

1. The dependent variable is time. This time is the time taken to correctly recognize the color of the ink. The independent variable comes from the combination of the word-color of the ink in which the letters are printed. Therefore the independent variable is the congruency or the incongruence of the word.

2. The null hypotheses for this test is:

- a. H_0 : There is no difference in mean time for the congruent and incongruent data.

$$\mu_0 = \mu_C - \mu_I$$

$$H_0: \mu_0 = 0$$

- b. H_a : There is a difference in the means of the congruent and incongruent data.

$$H_a: \mu_0 \neq 0$$

In order to know which one of our hypotheses is correct, we will use a two-sided paired T-distribution test statistic. We use the t-test for this data because there are less than 30 samples, we do not know the population standard deviations and the test is paired because the same group has been tested twice. The test type is dependent because the same one sample has been tested more than once (twice to be precise) and the assumption we make here is that data is normally distributed.

3. The mean and Standard deviations of both congruent and incongruent data are:

- a. Congruent Mean = 14.05 seconds

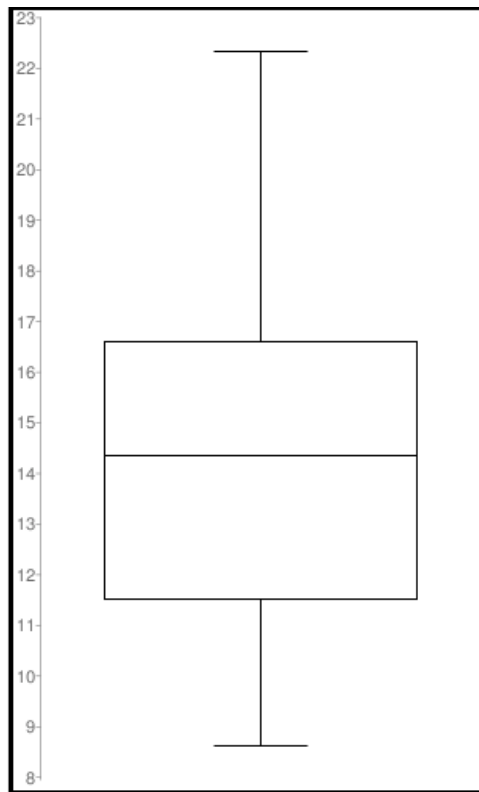
- b. Incongruent Mean = 22.016 seconds

- c. Congruent Standard Deviation = 3.56 seconds

- d. Incongruent Standard Deviation = 4.797 seconds

4. Here's a diagram of the data:

It shows that Incongruent Data is always greater than the congruent time. Below is the boxplot for Congruent Data



Some statistics are:

Min = 8.63

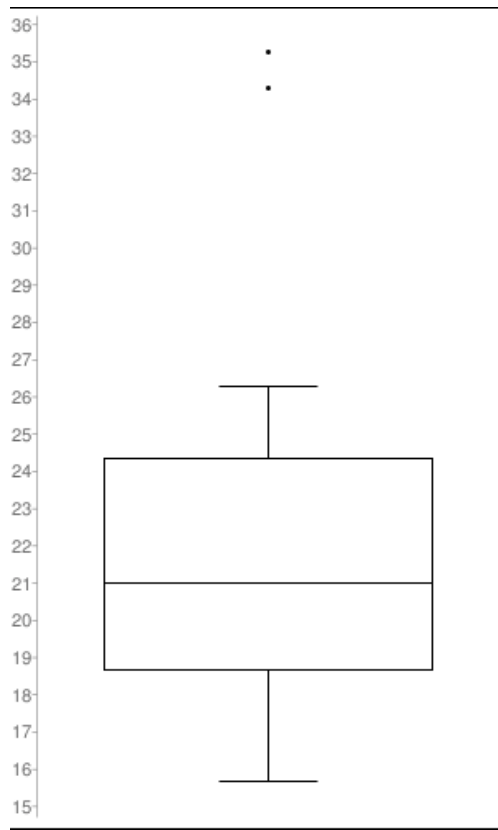
Q1=11.527

Median = 14.356

Q3 = 16.594

Max = 22.328

Below is the boxplot for Incongruent Data



Some statistics of the Incongruent Data's boxplot are:

Min = 15.687

Q1 = 18.668

Median = 21.0175

Q3 = 24.366

Max = 35.255

Outliers = 34.288, 35.255

5. Below are the test results:

a. Alpha=0.05

b. T-statistic = 8.021

c. T-critical values = -2.069 and 2.069

d. Point Estimate = 7.967

e. Confidence Interval = (5.925,10.009)

We reject the null hypotheses that there is no difference in the mean of congruent and incongruent data.

6. Another example that I can think of is that we read a sentence with words correctly spelled and we read sentences with words jumbled up. We note the time difference and perform similar tasks.