

PSYCHOLOGY 515 -- EXPERIMENTAL DESIGN

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Homework No. 6

1. Suppose you obtain the following results in a 3 x 6 factorial experiment with $n = 5$ independent observations per cell. Both factors are fixed.

<i>Source</i>	<i>df</i>	<i>MS</i>	<i>F</i>
A	2	48	12.00
B	5	40	10.00
AB	10	6	1.50
S(AB)	72	4	

- What are the formulas for the expected mean squares for each source in the table?
 - What proportion of variation in the population is estimated to be due to each ANOVA source?
 - What proportion of variation is due to systematic sources of variation that involve Factor B (i.e., B and AB combined)?
 - What is the F -ratio for pooled variation due to B and AB?
2. Suppose the following data are from an experiment in which 8 subjects from each of three IQ levels are randomly split so that 4 subjects from each IQ level receive a hypnotic induction and 4 receive only relaxation instruction before reading a passage of material. Subjects are later tested for comprehension of the passage. Scores for each subject are as follows:

	Low IQ	Med IQ	High IQ
Hypnosis	13	20	33
	8	22	23
	18	12	31
	18	18	26
Relaxation	19	47	36
	14	32	40
	21	26	32
	20	31	30

- Do an ANOVA of the above data.
 - Use the Tukey HSD test to test the differences between pairs of means for IQ blocks averaged over the levels of Learning condition (i.e., the IQ marginal means).
 - What cell means would be estimated for the data on the basis of the grand mean and main effects only (additive model)?
 - What are the interaction parameter estimates?
 - Test the simple effects of Learning condition at each level of IQ blocks. Present the results in a summary table.
 - Test whether the quadratic trend of IQ block differs significantly between the Hypnosis and Relaxation conditions. (Assume equally spaced levels of IQ blocks).
3. Suggest a set of six mutually orthogonal comparisons that might sensibly be made on data involving the following seven groups: religious Jews, religious Catholics, religious Protestants, 'areligious' Jews, areligious Catholics, areligious Protestants, and Others. Each contrast should have a sensible interpretation. Specify the weights for each contrast.