Project 1

Jennifer

The independent variable is the list of words presented in a Stroop task. Dependent variable is the time the participants completes the task (congruent set and incongruent set).

Hypothesis

μ_C = congruent population mean

μ_I = incongruent population mean

Null: The time to name the color of the ink is the same whether the color of the ink matches the word (congruent) or not (incongruent).

$$\mathcal{H}_0 : \mu_C = \mu_I$$

Alternative: The time to name the color of the ink when the color of the ink matches the word (congruent) is different than when the color of the ink does not match the word (incongruent).

$$\mathcal{H}_A : \mu_C \neq \mu_I$$
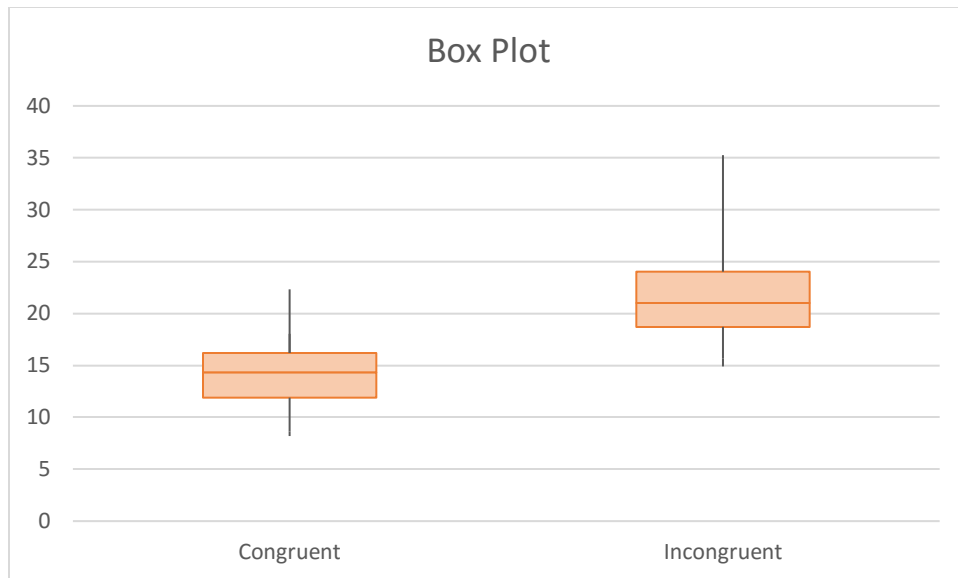
Box Plot

This is boxplot that displays the distribution of congruent and incongruent data values. In comparison to congruent, the participants' time to complete the incongruent task is longer since the range of the incongruent data values are higher than the congruent data values.

Descriptive Statistics
Congruent Set
X_C = 14.05 seconds
σ_C = 3.56 seconds

Incongruent Set
X_I = 22.02 seconds
σ_I = 4.8 seconds

Math Symbols
X = mean
σ = standard deviation

Statistical T-Test

Since the samples are dependent, I will do a two-tailed dependent t-test for paired samples. I will use a confidence level of 95% ($\propto$ = 0.05). I will be doing the t statistics since the sample is less than 30 and the population standard deviation is unknown.

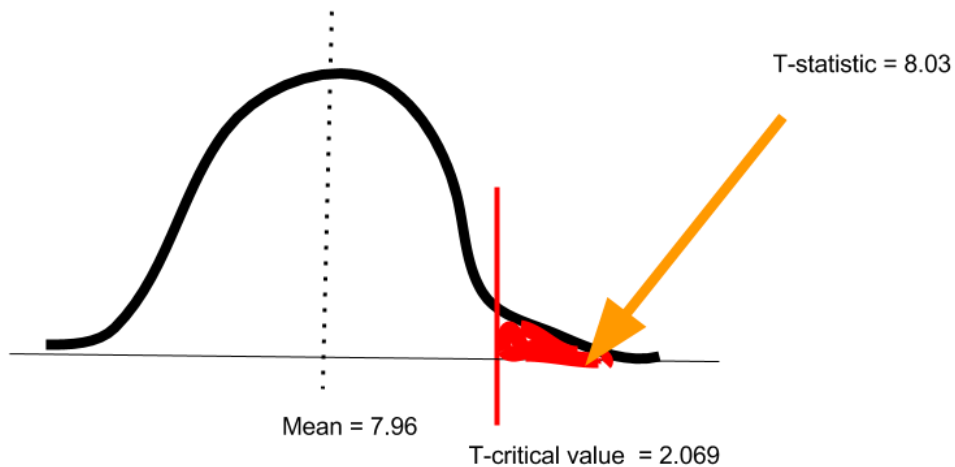Statistics on the difference of the samples (indicated by I-C)
X_{I-C} = 7.96
σ_{I-C} = 4.86

Point Estimate =Mean(Congruent)-Mean(Incongruent)= X_C -X_I =7.97

$$\text{T-statistic} = \frac{7.97}{4.86/\sqrt{24}} = 8.03$$

Since degrees of freedom (df) is 23, the t-critical value ($\propto$ = 0.05) is 2.069.

T-statistic = 8.03

Mean = 7.96

T-critical value = 2.069

Source: the drawing I did on google drawing shows where the mean, t-statistic, and t-critical value lie on the normal curve.

Conclusion

Since the t-statistic is greater than the t-critical value, I reject the null hypothesis. The time to name the color of the ink when the color of the ink matches the word (congruent) is different than when the color of the ink does not match the word (incongruent). I conclude that the time to name the color of the ink of the congruent word is faster than the color of ink of the incongruent word.