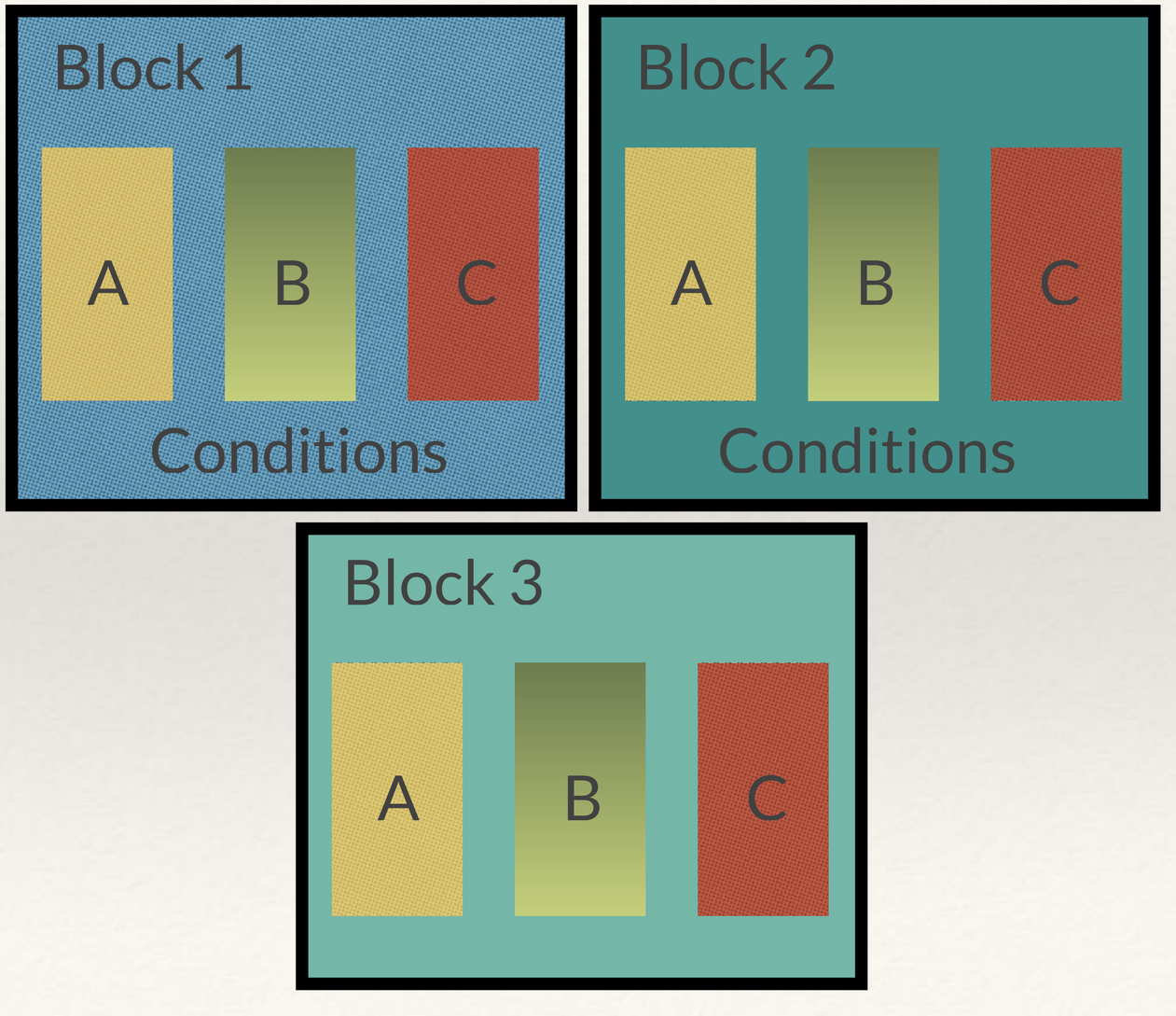
BLOCKED EXPERIMENTAL DESIGNS

- Often in experiments there are natural blocks that exist non-intentionally.
- Even though these blocks were not created intentionally, they often still group experimental units that are more similar within blocks than between blocks due to unknown conditions.
- Analyzing results within each natural block makes it possible to separate treatment variability from variability due to the blocking factor that occurs unintentionally but systematically.



ADDING BLOCKS USING MIXED MODELS

$$y_i \sim Normal(\mu_i,\ \sigma)$$

$$\mu_i = \alpha_0 + \alpha_{block[i]} + \beta x_i$$

$$\alpha_k \sim Normal(0,\ \sigma_\alpha), \text{for } k \text{ in } \{1, \cdots, N_{blocks}\}$$

$$\alpha_0 \sim Normal(0,\ 1)$$

$$\beta \sim Normal(0,\ 0.3)$$

$$\sigma,\ \sigma_{block} \sim Exponential(1)$$