**Psy 230**

**Single-Factor Between-Subjects ANOVA**

(1) Consider an experiment comparing the effects of three kinds of reinforcement on the performance of children given a series of simple reasoning problems. The independent variable of reinforcement consists of the following three conditions: praise for correct responses; criticism for mistakes; and silence regardless of whether the child answered the problem correctly. Five children are randomly assigned to each of the treatment conditions. The measure of performance is the number of correct responses given during the course of testing. Calculate the ANOVA and state your conclusion.

Praise Criticism Silence

7 9 2

8 4 7

6 6 5

10 9 3

7 8 5

(2) A researcher investigated the number of viral infections people contracted as a function of the amount of stress they experienced during a six-month period. She obtained the following data:

Negligible Minimal Moderate Severe

2 4 6 5

1 3 5 7

4 2 7 8

1 3 5 4

a) What are the null and alternative hypotheses?

b) Calculate the F-ratio.

c) Are the results significant at alpha = .05?

(3) A researcher investigated the effect of volume of background noise on participants' error rates while performing a boring task. He tested three groups of randomly selected students and obtained the following error data and sums of squares:

Low Volume Moderate Volume High Volume

*M* 61.5 65.5 48.25

*n* 4 5 7

Conduct the ANOVA and fill in the summary table below.

***Source*** ***SS*** ***df*** ***MS*** ***F***

**Between** 652.16

**Within** 612.75

**Total** 1264.91

**Psy 230**

**Single-Factor Between-Subjects ANOVA--Post Hoc Tests**

4) Use the data from #1 of the previous worksheet. Recall that this experiment compared the effects of three kinds of reinforcement (praise, criticism, silence) on the problem solving performance of children. Use Tukey’s HSD test to conduct all possible pairwise comparisons.



a) Is the Praise condition significantly different from the Criticism condition?

b) Is the Praise condition significantly different from the Silence condition?

c) Is the Criticism condition significantly different from the Silence condition?

5) This question uses the data from #2 of the previous worksheet. Recall that this experiment investigated the number of viral infections people contracted as a function of amount of stress (4 levels—negligible, minimal, moderate, severe). Since the overall ANOVA was significant, the researchers are interested in finding the location of the difference or differences. They want to conduct 5 two-group ANOVAs. Let’s assume that these comparisons were planned—they directly follow from the research hypothesis. The researchers want to protect against an inflated experimentwise alpha by dividing alpha = .05 equally among the planned comparisons (Dunn test).

a) Is the Negligible condition significantly different from the Moderate condition?

b) Is the Negligible condition significantly different from the Severe condition?

c) Is the Minimal condition significantly different from the Moderate condition?

d) Is the Minimal condition significantly different from the Severe condition?

e) Is the Moderate condition significantly different from the Severe condition?