Multilevel Modeling Notes

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Contents

1. Three-level Modele

1.1. Empty Model

$y_{\text{tij}} = \gamma_0 + u_{\text{ij}} + v_j + \varepsilon_{\text{tij}}$, where $u_{\text{ij}} \sim N(0, \sigma_n^2)$, $v_j \sim N(0, \sigma_h^2)$, $\varepsilon_{\text{tij}} \sim N(0.\sigma^2)$

1.2. Building

$y_{\text{tij}} = a_{\text{ij}} + bT_{\text{tij}} + \varepsilon_{\text{tij}}$

$a_{\text{ij}} = a_j + \alpha^{(1)} e_{\text{ij}} + \alpha^{(2)} z_{\text{ij}} + \alpha^{(3)} t_{\text{ij}}$

$a_j = a + \gamma s_j + u_j$, where $u_j \sim N(0, \sigma_u^2)$, Random Intercept Model

1.3. Covariates

1.3.1. Level 1

$T_{\text{tij}} = t, t = 1, 2, 3$

1.3.2. Level 2

e_{ij} (exper), z_{ij} (gender), t_{ij} (intervention)

1.3.3. Level 3

$s_j \rightarrow$ size of hospital