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Exam 2

PS306, Fall 1998

Psssst. Hey, wanna take a break this weekend? If you have not already done so, why not go see Arcadia? I'm going! It will give me a chance to see some of the non-experimental skills that some of my students have acquired. Should be a good time!

OK, so you can't escape a commercial even on an exam...how bad is that! ☺ As always, the Skidmore Honor Code is in effect. Keep your eyes focused on your own exam. Point values are as indicated. Keep in mind that I think of a point as a minute, so spend the appropriate amount of time on each question. Good luck!

1a. Suppose that you are interested in conducting an experiment on the effects of sleep deprivation and task difficulty on performance. You operationally define performance as the time it takes a participant to complete the task correctly (better performance = faster time to complete the task). You decide that you want to use 5 levels of sleep deprivation. You also decide to use 3 levels of difficulty: easy tasks, moderate tasks, and difficult tasks. (You pre-test the tasks with a group of participants to determine the level of task difficulty.) You decide to use a completely between design (both factors independent groups), with an $n = 25$. Describe the study you would conduct in sufficient detail that I can tell that you know how to conduct such a study. Flesh out the details of the experiment: (1) the exact levels of sleep deprivation you would use; (2) how many people you would need to complete your study; (3) how you would run them through the study;

(4) produce a figure or table to illustrate a set of results that you think you might obtain from this study and what the implications of the results would be in terms of the effects found in an ANOVA; and (5) the d.f. that would be in your source table for the analysis of this experiment. [25 pts]

Area reserved for the student to produce a figure or table illustrating results and implications, and to provide degrees of freedom for the ANOVA source table.

<u>SOURCE</u>	<u>df</u>
Sleep Deprivation	
Task Difficulty	
Depriv x Diff	
<u>Error</u>	
Total	

1b. How would your design change if you made task difficulty a repeated factor? (Assume that you still want to have *at least 25* scores in each condition.) Briefly describe how the number of participants would change, as well as the way you would run them through the various conditions. [10 pts]

2. Several researchers have investigated the encoding specificity effect. The general finding is that people remember best when the testing situation is as similar as possible to the learning situation. (Thus, because the typical testing situation is a relatively quiet classroom, you'd best study/learn under conditions as similar to the testing situation as possible.) Dr. Ivana B. Loude was interested in further investigating this effect, to see the extent to which the learning and testing situations had to be similar. She decided to focus on the noise level of the room. Thus, she had 4 different noise levels (70 dB, 80 dB, 90 dB, and 100 dB) present while people watched a screen displaying pictures of 50 common objects (the acquisition phase of the experiment). After a brief distractor task, Dr. Loude tested some of the people from each noise level at one of 3 noise levels (10 dB less noise than acquisition, the same noise level, or 10 dB more noise than at acquisition). Thus, for instance, for the 70 dB acquisition group, one-third would be tested at 60 dB (-10 dB), one-third would be tested at 70 dB (same), and one-third would be tested at 80 dB (+10 dB). The dependent variable was the number of objects correctly recalled. Thus, this experiment is a 4x3 independent groups design. Below are the analyses of this experiment. The four acquisition noise levels are (1 = 70 dB, 2 = 80 dB, 3 = 90 dB, 4 = 100 dB). The three test noise levels are (1 = -10 dB from acquisition, 2 = Same as acquisition, 3 = +10 dB from acquisition). Interpret the results as completely as you can. [15 pts]

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
Acquisition Noise (A)	3	2032.633	677.544	69.242	.0001
Test Noise (B)	2	1684.85	842.425	86.092	.0001
AB	6	642.217	107.036	10.939	.0001
Error	108	1056.8	9.785		

Test Noise:		level 1	level 2	level 3	Totals:
Acquisition Noise	level 1	10 25.7	10 31.3	10 24.1	30 27.033
	level 2	10 31.6	10 37.3	10 25.8	30 31.567
	level 3	10 31.7	10 29.7	10 23.1	30 28.167
	level 4	10 26.8	10 21	10 12.9	30 20.233
Totals:		40 28.95	40 29.825	40 21.475	120 26.75

3. Dr. Julie Ard was interested in the effects of music on studying, also using an encoding specificity paradigm. That is, she was interested in the extent to which the similarity of the study and test situations affected performance. To test her hypotheses, she used five acquisition conditions (1 = heavy metal, 2 = rock, 3 = classical, 4 = jazz, 5 = blues). People in these groups studied material while listening to a particular type of music. After a brief delay, half of the people in each condition were tested under identical music (1 = same) and half of the people were tested with no music (2 = different). The dependent variable was the percentage score on the test (100 = perfect performance). Complete the analysis and interpret the results below as completely as possible. [15 pts.]

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
Music (A)		1872			.0001
Test Situation (B)		823			.0001
AB		150			.1579
Error		1999			

Test Situation:		level 1	level 2	Totals:
Music	level 1	10 75.8	10 68.8	20 72.3
	level 2	10 82.6	10 75	20 78.8
	level 3	10 84.6	10 79.7	20 82.15
	level 4	10 86	10 84.7	20 85.35
	level 5	10 84	10 76.1	20 80.05
Totals:		50 82.6	50 76.86	100 79.73

4. People who are just starting to think about conducting experiments are often tempted to first collect some data on all the participants in a study and then match them on particular characteristics. In class, we discussed reasons why this approach might not be a great idea. Another common desire is to measure people on the dependent variable before putting people in any condition (pre-test) then measuring their performance on the dependent variable after the manipulation(s). Neither of these approaches is necessary with appropriate experimental design, right? If you use random assignment to conditions and have a sufficient number of participants you should be ok. First, tell me how random assignment to conditions works to solve the problems addressed by matching and pre-tests. Next, to show that you understand the nature of the problems, give me an example of a confounded experiment in which people are not randomly assigned to conditions and explain why the lack of random assignment would represent a confound. [10 pts]