

Contents

PART I. FOUNDATIONS

1. Structural Equation Modeling: An Overview	3
Rick H. Hoyle	
2. A Brief History of Structural Equation Modeling	17
Ross L. Matsueda	
3. The Causal Foundations of Structural Equation Modeling	49
Judea Pearl	
4. Visualizations for Structural Equation Modeling	76
Jolynn Pek, Erin K. Davisson, and Rick H. Hoyle	
5. Latent Variables in Structural Equation Modeling	97
Kenneth A. Bollen and Rick H. Hoyle	
6. Simulation Methods in Structural Equation Modeling	110
Walter L. Leite, Deborah L. Bandalos, and Zuchao Shen	
7. Assumptions in Structural Equation Modeling	128
Rex B. Kline	
8. On the Estimation of Structural Equation Models with Latent Variables	145
Yunxiao Chen, Irini Moustaki, and Siliang Zhang	

- 9. Power Analysis within a Structural Equation Modeling Framework** 163
Yi Feng and Gregory R. Hancock
- 10. Model Fit in Structural Equation Modeling** 184
Stephen G. West, Wei Wu, Daniel McNeish, and Andrea Savord
- 11. Model Selection in Structural Equation Modeling** 206
Kristopher J. Preacher and Haley E. Yaremych
- 12. Fitting Structural Equation Models with Missing Data** 223
Craig K. Enders
- 13. Structural Equation Modeling with the Mplus and lavaan Programs** 241
Christian Geiser

PART II. BASIC MODELS AND APPLICATIONS

- 14. Confirmatory Factor Analysis** 261
Timothy A. Brown
- 15. Confirmatory Measurement Models for Dichotomous and Ordered Polytomous Indicators** 277
Natalie A. Koziol
- 16. Item Parceling in SEM: A Researcher Degree-of-Freedom Ripe for Opportunistic Use** 296
Sonya K. Sterba and Jason D. Rights
- 17. Using Factor Scores in Structural Equation Modeling** 316
Ines Devlieger and Yves Rosseel
- 18. Bifactor Measurement Models** 329
Steven P. Reise, Maxwell Mansolf, and Mark G. Haviland
- 19. Multitrait–Multimethod Models** 349
Michael Eid, Tobias Koch, and Christian Geiser
- 20. Investigating Measurement Invariance Using Confirmatory Factor Analysis** 367
Keith F. Widaman and Margarita Olivera-Aguilar

- 21. Flexible Structural Equation Modeling Approaches for Analyzing Means** 385
Marilyn S. Thompson, Yixing Liu, and Samuel B. Green
- 22. Mediation/Indirect Effects in Structural Equation Modeling** 409
Oscar Gonzalez, Matthew J. Valente, JeeWon Cheong,
and David P. MacKinnon
- 23. Latent Interaction Effects** 427
Augustin Kelava and Holger Brandt
- 24. Dynamic Moderation with Latent Interactions:
General Cross-Lagged Panel Models with Interaction Effects over Time** 447
Michael J. Zyphur and Ozlem Ozkok
- 25. Psychometric Scale Evaluation Using Structural Equation Modeling
and Latent Variable Modeling** 462
Tenko Raykov
- 26. Multilevel Structural Equation Modeling** 481
Ronald H. Heck and Tingting Reid
- PART III. SPECIALIZED AND ADVANCED MODELS AND APPLICATIONS**
- 27. Exploratory Structural Equation Modeling** 503
Alexandre J. S. Morin
- 28. Structural Equation Modeling with Small Samples and Many Variables** 525
Katerina M. Marcoulides, Ke-Hai Yuan, and Lifang Deng
- 29. Mixture Models** 543
Douglas Steinley
- 30. Latent Curve Modeling of Longitudinal Growth Data** 556
Kevin J. Grimm and John J. McArdle
- 31. Dynamic Structural Equation Modeling as a Combination
of Time Series Modeling, Multilevel Modeling, and Structural Equation Modeling** 576
Ellen L. Hamaker, Tihomir Asparouhov, and Bengt Muthén

32. Continuous-Time Dynamic Models: Connections to Structural Equation Models and Other Discrete-Time Models	597
Sy-Miin Chow, Diane Losardo, Jonathan Park, and Peter C. M. Molenaar	
33. Latent Trait–State Models	615
David A. Cole and Qimin Liu	
34. Longitudinal Models for Assessing Dynamics in Dyadic Data	634
Meng Chen, Hairong Song, and Emilio Ferrer	
35. Structural Equation Modeling in Genetics	646
Susanne Bruins, Sanja Franić, Conor V. Dolan, Denny Borsboom, and Dorret I. Boomsma	
36. Structural Equation Modeling–Based Meta-Analysis	664
Mike W.-L. Cheung	
37. Nonlinear Structural Equation Models: Advanced Methods and Applications	681
Jeffrey R. Harring and Jinwang Zou	
38. Foundations and Extensions of Bayesian Structural Equation Modeling	701
Sarah Depaoli, David Kaplan, Sonja D. Winter	
39. Machine Learning Approaches to Structural Equation Modeling	722
Andreas M. Brandmaier and Ross C. Jacobucci	
Author Index	741
Subject Index	757
About the Editor	779
Contributors	781

The expanded companion website, www.handbookofsem.com, presents full data sets, code, and output for many of the chapters, as well as bonus selected chapters from the prior edition.