

A Conceptual View of Structural Equation Modeling

I. The Relevance of SEM to Biology

A. From Curious Naturalists to Ecologists

1. Early Descriptive Research
2. Experimentation/Hypothesis Testing
3. Statistical Methods
 - a. K. Pearson, R.A. Fisher, & Sewall Wright
 - b. Commonly Employed Methods
 1. Regression/Correlation
 2. ANOVA
 3. Categorical Analyses
 4. Non-parametric Methods
 5. Multivariate Methods

II. Why Structural Equation Modeling?

- A. Ecological and Evolutionary Processes
- B. Error

1. Sampling Error

Estimates that differ because only a portion of the population was sampled.

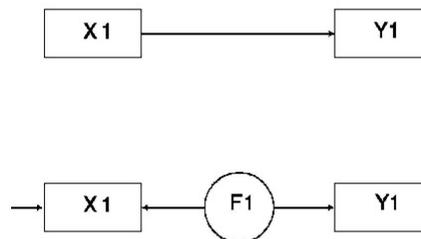
2. Measurement Error

a. Non-sampling error

b. Sources of measurement error

1. **Construct reliability**

2. **Construct validity**



Introduction to Path Diagrams

A. Basic conventions

B. Regression models

1. Simple regression
2. Multiple regression
3. Models with latent variables

- c. Measurement error simulation (Pugesek and Tomer, *Biom. J.* 37: 449-462 (1995))

3. How SEM treats measurement error

- C. Testing and Disconfirming Models

1. Comparing actual covariance matrix to model implied covariance matrix (Σ).
2. Refining theory.