

FIFTH EDITION


Research Methods in Physical Activity

Jerry R. Thomas • Jack K. Nelson
Stephen J. Silverman

Contents

Preface xi

Acknowledgments xv

	Part I Overview of the Research Process	1
	Chapter 1 Introduction to Research in Physical Activity	3
	▪ <i>The Nature of Research</i> 3 ▪ <i>Unscientific Versus Scientific Methods of Problem Solving</i> 10 ▪ <i>Alternative Models of Research</i> 14 ▪ <i>Types of Research</i> 17 ▪ <i>Overview of the Research Process</i> 20 ▪ <i>Summary</i> 22	
	Chapter 2 Developing the Problem and Using the Literature	25
	▪ <i>Identifying the Research Problem</i> 25 ▪ <i>Purpose of the Literature Review</i> 29 ▪ <i>Basic Literature Search Strategies</i> 31 ▪ <i>Steps in the Literature Search</i> 32 ▪ <i>Summary</i> 49	
	Chapter 3 Presenting the Problem	51
	▪ <i>Choosing the Title</i> 51 ▪ <i>Writing the Introduction</i> 52 ▪ <i>Stating the Research Problem</i> 54 ▪ <i>Presenting the Research Hypothesis</i> 56 ▪ <i>Operationally Defining Your Terms</i> 57 ▪ <i>Basic Assumptions, Delimitations, and Limitations</i> 58 ▪ <i>Justifying the Significance of the Study</i> 59 ▪ <i>The Differences Between the Thesis and the Research Article</i> 61 ▪ <i>Summary</i> 61	

Chapter 4 Formulating the Method 63

- *How to Present Methodological Details* 64
- *Why Planning the Method Is Important* 64
- *Two Principles for Planning Experiments* 64
- *Describing Participants* 65
- *Describing Instruments* 67
- *Describing Procedures* 68
- *Describing Design and Analysis* 72
- *Establishing Cause and Effect* 73
- *Interaction of Participants, Measurements, and Treatments* 74
- *Summary* 75

Chapter 5 Ethical Issues in Research and Scholarship 77

- *Seven Areas of Scientific Dishonesty* 77
- *Ethical Issues Regarding Copyright* 83
- *Model for Considering Scientific Misconduct* 85
- *Working With Faculty* 86
- *Protecting Human Participants* 88
- *Protecting Animal Subjects* 90
- *Summary* 91

Part II Statistical and Measurement Concepts in Research 95

Chapter 6 Becoming Acquainted With Statistical Concepts 97

- *Why We Need Statistics* 97
- *Use of Computers in Statistical Analysis* 99
- *Description and Inference Are Not Statistical Techniques* 99
- *Ways to Select a Sample* 99
- *Justifying Post Hoc Explanations* 101
- *Difficulty of Random Sampling and Assignment: How Good Does It Have to Be?* 101
- *Unit of Analysis* 102
- *Measures of Central Tendency and Variability* 103
- *Basic Concepts of Statistical Techniques* 107
- *Summary* 110

Chapter 7 Statistical Issues in Research Planning and Evaluation 113

- *Probability* 113
- *Meaningfulness (Effect Size)* 115
- *Power* 116
- *Using Information in the Context of the Study* 119
- *Reporting Statistical Data* 122
- *Summary* 123

Chapter 8 Relationships Among Variables 125

- *What Correlational Research Investigates* 125
- *Understanding the Nature of Correlation* 126
- *What the Coefficient of Correlation Means* 132
- *Using Correlation for Prediction* 135
- *Partial Correlation* 138
- *Uses of Semipartial Correlation* 139
- *Procedures for Multiple Regression* 139
- *Multivariate Forms of Correlation* 141
- *Summary* 144

Chapter 9 Differences Among Groups 147

- *How Statistics Test Differences* 147
- *Types of t Tests* 149
- *Interpreting t* 154
- *Relationship of t and r* 157
- *Analysis of Variance* 157
- *Analysis of Covariance* 171
- *Experimentwise Error Rate* 171
- *Understanding Multivariate Techniques* 172
- *Summary* 176

Chapter 10 Nonparametric Techniques 179

- *Chi Square: Testing the Observed Versus the Expected* 181
- *Procedures for Rank-Order Data* 185
- *Correlation* 186
- *Differences Among Groups* 188
- *Summary* 191

Chapter 11 Measuring Research Variables 193

- *Validity* 193
- *Reliability* 197
- *Methods of Establishing Reliability* 200
- *Intertester Reliability (Objectivity)* 202
- *Standard Error of Measurement* 202
- *Using Standard Scores to Compare Performance* 204
- *Measuring Movement* 205
- *Measuring Written Responses* 205
- *Measuring Affective Behavior* 205
- *Scales for Measuring Affective Behavior* 207
- *Measuring Knowledge* 209
- *Item Response Theory* 210
- *Summary* 211

Part III Types of Research 213

Chapter 12 Historical Research in Physical Activity 215

- *Research Paradigms* 215
- *Lines of Inquiry and Topics* 217
- *Designing the Research* 220
- *Working With the Evidence* 220
- *Summary* 228

Chapter 13	Philosophic Research in Physical Activity	231
	<ul style="list-style-type: none"> ▪ <i>Identifying the Purposes of Philosophic Research</i> 232 ▪ <i>Locating a Research Problem</i> 235 ▪ <i>Analyzing a Research Problem</i> 236 ▪ <i>Summary</i> 243 	
Chapter 14	Research Synthesis (Meta-Analysis)	247
	<ul style="list-style-type: none"> ▪ <i>Using Meta-Analysis to Synthesize Research</i> 248 ▪ <i>Presenting Effect Size Data</i> 256 ▪ <i>Summary</i> 257 	
Chapter 15	The Survey	269
	<ul style="list-style-type: none"> ▪ <i>The Questionnaire</i> 269 ▪ <i>The Delphi Method</i> 280 ▪ <i>The Personal Interview</i> 281 ▪ <i>The Normative Survey</i> 284 ▪ <i>Summary</i> 284 	
Chapter 16	Other Descriptive Research Methods	287
	<ul style="list-style-type: none"> ▪ <i>Developmental Research</i> 287 ▪ <i>The Case Study</i> 290 ▪ <i>Job Analysis</i> 293 ▪ <i>Observational Research</i> 293 ▪ <i>Unobtrusive Research Techniques</i> 297 ▪ <i>Correlational Research</i> 298 ▪ <i>Summary</i> 299 	
Chapter 17	Physical Activity Epidemiology Research	301
	<ul style="list-style-type: none"> ▪ <i>Observational Versus Experimental Research</i> 303 ▪ <i>What Is Epidemiology?</i> 303 ▪ <i>Physical Activity Measurement Definitions</i> 305 ▪ <i>Assessment of Physical Activity</i> 306 ▪ <i>Epidemiologic Study Designs</i> 309 ▪ <i>Reading and Interpreting a Physical Activity Epidemiologic Study</i> 318 ▪ <i>Summary</i> 320 	
Chapter 18	Experimental and Quasi-Experimental Research	321
	<ul style="list-style-type: none"> ▪ <i>Sources of Invalidity</i> 322 ▪ <i>Threats to Internal Validity</i> 323 ▪ <i>Threats to External Validity</i> 326 ▪ <i>Controlling Threats to Internal Validity</i> 327 ▪ <i>Controlling Threats to External Validity</i> 329 ▪ <i>Types of Designs</i> 330 ▪ <i>Summary</i> 343 	

Chapter 19 Qualitative Research 345

- *Contrasting Characteristics of Qualitative and Quantitative Research* 346
- *Procedures in Qualitative Research* 347
- *Analysis of the Data* 352
- *Concluding Remarks* 362
- *Summary* 363

Part IV Writing the Research Report 365

Chapter 20 Completing the Research Process 367

- *Research Proposal* 367
- *Developing a Good Introduction* 367
- *Describing the Method* 368
- *The Proposal Process* 369
- *Preparing and Presenting Qualitative Research Proposals* 372
- *Writing Proposals for Granting Agencies* 373
- *Submitting Internal Proposals* 374
- *Completing Your Thesis or Dissertation* 374
- *Results and Discussion* 374
- *How to Handle Multiple Experiments in a Single Report* 378
- *How to Use Tables and Figures* 379
- *Summary* 386

Chapter 21 Ways of Reporting Research 389

- *Basic Writing Guidelines* 389
- *A Brief Word About Acknowledgments* 390
- *Thesis and Dissertation Format: Traditional Versus Journal* 390
- *Helpful Hints for Successful Journal Writing* 397
- *Writing Abstracts* 398
- *Making Oral and Poster Presentations* 401
- *Summary* 404

Appendixes 405

A Statistical Tables 405

B A Brief Historical Overview of Research in Physical Activity in the United States 418

C Sample Consent Forms 422

References 432

Author Index 448

Subject Index 450

About the Authors 455