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Exam 2

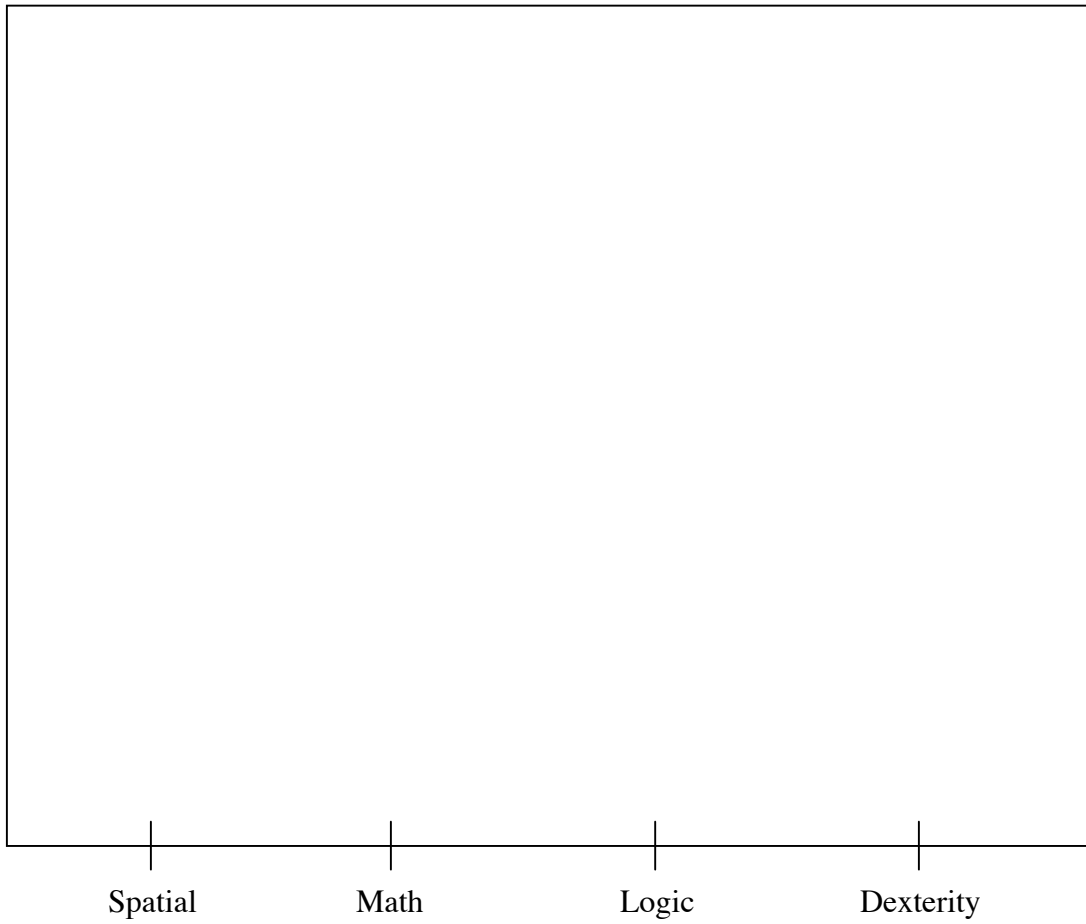
PS 306, Fall 2002

Good luck on this exam. As on the first exam, keep track of your time so that you don't find yourself running out of time. If you keep to spending about as many minutes on a question as the point value of that question, you will complete the exam without difficulty. As always, the Skidmore Honor Code is in effect, so keep your eyes focused on your own exam. Take a deep breath and begin!

1. One problem that you might encounter in a study that could lead to a confound is mortality or attrition. Carefully describe a hypothetical experimental scenario in which such attrition would be a confound. Then describe a scenario in which your study might encounter attrition, but it would not lead to a confound. Clear logic and sufficient detail in your examples are both important. [10 pts]

2a. Suppose that you are interested in determining the extent to which either or both of two drugs (Drug A and Drug B) might lead to improved performance on problem solving tasks for mentally retarded children. To gain a sense of the nature of the impact of the treatments, you decide to test each child on four different types of problems chosen to be appropriate for the mental abilities of such mentally retarded children (spatial problems, math problems, logic problems, and manual dexterity problems). Because you are concerned about the problems of carry-over effects, you decide to use a mixed design with the Drug factor between groups (independent groups) and the Problem factor within groups (repeated measures). Carefully describe the design of your study, the procedure you would use in conducting your study, the number of participants you would use in your study, and any relevant details that will make clear that you've thought carefully about the design of this study. [20 pts]

2b. In the “graph” below, indicate the means that might result from your study. Then tell me what your means would lead you to predict about the results of an ANOVA on the data. [10 pts]



3. An experiment is done to test the effect of age and dress of a speaker on attitude of a college audience. Groups of college students listen to a speaker talk on why Slabotnik should be president. The speaker is either neatly dressed (tie and jacket) or grubbily dressed (ripped blue jeans and torn t-shirt). Additionally, the speaker is either in his 20's, 30's, or 40's. After the talk, the subjects rate their attitude about whether Slabotnik should be elected, on a scale ranging from 0 (should not be elected) to 7 (should be elected). Complete the source table below and interpret the study as completely as you can. [20 pts]

What are your three H_0 's?

What value represents your best estimate of σ^2 ?

ANOVA Table for Approval

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Age				1.637	.2114	3.274	.307
Dress				23.407	<.0001	23.407	.999
Age * Dress				36.681	<.0001	73.363	1.000
Residual			.628				

Means Table for Approval

Effect: Age * Dress

	Count	Mean	Std. Dev.	Std. Err.
20, Grubby	6	4.500	1.049	.428
20, Neat	6	.667	.816	.333
30, Grubby	6	3.167	.753	.307
30, Neat	6	1.500	.548	.224
40, Grubby	6	1.167	.753	.307
40, Neat	6	2.833	.753	.307

4. Dr. B. N. Goode is an educational psychologist who is interested in the impact of different textbooks on learning. He wants to assess the benefits of three different statistics texts (by Drs. Aaron, Brown and Curtis). To conduct the study, he gets one of his colleagues to agree to use the Aaron text, another colleague to use the Brown text, and a third colleague to use the Curtis text as they teach their statistics courses. Because he's also interested in determining if one text might be more appropriate for a particular type of student, he divides each class into thirds, based on prior GPA (Low, Medium, High). Dr. Goode gives all three classes a standard test and uses the scores on the test as his dependent variable. Complete the source table below and interpret the results of this study as completely as possible. [20 pts]

ANOVA Table for Test Score

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Textbook		1312.11			<.0001	337.228	1.000
GPA		4700.86			<.0001	1208.176	1.000
Textbook * GPA		31.88			.0982	8.196	.574
Residual		245.12					

Means Table for Test Score

Effect: Textbook * GPA

	Count	Mean	Std. Dev.	Std. Err.
Aaron, High	8	90.500	2.673	.945
Aaron, Low	8	70.625	1.061	.375
Aaron, Med	8	81.750	2.315	.818
Brown, High	8	87.500	1.604	.567
Brown, Low	8	66.500	2.204	.779
Brown, Med	8	75.625	1.188	.420
Curtis, High	8	96.000	1.309	.463
Curtis, Low	8	77.500	2.976	1.052
Curtis, Med	8	87.375	1.408	.498