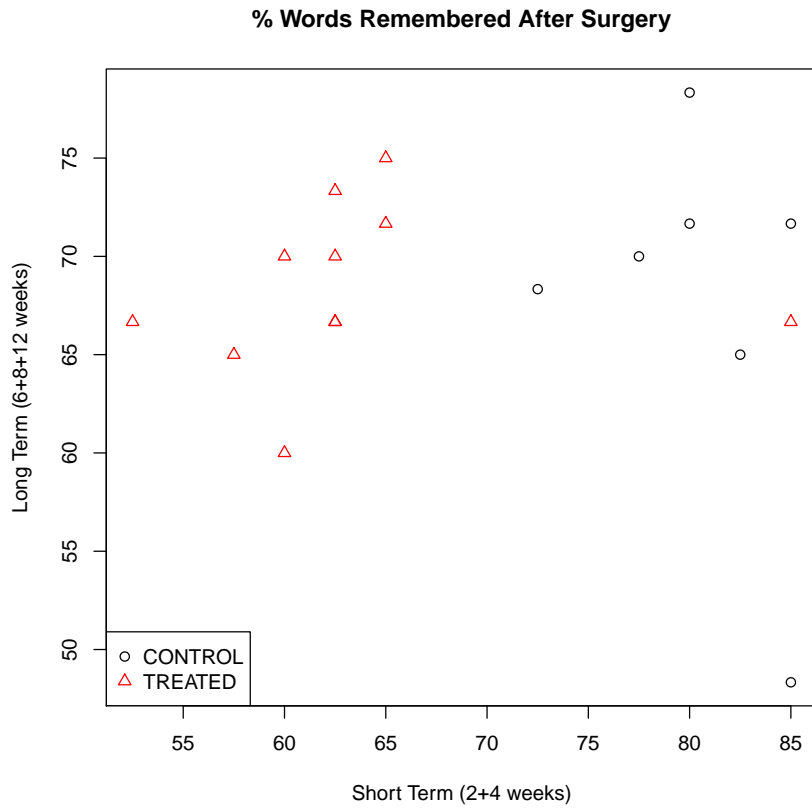


2/23/2010 36-402/608 ADA-II H. Seltman
Handout #12: Repeated Measures (Part 1)

1. Definition of “experimental unit”: the unit to which treatment is applied
2. Definition of “multivariate” response models: models that deal with multiple outcome measurements per experimental unit and that appropriately take into account correlation among these measurements.
3. Definition of “repeated measures” models: multivariate response models in which the same kind of outcome is measured at different times or locations.
4. Approaches to multivariate analysis
 - (a) Do separate analyses for each outcome, because they are not strongly related (in terms of meaning and goals).
 - (b) Combine appropriate outcomes on each subject to make a single outcome that relates to the goals of the experiment, then analyze by non-RM methods.
 - (c) Use RM methods that model the correlation directly.
 - (d) Use hierarchical or mixed models to model the correlation through random intercepts and/or slopes. (For repeated measures models only)
5. Recognizing study types
 - (a) Longitudinal: the same subjects are measured repeatedly over time
 - (b) Crossover: longitudinal studies in which treatment changes over time (usually in “counterbalanced” order)
 - (c) Split-plot experiments: experiments with two or more treatment variables that are applied at different levels, usually “between subjects” and “within subjects”. Also just called “mixed within/between repeated measures” experiments
6. Next class: Analysis of these models using classic RM methods and Hotelling’s T^2
7. Example: Monkey memory study
 - (a) Eighteen monkeys were trained to discriminate different object pairs at 2, 4, 8, 12 and 16 weeks before treatment.
 - (b) Eleven monkeys were (presumably randomly) assigned to the “treated” (as opposed to “control”) group and had brain surgery to remove their hippocampal formations.

- (c) After surgery (or no surgery) the monkeys were tested to measure the percent correct discrimination of the pairs.
- (d) The goal was to test the effects of the surgery (and thus the role of the hippocampus) on short term vs. long term memory. Short term was defined in advance as less than 5 weeks.



8. Breakout and Discussion