

Name: _____
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Assignment 9 Part I

The following item is selected from the textbook (Keppel & Wickens).

1. (14.1 in textbook). Calculate the means of the men and the women in table 14.2 using the individual scores and the means. For which set is the difference larger?

Men (b ₁)				Female (b ₂)		
a ₁	a ₂	a ₃		a ₁	a ₂	a ₃
16	21	8		9	22	8
12	20	18		6	19	10
9	19	12		15	24	14
14	15			11	25	7
17	17			12	19	5
	22			8	19	11
				14	14	8
					26	
					21	
Sum:	68	114	38	75	189	63
n _{jk} :	5	6	3	7	9	7
\bar{Y}_{jk} :	13.600	19.000	12.667	10.714	21.000	9.000

Solution:

Means of the men using the individual scores:

$$\bar{Y}_{men} = \frac{16 + 12 + 9 + \dots + 8 + 18 + 12}{14} = 15.714$$

Means of the men using the means:

$$\bar{Y}_{men} = \frac{13.600 + 19.000 + 12.667}{3} = 15.089$$

Means of the women using the individual scores:

$$\bar{Y}_{women} = \frac{9 + 6 + 15 \dots + 7 + 5 + 11 + 8}{23} = 14.217$$

Means of the women using the means:

$$\bar{Y}_{women} = \frac{10.714 + 21.000 + 9.000}{3} = 13.571$$

The difference between men and women using means calculated by the individual scores:

$$\bar{Y}_{diff} = 15.714 - 14.217 = 1.497$$

The difference between men and women using means calculated by the means:

$$\bar{Y}_{diff} = 15.089 - 13.571 = 1.518$$

The difference using means calculated by the means is larger than that calculated by the individual scores.

2. You are interested in comparing the weight loss for obese dogs when fed four different brands of dog food that claim to help dogs lose weight. You are going to compare the weight loss among the different brands after 3 months of eating the diet dog food in three different breeds of dog: Golden Retriever, Saint Bernard, and American Bulldog.
- If you want to analyze the results by running a two-way ANOVA, this study would use a ____ x ____ factorial design. **3x4**
 - Name the independent and dependent variables in this study.
The independent variables (or factors) are brand of dog food and breed of dog.
The dependent variable is the amount of weight loss.
 - When you run the two-way ANOVA, you are first interested in whether there is an interaction between which variables? **Between the independent variables**
 - Using the General Linear Model, write the null hypothesis to test that the simple effects of the type of dog food is the same for each breed of dog. Make sure to define the factors (tell which factor is factor A, etc.)
Let the brand of dog food be Factor A and the breed of dog be Factor B.
If the simple effect of the type of dog food is the same for all three breeds of dog, then that means there is no interaction.
 $H_0: Y_{ijk} = \mu_T + \alpha_j + \beta_k + E_{ijk}$
 - Using the General Linear Model, write the null hypothesis to test that the average amount of weight loss across all breeds of dog is equivalent for each brand of dog food.
 $H_0: Y_{ijk} = \mu_T + \beta_k + (\alpha\beta)_{jk} + E_{ijk}$
 - Using the General Linear Model, write the null hypothesis to test that the average amount of weight loss across all brands of dog food is equivalent for each breed of dog.
 $H_0: Y_{ijk} = \mu_T + \alpha_j + (\alpha\beta)_{jk} + E_{ijk}$
 - If we rejected the null hypothesis in parts (d), (e), and (f), then which general linear model should be used to estimate the amount of weight a dog will lose?
 $Y_{ijk} = \mu_T + \alpha_j + \beta_k + (\alpha\beta)_{jk} + E_{ijk}$
 - If we failed reject the null hypothesis in parts (d), (e), and (f), then which general linear model should be used to estimate the amount of weight a dog will lose?
 $Y_{ijk} = \mu_T + E_{ijk}$

Part II: SPSS

An experimental psychologist conducted a study to observe the impact of an ethnic sensitivity training on overall ethnic sensitivity towards racial groups other than that of origin.

There were 100 participants in the study who were randomly assigned to four (a=4) Ethnic Sensitivity training groups. The group activities varied in length from 3 to 9 months and included training modules regarding racial stereotypes, interactions, relationships and biases. At the end of the program, there were a total of N=46 participants who had completed all training modules. Group one which lasted 3 months contained all online modules. Group two which lasted 6 months contained 3 months of online modules, and 3 months of face-to-face training. Group three which lasted 9 months consisted solely of face-to-face training. Group four had no training.

At the end of the program, all remaining participants were given pictures a face of and asked to assign the “person” a score on various characteristics. An ETHSEN score was assigned to each person based on the sums of scores on such qualities as kindness, honesty, hardworking, etc. In addition, each participant was asked to rate his/herself on their own skin tone (selfskintone) in the following categories: Light, medium or dark.

At the end of the experiment, the using the dataset **Ethnic Sensitivity**, researcher had the following questions:

- a. **How many people were in each training group at the end of the experiment?**
Group 1=11, Group 2=15, Group 3=10 Group 4=10
- b. **Was there a significant difference in the Ethnic Sensitivity score based on participants’ own skin tone?** **No, the p value was 0.33**
- c. **Was there a significant treatment effect based on group membership?** **Yes, the p value was 0.00**
- d. **Was there an interaction between the self-reported skin tone and the ethnic sensitivity score?** **No. There is no interaction between the self-reported skin tone and the ethnic sensitivity. Interaction should be between independent variables, not between independent and dependent variables.**
- e. **What are the differences in means of Ethnic Sensitivity based on Training Group membership?** **1=22.31 2=22.34, 3=24.29, 4=36.15**