

## Homework 6: due Tuesday, 13 December

**Satiety study.** Investigators recruited 54 healthy adults to participate in a study to compare two food supplements against a placebo control, to see which would reduce hunger the most. Eighteen participants were randomly assigned to each treatment. Participants arrived at the clinic fasting and ate a standard breakfast plus one of the supplements (H or R) or placebo control (C). The standard breakfasts were identical.

The primary outcome was *satiety*, which is the opposite of hunger, and it was measured by asking participants to click the point on the visual analog scale (VAS) below that reflected their satiety:

I am completely empty. \_\_\_\_\_ I cannot eat another bite.

Distance from the left end is the *satiety score*. Participants completed the VAS satiety question at 0, 30, 60, 120, and 180 minutes after eating the standard breakfast. The data set `satiety.xls` contains subject id, supplement, measurement time and satiety score (mm).

1. Plot individual profiles (satiety score against measurement time) for each group separately (3 plots).
2. Make the 5×5 matrix of plots of correlation within subjects. Use Proc Transpose to reshape data to wide form, and use BY supplement id to keep supplement in the data; you must first sort BY supplement id.
3. Test for differences between treatment groups in satiety at baseline (time = 0). Identify the model and test you used, and give the results and *p*-value of that test.
4. Use Proc Mixed to fit this model:

```
class supplement id time;
model satiety=supplement time supplement*time;
random intercept / subject=id v vcorr ;
```

Give the estimated correlation between measurements from the same person. Give the type 3 tests of fixed effects, and write a sentence interpreting these tests.

5. Use the `diff` option to LSmeans to compare the treatments at each time. Write a sentence summarizing differences between H and C.
6. Make the interaction plot with standard error bars.
7. Calculate maximum satiety and the area under the curve (AUC) *in hours* for the satiety scores for each person. Use the trapezoidal rule and use linear interpolation to replace missing values. Sort the data by ID, and print subject, supplement, AUC and maximum for the first 10 subjects.
8. Use Proc GLM to compare the three treatments with respect to AUC and maximum satiety. Make a table summarizing the results.