

Typically

$$y_i = \beta_0 + \beta_1 x_i + b_{j[i]} + \varepsilon_i$$

$$b_j \sim N(0, \sigma_b^2)$$

$$\varepsilon_i \sim N(0, \sigma^2)$$

model {

for(i in 1:N) {

$$y[i] \sim \text{dnorm}(\text{yhat}[i], \text{tau-y})$$

$$\text{yhat}[i] \leftarrow \beta_0 + \beta_1 * x[i] + b[j[i]]$$

}

for(j in 1:J) {

$$b[j] \sim \text{dnorm}(0, \text{tau-b})$$

}

$$\beta_0 \sim \text{dnorm}(0, .001)$$

$$\beta_1 \sim \text{dnorm}(0, .001)$$

$$\text{tau-y} \leftarrow \text{pow}(\text{sigma-y}, -2)$$

$$\text{sigma-y} \sim \text{dunif}(0, 1000)$$

$$\text{tau-b} \leftarrow \text{pow}(\text{sigma-b}, -2)$$

$$\text{sigma-b} \sim \text{dunif}(0, 1000)$$

}

JAGS Land

$$y_i \sim N(\hat{y}_i, \tau)$$

$$\tau = \frac{1}{\sigma^2} \text{ precision}$$

$$\hat{y}_i = \beta_0 + \beta_1 x_i + b_{j[i]}$$

$$b_j \sim N(0, \tau_b)$$

$$\tau_b = \frac{1}{\sigma_b^2}$$

$$\beta_0 \sim N(0, 1000)$$

$$\beta_1 \sim N(0, 1000)$$

$$\sigma^2 \sim \text{Unif}(0, 1000)$$

$$\sigma_b^2 \sim \text{Unif}(0, 1000)$$

looping through each observation

$$y_i \sim N(\hat{y}_i, \frac{1}{\sigma^2})$$

$$\hat{y}_i = \beta_0 + \beta_1 x_i + b_j$$

looping through each group

$$b_j \sim N(0, \frac{1}{\sigma_b^2})$$

$$\beta_0 \sim N(0, \frac{1}{.001})$$

$$\beta_1 \sim N(0, \frac{1}{.001})$$

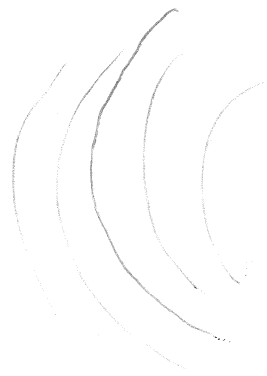
$$\tau = \frac{1}{\sigma^2}$$

$$\sigma \sim \text{Unif}(0, 1000)$$

$$\tau_b = \frac{1}{\sigma_b^2}$$

$$\sigma_b \sim \text{Unif}(0, 1000)$$

## Baseball example



Typical

$$y_i = \beta_0 + \beta_1 \text{age}_i + \beta_2 \text{age}_i^2 + b_{j[i]} + \epsilon_i$$

$$b_j \sim N(0, \sigma_b^2)$$

$$\epsilon_i \sim N(0, \sigma^2)$$

JAGS Land

$$y_i \sim N(\hat{y}_i, \tau)$$

$$\tau = \frac{1}{\sigma^2}$$

$$\hat{y}_i = \beta_0 + \beta_1 \text{age}_i + \beta_2 \text{age}_i^2 + b_{j[i]}$$

$$b_j \sim N(0, \tau_b)$$

$$\tau_b = \frac{1}{\sigma_b^2}$$

$$\beta_0 \sim N(0, 1000)$$

$$\beta_1 \sim N(0, 1000)$$

$$\beta_2 \sim N(0, 1000)$$

$$\sigma^2 \sim \text{Unif}(0, 1000)$$

$$\sigma_b^2 \sim \text{Unif}(0, 1000)$$

model {

for (i in 1:N) {

$$y[i] \sim \text{dnorm}(yhat[i], \tau_{ou-y})$$

$$y_i \sim N(\hat{y}_i, \tau_y)$$

$$yhat \leftarrow \beta_0 + \beta_1 * a1[i] + \beta_2 * a2[i] + b[j[i]] \quad \hat{y}_i = \beta_0 + \beta_1 * a1_i + \beta_2 * a2_i + b_{j[i]}$$

}

for (j in 1:J) {

$$b[j] \sim \text{dnorm}(0, \tau_{au-b})$$

}

$$\beta_0 \sim \text{dnorm}(0, .001)$$

$$\beta_1 \sim \text{dnorm}(0, .001)$$

$$\beta_2 \sim \text{dnorm}(0, .001)$$