

Step 1: Initialization:

$$b_j^{(r)} = \bar{y}_{\cdot j} - \bar{y}_{\cdot \cdot};$$
$$\gamma_i^{(r)} = \bar{y}_{i \cdot} - \bar{y}_{\cdot \cdot}; \text{ and,}$$
$$m^{(r)}(x_i) = 0.$$

Pre-generate all kernel values  
for Step 2 and Step 3

Have we reach  
convergence or the maximum  
number of steps?

Step 2: Smoothing

$$\sum_{i=1}^n \sum_{j=1}^J \left\{ y_{ij}^{(r)} - \beta_0 - \beta_1(x_i - x_0) \right\}^2 K_h(x_i - x_0)$$

Step 3: Mixed-effects

$$\mathbf{y}_i^{(r)} = \mathbf{b} + \gamma_i + \epsilon_i$$
$$\sum_{i=1}^n \{ (\mathbf{y}_i - \mathbf{b} - \gamma_i) \Sigma_i^{-1} (\mathbf{y}_i - \mathbf{b} - \gamma_i) + \gamma_i^2 / \sigma_\gamma^2 \}$$

Step 4: Update convergence

$$\frac{\sum_{i=1}^n \left( \hat{m}^{(r)}(x_i) - \hat{m}^{(r-1)}(x_i) \right)^2}{\sum_{i=1}^n \hat{m}^{(r-1)}(x_i)^2 + 10^{-4}} < 10^{-4}$$

Return: M(xi)  
B(j)