

1) In a study examining cardiovascular responses to embarrassment, Harris (2001) asked participants to sing the Star Spangled Banner in front of a video camera while she recorded their heart rate and blood pressure. The data indicate that heart rate increases quickly during the first minute of an embarrassing episode, then drops quickly during the second minute. Blood pressure, on the other hand, increases steadily for a full 2 minutes before gradually returning to normal. Following are heart rate data similar to the research results. Do the data show significant changes in heart rate over time?

Person	Baseline	1 Minute	2 Minutes	P		
A	74	88	75	237	N = 12 G = 960 $\Sigma X^2 = 77,208$	
B	76	90	77	243		
C	78	89	76	243		
D	76	85	76	237		
		M = 76	M = 88	M = 76		
		SS = 8	SS = 14	SS = 2		

3) The librarian at the local elementary school claims that, on average, the books in the library are more than 20 years old. To test this claim, a student takes a sample of $n = 30$ books and records the publication date for each. The sample produces an average age of $M = 23.8$ years with a variance of $s^2 = 67.5$. Use this sample to conduct a one-tailed test with $\alpha = .01$ to determine whether the average age of the library books is significantly greater than 20 years ($\mu > 20$).

	Treatment			
	I	II	III	
4	4	9	N = 12 G = 48 $\Sigma X^2 = 260$	
2	0	3		
6	3	6		
4	1	6		
M = 4		M = 2	M = 6	
T = 16		T = 8	T = 24	
SS = 8		SS = 10	SS = 18	

- 2) a. Use an _____ with $\alpha = .05$ for all tests to evaluate the significance of the main effects and the interaction.
 b. Test the simple main effects using $\alpha = .05$ to evaluate the mean difference between males and females for each of the three treatments.

		Treatments			
		I	II	III	
Male	1	7	9	$T_{male} = 54$	
	2	2	11		
	6	9	7		
	M = 3	M = 6	M = 9		
Factor A:		T = 9	T = 18	T = 27	N = 18 G = 144 $\Sigma X^2 = 1608$
Gender		SS = 14	SS = 26	SS = 8	
Female	3	10	16	$T_{female} = 90$	
	1	11	18		
	5	15	11		
	M = 3	M = 12	M = 15		
		T = 9	T = 36	T = 45	
		SS = 8	SS = 14	SS = 26	

4) When people learn a new task, their performance usually improves when they are tested the next day, but only if they get at least 6 hours of sleep (Stickgold, Whidbee, Schirmer, Patel, & Hobson, 2000). The following data demonstrate this phenomenon. The participants learned a visual discrimination task on one day, and then were tested on the task the following day. Half of the participants were allowed to have at least 6 hours of sleep and the other half were kept awake all night. Is there a significant difference between the two conditions? Use a two-tailed test with $\alpha = .05$.

Performance Scores	
6-hours Sleep	No Sleep
n = 8	n = 8
M = 72	M = 61
SS = 440	SS = 456

6) A variety of research results suggest that visual images interfere with visual perception. In one study, Segal and Fusella (1970) had participants watch a screen, looking for brief presentations of a small blue arrow. On some trials, the participants were also asked to form a mental image (for example, imagine a volcano). The results for a sample of $n = 6$, show that participants made an average of $M_D = 4.3$ more errors while forming images than while not forming images. The difference scores had $SS = 63$. Do the data indicate a significant difference between the two conditions? Use a two-tailed test with $\alpha = .05$.