Psychology 610

Prof. Moore

Midterm II Study Questions

1. Know how to calculate:

-- anova summary for a two-way or three-way between-subjects factorial design experiment, given raw data
-- for fixed, crossed, random and nested designs
-- for one-way within designs
-- simple main effects, simple interactions
-- interaction contrasts (including two-way trend)
-- trends or contrasts on the main effects
-- post-hoc tests (Scheffe and Tukey) on cell means or main effect means, given appropriate formulas, tables, etc.
--main effects and interactions in three-way or higher between-subjects designs, as well as relevant analytical comparisons, simple effects, etc.

2. Understand what is partitioned in the simple main effects, simple interactions, interaction contrasts, etc. What is the relationship between one-way between-subject anova and two-way between-subject anova?

-- Express a factorial design in terms of a set of orthogonal contrasts on the cell means.

3. Know how to interpret the outcomes of the various analyses listed under #1. Given a research or theoretical question, be able to <u>select</u> an analysis that will address it appropriately.

4. Explain the concept of an interaction effect, and what it means to have no interaction.

-- Be able to set up contrasts for a two-way factorial design that could be used to compute the SS for an interaction.

-- Know how to extract the $\hat{\alpha}\hat{\beta}$ components of the linear model, how graphing them can help interpret the interaction and relate these to the SS for the interaction.

-- From the Loftus article: how do you know when an interaction can be interpreted as reflecting a "real" interaction in the psychological processes? Discuss scale dependency of interactions, and transformations to reduce interactions.

-- Should all possible interactions in a multi-way design be tested? What are the options for dealing with interactions that are <u>not</u> tested?

5. How can you tell when a factor is nested in another factor? Relate the partition for a nested design to the partition for a completely crossed design, and to the simple main effects tests in a crossed design.

6. What does it mean for a factor to be a random factor? Explain which error terms are different when a random factor other than subjects is involved in an experiment. Explain why the error terms are different when a random factor is involved.

Within-Subject Design

1. Conceptually, what are the advantages and disadvantages of within-subject design?

2. Statistically, when is within-subject design an advantage?

3. What are the statistical assumptions of within-subject anova? What is assumed to be independent in a within-subject anova?
   -- What is a variance-covariance matrix?
   -- What assumption is made about the variance-covariance matrix in within-subject anova?
   -- Calculate a variance-covariance matrix given the formula for covariance.

4. What are the options for dealing with an inflated Type I error when sphericity is violated?

5. What is partitioned when comparisons are constructed in a within-subject design using Keppel's (or the class) method? Why is it nice for the error to be partitioned? By partitioning the error, what is the experimenter implicitly admitting?

6. What is the linear model for with-in subject design? What are error terms for a with-subject factorial design?