

# *Brief Contents*

Preface	xxi	
Chapter 1	Introduction	1
<b>SECTION I:</b>	<b>PREPARING FOR A MULTIVARIATE ANALYSIS</b>	<b>35</b>
Chapter 2	Examining Your Data	37
Chapter 3	Factor Analysis	101
<b>SECTION II:</b>	<b>DEPENDENCE TECHNIQUES</b>	<b>167</b>
Chapter 4	Multiple Regression Analysis	169
Chapter 5	Multiple Discriminant Analysis and Logistic Regression	269
Chapter 6	Multivariate Analysis of Variance	383
Chapter 7	Conjoint Analysis	459
<b>SECTION III:</b>	<b>INTERDEPENDENCE TECHNIQUES</b>	<b>553</b>
Chapter 8	Cluster Analysis	555
Chapter 9	Multidimensional Scaling and Correspondence Analysis	629
<b>SECTION IV:</b>	<b>MOVING BEYOND THE BASIC TECHNIQUES</b>	<b>703</b>
Chapter 10	Structural Equation Modeling: An Introduction	705
Chapter 11	SEM: Confirmatory Factor Analysis	770
Chapter 12	SEM: Testing a Structural Model	843
Index		891

# Contents

## Preface    xxi

## Chapter 1 Introduction    1

What Is Multivariate Analysis?	3
Multivariate Analysis in Statistical Terms	4
Some Basic Concepts of Multivariate Analysis	4
<i>The Variate</i>	5
<i>Measurement Scales</i>	5
<i>Measurement Error and Multivariate Measurement</i>	8
<i>Statistical Significance Versus Statistical Power</i>	9
A Classification of Multivariate Techniques	13
<i>Dependence Techniques</i>	13
<i>Interdependence Techniques</i>	17
Types of Multivariate Techniques	17
<i>Principal Components and Common Factor Analysis</i>	17
<i>Multiple Regression</i>	18
<i>Multiple Discriminant Analysis and Logistic Regression</i>	18
<i>Canonical Correlation</i>	19
<i>Multivariate Analysis of Variance and Covariance</i>	20
<i>Conjoint Analysis</i>	20
<i>Cluster Analysis</i>	20
<i>Perceptual Mapping</i>	21
<i>Correspondence Analysis</i>	21
<i>Structural Equation Modeling and Confirmatory Factor Analysis</i>	22
Guidelines for Multivariate Analyses and Interpretation	23
<i>Establish Practical Significance as Well as Statistical Significance</i>	23
<i>Recognize That Sample Size Affects All Results</i>	23
<i>Know Your Data</i>	24
<i>Strive for Model Parsimony</i>	24
<i>Look at Your Errors</i>	25
<i>Validate Your Results</i>	25
A Structured Approach to Multivariate Model Building	25
<i>Stage 1: Define the Research Problem, Objectives, and Multivariate Technique to Be Used</i>	26
<i>Stage 2: Develop the Analysis Plan</i>	26
<i>Stage 3: Evaluate the Assumptions Underlying the Multivariate Technique</i>	26
<i>Stage 4: Estimate the Multivariate Model and Assess Overall Model Fit</i>	27
<i>Stage 5: Interpret the Variate(s)</i>	27
<i>Stage 6: Validate the Multivariate Model</i>	27
<i>A Decision Flowchart</i>	28
Databases	28
<i>Primary Database</i>	28
<i>Other Databases</i>	31
Organization of the Remaining Chapters	31
<i>Section I: Preparing for a Multivariate Analysis</i>	31
<i>Section II: Dependence Techniques</i>	32

<i>Section III: Interdependence Techniques</i>	32
<i>Section IV: Moving Beyond the Basics</i>	32
Summary	32
Questions	34
Suggested Readings	34
References	34

## SECTION I PREPARING FOR A MULTIVARIATE ANALYSIS 35

### Chapter 2 Examining Your Data 37

Introduction	41
Graphical Examination of the Data	41
<i>Univariate Profiling: Examining the Shape of the Distribution</i>	42
<i>Bivariate Profiling: Examining the Relationship Between Variables</i>	43
<i>Bivariate Profiling: Examining Group Differences</i>	44
<i>Multivariate Profiles</i>	46
Summary	49
Missing Data	49
<i>The Impact of Missing Data</i>	49
<i>A Simple Example of a Missing Data Analysis</i>	50
<i>A Four-Step Process for Identifying Missing Data and Applying Remedies</i>	52
<i>An Illustration of Missing Data Diagnosis with the Four-Step Process</i>	62
Summary	72
Outliers	73
<i>Detecting and Handling Outliers</i>	74
<i>An Illustrative Example of Analyzing Outliers</i>	76
Testing the Assumptions of Multivariate Analysis	79
<i>Assessing Individual Variables Versus the Variate</i>	79
<i>Four Important Statistical Assumptions</i>	79
<i>Data Transformations</i>	87
<i>An Illustration of Testing the Assumptions Underlying Multivariate Analysis</i>	88
Incorporating Nonmetric Data with Dummy Variables	96
Summary	97
Questions	99
Suggested Readings	100
References	100

### Chapter 3 Factor Analysis 101

What Is Factor Analysis?	104
A Hypothetical Example of Factor Analysis	105
Factor Analysis Decision Process	107
<i>Stage 1: Objectives of Factor Analysis</i>	107
<i>Stage 2: Designing a Factor Analysis</i>	111
<i>Stage 3: Assumptions in Factor Analysis</i>	113
<i>Stage 4: Factors and Assessing Overall Fit</i>	115
<i>Stage 5: Interpreting the Factors</i>	122
<i>Stage 6: Validation of Factor Analysis</i>	134
<i>Stage 7: Additional Uses of Factor Analysis Results</i>	134
An Illustrative Example	140
<i>Stage 1: Objectives of Factor Analysis</i>	141
<i>Stage 2: Designing a Factor Analysis</i>	141

<i>Stage 3: Assumptions in Factor Analysis</i>	141
<i>Component Factor Analysis: Stages 4 Through 7</i>	144
<i>Common Factor Analysis: Stages 4 and 5</i>	158
<i>A Managerial Overview of the Results</i>	162
Summary	162
Questions	165
Suggested Readings	165
References	165

## SECTION II DEPENDENCE TECHNIQUES 167

### Chapter 4 Multiple Regression Analysis 169

What Is Multiple Regression Analysis?	176
An Example of Simple and Multiple Regression	177
<i>Setting a Baseline: Prediction Without an Independent Variable</i>	177
<i>Prediction Using a Single Independent Variable: Simple Regression</i>	178
<i>Prediction Using Several Independent Variables: Multiple Regression</i>	185
Summary	188
A Decision Process for Multiple Regression Analysis	188
Stage 1: Objectives of Multiple Regression	188
<i>Research Problems Appropriate for Multiple Regression</i>	189
<i>Specifying a Statistical Relationship</i>	191
<i>Selection of Dependent and Independent Variables</i>	192
Stage 2: Research Design of a Multiple Regression Analysis	194
<i>Sample Size</i>	194
<i>Creating Additional Variables</i>	197
<i>Fixed Versus Random Effects Predictors</i>	203
Stage 3: Assumptions in Multiple Regression Analysis	204
<i>Assessing Individual Variables Versus the Variate</i>	204
<i>Methods of Diagnosis</i>	205
<i>Linearity of the Phenomenon</i>	205
<i>Constant Variance of the Error Term</i>	207
<i>Independence of the Error Terms</i>	207
<i>Normality of the Error Term Distribution</i>	208
Summary	208
Stage 4: Estimating the Regression Model and Assessing Overall Model Fit	209
<i>Selecting an Estimation Technique</i>	209
<i>Testing the Regression Variate for Meeting the Regression Assumptions</i>	214
<i>Examining the Statistical Significance of Our Model</i>	214
<i>Identifying Influential Observations</i>	220
Stage 5: Interpreting the Regression Variate	223
<i>Using the Regression Coefficients</i>	223
<i>Assessing Multicollinearity</i>	226
Stage 6: Validation of the Results	233
<i>Additional or Split Samples</i>	233
<i>Calculating the PRESS Statistic</i>	234
<i>Comparing Regression Models</i>	234
<i>Forecasting with the Model</i>	234
Illustration of a Regression Analysis	235
<i>Stage 1: Objectives of Multiple Regression</i>	235
<i>Stage 2: Research Design of a Multiple Regression Analysis</i>	236
<i>Stage 3: Assumptions in Multiple Regression Analysis</i>	236

<i>Stage 4: Estimating the Regression Model and Assessing Overall Model Fit</i>	237
<i>Stage 5: Interpreting the Regression Variate</i>	256
<i>Stage 6: Validating the Results</i>	259
<i>Evaluating Alternative Regression Models</i>	259
<i>A Managerial Overview of the Results</i>	264
Summary	265
Questions	267
Suggested Readings	268
References	268

## **Chapter 5 Multiple Discriminant Analysis and Logistic Regression 269**

What Are Discriminant Analysis and Logistic Regression?	273
<i>Discriminant Analysis</i>	274
<i>Logistic Regression</i>	275
Analogy with Regression and MANOVA	276
Hypothetical Example of Discriminant Analysis	276
<i>A Two-Group Discriminant Analysis: Purchasers Versus Nonpurchasers</i>	276
<i>A Geometric Representation of the Two-Group Discriminant Function</i>	280
<i>A Three-Group Example of Discriminant Analysis: Switching Intentions</i>	280
The Decision Process for Discriminant Analysis	285
Stage 1: Objectives of Discriminant Analysis	285
Stage 2: Research Design for Discriminant Analysis	286
<i>Selecting Dependent and Independent Variables</i>	286
<i>Sample Size</i>	288
<i>Division of the Sample</i>	289
Stage 3: Assumptions of Discriminant Analysis	290
<i>Impacts on Estimation and Classification</i>	290
<i>Impacts on Interpretation</i>	290
Stage 4: Estimation of the Discriminant Model and Assessing Overall Fit	292
<i>Selecting an Estimation Method</i>	294
<i>Statistical Significance</i>	293
<i>Assessing Overall Model Fit</i>	295
<i>Casewise Diagnostics</i>	304
<i>Summary</i>	305
Stage 5: Interpretation of the Results	306
<i>Discriminant Weights</i>	306
<i>Discriminant Loadings</i>	307
<i>Partial F Values</i>	307
<i>Interpretation of Two or More Functions</i>	307
<i>Which Interpretive Methods to Use?</i>	310
Stage 6: Validation of the Results	310
<i>Validation Procedures</i>	310
<i>Profiling Group Differences</i>	311
A Two-Group Illustrative Example	312
<i>Stage 1: Objectives of Discriminant Analysis</i>	312
<i>Stage 2: Research Design for Discriminant Analysis</i>	313
<i>Stage 3: Assumptions of Discriminant Analysis</i>	314
<i>Stage 4: Estimation of the Discriminant Model and Assessing Overall Fit</i>	314
<i>Stage 5: Interpretation of the Results</i>	327
<i>Stage 6: Validation of the Results</i>	330
<i>A Managerial Overview</i>	331

A Three-Group Illustrative Example	331
<i>Stage 1: Objectives of Discriminant Analysis</i>	332
<i>Stage 2: Research Design for Discriminant Analysis</i>	332
<i>Stage 3: Assumptions of Discriminant Analysis</i>	333
<i>Stage 4: Estimation of the Discriminant Model and Assessing Overall Fit</i>	333
<i>Stage 5: Interpretation of Three-Group Discriminant Analysis Results</i>	346
<i>Stage 6: Validation of the Discriminant Results</i>	353
<i>A Managerial Overview</i>	354
Logistic Regression: Regression with a Binary Dependent Variable	335
<i>Representation of the Binary Dependent Variable</i>	355
<i>Estimating the Logistic Regression Model</i>	357
<i>Assessing the Goodness-of-Fit of the Estimation Model</i>	361
<i>Testing for Significance of the Coefficients</i>	363
<i>Interpreting the Coefficients</i>	363
<i>Summary</i>	368
An Illustrative Example of Logistic Regression	368
<i>Stages 1, 2, and 3: Research Objectives, Research Design, and Statistical Assumptions</i>	369
<i>Stage 4: Estimation of the Logistic Regression Model and Assessing Overall Fit</i>	369
<i>Stage 5: Interpretation of the Results</i>	375
<i>Stage 6: Validation of the Results</i>	377
<i>A Managerial Overview</i>	377
Summary	378
Questions	381
Suggested Readings	382
References	382
<b>Chapter 6 Multivariate Analysis of Variance</b>	<b>383</b>
MANOVA: Extending Univariate Methods for Assessing Group Differences	387
<i>Univariate Procedures for Assessing Group Differences</i>	388
<i>Multivariate Procedures for Assessing Group Differences</i>	392
A Hypothetical Illustration of MANOVA	396
<i>Analysis Design</i>	396
<i>Differences from Discriminant Analysis</i>	397
<i>Forming the Variate and Assessing Differences</i>	397
A Decision Process for MANOVA	398
Stage 1: Objectives of MANOVA	399
<i>When Should We Use MANOVA?</i>	400
<i>Types of Multivariate Questions Suitable for MANOVA</i>	400
<i>Selecting the Dependent Measures</i>	401
Stage 2: Issues in the Research Design of MANOVA	402
<i>Sample Size Requirements—Overall and by Group</i>	402
<i>Factorial Designs—Two or More Treatments</i>	403
<i>Using Covariates—ANCOVA and MANCOVA</i>	405
<i>MANOVA Counterparts of Other ANOVA Designs</i>	407
<i>A Special Case of MANOVA: Repeated Measures</i>	407
Stage 3: Assumptions of ANOVA and MANOVA	408
<i>Independence</i>	409
<i>Equality of Variance—Covariance Matrices</i>	409
<i>Normality</i>	410
<i>Linearity and Multicollinearity Among the Dependence Variables</i>	410
<i>Sensitivity to Outliers</i>	410

Stage 4: Estimation of the MANOVA Model and Assessing Overall Fit	411
<i>Estimation with the General Linear Model</i>	411
<i>Criteria for Significance Testing</i>	413
<i>Statistical Power of the Multivariate Tests</i>	414
Stage 5: Interpretation of the MANOVA Results	418
<i>Evaluating Covariants</i>	418
<i>Assessing Effects on the Dependent Variate</i>	419
<i>Identifying Differences Between Individual Groups</i>	422
<i>Assessing Significance for Individual Dependent Variables</i>	426
Stage 6: Validation of the Results	427
Summary	427
Illustration of a MANOVA Analysis	428
Example 1: Difference Between Two Independent Groups	430
<i>Stage 1: Objectives of the Analysis</i>	430
<i>Stage 2: Research Design of the MANOVA</i>	431
<i>Stage 3: Assumptions in MANOVA</i>	432
<i>Stage 4: Estimation of the MANOVA Model and Assessing the Overall Fit</i>	433
<i>Stage 5: Interpretation of the Results</i>	436
Example 2: Difference Between $K$ Independent Groups	436
<i>Stage 1: Objectives of the MANOVA</i>	437
<i>Stage 2: Research Design of MANOVA</i>	438
<i>Stage 3: Assumptions in MANOVA</i>	438
<i>Stage 4: Estimation of the MANOVA Model and Assessing Overall Fit</i>	439
<i>Stage 5: Interpretation of the Results</i>	441
Example 3: A Factorial Design for MANOVA with Two Independent Variables	443
<i>Stage 1: Objectives of the MANOVA</i>	443
<i>Stage 2: Research Design of MANOVA</i>	444
<i>Stage 3: Assumptions in MANOVA</i>	447
<i>Stage 4: Estimation of the MANOVA Model and Assessing Overall Fit</i>	448
<i>Stage 5: Interpretation of the Results</i>	451
Summary	452
A Managerial Overview of the Results	452
Summary	454
Questions	457
Suggested Readings	457
References	457
<b>Chapter 7 Conjoint Analysis</b>	<b>459</b>
What Is Conjoint Analysis?	464
A Hypothetical Example of Conjoint Analysis	465
<i>Specifying Utility, Factors, Levels, and Stimuli</i>	466
<i>Gathering Preferences from Respondents</i>	466
<i>Estimating Part-Worths</i>	467
<i>Determining Attribute Importance</i>	469
<i>Assessing Predictive Accuracy</i>	471
The Managerial Uses of Conjoint Analysis	471
Comparing Conjoint Analysis with Other Multivariate Methods	472
<i>Compositional Versus Decompositional Techniques</i>	472
<i>Specifying the Conjoint Variate</i>	473
<i>Separate Models for Each Individual</i>	473

<i>Flexibility in Types of Relationships</i>	474
<i>Summary</i>	474
Designing a Conjoint Analysis Experiment	474
Stage 1: The Objectives of Conjoint Analysis	477
<i>Defining the Total Utility of the Object</i>	477
<i>Specifying the Determinant Factors</i>	477
Stage 2: The Design of a Conjoint Analysis	478
<i>Selecting a Conjoint Analysis Methodology</i>	479
<i>Designing Stimuli: Selecting and Defining Factors and Levels</i>	480
<i>Specifying the Basic Model Form</i>	485
<i>Data Collection</i>	492
Stage 3: Assumptions of Conjoint Analysis	501
Stage 4: Estimating the Conjoint Model and Assessing Overall Fit	501
<i>Selecting an Estimation Technique</i>	501
<i>Estimated Part-Worths</i>	505
<i>Evaluating Model Goodness-of-Fit</i>	506
Stage 5: Interpreting the Results	508
<i>Examining the Estimated Part-Worths</i>	508
<i>Assessing the Relative Importance of Attributes</i>	511
Stage 6: Validation of the Conjoint Results	512
Managerial Applications of Conjoint Analysis	513
<i>Segmentation</i>	513
<i>Profitability Analysis</i>	514
<i>Conjoint Simulators</i>	514
Alternative Conjoint Methodologies	516
<i>Adaptive/Self-Explicated Conjoint: Conjoint with a Large Number of Factors</i>	516
<i>Choice-Based Conjoint: Adding Another Touch of Realism</i>	518
<i>Overview of the Three Conjoint Methodologies</i>	523
An Illustration of Conjoint Analysis	523
<i>Stage 1: Objectives of the Conjoint Analysis</i>	524
<i>Stage 2: Design of the Conjoint Analysis</i>	524
<i>Stage 3: Assumptions in Conjoint Analysis</i>	528
<i>Stage 4: Estimating the Conjoint Model and Assessing Overall Model Fit</i>	528
<i>Stage 5: Interpreting the Results</i>	534
<i>Stage 6: Validation of the Results</i>	540
<i>A Managerial Application: Use of a Choice Simulator</i>	540
Summary	542
Questions	546
Suggested Readings	547
References	547

## SECTION III INTERDEPENDENCE TECHNIQUES 553

### Chapter 8 Cluster Analysis 555

What Is Cluster Analysis?	559
<i>Cluster Analysis as a Multivariate Technique</i>	559
<i>Conceptual Development with Cluster Analysis</i>	559
<i>Necessity of Conceptual Support in Cluster Analysis</i>	560



How Does Cluster Analysis Work?	561
<i>A Simple Example</i>	561
<i>Objective Versus Subjective Considerations</i>	567
<i>Summary</i>	567
Cluster Analysis Decision Process	567
<i>Stage 1: Objectives of Cluster Analysis</i>	569
<i>Stage 2: Research Design in Cluster Analysis</i>	571
<i>Stage 3: Assumptions in Cluster Analysis</i>	580
<i>Stage 4: Deriving Clusters and Assessing Overall Fit</i>	583
<i>Stage 5: Interpretation of the Clusters</i>	595
<i>Stage 6: Validation and Profiling of the Clusters</i>	596
Summary of the Decision Process	598
An Illustrative Example	598
<i>Stage 1: Objectives of Cluster Analysis</i>	598
<i>Stage 2: Research Design in Cluster Analysis</i>	599
<i>Stage 3: Assumptions in Cluster Analysis</i>	602
<i>Employing Hierarchical and Nonhierarchical Methods</i>	603
<i>Step 1: Hierarchical Cluster Analysis (Stage 4)</i>	603
<i>Step 2: Nonhierarchical Cluster Analysis (Stages 4, 5, and 6)</i>	614
Summary	623
Questions	627
Suggested Readings	627
References	627

## Chapter 9 Multidimensional Scaling and Correspondence Analysis 629

What Is Multidimensional Scaling?	632
<i>Comparing Objects</i>	632
<i>Dimensions: The Basis for Comparison</i>	633
A Simplified Look at How MDS Works	634
<i>Gathering Similarity Judgements</i>	634
<i>Creating a Perceptual Map</i>	635
<i>Interpreting the Axes</i>	637
Comparing MDS to Other Interdependence Techniques	637
<i>Individual as the Unit of Analysis</i>	637
<i>Lack of a Variate</i>	638
A Decision Framework for Perceptual Mapping	638
Stage 1: Objectives of MDS	638
<i>Key Decisions in Setting Objectives</i>	638
Stage 2: Research Design of MDS	643
<i>Selection of Either a Decompositional (Attribute-Free) or Compositional (Attribute-Based) Approach</i>	643
<i>Objects: Their Number and Selection</i>	645
<i>Nonmetric Versus Metric Methods</i>	646
<i>Collection of Similarity or Preference Data</i>	646
Stage 3: Assumptions of MDS Analysis	649
Stage 4: Deriving the MDS Solution and Assessing Overall Fit	650
<i>Determining an Object's Position in the Perceptual Map</i>	650
<i>Selecting the Dimensionality of the Perceptual Map</i>	652
<i>Incorporating Preferences into MDS</i>	654
Stage 5: Interpreting the MDS Results	659
<i>Identifying the Dimensions</i>	660

Stage 6: Validating the MDS Results	661
<i>Issues in Validation</i>	661
<i>Approaches to Validation</i>	661
Overview of Multidimensional Scaling	662
Correspondence Analysis	663
<i>Distinguishing Characteristics</i>	663
<i>Differences from Other Multivariate Techniques</i>	663
<i>A Simple Example of CA</i>	663
<i>A Decision Framework for Correspondence Analysis</i>	668
<i>Stage 1: Objectives of CA</i>	669
<i>Stage 2: Research Design of CA</i>	670
<i>Stage 3: Assumptions of CA</i>	670
<i>Stage 4: Deriving CA Results and Assessing Overall Fit</i>	670
<i>Stage 5: Interpretation of the Results</i>	672
<i>Stage 6: Validation of the Results</i>	673
<i>Overview of Correspondence Analysis</i>	673
Illustrations of MDS and Correspondence Analysis	674
<i>Stage 1: Objectives of Perceptual Mapping</i>	674
<i>Stage 2: Research Design of the Perceptual Mapping Study</i>	676
<i>Stage 3: Assumptions in Perceptual Mapping</i>	678
<i>Multidimensional Scaling: Stages 4 and 5</i>	679
<i>Correspondence Analysis: Stages 4 and 5</i>	691
<i>Stage 6: Validation of the Results</i>	696
<i>A Managerial Overview of MDS Results</i>	697
Summary	698
Questions	700
Suggested Readings	700
References	700

## SECTION IV MOVING BEYOND THE BASIC TECHNIQUES 703

### Chapter 10 Structural Equation Modeling: An Introduction 705

What Is Structural Equation Modeling?	711
<i>Estimation of Multiple Interrelated Dependence Relationships</i>	711
<i>Incorporating Latent Variables Not Measured Directly</i>	712
<i>Defining a Model</i>	713
<i>Summary</i>	718
SEM and Other Multivariate Techniques	718
<i>Similarity to Dependence Techniques</i>	719
<i>Similarity to Interdependence Techniques</i>	719
<i>Summary</i>	719
The Role of Theory in Structural Equation Modeling	720
<i>Specifying Relationships</i>	720
<i>Establishing Causation</i>	720
<i>Summary</i>	724
The History of SEM	724
A Simple Example of SEM	724
<i>The Research Question</i>	725
<i>Setting Up the Structural Equation Model for Path Analysis</i>	725
<i>The Basics of SEM Estimation and Assessment</i>	727
<i>Summary</i>	732

Developing a Modeling Strategy	732	
<i>Confirmatory Modeling Strategy</i>	732	
<i>Competing Models Strategy</i>	733	
<i>Model Development Strategy</i>	733	
Six Stages in Structural Equation Modeling	734	
<i>Stage 1: Defining Individual Constructs</i>	735	
<i>Stage 2: Developing and Specifying the Measurement Model</i>	736	
<i>Stage 3: Designing a Study to Produce Empirical Results</i>	737	
<i>Stage 4: Assessing Measurement Model Validity</i>	745	
<i>Stage 5: Specifying the Structural Model</i>	754	
<i>Stage 6: Assessing the Structural Model Validity</i>	756	
Summary	759	
Questions	761	
Suggested Readings	762	
Appendix 10A: Estimating Relationships Using Path Analysis		763
Appendix 10B: SEM Abbreviations	766	
Appendix 10C: Detail on Selected GOF Indices	767	
References	768	
<b>Chapter 11 SEM: Confirmatory Factor Analysis</b>	<b>770</b>	
What Is Confirmatory Factor Analysis?	773	
<i>CFA and Exploratory Factor Analysis</i>	773	
<i>A Simple Example of CFA and SEM</i>	774	
<i>CFA and Construct Validity</i>	776	
SEM Stages for Testing Measurement Theory Validation with CFA		779
<i>Stage 1: Defining Individual Constructs</i>	779	
<i>Stage 2: Developing the Overall Measurement Model</i>	781	
<i>Stage 3: Designing a Study to Produce Empirical Results</i>	790	
<i>Stage 4: Assessing Measurement Model Validity</i>	795	
CFA Illustration	800	
<i>Stage 1: Defining Individual Constructs</i>	800	
<i>Stage 2: Developing the Overall Measurement Model</i>	801	
<i>Stage 3: Designing a Study to Produce Empirical Results</i>	804	
<i>Stage 4: Assessing Measurement Model Validity</i>	805	
<i>Modifying the Measurement Model</i>	812	
Summary	815	
Advanced Topics in CFA	815	
<i>Higher-Order Factor Analysis</i>	815	
<i>Multiple Groups in CFA</i>	819	
<i>Item Parceling in CFA and SEM</i>	826	
Advanced CFA Illustrations	827	
<i>Multiple Group Analyses</i>	827	
<i>Measurement Bias</i>	833	
Summary	834	
Questions	836	
Suggested Readings	836	
Appendix 11A: Specification Issues in SEM Programs		837
Appendix 11B: Measured Variable and Construct Intercept Terms		840
References	841	

<b>Chapter 12 SEM: Testing a Structural Model</b>	<b>843</b>
What Is a Structural Model?	845
A Simple Example of a Structural Model	845
<i>Summary</i>	846
An Overview of Theory Testing with SEM	847
Stages in Testing Structural Theory	848
<i>One-Step Versus Two-Step Approaches</i>	848
<i>Stage 5: Specifying the Structural Model</i>	848
<i>Stage 6: Assessing the Structural Model Validity</i>	857
SEM Illustration	859
<i>SEM Stage 5: Specifying the Structural Model</i>	859
<i>Stage 6: Assessing the Structural Model Validity</i>	861
Advanced Topics	866
<i>Relationship Types</i>	866
<i>Multigroup Analyses</i>	874
<i>Longitudinal Data</i>	876
<i>Partial Least Squares</i>	878
<i>Interpretational Confounding</i>	880
Summary	881
Questions	882
Suggested Readings	882
Appendix 12A: The Multivariate Relationships in SEM	883
Appendix 12B: How to Fix Factor Loadings to a Specific Value in LISREL	885
Appendix 12C: Changing a CFA Setup in LISREL to a Structural Model Test	886
Appendix 12D: HBAT Example SEM Program Syntax for LISREL	887
References	889
Index	891