

# **Statistics: The Science of Decisions Project**

## **Rubric**

Answer Q1:

The independent variable is the color of the words.

The dependent variable is the time taken to read the words.

Answer Q2:

$H_0$  = There is no difference when the ink of the color of the words used when it comes to time taken in reading the words.

$H_a$  = There is difference in the time taken in reading the words with different ink color used.

The paired t-test is the appropriate hypothesis to be performed for this.

Answer Q3:

Soln:

Mean of the differences between incongruent and congruent results:

7.964791667

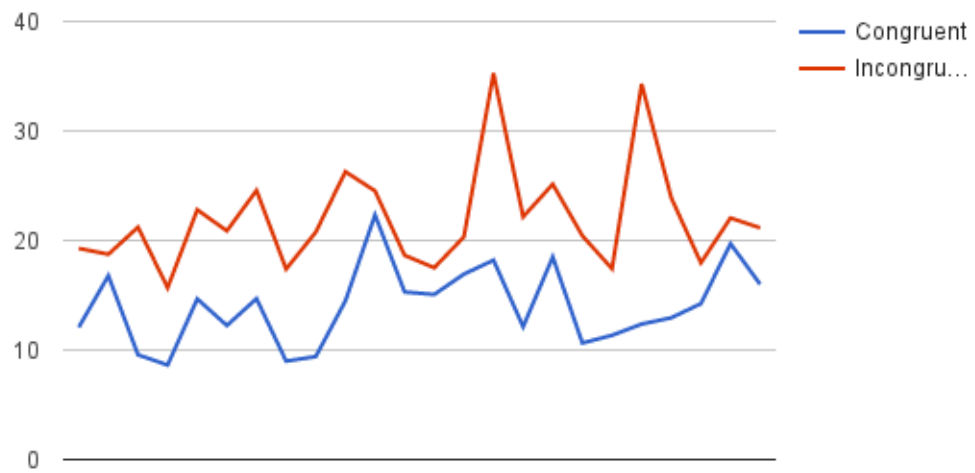
Standard deviation of the difference between incongruent and congruent results:

4.762400441

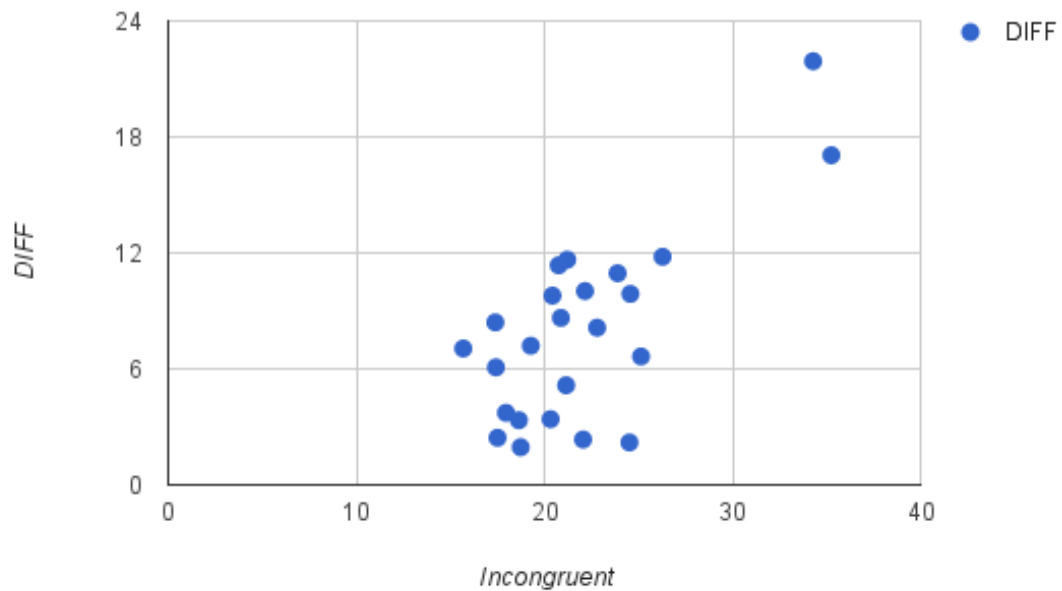
Answer Q4:

This chart shows the graph showing the congruent and incongruent values for all the data points.

**Congruent/Incongruent**



**Incongruent/DIFF**



The above chart shows the scatter plot for the difference values between congruent and incongruent values for the incongruent values. The differences is large for the larger incongruent values.

Answer Q5:

My sample size was 5 with 4 Degrees of Freedom.  
The results are shown below.

| Congruent | InCongruent | Diff    | Square of Diff from Mean |
|-----------|-------------|---------|--------------------------|
| 11.54     | 35.48       | 23.94   | 3.038049                 |
| 10.78     | 32          | 21.22   | 19.918369                |
| 9.56      | 31          | 21.44   | 18.003049                |
| 10.335    | 35.46       | 25.125  | 0.311364                 |
| 9.386     | 30.76       | 21.374  | 18.567481                |
|           |             |         |                          |
|           |             |         |                          |
|           |             | Ave     | Std Dev                  |
|           |             | 22.6198 | 14.959578                |

Confidence level = 95%  
t-statistic value : 3.38  
t-critical for 95% for two tailed test is 2.064.

We reject the null hypothesis that there is no difference between the congruent and incongruent tests because  $3.38 > 2.064$  and it falls in the critical region.

The experimental task gave the t-stat value of 8.36 which is also  $> 2.064$ . This comes to the conclusion that the results taken by me is same as the experimental tasks.  
The results matched my expectation.