Variability of predictions:

$$\text{var}(\hat{u}_i) = \text{var}(b(y_i - \bar{y}))$$ (cont)

$$= \text{var}(by_i - b\bar{y})$$

$$= \text{var}(by_i) + \underbrace{\text{var}(b\bar{y})}_{=0} - 2\underbrace{\text{cov}(by_i, b\bar{y})}_{=0}$$

$$= \text{var}(by_i)$$

$$= b^2 \cdot \text{var}(y_i) = h^4 \sigma_y^2$$

$$= \frac{\sigma_u^4}{\sigma_p^4} \cdot \sigma_y^2 = \frac{\sigma_u^4}{\sigma_u^2} = h^2 \sigma_u^2$$

$\text{var}(\hat{u}_i)$ should approximate $\text{var}(u) = \sigma_u^2$

Extension:

- More observations per animal
  ⇒ Repeated measure