

## What to do with covariance matrix ( $\eta_p(0)$ $\theta_p$ ) ?

Timepath97 Output, in each data example, constructed from SAS (reml or ml) core estimates

### Extensions using properties of collections of growth curves

To estimate growth-curve quantities of interest, substitute core estimates into relations among moments: selected given below

*variance*

$$\sigma_{\eta(t)}^2 = \sigma_{\eta(t^0)}^2 + ((t - t^0)/\kappa)^2 \sigma_{\eta(t^0)}^2$$

*covariance* (also yields correlation, using above)

$$\sigma_{\eta(t_1)\eta(t_2)} = \sigma_{\eta(t^0)}^2 + (t_1 - t^0)(t_2 - t^0) \sigma_{\theta}^2$$

*correlation between change and status*

$$\rho_{\eta(t)\theta} = \frac{(t - t^0)}{[\kappa^2 + (t - t^0)^2]^{1/2}}$$

*correlation between exogenous variable, W and status*

$$\rho_{W\eta(t)} = \frac{(t - t^0)\rho_{W\theta} + \kappa \rho_{W\eta(t^0)}}{[\kappa^2 + (t - t^0)^2]^{1/2}}$$

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**ASSESSMENTS OF STABILITY:** index of tracking Foulkes and Davis (1981): "tracking" if index > .50 (significantly)

Estimation. Fit individual trajectories (straight-line or polynomial etc).

For each individual compute the proportion of other trajectories not crossed.

Point estimate is the average over individuals of these proportions.

F-D p.441 use standard deviation of individual estimates divided by Sqrt[n] as the standard error and construct normal theory CI.

Bootstrap results array, in each data example, constructed by reformatting output from jackboot.sas. Choose quantities to bootstrap...

Examples: SmearMiss parameter est.; Ramus frame 6.