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### Assignment 8 Part I

The following item is selected from the textbook (Keppel & Wickens).

1. ( 12.2 in textbook). Consider the data in the numerical example in Table 11.8.
  - a. Test the significance of the simple effects of factor B.
  - b. Show that the total sum of squares associated with the three simple effects equals the sum of  $SS_B$  and  $SS_{A \times B}$

Table 11.8

	1-hour deprivation			24-hour deprivation		
	Control (a <sub>1</sub> b <sub>1</sub> )	Drug X (a <sub>2</sub> b <sub>1</sub> )	Drug Y (a <sub>3</sub> b <sub>1</sub> )	Control (a <sub>1</sub> b <sub>2</sub> )	Drug X (a <sub>2</sub> b <sub>2</sub> )	Drug Y (a <sub>3</sub> b <sub>2</sub> )
	1	13	9	15	6	14
	4	5	16	6	18	7
	0	7	18	10	9	6
	7	15	13	13	15	13
AB <sub>jk</sub>	12	40	56	44	48	40
$\sum Y^2$	66	468	830	530	666	450
$\bar{Y}_{jk}$	3.00	10.00	14.00	11.00	12.00	10.00
s <sub>jk</sub>	3.162	4.761	3.916	3.916	5.477	4.082
S <sub>Mjk</sub>	1.581	2.381	1.958	1.958	2.739	2.041

2. Use the following design matrix to write the null hypothesis for the contrast, simple, or main effect which would be tested to answer the following questions:
  - a) Is there a main effect for Factor A?
  - b) For individuals receiving level 2 of Factor B, is there a difference between levels 1 and 3 of Factor A?
  - c) Across levels of Factor A is there a difference between levels of Factor B?
  - d) Is there a simple effect for Factor A at level 1 of Factor B?
  - e) For individuals in the level 4 of Factor A, is there a difference between levels of Factor B?

	$a_1$	$a_2$	$a_3$	$a_4$	
$b_1$	$\bar{Y}_{.11}$	$\bar{Y}_{.12}$	$\bar{Y}_{.13}$	$\bar{Y}_{.14}$	$\bar{Y}_{.1.}$
$b_2$	$\bar{Y}_{.21}$	$\bar{Y}_{.22}$	$\bar{Y}_{.23}$	$\bar{Y}_{.24}$	$\bar{Y}_{.2.}$
	$\bar{Y}_{..1}$	$\bar{Y}_{..2}$	$\bar{Y}_{..3}$	$\bar{Y}_{..4}$	$\bar{Y}_{...}$

3. a) For number 2, part b, are you testing a main effect, simple effect or a contrast?
- b) For number 2, part c, are you testing a main effect, simple effect or a contrast?
- c) For number 2, part e, are you testing a main effect, simple effect or a contrast?

### **Part II: SPSS**

A researcher is interested in examining the impact of Halloween candy consumption on children's verbal fluency. He believes the effect will depend on whether children were forced to eat dinner prior to trick-or-treating. There are four levels of candy consumption: 0, 3, 6, and 9 candy bars (Factor A) and two levels of dinner: none vs. balanced meal (Factor B). Four children were randomly assigned to each group. After the children's respective 'treatment' condition was issued, the number of coherent sentences each child uttered during a 30 minute period was recorded.

1. Conduct a Two-way ANOVA
  - a. Provide a verbal description of your means plot
  - b. Provide the Interaction F value, df, p value, and effect size
2. When a child eats a balanced meal, is there a relationship between candy consumption and verbal fluency? (Report the findings of this simple effect)
3. If you were to continue the analysis, provide the contrast coefficients for comparing 0 candy bars consumed to all other levels of candy consumption.

What will the results of the simple comparison be 'conditional on'? In other words, describe what the contrast results will tell us.