Decomposition of σ_y^2 for repeated observations:

$$var(y_{ij}) = \underbrace{var(u_i) + var(pe_i)}_{\text{constant across all observations for animal } i} + var(te_{ij})$$

- Repeatability t: Tells us the ratio of variance components that are permanent compared to the total variance of all observations

$$t = \frac{var(u_i) + var(pe_i)}{var(y_{ij})} \Rightarrow var(u_i) + var(pe_i) = t \cdot \sigma_y^2$$

$$1 - t = \frac{var(y_{ij})}{var(y_{ij})} - \frac{var(u_i) + var(pe_i)}{var(y_{ij})}$$

$$= \frac{var(y_{ij}) - var(u_i) - var(pe_i)}{var(y_{ij})} = \frac{var(te_{ij})}{var(y_{ij})}$$

$$\Downarrow$$

$$var(te_{ij}) = (1-t)\sigma_y^2$$