

CONTENTS

Tables and Figures	ix
Preface	xvii
The Authors	xix
Chapter 1 Introduction and Overview	1
Review of Foundational Research Concepts	3
Review of Foundational Statistical Information	6
The Normal Distribution	14
Chapter 2 Logical Steps of Conducting Quantitative Research: Hypothesis-Testing Process	29
Hypothesis-Testing Process	30
Chapter 3 Maximizing Hypothesis Decisions Using Power Analysis	39
Balance between Avoiding Type I and Type II Errors	41
Chapter 4 Research and Statistical Designs	53
Formulating Experimental Conditions	54
Reducing the Imprecision in Measurement	55
Controlling Extraneous Experimental Influences	57
Internal Validity and Experimental Designs	59
Choosing a Statistic to Use for an Analysis	67
Chapter 5 Introduction to IBM SPSS 20	77
The IBM SPSS 20 Data View Screen	80
Naming and Defining Variables in Variable View	80

	Entering Data	86
	Examples of Basic Analyses	87
	Examples of Modifying Data Procedures	96
Chapter 6	Diagnosing Study Data for Inaccuracies and Assumptions	99
	Research Example	100
Chapter 7	Randomized Design Comparing Two Treatments and a Control Using a One-Way Analysis of Variance	129
	Research Problem	130
	Study Variables	131
	Research Design	133
	Stating the Omnibus (Comprehensive) Research Question	135
	Hypothesis Testing Step 1: Establish the Alternative (Research) Hypothesis (H_a)	136
	Hypothesis Testing Step 2: Establish the Null Hypothesis (H_0)	137
	Hypothesis Testing Step 3: Decide on a Risk Level (Alpha) of Rejecting the True H_0 Considering Type I and II Errors and Power	138
	Hypothesis Testing Step 4: Choose Appropriate Statistic and Its Sampling Distribution to Test the H_0 Assuming H_0 Is True	143
	Hypothesis Testing Step 5: Select Sample, Collect Data, Screen Data, Compute Statistic, and Determine Probability Estimates	144
	Hypothesis Testing Step 6: Make Decision Regarding the H_0 and Interpret Post Hoc Effect Sizes and Confidence Intervals	162
	Formula Calculations of the Study Results	166
Chapter 8	Repeated-Treatment Design Using a Repeated-Measures Analysis of Variance	183
	Research Problem	184
	Study Variables	185
	Research Design	186

Stating the Omnibus (Comprehensive)	
Research Question	189
Hypothesis Testing Step 1: Establish the Alternative (Research) Hypothesis (H_a)	190
Hypothesis Testing Step 2: Establish the Null Hypothesis (H_0)	191
Hypothesis Testing Step 3: Decide on a Risk Level (Alpha) of Rejecting the True H_0	
Considering Type I and II Errors and Power	192
Hypothesis Testing Step 4: Choose Appropriate Statistic and Its Sampling Distribution to Test the H_0 Assuming H_0 Is True	195
Hypothesis Testing Step 5: Select Sample, Collect Data, Screen Data, Compute Statistic, and Determine Probability Estimates	196
Hypothesis Testing Step 6: Make Decision Regarding the H_0 and Interpret Post Hoc Effect Sizes and Confidence Intervals	216
Formula Calculations of the Study Results	218
Chapter 9	
Randomized Factorial Experimental Design Using a Factorial ANOVA	231
Research Problem	232
Study Variables	232
Research Design	233
Stating the Omnibus (Comprehensive) Research Questions	237
Hypothesis Testing Step 1: Establish the Alternative (Research) Hypothesis (H_a)	238
Hypothesis Testing Step 2: Establish the Null Hypothesis (H_0)	240
Hypothesis Testing Step 3: Decide on a Risk Level (Alpha) of Rejecting the True H_0 Considering Type I and II Errors and Power	241
Hypothesis Testing Step 4: Choose Appropriate Statistic and Its Sampling Distribution to Test the H_0 Assuming H_0 Is True	247

Hypothesis Testing Step 5: Select Sample, Collect Data, Screen Data, Compute Statistic, and Determine Probability Estimates	248
Hypothesis Testing Step 6: Make Decision Regarding the H_0 and Interpret Post Hoc Effect Sizes and Confidence Intervals	271
Formula Calculations of the Study Results	278
Chapter 10 Analysis of Covariance	297
Research Problem	298
Study Variables	299
Research Design	300
Stating the Omnibus (Comprehensive) Research Question	301
Hypothesis Testing Step 1: Establish the Alternative (Research) Hypothesis (H_a)	301
Hypothesis Testing Step 2: Establish the Null Hypothesis (H_0)	302
Hypothesis Testing Step 3: Decide on a Risk Level (Alpha) of Rejecting the True H_0 Considering Type I and II Errors and Power	302
Hypothesis Testing Step 4: Choose Appropriate Statistic and Its Sampling Distribution to Test the H_0 Assuming H_0 Is True	306
Hypothesis Testing Step 5: Select Sample, Collect Data, Screen Data, Compute Statistic, and Determine Probability Estimates	307
Hypothesis Testing Step 6: Make Decision Regarding the H_0 and Interpret Post Hoc Effect Sizes and Confidence Intervals	324
Formula ANCOVA Calculations of the Study Results	327
ANCOVA Study Results	339
Chapter 11 Randomized Control Group and Repeated-Treatment Designs and Nonparametrics	345
Research Problem	346
Study Variables	346

Research Design	347
Stating the Omnibus (Comprehensive) Research Question	349
Hypothesis Testing Step 1: Establish the Alternative (Research) Hypothesis (H_a)	349
Hypothesis Testing Step 2: Establish the Null Hypothesis (H_0)	350
Hypothesis Testing Step 3: Decide on a Risk Level (Alpha) of Rejecting the True H_0 Considering Type I and II Errors and Power	350
Hypothesis Testing Step 4: Choose Appropriate Statistic and Its Sampling Distribution to Test the H_0 Assuming H_0 Is True	354
Hypothesis Testing Step 5: Select Sample, Collect Data, Screen Data, Compute Statistic, and Determine Probability Estimates	355
Hypothesis Testing Step 6: Make Decision Regarding the H_0 and Interpret Post Hoc Effect Sizes	370
Formula Calculations	376
Nonparametric Research Problem Two: Friedman's Rank Test for Correlated Samples and Wilcoxon's Matched-Pairs Signed-Ranks Test	382
Chapter 12 Bivariate and Multivariate Correlation Methods	
Using Multiple Regression Analysis	401
Research Problem	402
Study Variables	402
Research Method	403
Stating the Omnibus (Comprehensive) Research Question	405
Hypothesis Testing Step 1: Establish the Alternative (Research) Hypothesis (H_a)	405
Hypothesis Testing Step 2: Establish the Null Hypothesis (H_0)	406
Hypothesis Testing Step 3: Decide on a Risk Level (Alpha) of Rejecting the True H_0 Considering Type I and II Errors and Power	406

Hypothesis Testing Step 4: Choose Appropriate Statistic and Its Sampling Distribution to Test the H_0 Assuming H_0 Is True	407
Hypothesis Testing Step 5: Select Sample, Collect Data, Screen Data, Compute Statistic, and Determine Probability Estimates	407
Hand Calculations of Statistics	423
Chapter 13 Understanding Quantitative Literature and Research	439
Interpretation of a Quantitative Research Article	440
References	461
Index	465