

ID# _____
 (You must use your actual ID#)

Exam 3

PS 217, Spring 2005

As always, the Skidmore Honor Code is in effect for this exam, so you'll need to write out your declaration of adherence and sign it at the end of the exam. Read each question carefully and answer it completely, showing all your work. Have a peaceful and relaxing summer!

1. In a classic study, Tulving and Gold (1963) studied word identification under conditions of amounts of relevant and irrelevant context. Let's conceive of their study as a 2x5 independent groups design, with Context (Relevant vs. Irrelevant) and Number of Words (0, 1, 2, 4, and 8) as the two factors. For the very briefly presented target word *performer*, for instance, some participants would see no preceding words (0) or the first 1, 2, 4, or 8 words from one of two sentences. The Relevant sentence was "The actress received praise for being an outstanding..." The Irrelevant sentence was "The dog retrieved the burrito from the neighbor's..." Obviously, the issue was the extent to which the preceding context would help the participant to identify the target word that was presented very briefly. The dependent variable was the time it took the participant to identify the target word. Complete the source table below and analyze the data as completely as you can, providing an interpretation for the obtained results. [15 pts]

ANOVA Table for ID Time

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Number of Words		132			.0120	13.500	.841
Context		14344			<.0001	1461.920	1.000
Number of Words * Context		10560			<.0001	1076.267	1.000
Residual		1079					

Means Table for ID Time

Effect: Number of Words * Context

	Count	Mean	Std. Dev.	Std. Err.
0, Irrelevant	12	68.333	3.200	.924
0, Relevant	12	70.500	3.989	1.151
1, Irrelevant	12	73.083	2.314	.668
1, Relevant	12	67.917	2.778	.802
2, Irrelevant	12	80.917	3.147	.908
2, Relevant	12	55.917	3.679	1.062
4, Irrelevant	12	84.333	2.964	.856
4, Relevant	12	53.333	3.025	.873
8, Irrelevant	12	92.500	3.425	.989
8, Relevant	12	42.167	2.406	.694

2. In a study of hyperactivity among elementary school boys, 63 students were randomly selected from a school population of ADHD, 7-year-old boys are randomly assigned to one of 9 groups (n=7). (ADHD is Attention Deficits with Hyperactivity, and left untreated, it can prevent a child from attending to incoming learning stimuli and may also create major disruptions in the classroom.) The researcher wanted to study the classroom effects of both the drug Ritalin as well as a behavior modification program on the activity levels of the students. The drug administered at three levels: 5 mg Ritalin, 10 mg Ritalin, and 20 mg Ritalin. The behavior modification program consisted of giving each student 10 tokens to start the day and then taking away a token for each hyperactive infraction. The tokens that were saved could then be exchanged for some valued prize. The behavior modification program was varied across three levels: no program, program every other day, and program every day. After four weeks, all the children were evaluated for hyperactivity and were assigned scaled scores ranging from a possible low of 0 (no indication of hyperactivity) to a high of 40 (extreme hyperactivity). A partially completed StatView output of the data is seen below. Complete the source table and then analyze the data as completely as possible, providing a complete interpretation. Behavior Mod (None, Every other day, Every day). Ritalin (5 mg, 10 mg, 20 mg). [10 pts]

ANOVA Table for Hyperactivity Score

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Behavior Mod		1283.143			<.0001	52.583	1.000
Ritalin		657.238			<.0001	26.934	.999
Behavior Mod * Ritalin		128.762			.2746	5.277	.376
Residual		1317.714					

Means Table for Hyperactivity Score
Effect: Behavior Mod * Ritalin

	Count	Mean	Std. Dev.	Std. Err.
Every Day, 10 mg	7	12.286	3.352	1.267
Every Day, 20 mg	7	8.714	3.592	1.358
Every Day, 5 mg	7	14.429	3.645	1.378
Every Other Day, 10 mg	7	19.000	5.477	2.070
Every Other Day, 20 mg	7	17.143	5.429	2.052
Every Other Day, 5 mg	7	22.429	7.413	2.802
None, 10 mg	7	22.000	3.958	1.496
None, 20 mg	7	16.429	4.276	1.616
None, 5 mg	7	29.143	5.815	2.198

3. A researcher has developed a new test of self-esteem. To evaluate the reliability of the test, the researcher takes a sample of $n = 8$ participants. Each individual takes the test on a Monday evening, then returns two weeks later to take the test again. The two scores for each individual are reported below. Are the participant's scores on the two tests related to one another? (This measure is often referred to as test-retest reliability.) [15 pts]

	First Test	Second Test
	13	15
	5	4
	12	13
	11	11
	9	10
	14	13
	8	8
	8	6
Sum	80	80
SS	64	100

4a. Before making a decision about his advertising campaign, a publisher ran an experiment to discover whether readers' responses to certain ads differed. He wanted to test responses to three kinds of ads: ads with a color picture, ads with a black-and-white picture, and ads with no picture. Each ad was inserted with other material intended to draw attention away from the material being evaluated. Participants rated the critical ad on an 11-point scale (1 = little preference for the ad, 11 = great preference for the ad). Results for the 24 participants are given below. Analyze the results as completely as you can and then interpret the results. [15 pts]

	Color Picture	Black-and-White Picture	No Picture
	3	4	10
	3	7	7
	7	5	8
	6	3	5
	8	9	9
	1	8	7
	5	7	6
	3	5	8
Sum	36	48	60
SS	40	30	18

4b. [No computation is necessary to answer this part of the question.] Suppose that you were told that the first four participants in each group (of 4a) were males and the remaining participants in each group were females. This information would enable you to analyze the data in a new way, should you introduce this factor. How would your interpretation of the results be most likely to differ? Under which conditions would the F-ratio for Type of Ad be larger as a result of the new analysis? Under which conditions would the F-ratio be smaller as a result of the new analysis? [Examples, such as a possible source table, might help here.] [5 pts]

4c. [No computation is necessary to answer this part of the question.] Suppose that the *same 24 pieces of data* had been obtained from only 8 participants (in 4a) in a repeated measures analysis. How would your interpretation of the results be most likely to differ? Under which conditions would the F-ratio for Type of Ad be larger as a result of the new analysis? Under which conditions would the F-ratio be smaller as a result of the new analysis? [Examples, such as a possible source table, might help here.] [5 pts]

5. Although psychologists do not completely understand the phenomenon of dreaming, it does appear that people need to dream (or, at the very least, need REM sleep). One experiment demonstrating this fact shows that people who are deprived of REM sleep one night tend to have more REM sleep (dreams?) the following night, as if they were trying to make up for the lost REM sleep. In a typical version of this experiment, the psychologist first records the number of periods of REM sleep during a normal night's sleep. The next night, each participant is prevented from REM sleep by being awakened as soon as he or she begins to exhibit REM sleep. During the third night, the psychologist once again records the number of periods of REM sleep. Hypothetical data from this experiment are seen below. Analyze and interpret these results as completely as you can. [15 pts]

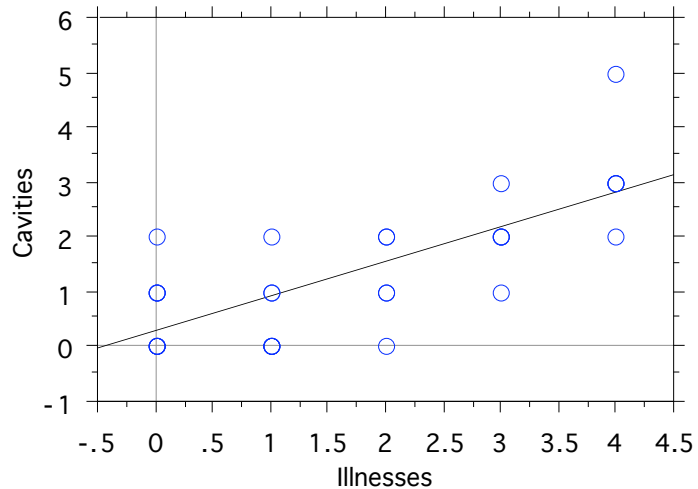
Participant	First Night	Night After Deprivation
1	4	7
2	5	5
3	4	8
4	6	7
5	4	9
6	5	7
7	4	7
8	4	6
Sum	36	56
SS	4	10

6. Dr. Ginger Vitas is a health psychologist who is interested in the relationship between dental health (operationally defined as number of cavities found in an annual checkup) and general health (operationally defined as the number of illnesses experienced in the preceding year). Analyze the output seen below as completely as you can. If a person had 3 illnesses in a year, how many cavities would you predict? If a person had 6 illnesses, how many cavities would you predict? What proportion of variability do these two variables share? [5 pts]

**Regression Summary
Cavities vs. Illnesses**

Count	30
Num. Missing	0
R	.738
R Squared	.545
Adjusted R Squared	.529
RMS Residual	.855

Regression Plot



$Y = .276 + .629 * X; R^2 = .545$

**ANOVA Table
Cavities vs. Illnesses**

	DF	Sum of Squares	Mean Square	F-Value	P-Value
Regression	1	24.501	24.501	33.521	<.0001
Residual	28	20.466	.731		
Total	29	44.967			

**Regression Coefficients
Cavities vs. Illnesses**

	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	.276	.245	.276	1.128	.2691
Illnesses	.629	.109	.738	5.790	<.0001

7a. Dr. Kip Werkin is an industrial/organizational psychologist who is interested in the impact of environmental factors (such as noise) on productivity. He has a group of ten workers experience each of a set of background noise levels (70 dB, 80 dB, 90 dB, and 100 dB SPL) as they work on a project that involves creating delicate instruments. (SPL = Sound Pressure Level) The dependent variable is the number of errors made in the construction of the pieces. Complete the source table and tell Dr. Werkin what he should conclude from this study. [10 pts]

ANOVA Table for SPL

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Subject		4.0					
Category for SPL		13.9			<.0001	67.018	1.000
Category for SPL * Subject		5.6					

Means Table for SPL

Effect: Category for SPL

	Count	Mean	Std. Dev.	Std. Err.
SPL 70 dB	10	.200	.422	.133
SPL 80 dB	10	.200	.422	.133
SPL 90 dB	10	1.000	.667	.211
SPL 100 dB	10	1.600	.516	.163

7b. If the *same* data were analyzed with an independent groups ANOVA, complete the source table below. [5 pts]

Source	df	SS	MS	F
Treatment				
Error				
Total				