Name:_____

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Assignment 4
Part I

§ Read the following and answer questions 1-5:

The Atlanta Braves play baseball games at 1pm, 4pm, 7pm, and 10pm (EST). You want to determine if the average number of runs the Braves score varies by the game time.

The group means are displayed in the table below:

Game Time	Average number of runs scored
1 pm	3.2
4 pm	2.3
7 pm	1.9
10 pm	3.7

1. You would like to perform a contrast to compare the means between groups 2 (game time at 4 pm) and 4 (game time at 10 pm). Circle each of the following sets of coefficients that you could use for this contrast.

a. (1, 2, 1, -2)
b. (0, 1, 0, -1)
c. (½ , 0, - ½ , 0)
d. (0, -1, 0, 1)
e. (0, ¼, 0, - ¼)
f. (0, - ½, 0, - ½)

B, D, and E are acceptable coefficients to use. A and F do not sum to 0. C involves a contrast for groups 1 and 3.

2. You would like to perform a contrast to compare the 1 pm game time (group 1) with the two night game times (groups 3 and 4).

a. Symbolically write the null hypothesis for this contrast using μ_i's.

$H_0 : \mu_1 = \frac{\mu_3 + \mu_4}{2}$ or $H_0 : \mu_1 - \frac{\mu_3}{2} - \frac{\mu_4}{2} = 0$

b. Rewrite the null hypothesis using Ψ. $H_0 : \Psi = 0$

c. Write the set of coefficients you would like to use for this contrast.

Answers may vary. (1, 0, -1/2, -1/2)

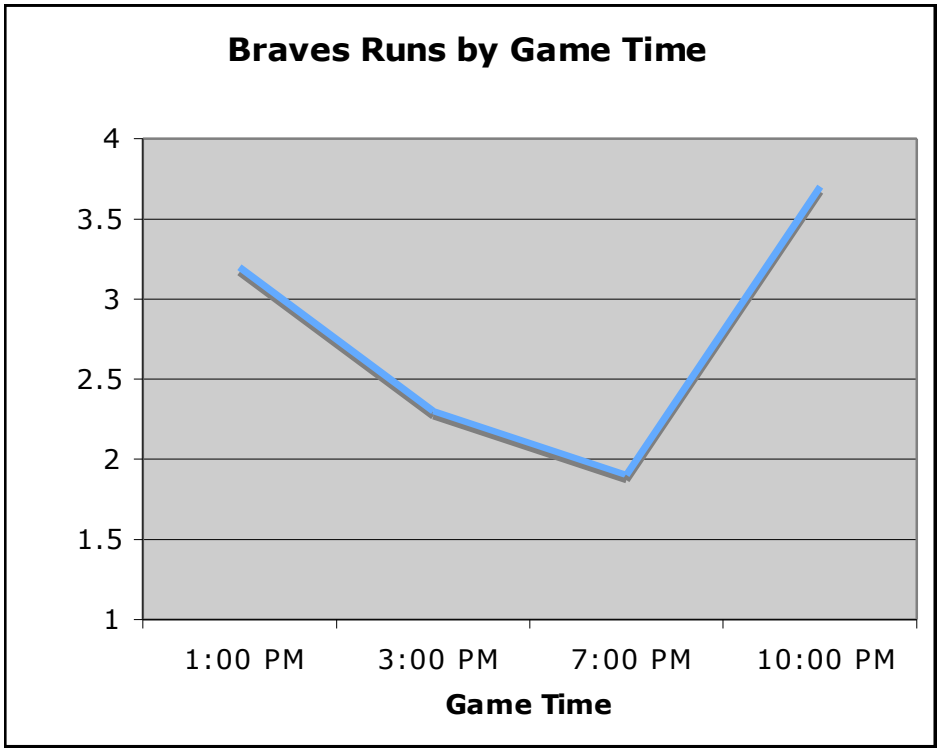
d. Calculate $\hat{\Psi}$. (1*3.2)+(0*2.3)+(-0.5*1.9)+(-0.5*3.7) = 0.40

3. You would like to perform a contrast between the earliest game time and the latest game time using the coefficients (1, 0, 0, -1). Write a contrast that is orthogonal to this contrast and verify that they are orthogonal.

(0, 1, -1, 0)

(1*0)+(0*1)+(0*-1)+(-1*0) = 0.

4. Sketch a plot of the average number of runs scored by the game time. Does the data look linear? Quadratic? Cubic?



The data looks somewhat quadratic.

5. What coefficients could you use to test whether the relationship among the means you observed using a plot in Question 4 exists?

(1, -1, -1, 1)

Part II: SPSS

1. Upload the data file homework4.sav into SPSS. Run the following contrasts:
   a. Contrast Drug A and Drug B
   b. Contrast Drug B and Control
   c. Contrast Control to the mean of Drug A and Drug B

2. What are the appropriate coefficients for (a) and (b) and (c)?
   i. 0, 1, -1
   ii. 1, 0, -1
   iii. 1, -.5, -.5

Contrast Coefficients

	Factor		
Contrast	Control	Drug A	Drug B
1	0	1	-1
2	1	0	-1
3	1	-.5	-.5

3. What are the t- statistic and the p-value for each contrast? What are your conclusions based on the analyses? t and p values presented within "Assume Equal Variances" section of table. According to the results, we fail to reject the null hypothesis for contrast 1. We reject the null for contrast 2 and 3.

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Comprehension Score	Assume equal variances	1	-3.0000	2.44949	-1.225	12	.244
		2	6.0000	2.44949	2.449	12	.031
		3	7.5000	2.12132	3.536	12	.004
	Does not assume equal variances	1	-3.0000	2.44949	-1.225	7.784	.256
		2	6.0000	2.54951	2.353	7.953	.047
		3	7.5000	2.12132	3.536	7.975	.008

4. Produce the 'Means Plot' for this data set, will you run a trend analysis on this data? In a very
brief statement, explain why or why not. We would not run a trend analysis; the independent variable in this experiment is **qualitative**. Trend analyses typically apply to **quantitative** independent variables—the groups are all different levels of the same variable. This answer can be visualized/appreciated via inspection of the means plot. The means correspond to a control group, a group that received Drug A and a group that received Drug B.