STAT 196
week 1

Exam Data: Mixed effects models (gender gap)

prclim SFYS (ImList)

normexam $y = \alpha_0 + \alpha_1 \text{sexM} + \varepsilon$ by school

$\hat{\alpha}_0 = \bar{F}$ $\hat{\alpha}_1 = \bar{M} - \bar{F}$

Unconditional Model ggaplmer

Level 1 $y = \alpha_0 + \alpha_1 \text{sexM} + \varepsilon$

Level 2 $\alpha_0 = \gamma_{00} + u_0$ no Level 2 predictors (fixef / ranef)

$\alpha_1 = \gamma_{10} + u_1$

combined model $y \sim \text{sex}$ (fixedeff) [sex|school] random

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Conditional model ggaplmer2 (correlate schavg)

Level 1 $y = \alpha_0 + \alpha_1 \text{sexM} + \varepsilon$ (random)

Level 2 $\alpha_0 = \gamma_{00} + \gamma_{01} \text{schavg} + u_0$ (fixed)

$\alpha_1 = \gamma_{10} + \gamma_{11} \text{schavg} + u_1$

combined model $y \sim \text{sex} * \text{schavg}$ (fixedeff)

Within-school ancova

ancovalmer

covariate standLRT

schavg = standLRT

Level 1 $y = \alpha_0 + \alpha_1 \text{sexM} + \alpha_2 \text{standLRT} + \varepsilon$ ancova

Level 2 $\alpha_0 = \gamma_{00} + u_0$ $\alpha_1 = \gamma_{10} + u_1$ $\alpha_2 = \gamma_{20} + u_2$

(could have additional predictors)

combined $y \sim \text{sexM} + \text{standLRT}$ (fixed)

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effects ranef fixef

random - varies over schools (Level 2 units)

fixed - does not vary over schools

see plots