

# Contents

Preface	xv		
About the Author	xxiii		
<b>1 Introduction</b>	<b>1</b>		
1.1 Why Do We Need Science at All?	2		
1.1.1 Rationale	2		
1.2 Illustrations of Our Limitations in Accruing Knowledge	3		
1.2.1 Senses and Their Limits	3		
1.2.2 Cognitive Heuristics	3		
1.2.3 Additional Information Regarding Cognitive Heuristics	4		
1.2.4 Memory	4		
1.2.5 General Comments	5		
1.3 Methodology	6		
1.3.1 Definition and Its Components	7		
1.3.2 Using Methodology to Answer Critical Questions	7		
1.4 A Way of Thinking and Problem Solving	7		
1.4.1 The Role of Theory	7		
1.4.2 Findings and Conclusions	8		
1.4.3 Additional Information Regarding Findings and Conclusions	8		
1.4.4 Parsimony	9		
1.4.5 How Parsimony Relates to Methodology	9		
1.4.6 Plausible Rival Hypothesis	10		
1.4.7 An Example of Plausible Rival Hypothesis	10		
1.5 The Semmelweis Illustration of Problem Solving	11		
1.5.1 Illustration: Saving Mothers from Dying	11		
1.5.2 Additional Information Regarding the Semmelweis Illustration	12		
1.5.3 A New Procedure	13		
1.5.4 General Comments	14		
<b>2 Internal and External Validity</b>	<b>15</b>		
2.1 Types of Validity	15		
2.2 Internal Validity	16		
2.3 Threats to Internal Validity	16		
2.3.1 History	17		
2.3.2 Maturation	18		
2.3.3 Testing	18		
2.3.4 History, Maturation, and Testing Combined	19		
2.4 Instrumentation as a Threat to Internal Validity	19		
2.4.1 Some Examples Involving Instrumentation	20		
2.4.2 Additional Information on Instrumentation	20		
2.4.3 Response Shift	21		
2.5 Additional Threats to Internal Validity	22		
2.5.1 Statistical Regression	22		
2.5.2 Three Ways to Help Protect Against Statistical Regression	22		
2.5.3 Selection Biases	23		
2.5.4 Attrition	24		
2.5.5 Diffusion or Imitation of Treatment	24		
2.5.6 Special Treatment or Reactions of Controls	25		
2.5.7 Additional Information on Reactions of Controls	25		
2.6 When and How These Threats Emerge	26		
2.6.1 Poorly Designed Study	26		
2.6.2 Well-Designed Study but Sloppily Conducted	27		
2.6.3 Well-Designed Study with Influences Hard to Control during the Study	28		
2.6.4 Well-Designed Study but the Results Obscure Drawing Conclusions	28		
2.7 Managing Threats to Internal Validity	29		
2.7.1 General Comments	30		
2.8 External Validity	30		
2.9 Threats to External Validity	30		
2.9.1 Summary of Major Threats	31		
2.9.2 Sample Characteristics	32		
2.9.3 College Students as Subjects	32		
2.9.4 Samples of Convenience	33		
2.9.5 Underrepresented Groups	34		
2.9.6 Additional Information on Underrepresented Groups	35		
2.9.7 Narrow Stimulus Sampling	35		
2.9.8 Additional Information on Narrow Stimulus Sampling	36		
2.10 Additional Threats to External Validity	37		
2.10.1 Reactivity of Experimental Arrangements	37		
2.10.2 Reactivity of Assessment	38		
2.10.3 Main Strategy for Combatting Reactivity	38		
2.10.4 Test Sensitization	39		
2.10.5 Multiple-Treatment Interference	39		
2.10.6 Novelty Effects	40		
2.10.7 Generality across Measures, Setting, and Time	41		
2.10.8 Cohorts	42		
2.11 When We Do and Do Not Care about External Validity	42		
2.11.1 Proof of Concept (or Test of Principle)	42		
2.11.2 Additional Information on Proof of Concept	43		
2.12 Managing Threats to External Validity	43		
2.12.1 General Comments	44		
2.12.2 More General Comments on Managing Threats	45		

2.13	Perspectives on Internal and External Validity	45	4.2.5	Stimulated by Other Studies	83
2.13.1	Parsimony and Plausibility	46	4.2.6	Translations and Extensions between Human and Nonhuman Animals	84
2.13.2	Priority of Internal Validity	46	4.2.7	Measurement Development and Validation	85
2.13.3	Further Considerations Regarding Priority of Internal Validity	47	4.3	Investigating How Two (or more) Variables Relate to Each Other	85
	Summary and Conclusions: Internal and External Validity	48	4.3.1	Association or Correlation between Variables	85
<b>3</b>	<b>Construct and Data-Evaluation Validity</b>	<b>49</b>	4.3.2	Concepts That Serve as the Impetus for Research	86
3.1	Construct Validity Defined	49	4.3.3	Risk Factor	86
3.2	Confounds and Other Intriguing Aspects of Construct Validity	50	4.3.4	Understanding the Difference between a Correlate and a Risk Factor	87
3.3	Threats to Construct Validity	51	4.3.5	Protective Factor	88
3.3.1	Attention and Contact with the Clients	51	4.3.6	Causal Factors	89
3.3.2	Single Operations and Narrow Stimulus Sampling	53	4.3.7	Key Criteria for Inferring a Causal Relation	89
3.3.3	Experimenter Expectancies	55	4.3.8	General Comments	90
3.3.4	Cues of the Experimental Situation	56	4.4	Moderators, Mediators, and Mechanisms	91
3.4	Managing Threats to Construct Validity	57	4.4.1	Moderators	91
3.4.1	General Comments	60	4.4.2	Moderator Research	92
3.5	Data-Evaluation Validity Defined	60	4.4.3	Mediators and Mechanisms	92
3.6	Threats to Data-Evaluation Validity Defined	61	4.4.4	Tutti: Bringing Moderators, Mediators, and Mechanisms Together	93
3.7	Overview of Essential Concepts of Data-Evaluation Validity	61	4.4.5	General Comments	94
3.7.1	Statistical Test and Decision Making	61	4.5	Translating Findings from Research to Practice	95
3.7.2	Effect Size	62	4.5.1	Basic and Applied Research	95
3.8	Threats to Data-Evaluation Validity	63	4.5.2	Distinguishing Applied Research from Basic Research	95
3.8.1	Low Statistical Power	63	4.5.3	Translational Research	96
3.8.2	Subject Heterogeneity	65	4.5.4	Further Consideration Regarding Translational Research	97
3.8.3	Variability in the Procedures	66	4.6	Theory as a Guide to Research	98
3.8.4	Unreliability of the Measures	67	4.6.1	Definition and Scope	98
3.8.5	Restricted Range of the Measures	67	4.6.2	Theory and Focus	99
3.8.6	Errors in Data Recording, Analysis, and Reporting	68	4.7	Why Theory Is Needed	100
3.8.7	Multiple Comparisons and Error Rates	70	4.7.1	Some Additional Reasons Why Theory Is Needed	101
3.8.8	Misreading or Misinterpreting the Data Analyses	70	4.7.2	Generating Versus Testing Hypotheses	101
3.9	Managing Threats to Data-Evaluation Validity	71	4.7.3	Further Considerations Regarding Generating Versus Testing Hypotheses	102
3.9.1	General Comments	74	4.8	What Makes a Research Idea Interesting or Important?	103
3.10	Experimental Precision	75	4.8.1	Guiding Questions	103
3.10.1	Trade-Offs and Priorities	75	4.8.2	More Information on Generating Guiding Questions	104
3.10.2	Holding Constant Versus Controlling Sources of Variation	76	4.9	From Ideas to a Research Project	104
	Summary and Conclusions: Construct and Data-Evaluation Validity	77	4.10	Overview of Key Steps	104
<b>4</b>	<b>Ideas that Begin the Research Process</b>	<b>78</b>	4.10.1	Abstract Ideas to Hypothesis and Operations	105
4.1	Developing the Research Idea	78	4.10.2	Moving to Operations Constructs and Procedures	105
4.2	Sources of Ideas for Study	80	4.10.3	Sample to Be Included	106
4.2.1	Curiosity	80	4.10.4	Research Design Options	107
4.2.2	The Case Study	80	4.10.5	Additional Information Regarding Research Design Options	108
4.2.3	Study of Special Populations	81	4.10.6	Multiple Other Decision Points	108
4.2.4	Additional Information Regarding Special Populations	82	4.11	General Comments	109

Summary and Conclusions: Ideas that Begin the Research Process	109		
<b>5 Experimental Research Using Group Designs</b>	<b>111</b>	<b>6 Control and Comparison Groups</b>	<b>139</b>
5.1 Subject Selection	111	6.1 Control Groups	140
5.1.1 Random Selection	112	6.2 No-Treatment Control Group	141
5.1.2 More Information on Random Selection	112	6.2.1 Description and Rationale	141
5.2 Who Will Serve as Subjects and Why?	113	6.2.2 Special Considerations	141
5.2.1 Diversity of the Sample	113	6.3 Wait-List Control Group	142
5.2.2 Dilemmas Related to Subject Selection	114	6.3.1 Description and Rationale	142
5.2.3 Samples of Convenience	115	6.3.2 Special Considerations	143
5.2.4 Additional Sample Considerations	115	6.4 No-Contact Control Group	143
5.3 Subject Assignment and Group Formation	116	6.4.1 Description and Rationale	144
5.3.1 Random Assignment	116	6.4.2 Special Considerations	144
5.3.2 Group Equivalence	117	6.5 Nonspecific Treatment or Attention-Placebo Control Group	145
5.3.3 Matching	118	6.5.1 Description and Rationale	145
5.3.4 Matching When Random Assignment is Not Possible	119	6.5.2 More Information on Description and Rationale	146
5.3.5 Perspective on Random Assignment and Matching	120	6.5.3 Special Considerations	146
5.4 True-Experimental Designs	121	6.5.4 Ethical Issues	147
5.5 Pretest-Posttest Control Group Design	121	6.6 Treatment as Usual	148
5.5.1 Description	121	6.6.1 Description and Rationale	148
5.5.2 An Example of a Randomized Controlled Trial (RCT)	122	6.6.2 Special Considerations	149
5.5.3 Considerations in Using the Design	122	6.7 Yoked Control Group	149
5.5.4 Additional Consideration Regarding Pretest-Posttest Design	123	6.7.1 Description and Rationale	150
5.6 Posttest-Only Control Group Design	124	6.7.2 More Information on Description and Rationale	150
5.6.1 Description	124	6.7.3 Special Considerations	151
5.6.2 Considerations in Using the Design	124	6.8 Nonrandomly Assigned or Nonequivalent Control Group	151
5.7 Solomon Four-Group Design	125	6.8.1 Description and Rationale	151
5.7.1 Description	125	6.8.2 Special Considerations	152
5.7.2 Considerations in Using the Design	126	6.9 Key Considerations in Group Selection	152
5.8 Factorial Designs	127	6.10 Evaluating Psychosocial Interventions	153
5.8.1 Considerations in Using the Design	128	6.10.1 Intervention Package Strategy	154
5.9 Quasi-Experimental Designs	128	6.10.2 Dismantling Intervention Strategy	155
5.10 Variations: Briefly Noted	129	6.10.3 Constructive Intervention Strategy	155
5.10.1 Pretest-Posttest Design	129	6.10.4 Parametric Intervention Strategy	156
5.10.2 Posttest-Only Design	129	6.11 Evaluating Additional Psychosocial Interventions	156
5.11 Illustration	130	6.11.1 Comparative Intervention Strategy	156
5.11.1 General Comments	131	6.11.2 Intervention Moderator Strategy	157
5.12 Multiple-Treatment Designs	131	6.11.3 More Information on Intervention Moderator Strategy	158
5.12.1 Crossover Design	131	6.11.4 Intervention Mediator/Mechanism Strategy	158
5.12.2 Multiple-Treatment Counter balanced Design	132	6.11.5 General Comments	159
5.13 Considerations in Using the Designs	133	Summary and Conclusions: Control and Comparison Groups	160
5.13.1 Order and Sequence Effects	133	<b>7 Case-Control and Cohort Designs</b>	<b>162</b>
5.13.2 Restrictions with Various Independent and Dependent Variables	134	7.1 Critical Role of Observational Research: Overview	162
5.13.3 Ceiling and Floor Effects	135	7.1.1 More Information on the Critical Role of Observational Research	164
5.13.4 Additional Considerations Regarding Ceiling and Floor Effects	135	7.2 Case-Control Designs	164
Summary and Conclusions: Experimental Research Using Group Designs	137	7.2.1 Cross-Sectional Design	165
		7.2.2 Retrospective Design	166
		7.2.3 More Information on Retrospective Design	167

7.2.4	Considerations in Using Case-Control Designs	168	8.4.3	Design Variations	200
7.2.5	Further Considerations in Using Case-Control Designs	169	8.4.4	Considerations in Using the Designs	200
<b>7.3</b>	<b>Cohort Designs</b>	<b>170</b>	<b>8.5</b>	<b>Multiple-Baseline Designs</b>	<b>201</b>
7.3.1	Single-Group Cohort Design	170	8.5.1	Description	201
7.3.2	Birth-Cohort Design	171	8.5.2	Illustration	202
7.3.3	More Information on Birth-Cohort Design	172	8.5.3	Design Variations	202
7.3.4	Multigroup Cohort Design	173	8.5.4	Considerations in Using the Designs	205
7.3.5	More Information on Multigroup Cohort Design	174	<b>8.6</b>	<b>Changing-Criterion Designs</b>	<b>205</b>
7.3.6	Accelerated, Multi-Cohort Longitudinal Design	175	8.6.1	Description	206
7.3.7	More Information on Accelerated, Multi-Cohort Longitudinal Design	176	8.6.2	Illustration	207
7.3.8	Considerations in Using Cohort Designs	177	8.6.3	Design Variations	207
<b>7.4</b>	<b>Prediction, Classification, and Selection</b>	<b>177</b>	8.6.4	Considerations in Using the Designs	209
7.4.1	Identifying Varying Outcomes: Risk and Protective Factors	177	<b>8.7</b>	<b>Data Evaluation in Single-Case Research</b>	<b>210</b>
7.4.2	Sensitivity and Specificity: Classification, Selection, and Diagnosis	179	<b>8.8</b>	<b>Visual Inspection</b>	<b>210</b>
7.4.3	Further Considerations Regarding Sensitivity and Specificity	180	8.8.1	Criteria Used for Visual Inspection	210
7.4.4	General Comments	181	8.8.2	Additional Information on Criteria Used for Visual Inspection	212
<b>7.5</b>	<b>Critical Issues in Designing and Interpreting Observational Studies</b>	<b>182</b>	8.8.3	Considerations in Using Visual Inspection	213
<b>7.6</b>	<b>Specifying the Construct</b>	<b>182</b>	<b>8.9</b>	<b>Statistical Evaluation</b>	<b>214</b>
7.6.1	Level of Specificity of the Construct	182	8.9.1	Statistical Tests	215
7.6.2	Operationalizing the Construct	183	8.9.2	Additional Information on Statistical Tests	216
7.6.3	Further Considerations Regarding Operationalizing the Construct	184	8.9.3	Considerations in Using Statistical Tests	218
<b>7.7</b>	<b>Selecting Groups</b>	<b>185</b>	<b>8.10</b>	<b>Evaluation of Single-Case Designs</b>	<b>220</b>
7.7.1	Special Features of the Sample	185	8.10.1	Special Strengths and Contributions	220
7.7.2	Selecting Suitable Controls	186	8.10.2	Strength 1 of Single-Case Designs	220
7.7.3	Additional Information on Selecting Suitable Controls	186	8.10.3	Strengths 2 and 3 of Single-Case Designs	220
7.7.4	Possible Confounds	187	8.10.4	Strengths 4 and 5 of Single-Case Designs	221
7.7.5	More Information on Possible Confounds	188	8.10.5	Issues and Concerns	221
<b>7.8</b>	<b>Time Line and Causal Inferences</b>	<b>189</b>	Summary and Conclusions: Single-Case Experimental Research Designs		222
<b>7.9</b>	<b>General Comments</b>	<b>190</b>	<b>9 Qualitative Research Methods</b> <b>224</b>		
Summary and Conclusions: Case-Control and Cohort Designs		190	<b>9.1</b>	<b>Key Characteristics</b>	<b>225</b>
<b>8 Single-Case Experimental Research Designs</b>		<b>192</b>	9.1.1	Overview	225
<b>8.1</b>	<b>Key Requirements of the Designs</b>	<b>193</b>	9.1.2	An Orienting Example	226
8.1.1	Ongoing Assessment	193	9.1.3	Definition and Core Features	227
8.1.2	Baseline Assessment	194	9.1.4	Contrasting Qualitative and Quantitative Research	227
<b>8.2</b>	<b>Stability of Performance</b>	<b>195</b>	9.1.5	More Information on Contrasting Qualitative and Quantitative Research	228
8.2.1	Trend in the Data	195	<b>9.2</b>	<b>Methods and Analyses</b>	<b>229</b>
8.2.2	Variability in the Data	196	<b>9.3</b>	<b>The Data for Qualitative Analysis</b>	<b>229</b>
<b>8.3</b>	<b>Major Experimental Design Strategies</b>	<b>197</b>	<b>9.4</b>	<b>Validity and Quality of the Data</b>	<b>230</b>
<b>8.4</b>	<b>ABAB Designs</b>	<b>197</b>	9.4.1	Validity	230
8.4.1	Description	197	9.4.2	Qualitative Research on and with Its Own Terms	230
8.4.2	Illustration	199	9.4.3	More Information on Key Concepts and Terms	231
			9.4.4	Checks and Balances	232
			<b>9.5</b>	<b>Illustrations</b>	<b>233</b>
			9.5.1	Surviving a Major Bus Crash	233
			9.5.2	Comments on This Illustration	234

9.5.3	Lesbian, Gay, Bisexual, and Transgender (LGBT) Youth and the Experience of Violence	234	10.4.2	Use of Short or Shortened Forms	263
9.5.4	Comments on This Illustration	235	10.4.3	Single or a Few Items	264
9.5.5	Yikes! Why Did I Post That on Facebook?	236	10.4.4	Considerations and Cautions	264
9.5.6	Comments on This Illustration	237	10.4.5	More Information Regarding Considerations and Cautions	265
9.6	Mixed Methods: Combining Quantitative and Qualitative Research	237	10.5	Interrelations of Different Measures	266
9.6.1	Motorcycle Helmet Use	237	10.5.1	Three Reasons for Lack of Correspondence among Measures	266
9.6.2	Comments on This Example	238	10.6	Construct and Method Variance	267
9.7	Recapitulation and Perspectives on Qualitative Research	239	10.6.1	Using a Correlation Matrix	268
9.7.1	Contributions of Qualitative Research	239	10.7	General Comments	269
9.7.2	Further Considerations Regarding Contributions of Qualitative Research	241		Summary and Conclusions: Selecting Measures for Research	270
9.7.3	Limitations and Unfamiliar Characteristics	242	<b>11</b>	<b>Assessment: Types of Measures and Their Use</b>	<b>272</b>
9.7.4	Unfamiliar Characteristics 1 and 2 of Qualitative Research	242	11.1	Type of Assessment	272
9.7.5	Unfamiliar Characteristics 3, 4, and 5 of Qualitative Research	243	11.1.1	Modalities of Assessment Used in Clinical Psychology	273
9.7.6	General Comments	244	11.2	Objective Measures	273
	Summary and Conclusions: Qualitative Research Methods	245	11.2.1	Characteristics	274
<b>10</b>	<b>Selecting Measures for Research</b>	<b>246</b>	11.2.2	Issues and Considerations	274
10.1	Key Considerations in Selecting Measures	247	11.2.3	More Information on Issues and Considerations	275
10.1.1	Construct Validity	248	11.3	Global Ratings	277
10.1.2	More Information on Construct Validity	248	11.3.1	Characteristics	277
10.1.3	Reasons for Carefully Selecting Measures	249	11.3.2	Issues and Considerations	278
10.1.4	Psychometric Characteristics	250	11.3.3	More Information on Issues and Considerations	279
10.1.5	More Information on Psychometric Characteristics	250	11.4	Projective Measures	279
10.1.6	Sensitivity of the Measure	251	11.4.1	Characteristics	279
10.1.7	Diversity and Multicultural Relevance of the Measure	253	11.4.2	Issues and Considerations	280
10.1.8	Core Features of Ethnicity, Culture, and Diversity	253	11.4.3	More Information on Issues and Considerations	281
10.1.9	General Comments	254	11.5	Direct Observations of Behavior	282
10.2	Using Available or Devising New Measures	255	11.5.1	Characteristics	282
10.2.1	Using a Standardized Measure	255	11.5.2	More Information on Characteristics	283
10.2.2	Varying the Use or Contents of an Existing Measure	256	11.5.3	Issues and Considerations	284
10.2.3	More Information on Varying the Use or Contents	256	11.6	Psychobiological Measures	285
10.2.4	Developing a New Measure	257	11.6.1	Characteristics	285
10.2.5	General Comments	259	11.6.2	More Information on Characteristics	287
10.3	Special Issues to Guide Measurement Selection	259	11.6.3	Issues and Considerations	289
10.3.1	Awareness of Being Assessed: Measurement Reactivity	259	11.7	Computerized, Technology-Based, and Web-Based Assessment	290
10.3.2	More Information on Awareness of Being Assessed	260	11.7.1	Characteristics	290
10.3.3	Countering Limited Generality	260	11.7.2	More Information on Characteristics	291
10.3.4	Use of Multiple Measures	261	11.7.3	Issues and Considerations	292
10.4	Brief Measures, Shortened Forms, and Use of Single-Item Measures	262	11.8	Unobtrusiveness Measures	293
10.4.1	Use of Brief Measures	263	11.8.1	Characteristics	293
			11.8.2	More Information on Characteristics	294
			11.8.3	Issues and Considerations	296
			11.9	General Comments	297
				Summary and Conclusions: Assessment: Types of Measure and Their Use	298

<b>12 Special Topics of Assessment</b>	<b>299</b>		
12.1 Assessing the Impact of the Experimental Manipulation	300	12.7.4 More Information on Improving Patient Care in Research	322
12.1.1 Checking on the Experimental Manipulation	300	12.7.5 General Comments	323
12.2 Types of Manipulations	300	Summary and Conclusions: Special Topics of Assessment	324
12.2.1 Variations of Information	300	<b>13 Null Hypothesis Significance Testing</b>	<b>325</b>
12.2.2 Variations in Subject Tasks and Experience	301	13.1 Significance Tests and the Null Hypothesis	325
12.2.3 Variation of Intervention Conditions	301	13.1.1 More Information on Significance Tests	327
12.2.4 Additional Information on Variation of Intervention Conditions	302	13.2 Critical Concepts and Strategies in Significance Testing	328
12.3 Utility of Checking the Manipulation	303	13.2.1 Significance Level (alpha)	328
12.3.1 No Differences between Groups	303	13.3 Power	328
12.3.2 Keeping Conditions Distinct	304	13.3.1 The Power Problem	328
12.4 Interpretive Problems in Checking the Manipulation	305	13.3.2 Relation to Alpha, Effect Size, and Sample Size	329
12.4.1 Effects on Manipulation Check and Dependent Measure	305	13.3.3 More Information on Relations to Alpha, Effect Size, and Sample Size	330
12.4.2 No Effect on Manipulation Check and Dependent Measure	306	13.3.4 Variability in the Data	332
12.4.3 Effect on Manipulation Check but No Effect on the Dependent Measure	306	13.4 Ways to Increase Power	332
12.4.4 No Effect on the Manipulation Check but an Effect on the Dependent Measure	306	13.4.1 Increasing Expected Differences between Groups	333
12.4.5 General Comments	307	13.4.2 Use of Pretests	333
12.5 Special Issues and Considerations in Manipulation Checks	308	13.4.3 Varying Alpha Levels within an Investigation	334
12.5.1 Assessment Issues	308	13.4.4 More Information on Varying Alpha Levels	334
12.5.2 More Information on Assessment Issues	308	13.4.5 Using Directional Tests	335
12.5.3 Data Analysis Issues: Omitting Subjects	309	13.4.6 Decreasing Variability (Error) in the Study	336
12.5.4 More Information on Omitting Subjects	310	13.5 Planning the Data Analyses at the Design Stage	336
12.5.5 Intent-to-Treat Analyses and Omitting and Keeping Subjects in Separate Data Analyses	310	13.6 Objections to Statistical Significance Testing	337
12.5.6 Pilot Work and Establishing Potent Manipulations	311	13.6.1 Major Concerns	337
12.6 Assessing Clinical Significance or Practical Importance of the Changes	312	13.6.2 Misinterpretations	338
12.6.1 Most Frequently Used Measures	314	13.6.3 More Information on Misinterpretations	339
12.6.2 Further Considerations Regarding Most Frequently Used Measures	314	13.6.4 Significance Testing and Failures to Replicate	339
12.6.3 More Information on Most Frequently Used Measures	315	13.6.5 General Comments	340
12.6.4 Other Criteria Briefly Noted	316	13.7 Hypothesis Testing: Illustrating an Alternative	340
12.6.5 Further Considerations Regarding Other Criteria	318	13.7.1 Bayesian Data Analyses	340
12.6.6 Other Terms and Criteria worth Knowing	319	13.7.2 More Information on Bayesian Data Analyses	341
12.6.7 General Comments	319	13.7.3 General Comments	342
12.7 Assessment during the Course of Treatment	320	Summary and Conclusions: Null Hypothesis Significance Testing	342
12.7.1 Evaluating Mediators of Change	320	<b>14 Presenting and Analyzing the Data</b>	<b>344</b>
12.7.2 More Information on Evaluating Mediators of Change	321	14.1 Overview of Data Evaluation	344
12.7.3 Improving Patient Care in Research and Clinical Practice	322	14.1.1 Checking the Data	344
		14.1.2 Description and Preliminary Analyses	345
		14.2 Supplements to Tests of Significance	346
		14.2.1 Magnitude and Strength of Effect	347
		14.2.2 Confidence Intervals	349
		14.2.3 Error Bars in Data Presentation	350

14.2.4	Statistical Significance, Magnitude of Effect, and Clinical or Practical Significance	351	15.3.6	Negative Effects in Perspective	386
14.3	Critical Decisions in Presenting and Analyzing the Data	352	15.3.7	Further Considerations Regarding Negative Effects	387
14.4	Handling Missing Data	353	15.4	Replication	387
14.4.1	Completer Analysis	353	15.4.1	Defined	387
14.4.2	Intent-to-Treat Analysis	354	15.4.2	Types of Replication	388
14.4.3	Multiple Imputation Models	355	15.4.3	Expansion of Concepts and Terms	389
14.4.4	General Comments	356	15.5	Importance of Replication	390
14.5	Outliers and the Prospect of Deleting Data	356	15.5.1	Reasons 1 and 2 for the Importance of Replication	390
14.6	Analyses Involving Multiple Comparisons	359	15.5.2	Reasons 3, 4, and 5 for the Importance of Replication	390
14.6.1	Controlling Alpha Levels	359	15.5.3	Instructive but Brief Replication Examples	391
14.6.2	Considerations	360	15.5.4	One Additional Replication Example	393
14.7	Multivariate and Univariate Analyses	362	15.5.5	Renewed Attention to Replication	395
14.7.1	Considerations	362	15.5.6	Additional Information Regarding Renewed Attention to Replication	396
14.8	General Comments	363	15.5.7	The Reproducibility Project	397
14.9	Special Topics in Data Analysis	363		Summary and Conclusions: Cautions, Negative Effects, and Replication	398
14.9.1	Understanding and Exploring the Data	363			
14.9.2	Research Based on Previously Collected Data	364			
	Summary and Conclusions: Presenting and Analyzing the Data	368			
<b>15</b>	<b>Cautions, Negative Effects, and Replication</b>	<b>370</b>	<b>16</b>	<b>Ethical Issues and Guidelines for Research</b>	<b>400</b>
15.1	Interpreting the Results of a Study	370	16.1	Background and Contexts	400
15.1.1	Common Leaps in Language and Conceptualization of the Findings	371	16.2	Scope of Ethical Issues	401
15.1.2	Meaning Changes of Innocent Words and One Variable "Predicts" Another	372	16.3	Inherent Roles of Values and Ethics in Research	401
15.1.3	"Implications" in the Interpretation of Findings	373	16.3.1	Values and Decisions in Research	402
15.1.4	Further Considerations regarding "Implications"	373	16.3.2	Relevance to Psychological Research	402
15.1.5	More Data Analyses Can Enhance Data Interpretation	374	16.3.3	Power Difference of Investigator and Participant	403
15.1.6	Another Example of More Data Analyses Enhancing Data Interpretation	376	16.4	Critical Issues in Research	403
15.1.7	Searching for Moderators or Statistical Interactions	377	16.4.1	Deception	404
15.1.8	General Comments	377	16.4.2	Further Considerations Regarding Deception	405
15.2	Negative Results or No-Difference Findings	378	16.4.3	Debriefing	407
15.2.1	Ambiguity of Negative Results	379	16.4.4	Further Considerations Regarding Debriefing	407
15.2.2	Reasons 1 and 2 for No-Difference Findings	379	16.4.5	Invasion of Privacy	408
15.2.3	Reasons 3, 4, and 5 for No-Difference Findings	380	16.4.6	Sources of Protection	409
15.3	Why Negative Results Are Useful	381	16.4.7	Special Circumstances and Cases	410
15.3.1	When Negative Results Are Interpretable	381	16.4.8	Further Considerations Regarding Special Circumstances	411
15.3.2	When Negative Results Are Important	382	16.5	Informed Consent	413
15.3.3	Additional Examples of Negative Results Being Important	383	16.5.1	Conditions and Elements	413
15.3.4	Further Considerations Regarding Importance of Negative Results	384	16.5.2	Important Considerations	414
15.3.5	Special Case of Searching for Negative Effects	385	16.5.3	Additional Important Considerations	414
			16.5.4	Consent and Assent	415
			16.5.5	Forms and Procedures	416
			16.5.6	Certificate of Confidentiality	418
			16.5.7	Letter and Spirit of Consent	418
			16.6	Intervention Research Issues	419
			16.6.1	Informing Clients about Treatment	420
			16.6.2	Withholding the Intervention	420

16.6.3	Control Groups and Treatments of Questionable Efficacy	421	18.3	Main Sections of the Article	461
16.6.4	Consent and the Interface with Threats to Validity	422	18.3.1	Title of the Article	461
16.6.5	General Comments	423	18.3.2	Abstract	462
16.7	Regulations, Ethical Guidelines, and Protection of Client Rights	424	18.3.3	Introduction	463
16.7.1	Federal Codes and Regulations	425	18.3.4	More Information on the Introduction	464
16.7.2	Professional Codes and Guidelines	425	18.3.5	Method	464
16.7.3	More Information on Professional Codes and Guidelines	427	18.3.6	Results	466
16.7.4	General Comments	428	18.3.7	Discussion	466
	Summary and Conclusions: Ethical Issues and Guidelines for Research	429	18.3.8	Tables, Figures, Appendices, and Other Supporting Data	468
<b>17</b>	<b>Scientific Integrity</b>	<b>431</b>	18.4	General Comments	469
17.1	Core Values Underpinning Scientific Integrity	432	18.5	Further Guides to Manuscript Preparation	470
17.2	Ethical Codes Related to Scientific Integrity	433	18.5.1	Questions to Guide Manuscript Preparation	470
17.3	Critical Issues and Lapses of Scientific Integrity	434	18.5.2	Formal Guidelines for Presenting Research	471
17.3.1	Fraud in Science	434	18.5.3	General Comments	473
17.3.2	More Information Regarding Fraud in Science	435	18.6	Selecting a Journal	474
17.3.3	Questionable Practices and Distortion of Findings	437	18.6.1	What Journal Outlets Are Available?	474
17.3.4	More Information on Questionable Practices	438	18.6.2	Some Criteria for Choosing Among the Many Options	474
17.3.5	Another Data Analysis Point	438	18.6.3	Additional Criteria for Consideration	475
17.3.6	Plagiarism	439	18.7	Manuscript Submission and Review	476
17.3.7	Self-Plagiarism	440	18.7.1	Overview of the Journal Review Process	476
17.4	Authorship and Allocation of Credit	441	18.7.2	More Information on Overview of the Journal Review Process	477
17.4.1	Guidelines and Best Practices for Allocating Authorship	442	18.7.3	You Receive the Reviews	478
17.4.2	Special Circumstances and Challenges	444	18.7.4	General Comments	479
17.5	Sharing of Materials and Data	445		Summary and Conclusions: Communication of Research Findings	480
17.5.1	"Big Data:" Special Circumstances Data Sharing	447	<b>19</b>	<b>Methodology: Constantly Evolving along with Advances in Science</b>	<b>481</b>
17.5.2	More Information on "Big Data"	449		Additional Information on Methodology	481
17.5.3	When Not to Share Data	449	19.1	The Dynamic Nature of Methodology	482
17.5.4	General Comments	451	19.2	Research Design	483
17.6	Conflict of Interest	451	19.2.1	Assessment	484
17.6.1	Procedures to Address Conflict of Interest	454	19.2.2	Data Evaluation and Interpretation	484
17.6.2	Other Conflicts of Interest Briefly Noted	454	19.2.3	Ethical Issues and Scientific Integrity	485
17.7	Breaches of Scientific Integrity	455	19.2.4	Communication of Research Findings	485
17.7.1	Jeopardizing the Public Trust	455	19.2.5	General Comments	486
17.8	Remedies and Protections	456	19.3	Importance of Methodological Diversity	486
	Summary and Conclusions: Scientific Integrity	458	19.4	Abbreviated Guidelines for a Well-(and Quickly) Designed Study	487
<b>18</b>	<b>Communication of Research Findings</b>	<b>459</b>		Summary and Conclusions: Methodology	490
18.1	Methodologically Informed Manuscript Preparation	460		Glossary	491
18.2	Overview	460		References	501
				End Notes	530
				Name Index	541
				Subject Index	554