

Exercises: Module 2

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 references 1-3 listed on the module 2 page. You can substitute #4 for #1 and #5 for #2, if they're easier to come by or make more sense to you.
2. In your own words, what is Sphericity?
3. What covariance structure does the multivariate approach use?
4. Huynh-Feldt covariance structure for three repeats looks like the matrix on the right:

List the parameters that would need to be estimated if there were only two repeats. How many are there? Compare the number of parameters to a compound symmetry and an unstructured structure.

Do the same if there were 4 repeats, then 8.

Huynh – Feldt =

$$\begin{bmatrix} \sigma_1^2 & \frac{\sigma_1^2 + \sigma_2^2}{2} - \lambda & \frac{\sigma_1^2 + \sigma_3^2}{2} - \lambda \\ \frac{\sigma_2^2 + \sigma_1^2}{2} - \lambda & \sigma_2^2 & \frac{\sigma_2^2 + \sigma_3^2}{2} - \lambda \\ \frac{\sigma_3^2 + \sigma_1^2}{2} - \lambda & \frac{\sigma_3^2 + \sigma_2^2}{2} - \lambda & \sigma_3^2 \end{bmatrix}$$

5. Using the Physical Training Data, use GLM Repeated Measures to test if mean LDL levels (which I believe is low-density cholesterol—the bad stuff) 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?
6. 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 in 1960. Include a mean 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). Do the univariate and multivariate results differ?
7. Using the Teacher data, test whether children's summer expectancies and gender predict teacher's ratings of rapport with each student (STRS) over time. Treat student as the subject.
8. Using the Swallowing data, test whether there are differences in mean Release Slope for the following four tasks: ESS (Effortful Saliva Swallow), NESS (Noneffortful Saliva Swallow), Water (DSW), and NectarThick Apple Juice (ANEC). You won't be able to have more than one swallow for each task per person, so the best we can do in this analysis is take the mean for

the 5 trials on each task, and use it as the outcome variable. Make sure you restrict the data to the posterior bulb.