

# Contents

<b>LIST OF EXAMPLES</b>	<b>xv</b>
<b>EDITORS' FOREWORD</b>	<b>xxi</b>
<b>1 SIMPLE EXAMPLES</b>	<b>1</b>
1.1 Regression Models	1
1.1.1 A Single Regression Equation	1
Example 1: Regression of GNP	2
1.1.2 Bivariate Regression	6
Example 2: Prediction of Grade Averages	6
1.2 Path Analysis	11
Example 3: Union Sentiment of Textile Workers	12
1.3 Measurement Models	15
Example 4: Ability and Aspiration	16
1.4 Confirmatory Factor Analysis	22
Example 5: Nine Psychological Variables – A Confirmatory Factor Analysis	23
1.5 Path Analysis with Latent variables	28
1.5.1 Recursive System	29
Example 6: Stability of Alienation	29
Example 7: Performance and Satisfaction	34
1.5.2 Non-Recursive System	38
Example 8: Peer Influences on Ambition	38
1.6 Analysis of Ordinal variables	44
Example 9: Panel Model for Political Efficacy	45
<b>2 MULTI-SAMPLE EXAMPLES</b>	<b>51</b>
2.1 Equal Factor Structures	52
Example 10: Testing Equality of Factor Structures	52
Example 11: Parental Socioeconomic Characteristics	56
2.2 Equal Regressions	61
Example 12: Testing Equality of Regressions	61
2.3 Estimation of Means of Latent Variables	66
Example 13: Mean Difference in Verbal Ability	66
Example 14: Nine Psychological Variables with Factor Means	71
2.4 Regression Models with Latent Variables	77
Example 15: Regression of Verbal7 on Verbal5	77
Example 16: Head Start Summer Program	79
<b>3 PATH DIAGRAMS</b>	<b>85</b>
3.1 Parameter Estimates and <i>t</i> -Values	86
3.2 B-, X-, Y-, S-, and R-Diagrams	87
3.3 Fit Statistics	92
3.4 Modification Indices	93
3.5 Adding or Deleting a Path	94
3.6 Adding an Error Covariance	96
3.7 Relaxing an Equality Constraint	97
3.8 Starting with an Empty Path Diagram	100

3.9	Zooming	104
3.10	Printing a Path Diagram	105
3.11	Saving the Path Diagram	106
3.12	Significance Levels for <i>t</i> -Values and Modification Indices	107
	3.12.1 <i>t</i> -Values	107
	3.12.2 Modification Indices	108
3.13	Summary of Keys	108
<b>4</b>	<b>FITTING AND TESTING</b>	<b>111</b>
4.1	From Theory to Statistical Model	111
4.2	Nature of Inference	114
4.3	Fitting and Testing a Covariance Structure	115
4.4	Selection of One of Several <i>a priori</i> Specified Models	118
4.5	Model Assessment and Modification	120
	4.5.1 Chi-square	121
	4.5.2 Other Goodness-of-fit Measures	122
	Goodness-of-fit Indices	122
	Fit Measures on Population Error of Approximation	123
	Information Measures of Fit	124
	Other Fit Indices	125
	4.5.3 Detailed Assessment of Fit	126
	Fitted and Standardized Residuals	126
	Modification Index	127
	4.5.4 Strategy of Analysis	128
4.6	Illustration	129
<b>5</b>	<b>LISREL OUTPUT</b>	<b>133</b>
5.1	Hypothetical Model	133
5.2	Classification of Variables	136
5.3	Parameter Matrices	137
5.4	Parameter Specifications	140
5.5	LISREL Estimates	141
5.6	Goodness-of-Fit Statistics	144
5.7	Fitted and Standardized Residuals	146
5.8	Modification Indices	147
5.9	Standardized Solutions	151
5.10	Direct, Indirect, and Total Effects (EF)	154
5.11	Estimating the Standardized Solution Directly	158
<b>6</b>	<b>SIMPLIS REFERENCE</b>	<b>161</b>
6.1	Input File	161
6.2	Title	162
6.3	Observed Variables or Labels	163
6.4	Data	165
	6.4.1 Raw Data	165
	6.4.2 Covariance Matrix or Correlation Matrix	166
	6.4.3 Means and Standard Deviations	169
	6.4.4 Asymptotic Covariance Matrix	169
	6.4.5 Asymptotic Variances	170
	6.4.6 Selection of Variables	170
6.5	Sample Size	170

6.6	Latent Variables or Unobserved Variables	171
6.7	Relationships	171
6.8	Paths	172
6.9	Scaling the Latent Variables	173
6.10	Starting Values	174
6.11	Error Variances and Covariances	175
	6.11.1 Fixed Error Variances	175
	6.11.2 Error Covariances	175
6.12	Uncorrelated Factors	176
6.13	Equality Constraints	177
	6.13.1 Equal Paths	177
	6.13.2 Equal Error Variances	177
	6.13.3 Freeing a Fixed Parameter or Relaxing an Equality Constraint	178
6.14	Options	178
	6.14.1 Wide Print	179
	6.14.2 Print Residuals	179
	6.14.3 Number of Decimals	179
	6.14.4 Method of Estimation	180
	6.14.5 Admissibility Check	181
	6.14.6 Maximum Number of Iterations	182
	6.14.7 Save Sigma	183
6.15	Cross-Validation	183
6.16	LISREL Output	184
6.17	End of Problem	185
6.18	Additional Command Lines	185
	Principal Components, Exploratory Factor Analysis, and Regression	185
	Missing Value Code	185
	System File and PSFFile	186
	No x-variables and Equal Variances	186
	\$ CLUSTER and \$ PREDICT	186
<b>7</b>	<b>COMPUTER EXERCISES</b>	<b>187</b>
	Exercise 1	187
	Problems	188
	Exercise 2	188
	Problem A	189
	Problem B	190
	Problem C	190
	Exercise 3	192
	Problems	193
	Exercise 4	193
	Problems	195
	Exercise 5	196
	Problem A	196
	Problem B	199
	Exercise 6	199
	Problem	200
	Exercise 7	201
	Problem A	203
	Problem B	203
	Problem C	203
	Exercise 8	203

Problem A	204
Problem B	205
Problem C	205
Problem D	206
Problem E	206
Exercise 9	209
Problems	209

<b>REFERENCES</b>	<b>211</b>
-------------------	------------

<b>AUTHOR INDEX</b>	<b>219</b>
---------------------	------------

<b>SUBJECT INDEX</b>	<b>221</b>
----------------------	------------