UNIVERSIDADE SÃO FRANCISCO

Análise de Dados: Modelagem com Equações Estruturais

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Mestrado E Doutorado Em Avaliação Psicológica -USF

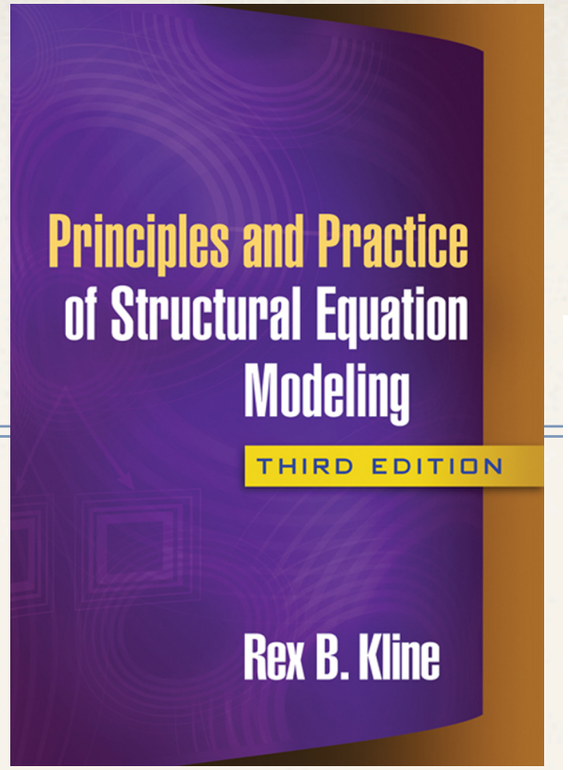
Conteúdo

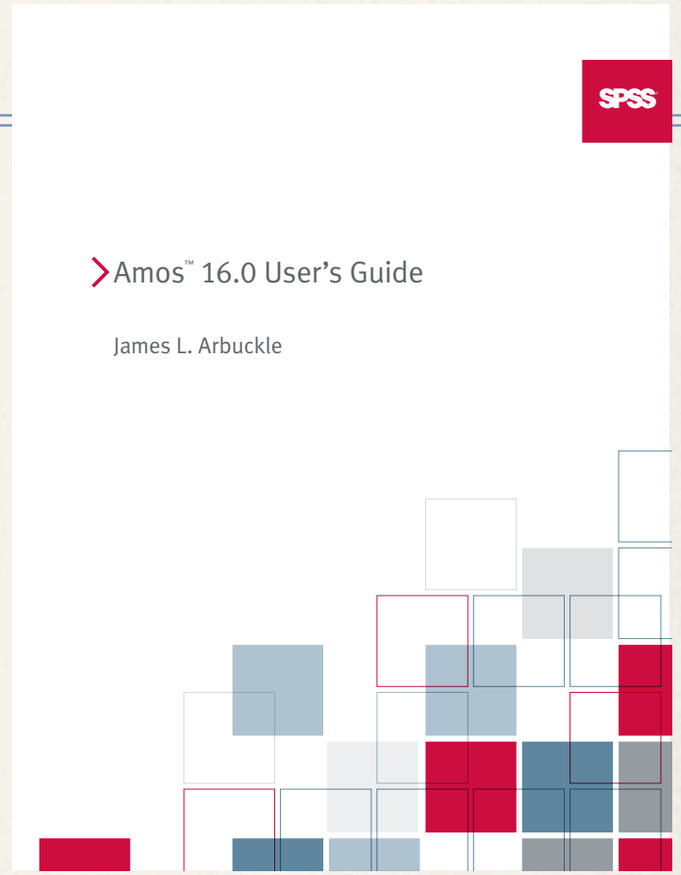
- Análise Fatorial Confirmatória (CFA) e Modelagem com Equações Estruturais (SEM)

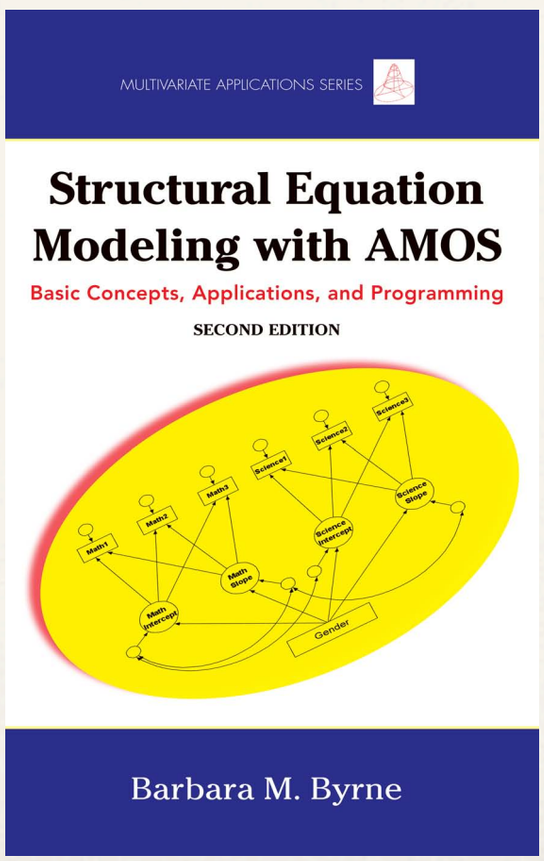
  - T1. Conceitos Fundamentais: Regressão Simples
  - T2. Conceitos Fundamentais: Regressão Múltipla, Correlação Parcial e Semiparcial.
  - T3. Mediação e Moderação
  - T4. Passos do SEM, Preparação dos dados, e Especificação do Modelo.
  - T5. Identificação e Estimação.
  - T6. Testagem de Hipótese e Diagnóstico do modelo.
  - T7. Exemplos de CFA (com variáveis contínuas e categóricas, Análise Bifatorial, Análise Hierárquica).
  - T8. CFA múltiplos Grupos e Invariância de Medida.
  - T9. Exemplos SEM

Materiais

- SPSS, AMOS, MPLUS
- http://www.statmodel.com
- http://www.ats.ucla.edu/stat/seminars/
- http://www.statmethods.net
- http://amosdevelopment.com
- http://psychweb.psy.umt.edu/denis/datadecision/multigroup/amos_group.html
- http://psych.unl.edu/psycrs/948_2011/
- http://www.statisticalassociates.com/booklist.htm
- http://www.bristol.ac.uk/cmm/learning/course-topics.html#m02
- http://www.guilford.com/cgi-bin/cartscript.cgi?page=add/kline/links.html&dir=

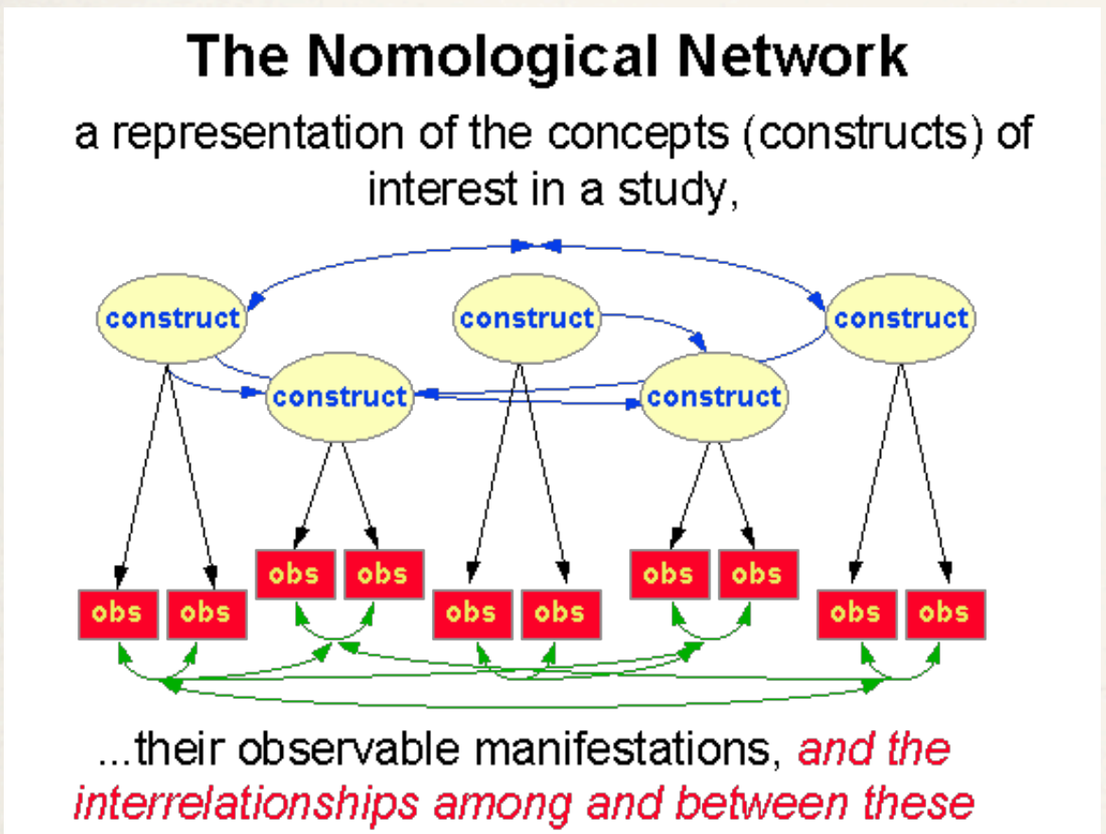


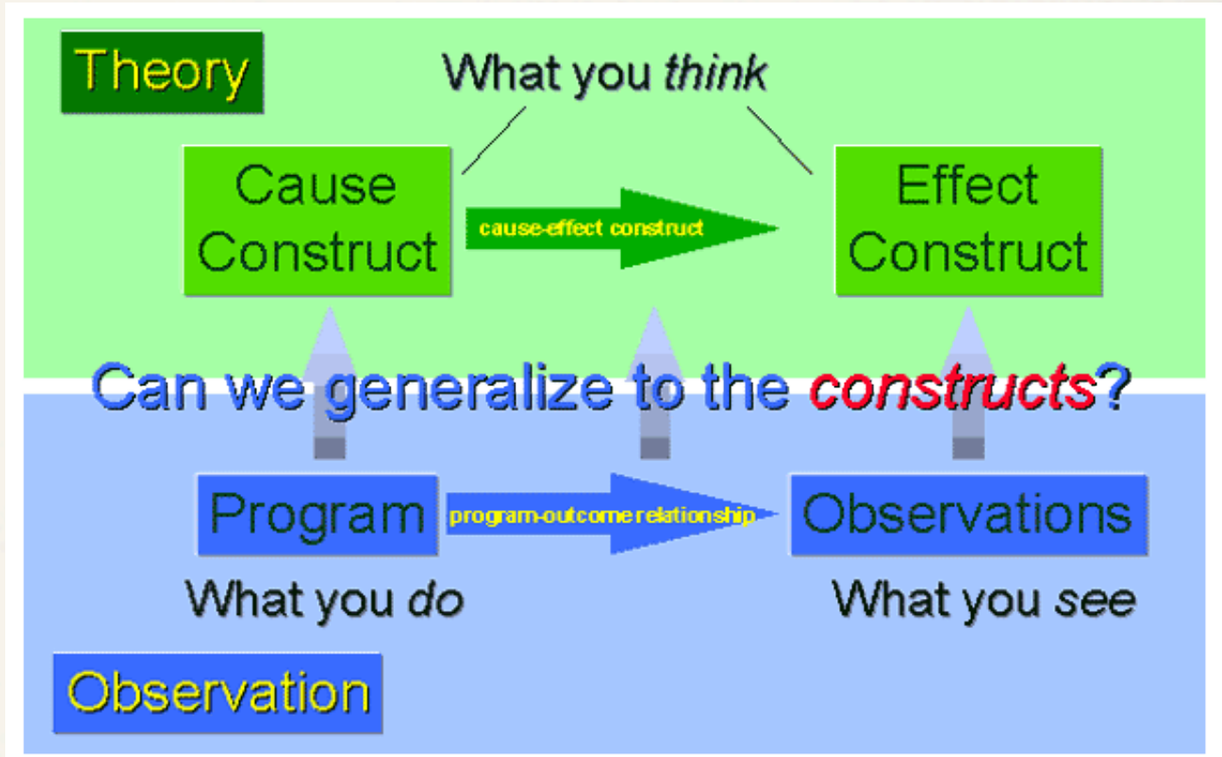




Porque SEM / AFC?

- Trochim, William M. The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL: <http://www.socialresearchmethods.net/kb/> (version current as of October 20, 2006).



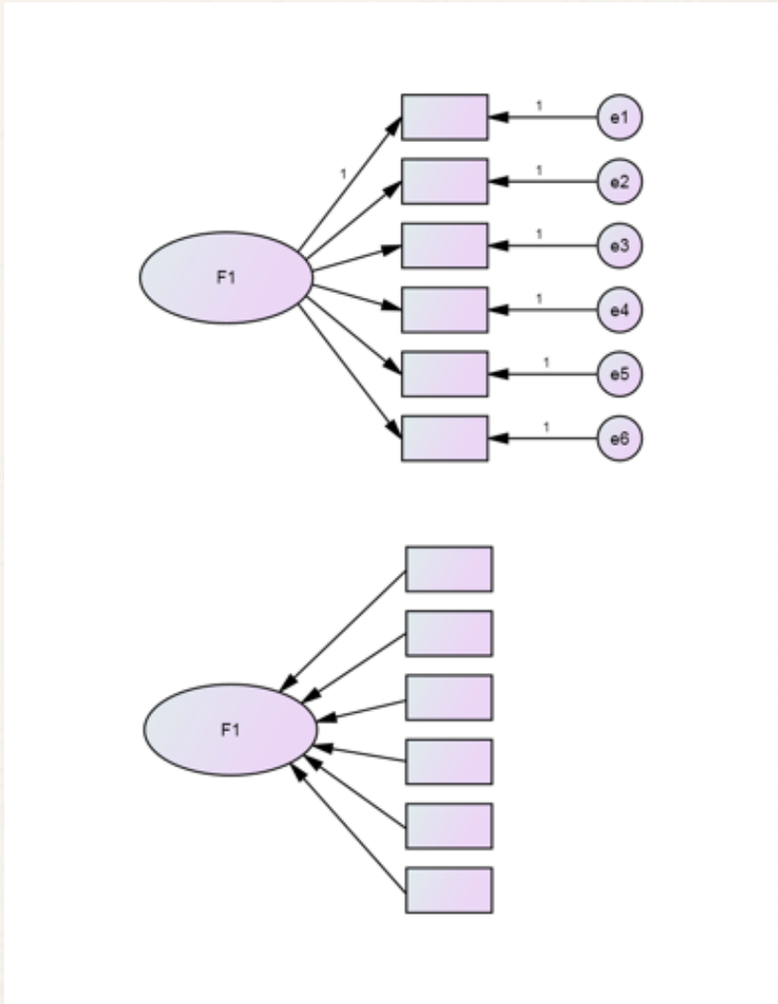


Dicas de Kline (2011)

- Know Your Area “Strong familiarity with the theoretical and empirical literature in your research area is the single most important thing you need for SEM”
- Know Your Measures
  - Review Fundamental Statistical Concepts and Technique
    - 1) principles of multiple correlation/regression,1 (2) the correct interpretation of results from statistical tests, and (3) data screening techniques.
- Get a Computer Tool for SEM
- Join the Community
  - www2.gsu.edu/~mkteer/semnet.html

Confirmação de hipóteses e distinção entre variáveis latentes e observadas

- Hipótese (especificação do modelo) > verifica-se se os dados dão suporte ao modelo: confirmação
- Teste de modelos alternativos
- Geração de modelos
- Variáveis latentes!
- SEM can be seen as a discom- firmatory technique, one that can help us to reject false models (those with poor fit to the data), but it basically never confirms your particular model when the true model is unknown.



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The Concept of Validity

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This article advances a simple conception of test validity: A test is valid for measuring an attribute if (a) the attribute exists and (b) variations in the attribute causally produce variation in the measurement outcomes. This conception is shown to diverge from current validity theory in several respects. In particular, the emphasis in the proposed conception is on ontology, reference, and causality, whereas current validity theory focuses on epistemology, meaning, and correlation. It is argued that the proposed conception is not only simpler but also theoretically superior to the position taken in the existing literature. Further, it has clear theoretical and practical implications for validation research. Most important, validation research must not be directed at the relation between the measured attribute and other attributes but at the processes that convey the effect of the measured attribute on the test scores.

Thus, a test is valid for measuring an attribute if and only if (a) the attribute exists and (b) variations in the attribute causally produce variations in the outcomes of the measurement procedure. The general idea is based on the causal theory of measurement

História

- Spearman (1904) AFE
- Sewell Wright (1918), um biogeneticista, path analysis (efeitos causais diretos e indiretos)
- The measurement (factor analysis) and structural (path analysis) approaches were integrated in the early 1970s in the work of basically three authors: K. Jöreskog, J. Kees- ling, and D. Wiley, into a framework that Bentler (1980) called the JWK model. LISREL
- Work by Muthén (1984) concerning estimation methods for non-normal data, such as when the indicators are dichotomous or ordered-categorical (ordinal) variables, further extended the range of application of SEM.
- Convergência entre SEM e análise multinível Muthén (1994)
- Latent Growth Models
- Latent Class Analysis
  - Mistura de sub-populações (classes/categorias) a quem a pertença não é conhecida e é inferida a partir dos dados
- Latent transition model e latent class regression,
-

Modelagem causal

- The origin of the term **causal modeling** dates to Wright's pioneering work, but here is a critical point: Wright invented path analysis in order to estimate the magnitudes of effects when the basic causal pathways were already known (e.g., genetics). That is, given a true causal model, the technique of path analysis could be applied to estimate it for observed variables. However, this is not how we generally use path analysis or related SEM techniques for analyzing latent variables today. In the behavioral sciences, we rarely know the true causal model. Instead, we usually hypothesize a causal model, and then we test that model using sample data. This context of use is vastly different from that of Wright's. Specifically, when the true causal model is unknown but our hypothesized model fits the data, about all we can say is that our model is consistent with the data, but we cannot claim that our model is proven. In this way, SEM can be seen as a discom- firmatory technique, one that can help us to reject false models (those with poor fit to the data), but it basically never confirms your particular model when the true model is unknown. Bollen (1989) put it this way (emphasis in original): If a model is consistent with reality, then the data should be consistent with the model. But, if the data are consistent with the model, this does not imply that the model corresponds to reality. (p. 68)