

To_be_deleted_afterwards

Random Intercepts

Model 1 Freq

$$\begin{aligned}\text{SecondVersion}_{ij} &= \beta_0 + \beta_1 * \text{FirstVersion}_i + \eta_{0j} + \epsilon_{ij} \\ \text{with} \\ \eta_{0j} &\sim \text{Normal}(0, \sigma_{\eta_0}) \\ \epsilon_{ij} &\sim \text{Normal}(0, \sigma_{\epsilon})\end{aligned}$$

Model 1 Bayes

$$\begin{aligned}\text{SecondVersion}_i &\sim \text{Normal}(\mu_i, \sigma_{\epsilon}) \\ \mu_i &= \beta_{0j[i]} + \beta_1 * \text{FirstVersion}_i \\ \beta_{0j} &\sim \text{Normal}(\beta_0, \sigma_{\beta_0})\end{aligned}$$

Random Slopes

Model 2 Freq

$$\begin{aligned}\text{SecondVersion}_{ij} &= \beta_0 + \beta_1 * \text{FirstVersion}_i + \eta_{0j} + \eta_{1j} * \text{FirstVersion}_i + \epsilon_{ij} \\ \text{with} \\ \eta_{0j} &\sim \text{Normal}(0, \sigma_{\eta_0}) \\ \eta_{1j} &\sim \text{Normal}(0, \sigma_{\eta_1}) \\ \epsilon_{ij} &\sim \text{Normal}(0, \sigma_{\epsilon})\end{aligned}$$

Model 2 Bayes (1)

$$\begin{aligned}
\text{SecondVersion}_i &\sim \text{Normal}(\mu_i, \sigma_\epsilon) \\
\mu_i &= \beta_{0j[i]} + \beta_{1j[i]} * \text{FirstVersion}_i \\
\beta_{0j} &\sim \text{Normal}(\beta_0, \sigma_{\beta_0}) \\
\beta_{1j} &\sim \text{Normal}(\beta_1, \sigma_{\beta_1})
\end{aligned}$$

Model 2 Bayes (2)

$$\begin{aligned}
\text{SecondVersion}_i &\sim \text{Normal}(\mu_i, \sigma_\epsilon) \\
\mu_i &= \beta_0 + \beta_{0j[i]} + (\beta_1 + \beta_{1j[i]}) * \text{FirstVersion}_i \\
\beta_{0j} &\sim \text{Normal}(0, \sigma_{\beta_0}) \\
\beta_{1j} &\sim \text{Normal}(0, \sigma_{\beta_1})
\end{aligned}$$

Model 3 Bayes

$$\begin{aligned}
\text{SecondVersion}_i &\sim \text{Normal}(\mu_i, \sigma_\epsilon) \\
\mu_i &= \beta_0 + \beta_{0j[i]} + (\beta_1 + \beta_{1j[i]}) * \text{FirstVersion}_i + \beta_2 * \text{ExperimentalCondition}_i \\
\beta_{0j} &\sim \text{Normal}(0, \sigma_{\beta_0}) \\
\beta_{1j} &\sim \text{Normal}(0, \sigma_{\beta_1})
\end{aligned}$$

Full specification Model 3

$$\begin{aligned}
\text{SecondVersion}_i &\sim \text{Normal}(\mu_i, \sigma_\epsilon) \\
\mu_i &= \beta_0 + \beta_{0j[i]} + (\beta_1 + \beta_{1j[i]}) * \text{FirstVersion}_i + \beta_2 * \text{ExperimentalCondition}_i \\
\begin{bmatrix} \beta_{0j} \\ \beta_{1j} \end{bmatrix} &\sim \text{MVNormal} \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \mathbf{S} \right)
\end{aligned}$$

$$\mathbf{S} = \begin{bmatrix} \sigma_{\beta_0}^2 & \sigma_{\beta_1\beta_0} \\ \sigma_{\beta_0\beta_1} & \sigma_{\beta_1}^2 \end{bmatrix}$$

Full specification M3 with priors

$$\text{SecondVersion}_i \sim \text{Normal}(\mu_i, \sigma_\epsilon)$$

$$\mu_i = \beta_0 + \beta_{0j[i]} + (\beta_1 + \beta_{1j[i]}) * \text{FirstVersion}_i + \beta_2 * \text{ExperimentalCondition}_i$$

$$\begin{bmatrix} \beta_{0j} \\ \beta_{1j} \end{bmatrix} \sim \text{MVNormal} \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \mathbf{S} \right)$$

$$\mathbf{S} = \begin{bmatrix} \sigma_{\beta_0}^2 & \sigma_{\beta_1\beta_0} \\ \sigma_{\beta_0\beta_1} & \sigma_{\beta_1}^2 \end{bmatrix}$$

$$\beta_0 \sim \text{StudentT}(3, 110.4, 13.3)$$

Prior for the overall Intercept

$$\beta_1 \sim \text{flat}$$

Prior for the overall effect of FirstVersion

$$\beta_2 \sim \text{flat}$$

Prior for the overall effect of ExperimentalCondition

$$\sigma_\epsilon \sim \text{HalfStudentT}(3, 0, 13.3)$$

Prior for the residual variance

$$\sigma_{\beta_0} \sim \text{HalfStudentT}(3, 0, 13.3)$$

Prior for the variance between classes for the Intercept

$$\sigma_{\beta_1} \sim \text{HalfStudentT}(3, 0, 13.3)$$

Prior for the variance between classes for the Slope for FirstVersion

$$\mathbf{R} \sim \text{LKJcorr}(1)$$

Prior for the correlationmatrix between Intercepts and Slopes (classes)