

Preface xix

## **PART 1** Introduction to Research 1

### **1** The Nature of Research 2

**Interactive and Applied Learning** 3 

Some Examples of Educational Concerns 3

Why Research Is of Value 4

Ways of Knowing 4

Types of Research 7

General Research Types 15

Critical Analysis of Research 16

A Brief Overview of the Research Process 19

Main Points 21

Key Terms 22

For Discussion 23

References 23

Research Exercise 1 24

Problem Sheet 1 24

## **PART 2** The Basics of Educational Research 25

### **2** The Research Problem 26

**Interactive and Applied Learning** 27 

What Is a Research Problem? 27

Research Questions 27

Characteristics of Good Research Questions 28

Main Points 35

Key Terms 35

For Discussion 35

Research Exercise 2 36

Problem Sheet 2 36

### **3** Locating and Reviewing the Literature 37

**Interactive and Applied Learning** 38 

The Definition and Value of a Literature Review 38

Types of Sources 38

Steps Involved in a Literature Search 39

Doing a Computer Search 44

Writing the Literature Review Report 51

Main Points 56

Key Terms 58

For Discussion 58

References 58

Research Exercise 3 59

Problem Sheet 3 59

## 4 Ethics and Research 60

### Interactive and Applied Learning 61

- Some Examples of Unethical Practice 61
- A Statement of Ethical Principles 61
- Protecting Participants from Harm 63
- Ensuring Confidentiality of Research Data 64
- When (If Ever) Is Deception of Subjects Justified? 64
- Three Examples Involving Ethical Concerns 65
- Research with Children 67
- Regulation of Research 69
- Academic Cheating and Plagiarism 72
- Main Points 72
- Key Terms 73
- For Discussion 73
- References 74
- Research Exercise 4 75
- Problem Sheet 4 75

## 5 Variables and Hypotheses 76

### Interactive and Applied Learning 77

- The Importance of Studying Relationships 77
- Variables 78
- Hypotheses 84
- Main Points 88
- Key Terms 89
- For Discussion 89
- References 89
- Research Exercise 5 90
- Problem Sheet 5 90

## 6 Sampling 91

### Interactive and Applied Learning 92

- What Is a Sample? 92
- Random Sampling Methods 95
- Nonrandom Sampling Methods 98
- A Review of Sampling Methods 101
- Sample Size 103
- External Validity: Generalizing from a Sample 104
- Main Points 107

- Key Terms 108
- For Discussion 108
- Research Exercise 6 110
- Problem Sheet 6 110

## 7 Instrumentation 111

### Interactive and Applied Learning 112

- What Are Data? 112
- Means of Classifying Data-Collection Instruments 114
- Examples of Data-Collection Instruments 117
- Norm-Referenced Versus Criterion-Referenced Instruments 137
- Measurement Scales 138
- Preparing Data for Analysis 141
- Main Points 142
- Key Terms 144
- For Discussion 144
- References 144
- Research Exercise 7 146
- Problem Sheet 7 146

## 8 Validity and Reliability 147

### Interactive and Applied Learning 148

- The Importance of Valid Instrumentation 148
- Validity 148
- Reliability 155
- Main Points 163
- Key Terms 163
- For Discussion 164
- References 164
- Research Exercise 8 165
- Problem Sheet 8 165

## 9 Internal Validity 166

### Interactive and Applied Learning 167

- What Is Internal Validity? 167
- Threats to Internal Validity 168
- How Can a Researcher Minimize These Threats to Internal Validity? 180

Main Points 181  
 Key Terms 182  
 For Discussion 183

Reference 183  
 Research Exercise 9 184  
 Problem Sheet 9 184

## PART 3 Data Analysis 185

### 10 Descriptive Statistics 186

**Interactive and Applied Learning** 187 

Statistics Versus Parameters 187  
 Two Fundamental Types of Numerical Data 187  
 Types of Scores 189  
 Techniques for Summarizing Quantitative Data 190  
 Techniques for Summarizing Categorical Data 209  
 Main Points 215  
 Key Terms 216  
 For Discussion 217  
 Research Exercise 10 218  
 Problem Sheet 10 218

### 11 Inferential Statistics 219

**Interactive and Applied Learning** 220 

What Are Inferential Statistics? 220  
 The Logic of Inferential Statistics 221  
 Hypothesis Testing 228  
 Practical Versus Statistical Significance 230  
 Inference Techniques 233

Main Points 241  
 Key Terms 243  
 For Discussion 243  
 Research Exercise 11 244  
 Problem Sheet 11 244

### 12 Statistics in Perspective 245

**Interactive and Applied Learning** 246 

Approaches to Research 246  
 Comparing Groups: Quantitative Data 247  
 Relating Variables Within a Group:  
   Quantitative Data 251  
 Comparing Groups: Categorical Data 255  
 Relating Variables Within a Group:  
   Categorical Data 257  
 A Recap of Recommendations 259  
 Main Points 259  
 Key Terms 260  
 For Discussion 260  
 Research Exercise 12 261  
 Problem Sheet 12 261

## PART 4 Quantitative Research Methodologies 263

### 13 Experimental Research 264

**Interactive and Applied Learning** 265 

The Uniqueness of Experimental Research 265  
 Essential Characteristics of Experimental Research 266  
 Control of Extraneous Variables 268  
 Group Designs in Experimental Research 268  
 Control of Threats to Internal Validity: A Summary 279  
 Evaluating the Likelihood of a Threat to Internal  
   Validity in Experimental Studies 281

Control of Experimental Treatments 284  
 An Example of Experimental Research 285  
 Analysis of the Study 294  
 Main Points 296  
 Key Terms 297  
 For Discussion 298  
 References 299  
 Research Exercise 13 300  
 Problem Sheet 13 300

**14** Single-Subject Research 301**Interactive and Applied Learning** 302 

Essential Characteristics of Single-Subject Research 302

Single-Subject Designs 303

Threats to Internal Validity in Single-Subject Research 309

An Example of Single-Subject Research 314

Analysis of the Study 327

Main Points 328

Key Terms 329

For Discussion 329

References 330

**15** Correlational Research 331**Interactive and Applied Learning** 332 

The Nature of Correlational Research 332

Purposes of Correlational Research 333

Basic Steps in Correlational Research 339

What Do Correlation Coefficients Tell Us? 341

Threats to Internal Validity in Correlational Research 341

Evaluating Threats to Internal Validity in Correlational Studies 345

An Example of Correlational Research 347

Analysis of the Study 358

Main Points 360

Key Terms 361

For Discussion 361

References 362

**16** Causal-Comparative Research 363**Interactive and Applied Learning** 364 

What Is Causal-Comparative Research? 364

Steps Involved in Causal-Comparative Research 367

Threats to Internal Validity in Causal-Comparative Research 368

Evaluating Threats to Internal Validity in Causal-Comparative Studies 370

Data Analysis 371

Associations Between Categorical Variables 373

An Example of Causal-Comparative Research 374

Analysis of the Study 386

Main Points 387

For Discussion 389

Reference 389

**17** Survey Research 390**Interactive and Applied Learning** 391 

What Is a Survey? 391

Why Are Surveys Conducted? 391

Types of Surveys 392

Survey Research and Correlational Research 393

Steps in Survey Research 393

Nonresponse 404

Problems in the Instrumentation Process in Survey Research 407

Evaluating Threats to Internal Validity in Survey Research 407

Data Analysis in Survey Research 407

An Example of Survey Research 408

Analysis of the Study 416

Main Points 417

Key Terms 419

For Discussion 419

References 420

## PART 5 Introduction to Qualitative Research 421

### 18 The Nature of Qualitative Research 422

#### Interactive and Applied Learning 423

- What Is Qualitative Research? 423
- General Characteristics of Qualitative Research 424
- Philosophical Assumptions Underlying Qualitative as Opposed to Quantitative Research 425
- Postmodernism 427
- Steps in Qualitative Research 427
- Approaches to Qualitative Research 430
- Qualitative Data Analysis 434
- Generalization in Qualitative Research 434
- Internal Validity in Qualitative Research 436
- Ethics and Qualitative Research 436
- Qualitative and Quantitative Research Reconsidered 437
- Main Points 438
- Key Terms 439
- For Discussion 439
- References 440

### 19 Observation and Interviewing 442

#### Interactive and Applied Learning 443

- Observation 443

- Interviewing 448
- Validity and Reliability in Qualitative Research 456
- An Example of Qualitative Research 458
- Analysis of the Study 469
- Main Points 471
- Key Terms 472
- For Discussion 473
- References 473

### 20 Content Analysis 475

#### Interactive and Applied Learning 476

- What Is Content Analysis? 476
- Some Applications 477
- Categorization in Content Analysis 478
- Steps Involved in Content Analysis 478
- An Illustration of Content Analysis 484
- Using a Computer in Content Analysis 486
- Advantages of Content Analysis 487
- Disadvantages of Content Analysis 487
- An Example of a Content Analysis Study 488
- Analysis of the Study 499
- Main Points 500
- Key Terms 501
- For Discussion 502
- References 502

## PART 6 Qualitative Research Methodologies 503

### 21 Ethnographic Research 504

#### Interactive and Applied Learning 505

- What Is Ethnographic Research? 505
- The Unique Value of Ethnographic Research 506
- Ethnographic Concepts 507
- Sampling in Ethnographic Research 509
- Do Ethnographic Researchers Use Hypotheses? 509
- Data Collection in Ethnographic Research 510
- Data Analysis in Ethnographic Research 514

- Roger Harker and His Fifth-Grade Classroom 516
- Advantages and Disadvantages of Ethnographic Research 518
- An Example of Ethnographic Research 518
- Analysis of the Study 528
- Main Points 529
- Key Terms 530
- For Discussion 530
- References 531

**22** Historical Research 532**Interactive and Applied Learning** 533 

- What Is Historical Research? 533
- Steps Involved in Historical Research? 534
- Data Analysis in Historical Research 539
- Generalization in Historical Research 539
- Advantages and Disadvantages of Historical Research 540

- An Example of Historical Research 541
- Analysis of the Study 549
- Main Points 550
- Key Terms 551
- For Discussion 552
- References 552

**PART 7** Mixed-Methods Studies 553**23** Mixed-Methods Research 554**Interactive and Applied Learning** 555 

- What Is Mixed-Methods Research? 555
- Why Do Mixed-Methods Research? 556
- Drawbacks of Mixed-Methods Studies 556
- A (Very) Brief History 557
- Types of Mixed-Methods Designs 558
- Other Mixed-Methods Research Design Issues 560
- Steps in Conducting a Mixed-Methods Study 561

- Evaluating a Mixed-Methods Study 563
- Ethics in Mixed-Methods Research 563
- Summary 563
- An Example of Mixed-Methods Research 563
- Analysis of the Study 578
- Main Points 581
- Key Terms 582
- For Discussion 583
- References 583

**PART 8** Research by Practitioners 585**24** Action Research 586**Interactive and Applied Learning** 587 

- What Is Action Research? 587
- Types of Action Research 588
- Steps in Action Research 591
- Similarities and Differences Between Action Research and Formal Quantitative and Qualitative Research 593
- The Advantages of Action Research 594

- Hypothetical Examples of Practical Action Research 595
- An Example of Action Research 600
- A Published Example of Action Research 601
- Analysis of the Study 608
- Main Points 609
- Key Terms 610
- For Discussion 610
- References 611

**PART 9** Writing Research Proposals and Reports 613**25** Preparing Research Proposals and Reports 614

**Interactive and Applied Learning** 615 

The Research Proposal 615

The Major Sections of a Research Proposal or Report 615

Sections Unique to Research Reports 622

A Sample Research Proposal 626

Main Points 638

For Review 638

Key Terms 639

For Discussion 639

References 639

## Appendixes A-1

**APPENDIX A** Portion of a Table of Random Numbers A-2

**APPENDIX B** Selected Values from a Normal Curve Table A-3

**APPENDIX C** Chi-Square Distribution A-4

**APPENDIX D** Using Microsoft Excel A-5

Glossary G-1

Credits C-1

Index I-1

# LIST OF FEATURES

## RESEARCH REPORTS

- Cognitive Effects of Chess Instruction on Students at Risk for Academic Failure 286
- Implementation of the Guided Reading Approach With Elementary School Deaf Students 315
- Physical Education in Urban High School Class Settings: Features and Correlations between Teaching Behaviors and Learning Activities 348
- Internet Use, Abuse, and Dependence Among Students at a Southeastern Regional University 374
- Teaching Social Studies in the 21st Century: A Research Study of Secondary Social Studies Teachers' Instructional Methods and Practices 408
- Walk and Talk: An Intervention for Behaviorally Challenged Youths 458
- The “Nuts and Bolts” of Teacher Images in Children’s Picture Storybooks: A Content Analysis 488
- Lessons on Effective Teaching from Middle School ESL Students 519
- Lydia Ann Stow: Self-Actualization in a Period of Transition 542
- Perceived Family Support, Acculturation, and Life Satisfaction in Mexican American Youth: A Mixed-Methods Exploration 564
- An Action Research Exploration Integrating Student Choice and Arts Activities in a Sixth Grade Social Studies Classroom 601



## RESEARCH TIPS

- Key Terms to Define in a Research Study 31
- What a Good Summary of a Journal Article Should Contain 50
- Some Tips About Developing Your Own Instrument 115
- Sample Size 234
- How Not to Interview 455
- What to Do About Contradictory Findings 562
- Things to Consider When Doing In-School Research 598
- Questions to Ask When Evaluating a Research Report 622



## MORE ABOUT RESEARCH

- Chaos Theory 8
- The Importance of a Rationale 33
- Patients Given Fake Blood Without Their Knowledge 65
- An Example of Unethical Research 67
- Department of Health and Human Services Revised Regulations for Research with Human Subjects 71
- Some Important Relationships That Have Been Clarified by Educational Research 80
- The Difficulty in Generalizing from a Sample 104
- Checking Reliability and Validity—An Example 158
- Threats to Internal Validity in Everyday Life 176



Some Thoughts About Meta-Analysis	178
Correlation in Everyday Life	213
Interpreting Statistics	258
Significant Findings in Experimental Research	283
Important Findings in Single-Subject Research	303
Examples of Studies Conducted Using Single-Subject Designs	313
Important Findings in Correlational Research	334
Significant Findings in Causal-Comparative Research	373
Important Findings in Survey Research	397
Important Findings in Content Analysis Research	479
Important Findings in Ethnographic Research	506
Important Findings in Historical Research	540
An Important Example of Action Research	595



## CONTROVERSIES IN RESEARCH

Should Some Research Methods Be Preferred over Others?	15
Clinical Trials—Desirable or Not?	63
Ethical or Not?	70
Sample or Census?	103
Which Statistical Index Is Valid?	140
High-Stakes Testing	151
Is Consequential Validity a Useful Concept?	161
Can Statistical Power Analysis Be Misleading?	240
Statistical Inference Tests—Good or Bad?	249
Do Placebos Work?	281
How Should Research Methodologies Be Classified?	366
Is Low Response Rate Necessarily a Bad Thing?	406
Clarity and Postmodernism	428
Portraiture: Art, Science, or Both?	431
Should Historians Influence Policy?	538
Are Some Methods Incompatible with Others?	558
How Much Should Participants Be Involved in Research?	591

## TABLES

<b>Table 4.1</b>	Criteria for IRB Approval	69
<b>Table 6.1</b>	Part of a Table of Random Numbers	96
<b>Table 7.1</b>	Characteristics of the Four Types of Measurement Scales	140
<b>Table 7.2</b>	Hypothetical Results of Study Involving a Comparison of Two Counseling Methods	141
<b>Table 8.1</b>	Example of an Expectancy Table	154
<b>Table 8.2</b>	Methods of Checking Validity and Reliability	159
<b>TABLE 9.1</b>	Threats to the Internal Validity of a Study	180
<b>Table 9.2</b>	General Techniques for Controlling Threats to Internal Validity	181
<b>Table 10.1</b>	Hypothetical Examples of Raw Scores and Accompanying Percentile Ranks	190
<b>Table 10.2</b>	Example of a Frequency Distribution	191
<b>Table 10.3</b>	Example of a Grouped Frequency Distribution	191
<b>Table 10.4</b>	Example of the Mode, Median, and Mean in a Distribution	196
<b>Table 10.5</b>	Yearly Salaries of Workers in a Small Business	197
<b>Table 10.6</b>	Calculation of the Standard Deviation of a Distribution	199
<b>Table 10.7</b>	Comparisons of Raw Scores and z Scores on Two Tests	202
<b>Table 10.8</b>	Data Used to Construct Scatterplot in Figure 10.17	206
<b>Table 10.9</b>	Frequency and Percentage of Total of Responses to Questionnaire	211
<b>Table 10.10</b>	Grade Level and Gender of Teachers (Hypothetical Data)	212
<b>Table 10.11</b>	Repeat of Table 10.10 with Expected Frequencies (in Parentheses)	212
<b>Table 10.12</b>	Position, Gender, and Ethnicity of School Leaders (Hypothetical Data)	212
<b>Table 10.13</b>	Position and Ethnicity of School Leaders with Expected Frequencies (Derived from Table 10.12)	213
<b>Table 10.14</b>	Position and Gender of School Leaders with Expected Frequencies (Derived from Table 10.12)	213

- Table 10.15** Gender and Ethnicity of School Leaders with Expected Frequencies (Derived from Table 10.12) 213
- Table 10.16** Total of Discrepancies Between Expected and Observed Frequencies in Tables 10.13 Through 10.15 214
- Table 10.17** Crossbreak Table Showing Relationship Between Self-Esteem and Gender (Hypothetical Data) 214
- Table 11.1** Contingency Coefficient Values for Different-Sized Crossbreak Tables 238
- Table 11.2** Commonly Used Inferential Techniques 239
- Table 12.1** Gain Scores on Test of Ability to Explain: Inquiry and Lecture Groups 250
- Table 12.2** Calculations from Table 12.1 252
- Table 12.3** Interpretation of Correlation Coefficients When Testing Research Hypotheses 253
- Table 12.4** Self-Esteem Scores and Gains in Marital Satisfaction 254
- Table 12.5** Gender and Political Preference (Percentages) 256
- Table 12.6** Gender and Political Preference (Numbers) 256
- Table 12.7** Teacher Gender and Grade Level Taught: Case 1 256
- Table 12.8** Teacher Gender and Grade Level Taught: Case 2 256
- Table 12.9** Crossbreak Table Showing Teacher Gender and Grade Level with Expected Frequencies Added (Data from Table 12.7) 257
- Table 12.10** Summary of Commonly Used Statistical Techniques 258
- Table 13.1** Effectiveness of Experimental Designs in Controlling Threats to Internal Validity 280
- Table 15.1** Three Sets of Data Showing Different Directions and Degrees of Correlation 333
- Table 15.2** Teacher Expectation of Failure and Amount of Disruptive Behavior for a Sample of 12 Classes 335
- Table 15.3** Correlation Matrix for Variables in Student Alienation Study 338
- Table 15.4** Example of Data Obtained in a Correlational Design 340
- Table 16.1** Grade Level and Gender of Teachers (Hypothetical Data) 373
- Table 17.1** Advantages and Disadvantages of Survey Data Collection Methods 394
- Table 17.2** Advantages and Disadvantages of Closed-Ended Versus Open-Ended Questions 399
- Table 18.1** Quantitative Versus Qualitative Research 424
- Table 18.2** Major Characteristics of Qualitative Research 426
- Table 18.3** Differing Philosophical Assumptions of Quantitative and Qualitative Researchers 427
- Table 19.1** Interviewing Strategies Used in Educational Research 450
- Table 19.2** Qualitative Research Questions, Strategies, and Data Collection Techniques 457
- Table 20.1** Coding Categories for Women in Social Studies Textbooks 481
- Table 20.2** Sample Tally Sheet (Newspaper Editorials) 484
- Table 20.3** Clarity of Studies 484
- Table 20.4** Type of Sample 484
- Table 20.5** Threats to Internal Validity 486
- Table 24.1** Basic Assumptions Underlying Action Research 588
- Table 24.2** Similarities and Differences Between Action Research and Formal Quantitative and Qualitative Research 594
- Table 25.1** References APA Style 623

## FIGURES

- Figure 1.1** Ways of Knowing 10
- Figure 1.2** Example of Results of Experimental Research: Effect of Method of Instruction on History Test Scores 11
- Figure 1.3** Is the Teacher's Assumption Correct? 18
- Figure 1.4** The Research Process 20
- Figure 2.1** Researchable Versus Nonresearchable Questions 29
- Figure 2.2** Some Times When Operational Definitions Would Be Helpful 32

- Figure 2.3** Relationship Between Voter Gender and Party Affiliation 34
- Figure 3.1** Excerpt from ERIC Journal Article 42
- Figure 3.2** Excerpt from ERIC Document 43
- Figure 3.3** Excerpt from ProQuest Dissertations and Theses 44
- Figure 3.4** Excerpt from Education Full Text 45
- Figure 3.5** Venn Diagrams Showing the Boolean Operators AND and OR 46
- Figure 3.6** Summary of Search Results 47
- Figure 3.7** Prompts for Evaluating Research Studies 51
- Figure 3.8** Example of an Annotated Table 52
- Figure 4.1** Example of a Consent Form 64
- Figure 4.2** Examples of Unethical Research Practices 66
- Figure 4.3** Example of a Consent Form for a Minor to Participate in a Research Study 68
- Figure 5.1** Quantitative Variables Compared with Categorical Variables 79
- Figure 5.2** Relationship Between Instructional Approach (Independent Variable) and Achievement (Dependent Variable), as Moderated by Gender of Students 82
- Figure 5.3** Examples of Extraneous Variables 83
- Figure 5.4** A Single Research Problem Can Suggest Several Hypotheses 85
- Figure 5.5** Directional Versus Nondirectional Hypotheses 87
- Figure 6.1** Representative Versus Nonrepresentative Samples 94
- Figure 6.2** Selecting a Stratified Sample 97
- Figure 6.3** Cluster Random Sampling 98
- Figure 6.4** Random Sampling Methods 99
- Figure 6.5** Convenience Sampling 100
- Figure 6.6** Nonrandom Sampling Methods 102
- Figure 6.7** Population as Opposed to Ecological Generalizing 106
- Figure 7.1** ERIC Database of Tests and Assessments 116
- Figure 7.2** Search Results for Social Studies Competency-Based Instruments 117
- Figure 7.3** Abstract from the ERIC Database 118
- Figure 7.4** Excerpt from a Behavior Rating Scale for Teachers 119
- Figure 7.5** Excerpt from a Graphic Rating Scale 119
- Figure 7.6** Example of a Product Rating Scale 120
- Figure 7.7** Interview Schedule (for Teachers) Designed to Assess the Effects of a Competency-Based Curriculum in Inner-City Schools 121
- Figure 7.8** Semi-Structured Interview Protocol 122
- Figure 7.9** Sample Observation Form 122
- Figure 7.10** Discussion-Analysis Tally Sheet 123
- Figure 7.11** Participation Flowchart 124
- Figure 7.12** Performance Checklist Noting Student Actions 125
- Figure 7.13** Time-and-Motion Log 126
- Figure 7.14** Example of a Self-Checklist 127
- Figure 7.15** Examples of Items from a Likert Scale Measuring Attitude Toward Teacher Empowerment 128
- Figure 7.16** Example of the Semantic Differential 129
- Figure 7.17** Pictorial Attitude Scale for Use with Young Children 129
- Figure 7.18** Sample Items from a Personality Inventory 130
- Figure 7.19** Sample Items from an Achievement Test 130
- Figure 7.20** Sample Item from an Aptitude Test 131
- Figure 7.21** Sample Items from an Intelligence Test 131
- Figure 7.22** Example from the Blum Sewing Machine Test 132
- Figure 7.23** Sample Items from the Picture Situation Inventory 133
- Figure 7.24** Example of a Sociogram 134
- Figure 7.25** Example of a Group Play 135
- Figure 7.26** Four Types of Measurement Scales 138
- Figure 7.27** A Nominal Scale of Measurement 138
- Figure 7.28** An Ordinal Scale: The Outcome of a Horse Race 139
- Figure 8.1** Types of Evidence of Validity 150
- Figure 8.2** Reliability and Validity 156

- Figure 8.3** Reliability of a Measurement 156
- Figure 8.4** Standard Error of Measurement 159
- Figure 8.5** The “Quick and Easy” Intelligence Test 160
- Figure 8.6** Reliability Worksheet 161
- Figure 9.1** A Mortality Threat to Internal Validity 169
- Figure 9.2** Location Might Make a Difference 170
- Figure 9.3** An Example of Instrument Decay 171
- Figure 9.4** A Data Collector Characteristics Threat 171
- Figure 9.5** A Testing Threat to Internal Validity 172
- Figure 9.6** A History Threat to Internal Validity 173
- Figure 9.7** Could Maturation Be at Work Here? 174
- Figure 9.8** The Attitude of Subjects Can Make a Difference 175
- Figure 9.9** Regression Rears Its Head 177
- Figure 9.10** Illustration of Threats to Internal Validity 179
- Figure 10.1** Example of a Frequency Polygon 192
- Figure 10.2** Example of a Positively Skewed Polygon 193
- Figure 10.3** Example of a Negatively Skewed Polygon 193
- Figure 10.4** Two Frequency Polygons Compared 193
- Figure 10.5** Histogram of Data in Table 10.3 194
- Figure 10.6** The Normal Curve 195
- Figure 10.7** Averages Can Be Misleading! 197
- Figure 10.8** Different Distributions Compared with Respect to Averages and Spreads 198
- Figure 10.9** Boxplots 198
- Figure 10.10** Standard Deviations for Boys’ and Men’s Basketball Teams 200
- Figure 10.11** Fifty Percent of All Scores in a Normal Curve Fall on Each Side of the Mean 200
- Figure 10.12** Percentages Under the Normal Curve 200
- Figure 10.13** z Scores Associated with the Normal Curve 201
- Figure 10.14** Probabilities Under the Normal Curve 203
- Figure 10.15** Table Showing Probability Areas Between the Mean and Different z Scores 203
- Figure 10.16** Examples of Standard Scores 204
- Figure 10.17** Scatterplot of Data from Table 10.8 206
- Figure 10.18** Relationship Between Family Cohesiveness and School Achievement in a Hypothetical Group of Students 208
- Figure 10.19** Further Examples of Scatterplots 209
- Figure 10.20** A Perfect Negative Correlation! 210
- Figure 10.21** Positive and Negative Correlations 210
- Figure 10.22** Examples of Nonlinear (Curvilinear) Relationships 210
- Figure 10.23** Example of a Bar Graph 211
- Figure 10.24** Example of a Pie Chart 212
- Figure 11.1** Selection of Two Samples from Two Distinct Populations 221
- Figure 11.2** Sampling Error 222
- Figure 11.3** A Sampling Distribution of Means 223
- Figure 11.4** Distribution of Sample Means 224
- Figure 11.5** The 95 Percent Confidence Interval 225
- Figure 11.6** The 99 Percent Confidence Interval 225
- Figure 11.7** We Can Be 99 Percent Confident 226
- Figure 11.8** Does a Sample Difference Reflect a Population Difference? 226
- Figure 11.9** Distribution of the Difference Between Sample Means 227
- Figure 11.10** Confidence Intervals 227
- Figure 11.11** Null and Research Hypotheses 229
- Figure 11.12** Illustration of When a Researcher Would Reject the Null Hypothesis 230
- Figure 11.13** How Much Is Enough? 231
- Figure 11.14** Significance Area for a One-Tailed Test 231
- Figure 11.15** One-Tailed Test Using a Distribution of Differences Between Sample Means 232
- Figure 11.16** Two-Tailed Test Using a Distribution of Differences Between Sample Means 232
- Figure 11.17** A Hypothetical Example of Type I and Type II Errors 233
- Figure 11.18** Rejecting the Null Hypothesis 239

- Figure 11.19** Power Under an Assumed Population Value 239
- Figure 11.20** A Power Curve 240
- Figure 12.1** Combinations of Data and Approaches to Research 247
- Figure 12.2** A Difference That Doesn't Make a Difference! 250
- Figure 12.3** Frequency Polygons of Gain Scores on Test of Ability to Explain: Inquiry and Lecture Groups 250
- Figure 12.4** 90 Percent Confidence Interval for a Difference of 1.2 Between Sample Means 251
- Figure 12.5** Scatterplots with a Pearson  $r$  of .50 253
- Figure 12.6** Scatterplot Illustrating the Relationship Between Initial Self-Esteem and Gain in Marital Satisfaction Among Counseling Clients 255
- Figure 12.7** 95 Percent Confidence Interval for  $r = .42$  255
- Figure 13.1** Example of a One-Shot Case Study Design 269
- Figure 13.2** Example of a One-Group Pretest-Posttest Design 269
- Figure 13.3** Example of a Static-Group Comparison Design 270
- Figure 13.4** Example of a Randomized Posttest-Only Control Group Design 271
- Figure 13.5** Example of a Randomized Pretest-Posttest Control Group Design 272
- Figure 13.6** Example of a Randomized Solomon Four-Group Design 273
- Figure 13.7** A Randomized Posttest-Only Control Group Design, Using Matched Subjects 274
- Figure 13.8** Results (Means) from a Study Using a Counterbalanced Design 276
- Figure 13.9** Possible Outcome Patterns in a Time-Series Design 277
- Figure 13.10** Using a Factorial Design to Study Effects of Method and Class Size on Achievement 278
- Figure 13.11** Illustration of Interaction and No Interaction in a 2 by 2 Factorial Design 278
- Figure 13.12** Example of a 4 by 2 Factorial Design 279
- Figure 13.13** Guidelines for Handling Internal Validity in Comparison Group Studies 282
- Figure 14.1** Single-Subject Graph 303
- Figure 14.2** A-B Design 304
- Figure 14.3** A-B-A Design 305
- Figure 14.4** A-B-A-B Design 306
- Figure 14.5** B-A-B Design 307
- Figure 14.6** A-B-C-B Design 308
- Figure 14.7** Multiple-Baseline Design 308
- Figure 14.8** Multiple-Baseline Design 309
- Figure 14.9** Multiple-Baseline Design Applied to Different Settings 310
- Figure 14.10** Variations in Baseline Stability 311
- Figure 14.11** Differences in Degree and Speed of Change 312
- Figure 14.12** Differences in Return to Baseline Conditions 313
- Figure 15.1** Scatterplot Illustrating a Correlation of +1.00 333
- Figure 15.2** Prediction Using a Scatterplot 334
- Figure 15.3** Multiple Correlation 336
- Figure 15.4** Discriminant Function Analysis 337
- Figure 15.5** Path Analysis Diagram 339
- Figure 15.6** Scatterplots for Combinations of Variables 343
- Figure 15.7** Eliminating the Effects of Age Through Partial Correlation 344
- Figure 15.8** Scatterplots Illustrating How a Factor (C) May Not Be a Threat to Internal Validity 347
- Figure 15.9** Circle Diagrams Illustrating Relationships Among Variables 347
- Figure 16.1** Examples of the Basic Causal-Comparative Design 368
- Figure 16.2** A Subject Characteristics Threat 369
- Figure 16.3** Does a Threat to Internal Validity Exist? 372
- Figure 17.1** Example of an Ideal Versus an Actual Telephone Sample for a Specific Question 395
- Figure 17.2** Example of an Internet Survey Created on SurveyMonkey 396
- Figure 17.3** Example of SurveyMonkey Data Results 397

- Figure 17.4** Example of Several Contingency Questions in an Interview Schedule 402
- Figure 17.5** Sample Cover Letter for a Mail Survey 403
- Figure 17.6** Demographic Data and Representativeness 405
- Figure 18.1** How Qualitative and Quantitative Researchers See the World 429
- Figure 19.1** Variations in Approaches to Observation 445
- Figure 19.2** The Importance of a Second Observer as a Check on One's Conclusions 447
- Figure 19.3** The Amidon/Flanders Scheme for Coding Categories of Interaction in the Classroom 448
- Figure 19.4** An Interview of Dubious Validity 453
- Figure 19.5** Don't Ask More Than One Question at a Time 454
- Figure 20.1** TV Violence and Public Viewing Patterns 477
- Figure 20.2** What Categories Should I Use? 481
- Figure 20.3** An Example of Coding an Interview 482
- Figure 20.4** Categories Used to Evaluate Social Studies Research 485
- Figure 21.1** Triangulation and Politics 515
- Figure 22.1** What Really Happened? 539
- Figure 22.2** Historical Research Is Not as Easy as You May Think! 541
- Figure 23.1** Exploratory Design 558
- Figure 23.2** Explanatory Design 559
- Figure 23.3** Triangulation Design 559
- Figure 24.1** Stakeholders 589
- Figure 24.2** The Role of the "Expert" in Action Research 590
- Figure 24.3** Levels of Participation in Action Research 591
- Figure 24.4** Participation in Action Research 593
- Figure 24.5** Experimental Design for the DeMaria Study 600
- Figure 25.1** Organization of a Research Report 624