

1. The independent and dependent variables are as follows:

- a. The condition of the Words i.e Congruent or Incongruent is the independent variable.
- b. Time taken to say out loud the colour of the ink is the dependent variable.

2.

- a. Null Hypotheses  $H_o$  : The time taken to say out loud the colour of the Ink in both the conditions i.e Congruent Words and Incongruent Words is approximately equal (Not Significant) or the difference between them is approximately equal to Zero.

$$H_o: \mu_i - \mu_c = 0$$

- b. Alternate Hypothesis  $H_a$  : The time taken to say out loud the colour of the ink in the Incongruent word condition is greater than the time taken to say out loud the colour of the ink in the Congruent word condition.

$$H_a: \mu_i - \mu_c > 0$$

Where,

- $\mu_i$  = Average Time taken to say out loud the colour of the ink of the words in Incongruent condition.
- $\mu_c$  = Average Time taken to say out loud the colour of the ink of the words in Congruent condition.

Since we have two Samples of two different populations and we want to figure out the population parameters, I would like to perform a t-test on this sample of Data. Since a same person is taking both the tests, it will be a Dependent t-test in which two different conditions are being tested.

As it is hypothesised in the Stroop effect that the time take to say out loud in the Incongruent word condition is more that the time taken to say out loud in the Congruent word condition, We perform a Directional t-test i.e one-tailed t-test.

3. Descriptive Statistics Analysis

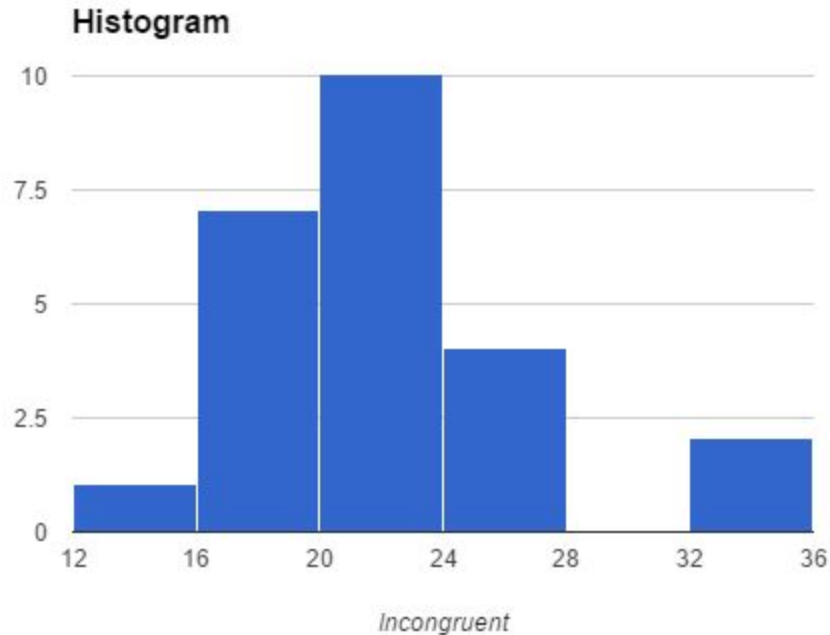
- a. Congruent Descriptive Statistics (14.051, 3.559):

- i. Mean = 14.051
- ii. Sample Standard Deviation = 3.559
- iii. Median = 14.357
- iv. Mode = None
- v. Range = 13.698

b. Incongruent Descriptive Statistics (22.0159, 4.797):

- i. Mean = 22.0159
- ii. Sample Standard Deviation = 4.797
- iii. Median = 21.0175
- iv. Mode = None
- v. Range = 19.568

4. Incongruent: This histogram show that the average time taken in the incongruent word condition falls in the 20-24 range and majority of the sample lies between the 16-28 range.



5. Result of the One-tailed t-Test ( $\alpha = 0.05$ ) of Dependent Samples:

- $t(24) = 8.02$ ,  $p = .01$ , one-tailed in the +ve direction
- $t\text{-critical} = 1.714$
- Confidence Interval on the Mean difference; 95% CI = (6.26, 9.67)
- $d = 1.64$
- $r^2 = .74$

According to the results of the one-tailed t-test we reject the null Hypothesis.

As suggested by the result the samples fall in the critical region and hence the null is rejected. This suggests that the time taken to say out loud the colour of the ink in the Incongruent word conditions is significantly more than the time taken to say out loud the colour of the ink in the congruent word condition. A large t-statistic value suggests a extremely statistically significant difference between them.

$r^2 = .74$ , suggests a strong relation between the two variables i.e time taken to say out loud the colour of the ink and the condition of the word (Congruent and Incongruent)

Yes, the result of the test matches my expectation.

6.

- a. In my opinion the working of our brain is responsible for this effect. Our brain likes to make things easier. It has already associated certain types of images with certain types of feelings, thoughts, emotions and words. This is what makes us human and is certainly the weakness of the humans that his experiment exploits. Our brain has already associated a specific colour with a specific word. This experiment is challenging this and hence results in more time in the case of the Incongruent word conditions.
- b. There is a task/game in which the first and the last alphabets of word are kept in the original order and the rest characters of the word are scrambled, yet we are able to read the word without any problems. This exercise basically shows the same principle behind the stroop effect.