Q1 What is our independent variable? What is our dependent variable?

Ans : An independent variable is one which is changed or controlled in an experiment. It can be the reason for a possible outcome. Here, in our project we have the colour of the ink as the independent variable. As it determines the outcome and is being changed.

The reaction time is the result we are looking for so it becomes the dependent variable.

Q2. What is an appropriate set of hypotheses for this task? What kind of statistical test do you expect to perform? Justify your choices.

Ans:

Firstly we take congruent set which means that the colour corresponds to the text and then we take incongruent set which means that colour and text do not correspond. On careful examination we see that the congruent values are always less than incongruent column. We can also take the mean of both the columns. Mean of the congruent column is 14.05113 whereas mean of the incongruent column is 22.01592.

The difference between completion time between means of congruent and incongruent sets is zero (i.e $\mu i = \mu c$).

Means of congruent and incongruent conditions are unequal ($\mu c \neq \mu i$).

We will use paired t-test on data because sample is dependendent. The paired t test reduces intersubject variability (because it makes comparisons between the same subject)

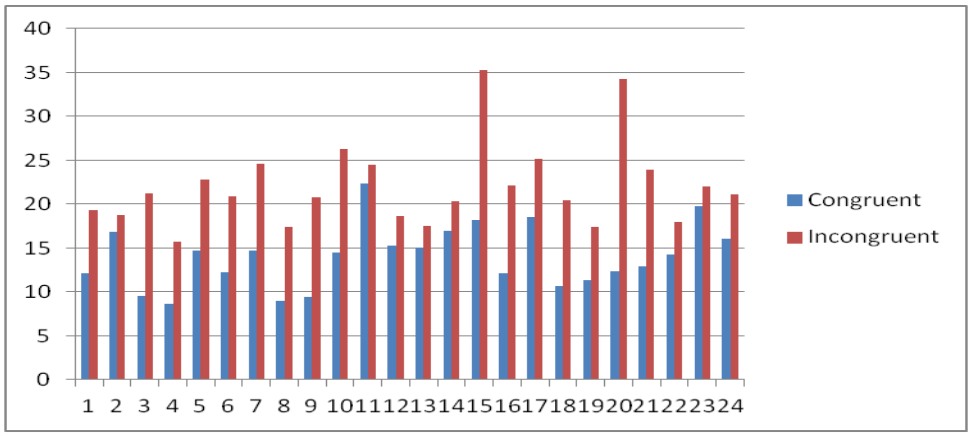
Q3. Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and at least one measure of variability.

Ans: The standard deviation of congruent set is 3.559358 whereas the standard deviation of the incongruent set is 4.797057. As we can see the standard deviation of the incongruent set is more that means it differs more from person to person. It can be said that the incongruent set gives a varying result. This gives us a great measure of the variability.

Regarding the central tendency , the median of the congruent and incongruent sets are 14.3565 and 21.0175 respectively. There is no specific mode in this dataset

Q4. 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: According to me the best way to represent the data will be a column plot. In the plot it can be clearly seen that the entire incongruent set values lies above the congruent one when the reaction time is taken on the y axis.



Q5. 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 = 8.02068

t critical = 1.71400

We can clearly say that: t statistic > t critical

We have come to a conclusion that the means of congruent and incongruent conditions are unequal.

It can be said that word recognition and colour recognition are two different tasks computed by our brain (perhaps in different areas). This result was in coherence with my expectations.

References:

www.statstutor.ac.uk/resources

Udacity lectures and quizzes

Graph from Microsoft Excel