Structural Equation Methods
0801953

Goals: Students will become familiar with the rationale of covariance structure analysis, causal models, model identification, goodness of fit, and estimation. They will apply and critique structural equation methods for studying associations among sets of variables in a series of empirical exercises. They will design and execute a structural equation analysis of a problem of their own choosing, and will write a report of results that would be appropriate for publication in a social science journal or monograph.

Primary Texts:
Kline, R. B. (1998). *Principles and practice of Structural Equations Modeling.* New York: Guilford.
Hoyle, R.H. (ed) (1995). *Structural Equation Modeling.* Thousand Oaks, CA: Sage.
Recommended: Bollen, K. A. (1989). Structural equations with latent variables. New York: Wiley.

Requirements: Students are responsible for readings and material covered in lectures, as well as regular assignments. Students are also asked to identify a scientific problem of their own for which structural equation methods are appropriate, to carry out a complete analysis, and to write a report of the results (12-15 pages) in the style of journal methods and results sections. There will be no exams, but students will be asked to make presentations of their final project to the class. The final grade will be based 60% on assignments and 40% on final project.

Learning outcomes:

1. Students will know the rationale of covariance structure analysis, causal models, model identification, goodness of fit, and estimation.
2. Apply and critique structural equation methods for studying associations among sets of variables in a series of empirical exercises.
3. Design and execute a structural equation analysis of a problem of their own choosing.
4. Write a report of results that would be appropriate for publication in a social science journal or monograph.

Topic	Reading	lab activity
Overview, causality	Hoyle'94, Holland'86, AppxA	
Background	K:1-60	Data input & screening
SEM basics	K:61-113	Matrix Algebra
SEM estimation	K:113-154	SEM Software
Testing Fit	H:76-99	Fit analyses
Nonrecursive models	K:155-188	Nonrecursive models
Meas Models/CFA	K:189-244	CFA
Spring break		
Hybrid models	K:244-269	Hybrid Model
SEM strategies, traps	K:273-281;H:16-36	Identification issues
Categorical Data	B:433-447	Categorical software
Special Models	K:282-313; W&S(1994)	Means models

Writing Results	H:158-176	Peer consultation
Reading literature	Various	Project consultation
Presentations		Presentations
Presentations		

Other Readings

Holland, P. (1986). "Statistics and causal inference (with discussion)." Journal of the American Statistical Association 81: 945-970.

Hoyle, R. H. and G. T. Smith (1994). "Formulating clinical research hypotheses as structural equation models: A conceptual overview." Journal of Consulting and Clinical Psychology 62(3): 429-440.

Willett, J. B. and A. G. Sayer (1994). "Using covariance structure analysis to detect correlates and predictors of individual change over time." Psychological Bulletin 116(2): 363-381.

Other References

Bollen, K.& Lennox, R. (1991) Conventional wisdom on measurement: A structural equation perspective. *Psychological Bulletin, 110*, 305-314.

Bollen, K. & Paxton (1998), "Interactions of Latent Variables in Structural Equation Modeling," *Structural Equation Modeling, 5* (3), 267-293

Hu and Bentler (1999), "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives," *Structural Equation Modeling, 6*, 1-31

Jaccard, James, and Choi K. Wan (1996), LISREL Approaches to Interaction Effects in Multiple Regression. Sage University Paper series on Quantitative Applications in the Social Sciences, 07-114. Thousand Oaks, CA: Sage.

Jöreskog, Karl G., and Dag Sörbom (1996), LISREL8 Users Reference Guide. Chicago: SSI, Inc.

Olsson, Foss, Troye and Howell (2000), "The performance of ML, GLS, and WLS Estimation in Structural Equation Modeling Under Conditions of Misspecification and Nonnormality," *Structural Equation Modeling, 7*, 557-596.

Pearl, Judea (2000) *Causality: Models, Reasoning, and Inference*. New York: Cambridge University Press.