Bogus Science 28
   Junk Science 30
   Controversy: The Myth of Vaccination and Autism Continues 30
   What Can You Do About This? 31
   Chapter Summary 32
   Chapter Review Questions 33
   Multiple Choice Questions 33
   Essay Questions 36
   Answers to Chapter Review Questions 36
   Answers to Multiple Choice Questions 36
   Answers to Essay Questions 36
2 Ethics in Research 38
   Learning Objectives 38
   Key Terms 39
   Chapter Preview 39
   Unethical Research Practices: Past and Present 41
      Ethical Problems in the Early Years of the Twentieth Century 41
      Ethics and Plagiarism 43
      Current Examples of Ethical Lapses 43
      The Impact of Ethical Lapses 46
   Ethical Guidelines Created by the American Psychological Association 46
      Aspirational Goals and Enforceable Rules 47
      Ethical Standards as They Affect You 48
   Legal Requirements and Ethics in Research 50
      Institutional Review Boards 50
   The Importance of Social Context in Deciding on Ethics in Research 51
      Stanley Milgram’s Research Project on Obedience 52
      The Ethical Issues 52
   What You Need to do if Your Research Involves Deception 53
      Some Research May Require Deception 54
      The Effects of Debriefing on Research 55
   The Controversy About Deception 56
   Ethical Issues in Special Circumstances 57
      Ethics in Cross-cultural Research 57
      Ethics in Internet Research 59
      Ethics in Research with Nonhuman Animals 60
   Chapter Summary 61
   Chapter Review Questions 62
      Multiple Choice Questions 62
      Essay Questions 65
   Answers to Chapter Review Questions 66
      Answers to Multiple Choice Questions 66
      Answers to Essay Questions 66

3 Planning Research: Generating a Research Question 67
   Learning Outcomes 67
   Key Terms 67
   Chapter Preview 67
   Where Research Ideas Begin: Everyday Observations and Systematic Research 69
      Informal and Formal Sources of Ideas 70
      The Effect of Theory 71
   How Can You Develop Research Ideas? 74
      Culture and Research 77
   The Virtual Laboratory: Research on the Internet 78
      Internet Research 80
      Factors that can Make a Difference 82
      Advantages to Internet Research 85
5 Measurement and Sampling

Key Terms 127

Chapter Preview 127

Psychological Concepts 129

Measuring Complex Concepts 129

Operational Definitions 129

Defining and Measuring Variables 131

The Importance of Culture and Context in Defining Variables 135

Multiple Possible Operational Definitions 136

Probability Sampling 136

Simple Random Sampling 137

Systematic Sampling 138

Stratified Random Sampling 138

Cluster Sampling 138

Nonprobability Sampling 140

Convenience Sampling 141

Quota Sampling 142

Purposive (Judgmental) Sampling 142

Chain-referral Sampling 143

Making Useful Measurements 143

Reliability 144

Validity 145

Considering Validity in Research 145

Construct Validity 145

Internal and External Validity 147

Statistical Conclusion Validity 151

Convergent and Divergent Validity 152

Research Applied to Life: The Head Start Program 152

Scales of Measurement 153

Nominal Scales 153

Ordinal Scales 154

Ratio and Interval Scales 154

Summary 155

Chapter Review Questions 156

Multiple Choice Questions 156

Essay Questions 158

Answers to Chapter Review Questions 158

Answers to Multiple Choice Questions 158

Answers to Essay Questions 158
Part II  Experimental Approaches

6  Conducting An Experiment: General Principles  160
Key Terms  160
Chapter Preview  160
Choosing a Methodology: The Practicalities of Research  162
Determining the Causes of Behavior  162
  Trying to Determine Causation in Research  163
  Requirements for Cause–Effect Relationships  163
The Logic of Experimental Manipulation  164
Research Applied to Life: Withholding Treatment in Research  166
Experimental Control – Or What Can Go Wrong  167
Lack of Control in Experimental Research: Extraneous Variables and
  Confounds  167
  Do Women Show Fear of Success?  169
  Experimenter and Participant Effects  171
Minimizing the Likelihood of Experimenter and Participant Effects  172
  The Hawthorne Effect  173
Research Applied to Life: Drug-sniffing Dogs  175
Realism in Research  176
Summary  177
Chapter Review Questions  177
  Multiple Choice Questions  177
  Essay Questions  180
Answers to Chapter Review Questions  180
  Answers to Multiple Choice Questions  180
  Answers to Essay Questions  180

7  Experiments with One Independent Variable  181
Key Terms  181
Chapter Preview  181
Determining Variables of Interest  183
  Investigating Psychology and Criminal Justice  183
  Variety of Research Variables  184
Independent and Dependent Variables  186
Using Experiments to Determine Causation  189
Is it Ethical to Induce Depression in Research?  190
Types of Independent and Dependent Variables  191
  Qualitative and Quantitative Independent Variables  192
Research Applied to Life: What We Believe  194
  Independent Variables Created by Different Types of Manipulations  195
  Types of Dependent Variables  197
Research Applied to Life: Race and Pain  197
Understanding Your Results  198
  Comparing Two Groups  198
  Generalizing Research Results  200
## Contents

Comparing Multiple Groups 201
Data Analysis 202
Experiments with Two Groups 202
Experiments with Multiple Groups 203
Summary 204
Chapter Review Questions 204
    Multiple Choice Questions 204
    Essay Questions 207
Answers to Chapter Review Questions 207
    Answers to Multiple Choice Questions 207
    Answers to Essay Questions 207

8 Experiments with Multiple Independent Variables 208
    Key Terms 208
    Chapter Preview 208
    Research with Multiple Independent Variables 209
        Main Effects 209
        Interactions between Variables 211
    Not Much Power in the Pose: Illustration of a $2 \times 3$ Design with an Interaction 212
    A $2 \times 2$ Factorial Design with Repeated Measures 214
    Research with More Than Two IVs 216
    Practical Complexities in Research 217
    Research Applied to Life: Racial Prejudice 219
    Data Analysis 224
    Summary 225
    Chapter Review Questions 226
        Multiple Choice Questions 226
        Essay Questions 228
    Answers to Chapter Review Questions 228
        Multiple Choice Questions 228
        Answers to Essay Questions 228

9 Expanding on Experimental Designs: Repeated Measures and Quasi-experiments 229
    Key Terms 229
    Chapter Preview 229
    Repeated-Measures Designs 231
    Advantages of Repeated-Measures Designs 231
        Increasing Efficiency in Data Collection 231
        Increasing Validity of Data 232
        Finding Enough Participants 232
        Reducing Error in Measurement 235
    Limitations to Repeated-Measures Designs 235
        Possible, but Unlikely, Repeated-Measures Designs 235
        Subject (Participant) Variables 236
    Research Applied to Life: Cell Phones, Alcohol, and Driving 236
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td><strong>Principles of Survey Research</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Key Terms</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Chapter Preview</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Surveys: Answering Diverse Questions</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Census versus Sample</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Accuracy of Survey Results</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Ethics in Survey Research</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Selecting Your Methodology</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Online Data Collection</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Question Types</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Question Content</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Research Applied to Life: How Many Adolescents Smoke?</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Response Bias</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Social Desirability</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Acquiescence</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Satisficing versus Optimizing</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Culture and Response Styles</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Acquiescent Response Style</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Extreme and Moderate Response Style</strong></td>
</tr>
</tbody>
</table>
Contents

Studying Sensitive Issues... 278
  Are Telephone Surveys Appropriate for Sensitive Issues?... 279
Crowdsourcing in Research... 279
Sampling Issues... 280
  Finding Hidden Populations... 280
Summary... 282
Chapter Review Questions... 283
  Multiple Choice Questions... 283
  Essay Questions... 285
Answers to Chapter Review Questions... 285
  Answers to Multiple Choice Questions... 285
  Answers to Essay Questions... 285

11 Correlational Research... 287
Key Terms... 287
Chapter Preview... 287
Correlational Studies... 289
  Finding Relationships... 289
  Making Predictions... 292
Research in Life: The Media and Violence... 293
Using the Correlational Approach... 294
  Correlational Studies... 295
  Correlational Analysis... 295
  Positive and Negative Correlations... 295
  Strength of Association... 296
Factors Affecting the Size of a Correlation Coefficient... 298
Traditional Correlational Tests... 303
  The Pearson Product-Moment Correlation... 303
Alternate Bivariate Correlations... 303
  Linear Regression... 304
Correlations with Multiple Variables... 305
  Multiple Regression... 306
Research Applied to Life: The Mental Health of College Students... 306
Summary... 308
Chapter Review Questions... 308
  Multiple Choice Questions... 308
  Essay Questions... 310
Answers to Chapter Review Questions... 310
  Multiple Choice Questions... 310
  Answers to Essay Questions... 310

12 Studying Patterns in The Natural World: Observational Approaches... 311
Key Terms... 311
Chapter Preview... 311
Observational Approaches... 313
Scientific versus Casual Observation... 313
Studying Natural Behaviors 314
  Studying Complex Human Behavior 315
Ethology 316
  Describing the Behavior of Nonhuman Animals 317
Approaches to Observational Research 318
  Five Practical Steps in Observational Research 318
Structured and Unstructured Observations 319
Sampling Issues in Observational Research 321
  Number of Sampling Blocks 321
Methods of Sampling Events During Observation 322
Estimating the Frequency and Duration of Behaviors 324
Ethological Observations in Clinical Research 325
The Human Side of Observational Research 325
  Ethics 325
  Participant–Observer Interactions 326
  Subject Reactivity 326
  Observer Effects 328
  Data Analysis in Observational Research 329
Summary 329
Chapter Review Questions 330
  Multiple Choice Questions 330
  Essay Questions 331
Answers to Chapter Review Questions 332
  Multiple Choice Questions 332
  Answers to Essay Questions 332

13 Research in Depth: Longitudinal and Single-case Studies 333

  Key Terms 333
  Chapter Preview 333
Longitudinal Research 335
  Common Themes in Longitudinal Research 335
  Cross-sectional versus Longitudinal Research 336
Varieties of Longitudinal Research 337
  Trend Studies 338
  Cohort Studies 340
  Cohort-sequential Studies 340
  Panel Studies 342
Research Applied to Life: Student Achievement 344
  Issues in Longitudinal Designs 345
    Retrospective and Prospective Studies 345
    Attrition 346
Single-subject Experimentation 350
  Experimental Analysis of Behavior 350
Methods of Single-case Designs 351
  Withdrawal Designs 351
  Single-subject Randomized Clinical Trials 352
Contents

Strengths of Single-participant Designs 352
Weaknesses of Single-participant Designs 353
Misunderstandings about Single-case Research 353
Case Studies 354
A Case Study with Experimental Manipulations: Tasting Pointed Chickens and Seeing Colored Numbers 356
Summary 357
Chapter Review Questions 357
  Multiple Choice Questions 357
  Essay Questions 359
Answers to Chapter Review Questions 359
  Multiple Choice Questions 359
  Answers to Essay Questions 359

Part IV Culture and Research

14 People are Different: Considering Cultural and Individual Differences in Research 361
  Key Terms 361
  Chapter Preview 361
  Different Cultural Perspectives 363
    What is Culture? 364
    Defining an Individual’s Culture, Ethnicity, and Race 366
      Criteria for Inclusion in a Group 368
      Social Issues and Cultural Research 369
    Cross-cultural Concepts in Psychology 370
      Are Psychological Constructs Universal? 370
      Issues in Cross-cultural Research 372
    Is There a Biological Basis for Race? 373
      The Criteria for Race 373
      Biological Insights Regarding Race 374
      Are There Really Different Races? 375
  Practical Issues in Cultural Research 376
    Lack of Appropriate Training among Researchers 376
    Why the Concepts of Culture and Ethnicity are Essential in Research 377
      Studying Differences Due to Language and Thought Processes 377
      Studying Differences in Simple and Complex Behaviors 378
    Is Culture-free Theory Really Free of Culture? 379
    Similarities and Differences within the Same Culture 380
  Cultural Factors in Mental Health Research 381
    Content Validity 381
    Translation Problems 382
    Cross-cultural Norms 382
    Cross-cultural Diagnoses 384
  Sex and Gender: Do Men and Women Come From Different Cultures? 386
    Stereotypes and Gender-related Performance 386
Wouldn’t life be interesting if you could predict the future? Some people claim to be able to do that. For instance, so-called psychics claim they can foretell the future. Unfortunately, the only accurate prediction is that after you leave them, they will have some of your money in their pockets.

It turns out, though, that it is possible to make reasonable predictions about the future. The best predictions that we can make involve the results of research. For example, meteorologists predict the weather every day based on scientific research and mathematical models. It is based on science, which means that their predictions are the best available, even if they aren’t perfect.

The same is true of psychological science. Psychologists have used research to help us understand and predict behavior. This is what psychological science is all about. A course in research methods or experimental psychology will give you the tools to conduct research yourself. Any study you conduct could add to our knowledge of what people are like, how they behave, and what you might predict about them in the future.

For example, psychological research has identified the most effective approaches to treating problems like posttraumatic stress disorder. Researchers have also discovered strategies that maximize student learning, lead to effective group work, and increase life satisfaction.

These outcomes may not be dramatic, but they demonstrate that psychological science can be useful in helping us understand and predict behavior.

Your course in psychological research will let you develop skills needed to conduct research projects yourself. But even if you don’t engage in research, this course will help you learn to evaluate information to determine if it is credible. This is one of the most important aspects of becoming scientifically literate and becoming an effective contributor to society, which increasingly relies on scientific knowledge.

Scientific awareness is important because, with newly developed artificial intelligence applications, a computer can gather information and summarize it more quickly than a person can. But the computer can’t evaluate the validity of claims that are made. That is something that you need to do. Understanding about research can aid you in evaluating claims that people make.

Ultimately, knowledge about research helps us have better lives through understanding human behavior. The purpose of this book is to show you how research has helped us to discover why we think, act, and behave as we do. Beyond this, it is as important to be able to recognize good research and to reject invalid claims as it is to be able to conduct your own studies. With this knowledge, you will be able to make better decisions as you move through life.

Advantages to this Book

There are several advantages to using this book. I hope the format of the chapters and the varied features both enhance the learning of research techniques and
foster an appreciation of why research is important. The features include the following:

- Clear and engaging writing style that will capture the reader’s interest.
- Presentation of important concepts without reliance on excess technical jargon.
- A chapter focusing specifically on diversity and its importance in understanding behavior.
- Presentation of research that involves diversity in sampling, going beyond the typical American undergraduate groups.
- Demonstrations of the wide range of methods that psychological scientists use to address varied research questions.
- Interesting examples that relate to the lives that people lead.
- Discussions that show how laboratory studies are important to everyday life.
- Explanations of research that has an impact on important societal issues.
- Inclusion of end-of-chapter practice quizzes with multiple-choice and short-answer items for each chapter.

**Using this Book**

This book is intended for students who are newly involved in learning about and conducting research. Students who have completed a statistics course will be most able to begin their work as researchers as they go through the book. Students who have not yet learned the basics of statistics will come to grasp the subtleties of the research process so that, with some supplementary work, they can analyze the data they collect in their projects. Instructors do not need to follow the order of chapters. Students can benefit from the material in the book when the presentation of chapters is changed.

The order of the chapters is such that the first five chapters provide the basic philosophy of research and elements of critical thinking and scientific literacy. After students learn this introductory material, they will have the essential tools to create a research project.

The next set of chapters focuses on the experimental method. This is the approach that psychological scientists rely on to understand causes of behavior and is frequently the first approach they implement. Following the experimental chapters, there are chapters involving correlational research that is valuable in spotting relations among variables even when we cannot draw conclusions about causation.

Finally, I have included a chapter that specifically addresses diversity in psychological research. With the changes in society associated with issues of race, ethnicity, nationality, sex and gender, and so forth, it is important to be aware of the impact of these factors on the people we study.

**Supplementary Material**

Part of the pedagogical package for this book is an instructor’s manual with activities, demonstrations, and data-collection exercises. Data sets for increasing the power of statistical analysis are available to supplement data collected in small classes.
There is also a test bank that contains multiple-choice questions, short-answer questions, and other integrative questions. The items generally focus on understanding concepts rather than simply repeating vocabulary, and they require that students go beyond simple memorization.

The supplementary material also includes PowerPoint files that track the material in the chapters. Some of the material in these files goes beyond what appears in the book so that the instructor can generate useful discussion of actual research projects.