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**Lab: 001B**

**HW#2**

**Question-1:**

Q 9.10:

Answer:

In the Bonferroni procedure the level of error rate becomes smaller with the increase in number of treatment groups. A smaller error rate makes the procedure more conservative in this sense but the chances of making Type II errors increases. Therefore, even though Bonferroni is conservative, the power of Bonferroni is comparatively low.

Q 9.13:

Answer:

For this problem we label the mean overweight measurements for agents A1, A2, A3, A4, and S respectively as mu\_1, mu\_2, mu\_3, mu\_4, mu\_5. We want to test if any of these means are statistically different.

Hypotheses for parameter of interest

NULL Hypothesis, H\_0 = mu\_1 = mu\_2 = mu\_3 = mu\_4 = mu\_5

Alt. Hypothesis, H\_A = at least one of mu\_1 , mu\_4, mu\_3, mu\_4, mu\_5 is different

Assumptions made on the model:

i. single, continuous response variable obtained

from a simple random sample, OR, a completely

randomized design is used

ii. Within each treatment group the residuals are

homoscedastic, independent, and normally distributed

The test statistic is: 15.68

The p-value: 0.0001

Conclusion: As p-value < 0.05 we reject the null hypothesis. We state that there is any statistically significant evidence to suggest that at least one of the mean overweight measurements for the five agents is different.

Q 9.14b:

Answer

The statistically significant different pairs of means are

-Agents A4 and S

-Agents A1 and S

-Agents A2 and S

-Agents A4 and A3

-Agents A1 and A3

**Question-2:**

Q9.17

Answer

a. μs – 1/4 \*( μ1 + μ2 +μ3+ μ4)

b. 1/2 \*( μ1+μ3) – 1/2 \* (μ2 + μ4)

c. 1/2 \*( μ1+μ2) – 1/2 \* (μ3 + μ4)

d. 1/2 \*( μ1+μ3) - μs

Q9.18

Answer

t = 5

**αE = 0.05, αI = αE/t-1 = 0.05/4 = 0.0125**

**N = total observations = 50 , N –t =45**

**T αI/2 , N – t = 2.86898**

**a.**

**MOE = 6.74416**

**95% confidence interval for the contrast = (9.27-11.395)** ± 6.74416 = (-8.8694, 4.61916)

The interval contains zero.

Decision: We are 95% confident that a statistically significant difference does not exist between the mean of the standard to the average of the four agent means

**b.**

**MOE = 6.0321**

**95% confidence interval for the contrast = (11.16-11.63)** ± 6.0321 = (-6.5021, 5.5621)

The interval contains zero.

Decision: We are 95% confident that a statistically significant difference does not exist between the mean for the agents with counseling to those without counseling

**c.**

**MOE = 6.0321**

**95% confidence interval for the contrast = (11.535-11.255)** ± 6.0321 = (-5.7521, 6.3121)

The interval contains zero.

Decision: We are 95% confident that a statistically significant difference does not exist between the mean for the agents with exercise to those without exercise

**d.**

**MOE = 7.3878**

**95% confidence interval for the contrast = (11.16-9.27)** ± 7.3878 = (-5.4978, 9.2778)

The interval contains zero.

Decision: We are 95% confident that a statistically significant difference does not exist between the mean for the agents with counseling to standard