Biostatistics 537: Longitudinal Data Analysis - Fall 2024

Problem Set 1 - Due: Tuesday, September 10, 2024

The data set for this problem (`vt.dat`) can be downloaded at the class blackboard site, Homework Assignment section, Problem Set 1.

The data consist of a sample of 22 subjects from a study of affective facial expressions (Vasey and Thayer, 1987). In this study several pieces of music were played to each subject in an attempt to elicit selected affected states. Trial 1 was a baseline, relaxing music condition. Trial 2 was designed to produce positive effects, and trial 3 was designed to produce agitation. Each trial lasted 90 seconds and the response variable at each trial was the mean electromyographic (EMG) amplitude (μV) from the left brow region. The variable order in the datafile is subject number followed by the three trial EMG measurements.

Consider the question of whether each of the two non-baseline trials differed from the baseline trial in EMG. For this, choose an appropriate set of contrasts that relate to this question. Posit a reasonable model and interpret the results. In doing this, you should choose between the univariate and multivariate repeated measures analysis of variance approaches, and give reasons for the approach you choose. Provide the model that you chose and interpret all model parameters. If you choose the univariate repeated measures model, estimate the intraclass correlation and comment on its magnitude.

Also, to better normalize the outcome variable use a log transformation. Here's some SAS code that will help with this problem:

```
FILENAME in1 'C:\vt.dat';
TITLE1 'Vasey & Thayer Data - Left Brow EMG amplitudes in 22 subjects';

/* input the data in multivariate format */
DATA MultData; infile in1;
INPUT subject 2.  (trial1 trial2 trial3) (4.)  ;
   ltrial1 = log(trial1);
   ltrial2 = log(trial2);
   ltrial3 = log(trial3);

PROC MEANS;
RUN;

/* set up the data in univariate format */
DATA UNIDATA;
SET MultData;
   ARRAY T(3) ltrial1-ltrial3;
   DO TRIAL = 1 TO 3;
      logEMG = t(TRIAL);
      OUTPUT;
   END;
   DROP ltrial1-ltrial3;
RUN;

PROC MEANS;
RUN:
```