TESTING A PERCEPTUAL PHENOMENON (STROOP EFFECT)

1. **What is our independent variable? What is our dependent variable?**

The dependent variable is the time taken to identify the colors used in displayed words (Y-axis).

The independent variable here is the Color Congruency Condition Test being done on participants ie congruence between the alphabets of the words and the color of the words used in displaying alphabets of the words (X-axis).

2. What is an appropriate set of hypotheses for this task? What kind of statistical test do you expect to perform? Justify your choices

Population Mean of Congruent test = μ_{cong}

Population Mean of Incongruent test = μ_{incong}

The appropriate set of hypotheses are :

Null Hypothesis $H_0 : \mu_{cong} = \mu_{incong}$

It means that there's not much significant change in population means of congruent and incongruent test conditions.

Alternative Hypothesis $H_a : \mu_{cong} \neq \mu_{incong}$

The alternative hypothesis being opposite of null, states that there is a significant change in means between population means of congruent and incongruent test conditions.

JUSTIFICATION :

Since the sample size is less than 30 we would use t-test because this is no longer normally distributed. If it had sample size of more than 30, than the distribution would be normal and we would use z-test.

The t-test used here will be dependent t-test because dependent t-test is testing the null hypothesis that there are no differences between the means of the two related groups. If we get a statistically significant result, we can reject the null hypothesis and accept the alternative hypothesis

3. Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and at least one measure of variability

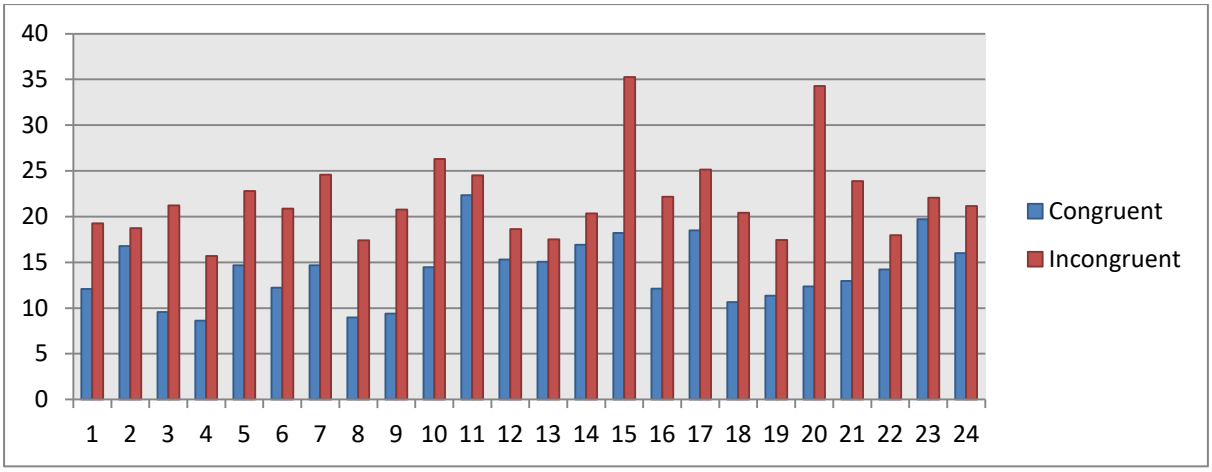
Central Tendency Measures of the following data:

	Congruent	**Incongruent**
Mean	14.05	22.015
Median	14.36	21.02

Variability Measures of the following data :

	Congruent	**Incongruent**
Standard Deviation	3.56	4.80

4. Provide one or two visualizations that show the distribution of the sample data. Write one or two sentences noting what you observe about the plot or plots.



This visualization shows that the time taken to complete the incongruent test by participants is far more than congruent test. This does graphically prove that 'stroop effect' really effects our reaction time.

5. Now, perform the statistical test and report your results. What is your confidence level and your critical statistic value? Do you reject the null hypothesis or fail to reject it? Come to a conclusion in terms of the experiment task. Did the results match up with your expectations?

t statistics = $(\mu_{incong} - \mu_{cong}) / (sd/\sqrt{n}) = 8.02$

At an alpha level of 0.5 (5%), t critical value = ±2.069

95% of Confidence Interval (CI) for the difference: (5.91,10.01)

Since the t-statistic lies in the critical region, we can say that the time it took to say the name of the colors in incongruent test is far greater. Hence, we Reject the null hypothesis!

Yes the result match with my expectations , But yet this doesn't really prove that there will always be a significant statistical differences between the color congruency tests.

CREDITS:

UDACITY LECTURES