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

- independent variable = the congruent words condition

- dependent variable = Time it takes to name the ink colors in equally-sized lists

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

- H0 : $\mu C = \mu I$ (the mean of reaction time for congruent of words equals to the mean of reaction time for incongruent of words)
- H1 : $\mu C \neq \mu I$ (the mean of reaction time for congruent of words does not equals to the mean of reaction time for incongruent of words)

Where **μC is** congruent **population means**.
μI is incongruent **population means**.

- Statistics test = Dependent paired, two sample t-test – because we have same group of people did the test 2 time, so it should be dependent paired.

- It is t-test because

-> we do not know the standard deviation of population.

-> we have less than 30 samples

-> We assume that the distributions are Gaussian

Now it's your chance to try out the Stroop task for yourself. Go to this link, which has a Java-based applet for performing the Stroop task. Record the times that you received on the task (you do not need to submit your times to the site.) Now, download this dataset which contains results from a number of participants in the task. Each row of the dataset contains the performance for one participant, with the first number their results on the congruent task and the second number their performance on the incongruent task.

Congruent – 11.679 , 31.613

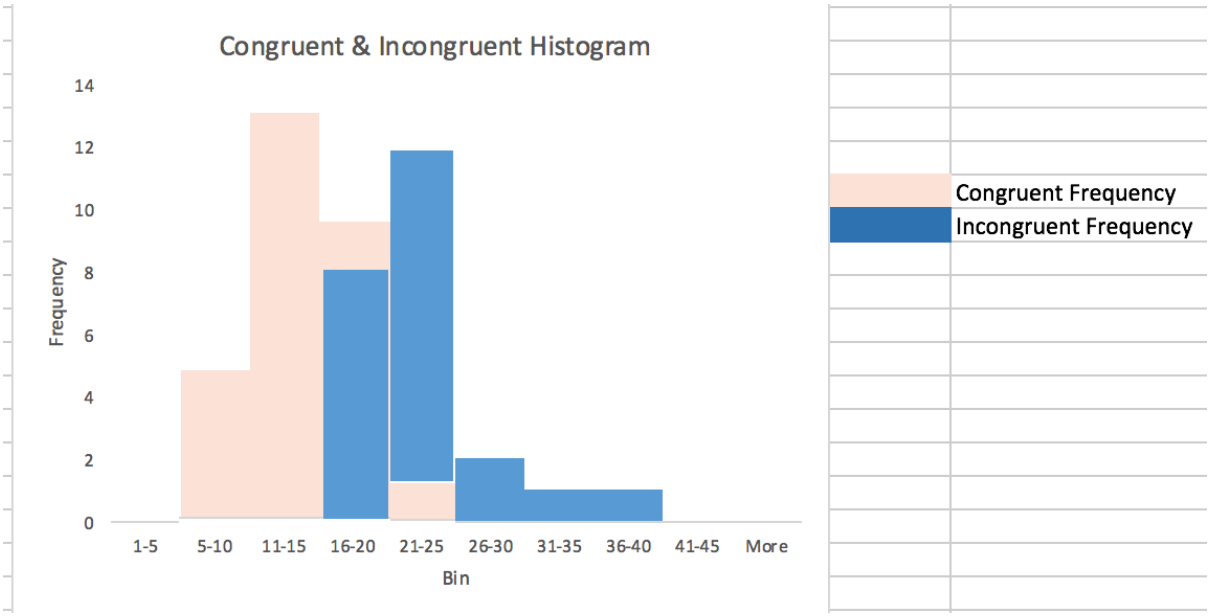
3. Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and at least one measure of variability.

Congruent	Incongruent
12.079	19.278
16.791	18.741
9.564	21.214
8.63	15.687
14.669	22.803
12.238	20.878
14.692	24.572
8.987	17.394
9.401	20.762
14.48	26.282
22.328	24.524
15.298	18.644
15.073	17.51
16.929	20.33
18.2	35.255
12.13	22.158
18.495	25.139
10.639	20.429
11.344	17.425
12.369	34.288
12.944	23.894
14.233	17.96
19.71	22.058
16.004	21.157

t-Test: Paired Two Sample for Means

	Congruent	*Incongruent*
Mean	14.051125	22.0159167
Variance	12.6690291	23.011757
Observations	24	24
Pearson Corr	0.35181953	
Hypothesized	0	
df	23	
t Stat	-8.0207069	
P(T<=t) one-t	2.0515E-08	
t Critical one	1.71387153	
P(T<=t) two-t	4.103E-08	
t Critical two	2.06865761	

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.



- All of the result from Incongruent data are higher that Congruent data

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?

- We can use the same image I got from question 3 to be the answer for this question

- Confident level = 0.05

- Critical statistic value = P(T<=t) two-tail = 4.103E-08 which < 0.05. So, we rejected it.

- The conclusion is “The congruent of words condition has significant impact on the time that each participant take to name the ink colors in equally-sized lists”

- Yes, this result match up with my expectation

6. Optional: What do you think is responsible for the effects observed? Can you think of an alternative or similar task that would result in a similar effect? Some research about the problem will be helpful for thinking about these two questions!

- I think the one that responsible for the effects should be the difference between the meaning of word and visualization components of the word.

- The things that should have the same result is the word with icon attach to it like below

SAD 

Happy