

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

Ans: The congruence of the word and the colour in which the word is written is the Independent Variable.

The response time for identifying the colour in which the word is displayed is the Dependent Variable.

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

Ans: Null Hypothesis( $\mu_i = \mu_c$ ): The average completion time in viewing the congruent(c) words is equal to that of the incongruent (i) words.

Alternative Hypothesis( $\mu_i \neq \mu_c$ ): The average completion time in viewing the congruent (c) words is not equal to that of the incongruent (i) words. The difference may be positive or negative.

The Dependent Samples t-Test would be the appropriate test because the samples are dependent and the same subjects are assigned two different conditions, which are dependent in nature. The dependency factors comes in to play when one has taken the first test and has gathered some experience before taking the second test.

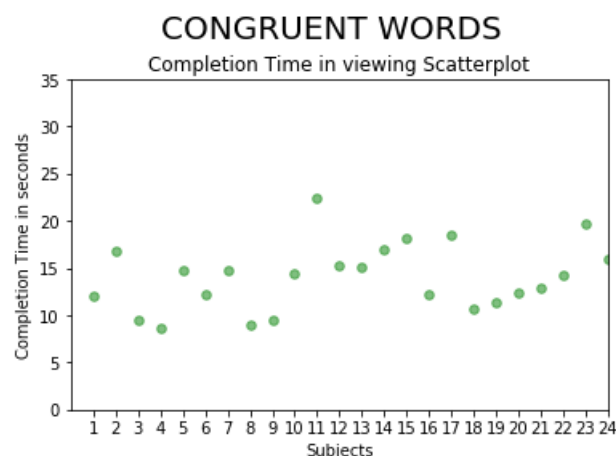
**3. Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and one measure of variability.**

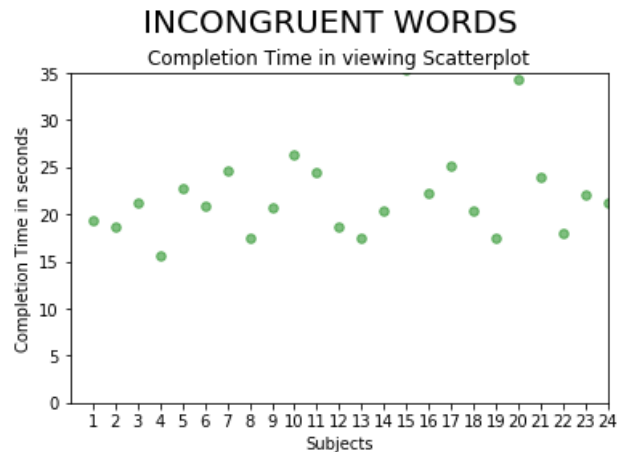
Ans:

	CONGRUENT	INCONGRUENT
MEAN	14.051125000000004	22.015916666666667
STANDARD DEVIATION	3.559357957645195	4.797057122469138

**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.**

Ans:





From the above two plots, we can observe that the Average Completion Time of the Incongruent Words is higher than that of the Congruent 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?**

Ans: t-statistic = 8.0207

t-critical = 1.711

t-statistic > t-critical

Mean =  $\mu_c - \mu_i = 14.051125$

Standard deviation =  $s_c - i_c = 4.865$

The Null Hypothesis is rejected because there is a significant difference between the average completion time in viewing the congruent and the incongruent words per person.

The results did not match up with the expectations. Had the average completion time in viewing the congruent and the incongruent words per person been almost the same, that would have met up our expectations since we were performing the Null Hypothesis.

#### References:

1. Udacity Machine Learning Foundation Nanodegree video lectures
2. [https://en.wikipedia.org/wiki/Null\\_hypothesis](https://en.wikipedia.org/wiki/Null_hypothesis)