

Practice with Linear Mixed Effects Model Comparison

When comparing models, the main points you want to look out for are:

- **Are the models nested?**
 - If yes, proceed with the other questions; if not, you can't compare deviances, and are stuck using something like AIC to determine the better model, using ML estimation.
- **Are the fixed effects the same? Or do just the random effects differ?**
 - If fixed effects are different (but nested), use ML estimation (i.e., specify `lmer(..., REML=FALSE)`)! If *just* the random effects are different, you can use REML estimation, the default in `lmer()`
- **Are you comparing a non-random effects model (e.g., `lm`) to a random effects model?**
 - Make sure to fit the random effects model with ML estimation, since that's what `lm()` does. Either compare the deviances manually, or use this specific model ordering `w/anova(mixed model, fixed model)`

Example Scenario: Subjects study a list of word pairs and then are tested with *both* a free recall test ("Recall as many word pairs as you can") and a cued recall test (present with one word, generate the pair). Further, all subjects see negative, positive, and neutral word pairs.

Example 1

Model 1: `lm(Recall ~ Task)`

Model 2: `lmer(Recall ~ Task + (1|Subject))`

Estimation for models:

Comparison:

Example 2

Model 1: `lmer(Recall ~ Task + (1|Subject))`

Model 2: `lmer(Recall ~ Task + Valence + (1|Subject))`

Estimation for models:

Comparison:

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Example 3

Model 1: `lmer(Recall ~ Task + (1|Subject))`

Model 2: `lmer(Recall ~ Valence + (1|Subject))`

Estimation for models:

Comparison:

Example 4

Model 1: `lmer(Recall ~ Task + (1|Subject))`

Model 2: `lmer(Recall ~ Task + (1 + Task |Subject))`

Estimation for models:

Comparison:

Example 5

Model 1: `lmer(Recall ~ Task * Valence + (1 + Task|Subject))`

Model 2: `lmer(Recall ~ Task * Valence + (1 + Task*Valence|Subject))`

Estimation for models:

Comparison: