

Spring 1992, Exam #1

Problem I

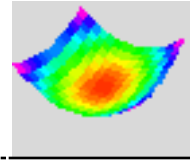
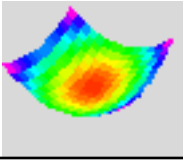
Three different drug treatments are evaluated. Subjects suffering from a chronic disease are randomly assigned to one of four groups. Three of these groups receive one of the drug treatments. The fourth group is a control group, receiving a placebo treatment. The dependent variable is the severity of disease symptoms following treatment (measured on a 1 to 9 scale). The resulting treatment means, cell sizes, and standard deviations are given below:

	<u>Mean</u>	<u>N</u>	<u>SD</u>
Placebo treatment:	6.7	12	1.38
Drug A treatment	6.5	14	1.49
Drug B treatment	4.7	11	1.51
Drug C treatment	5.9	13	1.37

Two different researchers analyze the resulting data. The first does a traditional one-way analysis of variance, testing the omnibus hypothesis of any group differences.

A Fill in the missing values in the following source table:

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F*</u>	<u>PRE</u>
Between	28.10	3	9.37	----	----
Within	95.13	--	-----		



B. Write a very short discussion of the conclusion this researcher should reach based on his analysis.

The second researcher decides to examine whether the 12 subjects in the Placebo treatment group differ from the other 38 who received one of the Drug treatments. He collapses across the three drug groups and conducts a one-way analysis of variance, comparing the two resulting groups:

	Mean	N	SD
Placebo treatment:	6.7	12	1.38
Drug treatment groups	5.77	38	1.60

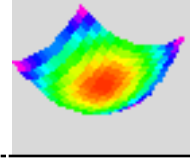
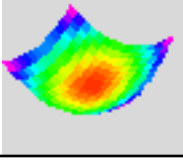
C. Fill in the missing values in the following source table that results from this analysis:

Source	SS	df	MS	F*	PRE
Between	-----	1	-----	-----	-----
Within	115.41	--	-----		

D. Again, write a very short discussion of the conclusion that this researcher should reach from his analysis.

Being imbued with enthusiasm for single degree of freedom contrasts, you decide to compare the Placebo treatment group with the three Drug groups, assigning code values of 3 to the Placebo group and -1 to each of the three Drug treatment groups.

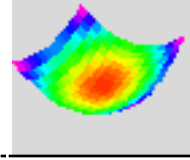
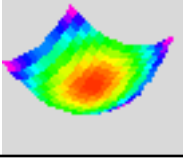
E. What are the values of F* and PRE that you come up with when you test whether this contrast is reliable?



F. Briefly discuss what the substantive difference is between the test you have just conducted and that conducted by the second researcher. In other words, what is the difference between the hypothesis you are testing and that tested by the second researcher?

G. After inspecting the data, it appears to you that Drug B is really the most effective. Test whether the mean number of symptoms for this Drug treatment group differs from that of the control. What is the critical value of F which you need to use to determine whether this comparison is reliable?

H. In a future study, you plan to compare Drug treatments B and C, running more subjects, because you believe Drug B to be superior to Drug C. You intend on randomly assigning 25 subjects to each of the two drug treatments. Assuming the difference between the two drugs is as large as it is in the present data, what will be the power of your test in the planned research?



Problem II

Data are collected from a random sample of CU undergraduates concerning the satisfaction with life at the University. The researchers are primarily interested in differences between minority and non-minority students and whether those differences change as a function of how long the students have been here (year in college) and gender. Assume that we have samples of minority and non-minority male and female students who are freshmen, sophomores, juniors, and seniors.

A. Write out the values of a code that would examine whether differences in satisfaction between minority and non-minority freshman are smaller than differences among more senior students.

B. State in substantive terms the question that is being asked by the following contrast code values:

	Freshmen	Sophomores	Juniors	Senior
Minority				
Male	-1	+1	0	0
Female	+1	-1	0	0
Non-Minority				
Male	+1	-1	0	0
Female	-1	+1	0	0