

Exercises: Module 4

If you have any questions as you go through these, feel free to ask them in the forum.

1. If you haven't done so, read the references listed on the module 4 page.
2. Using the Physical Training Data, run a marginal model to test if mean LDL levels change from pre- to post-training equally in the three training regimen groups. Support your answer. What do you conclude about the effects of training regimen on LDL?

Which covariance structure did you choose, and why?

3. Do the same for HDL. Are the effects the same as on LDL? Support your answer. What do you conclude about the effects of training regimen on HDL?
4. Using the County data, test whether the mean number of jobs in Alabama changed across the 5 decades of the study, and whether the change differed for counties classified as rural and non-rural. Treat Decade as categorical. Include a plot. Describe the findings and support your answer. (Note: It may be easier to read the output if you change the scale of the outcome variable to Thousands of Jobs).

Which covariance structure best fits these data?

Once you choose a covariance structure, rerun the model using ML estimation (not REML). Now test the same model, but treat time (Decade) as continuous. Which model fits better? Would you reach the same conclusions using these two models?

5. Using the Teacher data, plot teacher's ratings of rapport with students (STRS) across time, with:
 - a. An overall average trajectory over time.
 - b. A separate trajectory for each gender.
 - c. A separate trajectory for high and low values of Teacher Expectancy.
 - d. What do the trajectories look like? Are they linear? Do they tend to vary much in height or slope over time?
6. Now test whether children's summer expectancies and gender predict teacher's ratings of rapport with each student. Treat student as the subject. Decide whether to treat Time as continuous or categorical. Which covariance structure for the residuals fits best? Why?

7. To prepare for Mixed Models in Module 5, watch the Random Intercept and Random Coefficient Models webinar recording, available on the Workshop Bonus page.