

Test a Perceptual Phenomenon

Questions For Investigation

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

Answer:

Independent Variable: The property of word/color congruency between the word and the color of the word is the independent variable .

Dependent Variable: The time taken to recognize the word's color to complete the Stroop test.

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

Answer:

Null Hypothesis (H_0): The population mean for both Congruent and Incongruent test is same.

$H_0: \mu_i = \mu_c$ (μ_i - population mean of incongruent values, μ_c - population mean of congruent values)

Alternate Hypothesis (H_A): The population mean for the Congruent data test is less than that of Incongruent.

$H_A: \mu_i > \mu_c$ (μ_i - population mean of incongruent values, μ_c - population mean of congruent values)

Since the sample size is less than 30 and the central limit theorem holds good for sample size greater than 35. Also we are not been provided the population mean and population standard deviation so performing a z-test is not possible in our scenario.

A one-tail t-test(dependent test) is ideal where two tests are performed on same group of sample under different conditions. We can reject the null if the test is significant at probability <0.05 or 5%.

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

Answer:

Sample size is 24.

Mean: $\bar{x} = \sum x/n$ (where, \bar{x} is sample mean, x is the value and n is the size of sample)

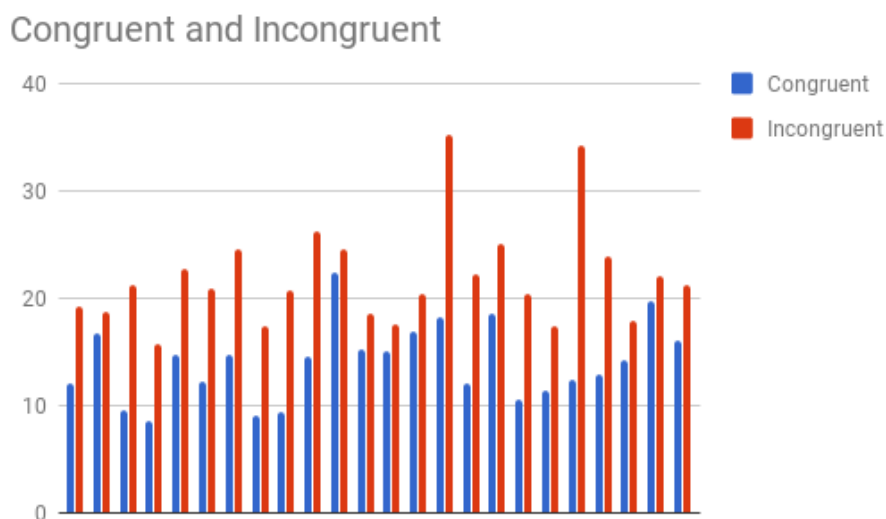
Congruent Mean- 14.05

Incongruent Mean- 22.02

Standard Error – Standard deviation/ \sqrt{n} = 0.99 [where n is the sample size]

[See the attached spreadsheet for detail data]

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.



The time taken for incongruent test is greater than that of congruent data test in all sample data provided. The bar graph above shows the plot of congruent v/s incongruent time sample data.

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?

Answer:

t-value: -8.02

Confidence interval: (-8.96, -6.98)

t-critical: -1.714

DF: 23

The P-Value is $< .00001$.

The result is significant at $p < .05$.

I rejected the null as the t value lies below the t-critical value

Yes the results matched with my expectations.

Sources used –

<https://faculty.washington.edu/chudler/java/strvote.html>

Udacity Lectures.

Google Sheets.

<http://www.socscistatistics.com/pvalues/tdistribution.aspx>