
Contents in Brief

About the Author	xvii
Preface	xix
I: OVERVIEW	1
Chapter 1 Introduction	3
Chapter 2 A Model of Empirical Research	13
II: MEASUREMENT	29
Chapter 3 Measurement Foundations: Validity and Validation	31
Chapter 4 Measurement Applications: Research Questionnaires	49
III: DESIGN	69
Chapter 5 Research Design Foundations	71
Chapter 6 Design Applications: Experiments and Quasi-Experiments	95
Chapter 7 Design Applications: Field Studies and Surveys	119
IV: ANALYSIS	135
Chapter 8 Data Analysis Foundations	137
Chapter 9 Analysis Applications: Describing Scores on a Single Variable	149
Chapter 10 Analysis Applications: Simple Correlation and Regression	165
Chapter 11 Analysis Applications: Multiple Correlation and Regression	191
V: STATISTICAL VALIDATION	221
Chapter 12 Statistical Inference Foundations	223
Chapter 13 Statistical Inference Applications	245
VI: GENERALIZATION	289
Chapter 14 External Validity	291
VII: RESEARCH REPORTS	313
Chapter 15 Research Report Writing	315
VIII: EXTENSIONS	329
Chapter 16 On Incomplete Data	331
Chapter 17 On Reliability	343
Chapter 18 On Multicollinearity	359
Chapter 19 On Multiple Correlation and Regression Modeling	369
Glossary	395
References	411
Author Index	415
Subject Index	417

Contents

About the Author	xvii
Preface	xix
I OVERVIEW	1
1. Introduction	3
Research Activities	7
A Point of View	7
Objectives and Organization	9
Summary	11
For Review	11
2. A Model of Empirical Research	13
Research Variables	14
Conceptual and Operational Variables	14
Dependent and Independent Variables	15
The Model	16
Conceptual Relationships	17
Operational Relationships	18
Empirical Relationships	18
Causal Relationships	18
Conceptual to Operational Relationships	19
Generalizing From the Model	21
Statistical Generalization	22
External Generalization	22
Summary	23
For Review	25
II MEASUREMENT: UNDERSTANDING CONSTRUCT VALIDITY	29
3. Measurement Foundations: Validity and Validation	31
Construct Definitions	32

Construct Domain	32
Nomological Networks	33
Construct Definition Illustration	33
Construct Validity Challenges	34
Random Errors	34
Systematic Errors	36
Scores Are Critical	36
Construct Validation	38
Content Validity	39
Reliability	40
Types of Reliability	40
Reliability and Construct Validity	41
Convergent Validity	41
Discriminant Validity	43
Investigating Nomological Networks	43
Summary	46
For Review	47
4. Measurement Applications: Research Questionnaires	49
Questionnaire Decisions	51
Alternatives to Questionnaire Construction	51
Secondary Data	51
Questionnaires Developed by Others	52
Questionnaire Type	52
Self-Reports Versus Observations	52
Interviews Versus Written Questionnaires	53
Questionnaire Construction	54
Content Domain	56
Items	56
Item Wording	57
Item Sequence	57
Scaling	58
Questionnaire Response Styles	59
Self-Reports	60
Observations	62
Implications for Questionnaire Construction and Use	62
Pilot Testing	63
Summary	63
For Review	65
Part II: Suggested Reading	66

III	DESIGN: ADDRESSING INTERNAL VALIDITY	69
5.	Research Design Foundations	71
	Causal Challenges	72
	Causal Direction	73
	Uncontrolled (Nuisance) Variables	74
	Bias	75
	Spurious Relationships	77
	Suppressor Variables	77
	Noise	78
	Mediators	79
	Moderators	79
	Using Design to Address Causal Challenges	83
	Sampling: Selecting Cases to Study	83
	Restriction of Range	83
	Comparison Groups	84
	Measurement Decisions	84
	Control Over Independent Variables	84
	Measurement and Statistical Control	85
	Administering Measures to Cases	86
	Matching	86
	Random Assignment	87
	Design Types	88
	Experiments	88
	Quasi-Experiments	88
	Field Studies and Surveys	89
	Summary	89
	For Review	92
6.	Design Applications: Experiments and Quasi-Experiments	95
	Basic Designs	96
	Design A1: Cross-Sectional Between-Cases Design	96
	Design B1: Longitudinal Within-Cases Design	98
	Threats to Internal Validity	99
	Threats From the Research Environment	99
	Demands on Participants	100
	Researcher Expectations	101
	Threats in Between-Cases Designs	101
	Threats in Longitudinal Designs	103
	Additional Designs	104
	Design C1: Longitudinal Between-Cases	104

Design D: Cross-Sectional Factorial Design	108
Design E: Cross-Sectional Design With Covariate	110
Design Extensions	113
Summary	114
For Review	115
7. Design Applications: Field Studies and Surveys	119
Basic Designs	120
Design A2: Between-Cases Design	121
Design B2: Within-Cases Time Series	121
Design C2: Longitudinal Between-Cases Panel Studies	124
Design Extensions	125
Threats to Internal Validity	125
Concerns About Causal Direction	127
Biases Introduced by a Single Source and Similar Method	128
Praise for Surveys and Field Studies	129
Internal Validity May Not Be a Concern	130
Causation May Not Be a Concern	130
Design Constraints	130
Summary	131
For Review	132
Part III: Suggested Reading	133
IV ANALYSIS: INVESTIGATING EMPIRICAL RELATIONSHIPS	135
8. Data Analysis Foundations	137
Data Analysis and Statistics	138
Statistical Information	139
Statistical Purposes	139
Properties of Scores	139
Levels of Measurement	140
Discrete and Continuous Variables	141
Conventions	142
Summary	143
For Review	145
Appendix 8A: On Clean Data	147

9. Analysis Applications: Describing Scores on a Single Variable	149
A Data Matrix	150
Tables and Graphs	150
Tables	151
Graphs	152
Statistical Representation of Scores	153
Central Tendency	153
Variability	155
Shape	156
Skew	160
Kurtosis	160
Relationships Between Statistics	160
Skew and Central Tendency	160
Skew and Variability	161
Summary	161
For Review	162
10. Analysis Applications: Simple Correlation and Regression	165
Graphical Representation	168
Simple Correlation	169
Correlation Formulas	171
Covariance	172
Standard Scores	173
Variance Explained	175
Simple Regression	178
Regression Model	178
Regression Formulas	181
Nominal Independent Variables	181
Summary	183
For Review	187
11. Analysis Applications: Multiple Correlation and Regression	191
Graphical Representation	192
Multiple Correlation	194
Multiple Coefficient of Determination	195
Examples of the Multiple Coefficient of Determination	196
Multiple Regression	198
Intercept and Partial Regression Coefficients	200
Partial Beta Coefficients	200
Examples of Multiple Regression	201

More Than Two Independent Variables	203
Nominal Independent Variables	205
One Nominal Variable With More Than Two Values	205
Other Independent Variables	207
Summary	209
For Review	210
Appendix 11A: Contributions of Single Independent Variables in Multiple Correlation	215
Appendix 11B: Another Way to Think About Partial Coefficients	218
Part IV: Suggested Reading	220
V STATISTICAL VALIDATION	221
12. Statistical Inference Foundations	223
Probability	226
Random Variables	226
Independent Random Variables	227
Probability Distributions	227
Discrete Probability Distributions	228
Continuous Probability Distributions	232
Sampling Distributions	234
Statistics and Parameters	235
Sampling Distribution of the Mean	236
Other Sampling Distributions	240
Summary	240
For Review	241
13. Statistical Inference Applications	245
Statistical Hypothesis Testing	246
Hypothesis Testing Logic and Procedures	247
Specify Hypotheses and Significance Levels	248
Draw a Probability Sample	249
Estimate the Sampling Distribution If the Null Hypothesis Is True	249
Identify Critical Region(s) of the Null Sampling Distribution	250
Use Sample Statistic to Decide If the Null Sampling Distribution Is False	251
Hypothesis Testing Example	251
Hypothesis Testing Outcomes	254
Statistical Power	255

Statistical Power Conventions	256
Other Power Determinants	261
Confidence Intervals	262
Confidence Interval Logic and Procedures	262
Set Confidence Level	262
Draw a Probability Sample and Calculate Sample Statistic	263
Estimate Sampling Distribution Assuming the Statistic Represents the Parameter	263
Identify Probable Region of the Sampling Distribution	264
Infer That the Population Parameter Falls Within the Probable Region	265
Confidence Interval Example	265
Confidence Intervals Versus Hypothesis Testing and Power	268
Internal Statistical Validity	269
Randomization Tests	269
Concluding Cautions	272
Summary	273
For Review	274
Appendix 13A: Formulas for Statistical Inference	278
Part V: Suggested Reading	287
VI GENERALIZATION:	289
ADDRESSING EXTERNAL VALIDITY	
14. External Validity	291
External Generalization Challenges	293
Generalizing From Single Studies	294
Replication	295
Replication Roles	296
Narrative Reviews of Replication	298
Meta-Analysis	299
Example	302
Illustrative Data	302
Meta-Analysis Interpretations	304
External Statistical Inference	304
Internal Statistical Inference	305
Evaluation	306
Contributions of Meta-Analysis	306
Meta-Analysis Reservations	307
Closing Observations	308
Summary	308

For Review	309
Part VI: Suggested Reading	310
VII RESEARCH REPORTS	313
15. Research Report Writing	315
Research Report Format	316
Introduction	316
Methods	316
Cases	317
Measures	317
Procedure	318
Analyses	318
Results	319
Discussion	319
Alternative Research Report Formats	320
Additional Suggestions	321
Begin by Organizing	321
Rewrite, Then Rewrite	322
Draft a Critic	323
Take a Scout’s Oath	323
Summary	323
Appendix 15A: On Table Construction	325
VIII EXTENSIONS	329
16. On Incomplete Data	331
Avoid Incomplete Data	333
Evaluate Nonresponse	333
Address Missing Data	334
Dependent Variables	334
Independent Variables	335
Delete Variables	335
Delete Cases	335
Estimate Missing Scores	336
Identify “Missingness”	338
Summary	340
For Review	341
Suggested Reading	342

17. On Reliability	343
Reliability Defined	344
Estimating Reliability	346
Coefficient Alpha	346
Interpreting Coefficient Alpha	348
Consequences of Unreliability	349
Consequences for Simple Correlation and Regression	349
Demonstrations	350
Correlation Coefficients	350
Regression Coefficients and Intercepts	352
Unreliability in X	352
Unreliability in Y	352
Summary	353
For Review	353
Suggested Reading	357
 18. On Multicollinearity	 359
Problems for Statistical Inference: Bouncing Betas	360
A Demonstration	361
Population Parameters	362
Sample Statistics	363
Multicollinearity Misconceived	366
Addressing Multicollinearity	367
Summary	367
For Review	368
 19. On Multiple Correlation and Regression Modeling	 369
Causal Models	372
Evaluating Causal Models	372
Four Causal Models	372
Direct Effects Models	372
Mediated Models	374
Moderated Models	376
Hierarchical Models	380
Importance of Specification	383
Empirical Models	384
Stepwise Regression	384
Evaluation of Stepwise Regression	386
A Closing Caution	386
Summary	387
For Review	388

Suggested Reading	391
Appendix 19A: Additional Assumptions for Inference	392
Glossary	395
References	411
Author Index	415
Subject Index	417