

The effects issue: do effects always add up to zero?

$$t_{ij} = \mu_{..} + \tau_i + \varepsilon$$

$$Y_{ij} = \bar{Y}_{..} + \hat{\tau}_i + \varepsilon$$

$$\bar{Y}_{..} = \sum \sum Y_{ij} / rk$$

example:

$$\begin{aligned}\bar{Y}_{..} &= 9.260544 = \bar{\varepsilon} + \bar{\mu} \\ \bar{Y}_A &= 10.201928 \\ \bar{Y}_B &= 5.495007\end{aligned}$$

$\xrightarrow{\text{coeffs}}$

$$\begin{aligned}A &\quad 10.201928 \\ B &\quad -4.706921\end{aligned}$$
$$\bar{Y}_B - \bar{Y}_A$$
$$\bar{Y}_B = 10.201928 + (-4.706921) \\ = 5.495007$$

wrong
effects

$$\begin{aligned}\Delta A &= 10.201928 - 9.260544 \\ &= 0.941384\end{aligned}$$

$$\begin{aligned}\Delta B &= 5.495007 - 9.260544 \\ &= -3.765537\end{aligned}$$

weighted sum of effects: ZERO!

$$\bar{Y}_{..} = \frac{\bar{Y}_A + \bar{Y}_B}{2} = 7.848467$$

Correct fx:

$$\begin{aligned}\Delta A &= 10.201928 - 7.848467 = 2.35346 \\ \Delta B &= 5.495007 - 7.848467 = -2.35346\end{aligned}$$

