

PSYCHOLOGY 515—EXPERIMENTAL DESIGN

Bob McFatter

Homework No. 4

1. Compute and test the linear, quadratic, and cubic contrasts with the following data on the number of errors made in performance of a perceptual-motor task after an interpolated interfering task as a function of the amount of original learning. Use JMP to get the hypothesis SS in each case. The within mean square is 3.72. Also test the residual variation for significance. Another way of stating the problem is, "Partition the between variation into linear, quadratic, cubic, and the residual components and test the significance of each." *Briefly interpret the results of the analysis.* [The data are from Ritchie & Muckler (1954). *Journal of Exp. Psych.*, 48,409-415.]

# of original learning trials:	24	48	72	96	120
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Total # of errors:	101	71	62	70	67
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(20 subjects per group)

[NB. the above group scores are totals, not means. See notes, p. 21]

2. The age in years of each of seven schools is given below along with the mean test anxiety score of 40 children randomly selected from the school.

School:	T	L	S	W	M	C	O
Mean Score:	5.85	8.88	9.40	8.58	8.25	7.75	9.28
School Age:	33	7	4	10	26	36	3

The within schools mean square is 31.05. Use JMP to find the sum of squares between school anxiety scores attributable to the linear regression on age of school. Test this source for significance.

3. The following are scores on a test battery for subjects randomly assigned to four drug conditions. There are 5 subjects in each condition.

	Drug			
	Drug A	Drug B	Control	Placebo
	183	171	182	160
	173	175	178	179
	181	179	186	177
	181	165	175	176
	184	160	181	165

- a) Use Fisher's LSD, Tukey's HSD and Scheffe's test to compare all possible pairs of means in the above data. Use $\alpha = .05$. Describe how the minimum difference between any pair of means that would be considered significantly different differs for the 3 tests.
- b) If two means were *a priori* predicted to differ, how different would they have to be in order to reach statistical significance?