

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

$$\begin{aligned}
\text{SecondVersion}_i &\sim \text{Normal}(\mu_i, \sigma_\epsilon) \\
\mu_i &= \beta_0 + \beta_{0j[i]} + (\beta_1 + \beta_{1j[i]}) * \text{FirstVersion}_i + \beta_2 * \text{ExperimentalCondition}_i \\
\begin{bmatrix} \beta_{0j} \\ \beta_{1j} \end{bmatrix} &\sim \text{MVNormal} \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \mathbf{S} \right) \\
\mathbf{S} &= \begin{bmatrix} \sigma_{\beta_0}^2 & \sigma_{\beta_1\beta_0} \\ \sigma_{\beta_0\beta_1} & \sigma_{\beta_1}^2 \end{bmatrix} \\
\beta_0 &\sim \text{StudentT}(3, 110.4, 13.3) \\
\beta_1 &\sim \text{flat} \\
\beta_2 &\sim \text{flat} \\
\sigma_\epsilon &\sim \text{HalfStudentT}(3, 0, 13.3) \\
\sigma_{\beta_0} &\sim \text{HalfStudentT}(3, 0, 13.3) \\
\sigma_{\beta_1} &\sim \text{HalfStudentT}(3, 0, 13.3) \\
\mathbf{R} &\sim \text{LKJcorr}(1)
\end{aligned}$$

Full specification M3 with CUSTOM priors

$$\begin{aligned}
\text{SecondVersion}_i &\sim \text{Normal}(\mu_i, \sigma_\epsilon) \\
\mu_i &= \beta_0 + \beta_{0j[i]} + (\beta_1 + \beta_{1j[i]}) * \text{FirstVersion}_i + \beta_2 * \text{ExperimentalCondition}_i \\
\begin{bmatrix} \beta_{0j} \\ \beta_{1j} \end{bmatrix} &\sim \text{MVNormal} \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \mathbf{S} \right) \\
\mathbf{S} &= \begin{bmatrix} \sigma_{\beta_0}^2 & \sigma_{\beta_1\beta_0} \\ \sigma_{\beta_0\beta_1} & \sigma_{\beta_1}^2 \end{bmatrix} \\
\beta_0 &\sim \text{StudentT}(3, 110.4, 13.3) \\
\beta_1 &\sim \text{Normal}(1, 5) \\
\beta_2 &\sim \text{Normal}(3.4, 17) \\
\sigma_\epsilon &\sim \text{HalfStudentT}(3, 0, 13.3) \\
\sigma_{\beta_0} &\sim \text{HalfStudentT}(3, 0, 13.3) \\
\sigma_{\beta_1} &\sim \text{HalfStudentT}(3, 0, 5) \\
\mathbf{R} &\sim \text{LKJcorr}(1)
\end{aligned}$$
