

Oct 13

1. Response profile analysis

Does not distinguish within- vs. between-individual sources variation!

→ Ignores time order (time is treated as categorical)

→ Data must be balanced and should have small number of discrete or categorical covariates

→ Must assume unstructured covariance matrix

→ 2. Parametric time model + covariance model, (no random effects except error)

$$Y_i = X_i \beta + e_i \quad e_i \sim \text{MVN}(0, \Sigma_i)$$

→ Does not distinguish within- vs. between-individual sources variation!

→ choice of covariance model (unstructured, compound symmetric, Toeplitz, etc) reflects all sources of variation (Σ_i)

Captures time order

3. Linear mixed effect models (related: structural equation models)

$$Y_i = X_i \beta + Z_i b_i + e_i \quad \left. \begin{array}{l} b_i \sim \text{MVN}(0, G) \text{ (between)} \\ e_i \sim \text{MVN}(0, R_i) \text{ (within)} \end{array} \right\} \Sigma_i = Z_i G Z_i' + R_i$$

Distinguishes within- vs. between-individual sources of variation

Choice of random effects (b_i) imposes structure on covariance
variation between-individual G (between)

Typically $R_i = \sigma^2 I_{n_i}$

R (within)