Name______________________________ Please circle your TA: Adam Suzanne Yiyu

Psychology 318 Exam #2
April 19, 2017

Instructions

1. Use a pencil, not a pen
2. Put your name on each page where indicated, and in addition, put your section on this page.
3. Exams will be due at 10:20!
4. If you find yourself having difficulty with some problem, go on to the rest of the problems, and return to the troublemaker if you have time at the end of the exam.
5. Leave your answers as reduced fractions or decimals to three decimal places.
6. **CIRCLE ALL ANSWERS: You will lose credit if an answer is not circled!!**
7. Check to make sure that you have all questions (see grading below)
8. **SHOW ALL YOUR WORK: An answer that appears from nowhere will receive no credit!!**
9. Assume homogeneity of variance unless told otherwise.
10. Don't Panic!
11. Good luck!

Grading

Problem	Points	Grader
1	36	Yiyu
2a-e	52	Suzanne
3	12	Adam

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1. An experiment is done with J = 4 conditions. **You can assume that all the original scores (and therefore, of course, T_j's and Σx_{ij}'s) are integers**.
Below are partial summary data from the experiment.

	Condition 1	Condition 2	Condition 3	Condition 4	Relevant Sums
n_j				11	31 = N
df_j			2		27 = dfW
T_j			33		417 = T
M_j				13.636	
Σx_{ij}^2		1,616		2,066	
SS_j		28.400	14.000		70.660 = SSW
$est\sigma_j^2$	1.286	3.156			

Fill in all remaining (i.e., all the unshaded) cells in the table. **Show all your work in the space below.** (36 points, i.e., 2 points per cell).

NOTE: if you cannot figure out the value of some cell that you need, a TA will *sell* you the value for two points.

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2. The experiment from Question 1 is carried out again. Below is a table of most of the summary data.

	Condition 1	Condition 2	Condition 3	Condition 4
n_j	1	11	5	6
df_j	0	10	4	5
T_j	17	133	51	84
M_j	17.000	12.091	10.200	14.000
Σx_{ij}^2	289	1,617	531	1,178
T_j^2/n_j	289.000	1,608.091	520.200	1,176.000
SS_j	0.000	8.909	10.800	2.000
$est_j\sigma^2$	N/A	0.891	2.700	0.400
weights: w_j				
95% CI_j (HOV)		0.675		0.913
95% CI_j (no HOV)		0.634		0.644

a. Compute MSW in three ways: first by using the ANOVA-table formulas derived in class for computing SSW and dfW, second by computing and combining SSW and dfW directly from the summary table, and third by computing a weighted estimate of the individual estimated σ_j^2's. As part of your answer to this question, please compute and fill in relevant weights that should go to each of the individual estimated σ^2's in the unshaded spaces provided in the table. **Be sure to show your work!** (12 points)

b. Compute and fill in the missing 95% confidence interval magnitudes in the summary table. Note that some of the required confidence intervals assume homogeneity of variance (HOV), while others do not. Place your results in the indicated, unshaded, table cells. If there is anything you cannot compute, please explain *why* you can't compute it. (16 points)

c. Carry out an ANOVA on these data. Include SST and dfT in your ANOVA table. Use the .05 α-level. (12 points)

d. Carry out the following hypothesis test: (6 points)

H_0: Homogeneity of variance is true, i.e., the population variance is the same for all four conditions.

H_1: The population variances for Conditions 2 and 4 are the same, but the population variance for Condition 3 is *different* than that of Conditions 2 and 4. **Use the .05 α-level**.

e. Suppose that you *know* that the *standard deviation* for Condition 1 is equal to $\sigma_1 = 1.0$. Carry out the following hypothesis test: (6 points)

H_0: the population variance is the same for all four conditions.

H_1: The population variance for Condition 3 is *higher* than that of Condition 1. **Use the .01 α-level**.

3. An experiment has $J = 7$ conditions with $n = 25$ per condition. The population variance is, as usual, unknown.

a) The **90% confidence interval magnitude** around each sample mean (assuming homogeneity of variance) is computed to be ± 1.50. What is MSW? (8 points)

b) Suppose the experiment is repeated with $n = 5$ per condition. What is your *best guess* as to what the 90% confidence interval magnitude around each sample mean would be? (Again assume homogeneity of variance). (4 points)