

REPEATED MEASURES HOMEWORK**Hwk #Repe1 due 5/10/16**

1. (3 points). Do problem 7.3 in the text

For the next problem use the data set `hers_subset_nodm.dta`, available on the course web site. This is a subset of the data from the Heart and Estrogen/Progestin Study (HERS - Hulley, *et al*, 1998, *JAMA*), containing only those women with no diabetes at baseline and a few of the variables. HERS was a randomized hormone replacement study coordinated out of UCSF (and a precursor to WHI) for prevention of heart attacks among post-menopausal women with existing heart disease. We are going to be interested in whether exercise seems to be related to glucose (for background see Section 4.1 of the text). The variables are described in the variables window, but you may need to expand it to see the descriptions.

2. (6 points)
 - a. Reproduce the values in Table 4.1 by restricting the analysis to visit 0 (baseline).
 - b. Now repeat the analysis in a., but using the data from all the visits and accommodating the correlation. How do the results compare? Suggest reasons for the differences.
 - c. Build a model incorporating predictors as in Table 4.2 of the text. (You have average drinks per week, but not the variable `drinkany`).
 - d. Graph the residuals to check for gross model violations. Provide a brief discussion of what you find and how you would address any problems (no need to do further analyses).
3. (4 points) Consider the effect of the treatment (variable name `group`) on the change in glucose over time. Model the changes over time as linear in visit and fit a model allowing different trends over time for the two treatment groups
 - i) What is the interpretation of the coefficients in the model?
 - ii) Is there a statistically significant effect of treatment on glucose?
 - iii) Is there evidence for lack of linearity in the response over time?

Hwk #Repe2 due 5/17/16

4. (3 points) Using the HERS data, fit a model with the outcome of whether or not someone is on hypertension medication (htnmeds). Use predictors of age, BMI and exercise >3 times per week (exercise). Provide interpretations of each of the coefficients.
5. (6 points) Using the Georgia babies dataset, fit a model that allows for both mom-specific intercepts and trends in birth weight with birth order. Does this model fit appreciably better than a model that only has mom-specific intercepts? (Hint: consider the change in log likelihood). Compared to either an xtgee analysis or the mixed analysis with only random intercepts, does the model with random trends give a different conclusion with respect to the primary question of interest (the relationship of birth weight to birth order). Provide interpretations of the variances of the random intercepts and of the random trends. This may be easiest to do by considering the birth weight versus birth order relationship for a woman who is one standard deviation above or below normal for the intercept or for the trend.
6. (4 points) Find the longitudinal OAI_pain dataset on the website. The relevant variables are sev_pain (which is 1 if severe pain was reported in the right knee in at least one activity and 0 otherwise), BMI, visit (0=baseline, then yearly), sex (1=male, 2=female), and race (0=other non-white, 1=white, 2=African American, 3=Asian). Use a log link to fit a model to assess whether BMI and sex are related to the change in pain over time. Provide an interpretation of coefficients relevant to the change in pain over time (you do not need to interpret all the coefficients in the model).