PROJECT ON TESTING A PERCEPTUAL PHENOMENON

Questions given to investigate:

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

Dependent Variable:

Dependent Variable is defined as variable whose value will be dependent on other variable or other things. In given example our dependent variable is time taken to read the words by each participant.

Independent Variable:

Independent Variable is defined as variable whose value will be independent. In given example our independent variables are the two conditions one is congruent words condition the other one is incongruent condition.

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

Set of Hypotheses:

I prefer Null Hypotheses and Alternative Hypotheses for this given dataset as set of hypotheses.

Where,

Alternative Hypothesis:

The population means reaction time in incongruent condition will take longer than congruent condition. (H1: μC lesser than μI)

Mathematical Expression is H_A: $\mu_C < \mu_I$

Null Hypothesis:

There will not be a difference in the population that is reaction time between incongruent and congruent condition. (H0: μC equals μI)

Mathematical Expression is H_A: $\mu_C = \mu_I$

(where μ is a population mean, the subscript "C" represents the congruent words condition, and the subscript "I" represents the incongruent words condition.)

Statistical Test:

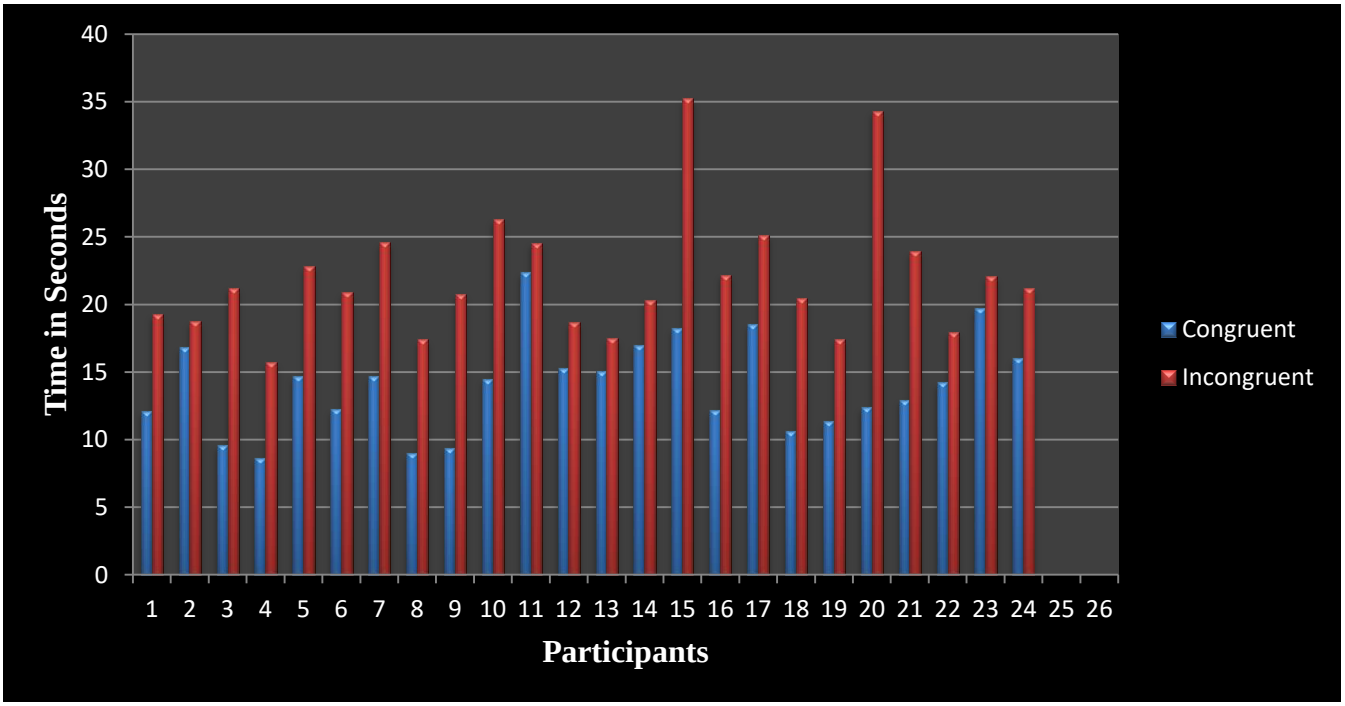
The statistical test that, I prefer to perform is **Two-tailed dependent t-test.** Because,

1) The sample size was below 30
2) The population's standard deviation is unknown.
3) To know the difference between the two paired samples.

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

STATISTICS	CONGRUENT	INCONGRUENT
Mode	22.328	35.255
Mean	14.051	22.0159
Median	14.356	21.017
N	24	24
Sample 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.



It shows it takes more time to read incongruent set of words than reading congruent sets of words.

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?

The T-Statistic is 8.0207069. There are 23 degrees of freedom (24 observations). Using a confidence level of 95%, the critical test statistic is 2.069. The t-statistic greatly exceeds this, so I reject the null hypothesis and conclude that there is a significant difference in reading speed of the two datasets (decreased speed for incongruent words). This matches my expectations after trying the test myself and viewing the scatterplot.

Reference:

https://en.wikipedia.org/wiki/Stroop_effect