

1. What is our independent variable? What is our dependent variable?
 - a. In the Stroop test the dependent variable is the response time for the participant the color of the ink or font used. Whereas the independent variable is the congruent or incongruent of word conditions.
2. What is an appropriate set of hypotheses for this task? What kind of statistical test do you expect to perform? Justify your choices.
 - a. μI - mean of incongruent population
 - b. μC -mean of congruent population
 - c. Alternative Hypothesis, H_a , The color difference will significantly affect the time of responses for the population $H_a = \mu I \leq \mu C$

- d. Null Hypothesis, H_0 , there will be no change between the words of the same color and those different for the population

$$H_0 = \mu I - \mu C = 0$$

We will use the two-tailed t-test:

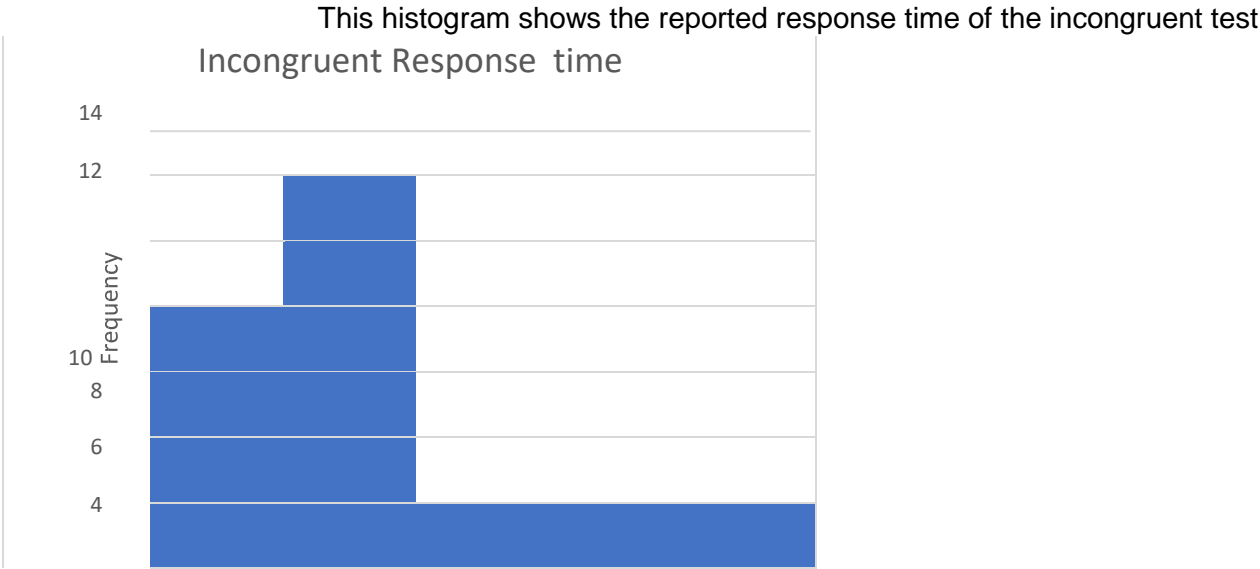
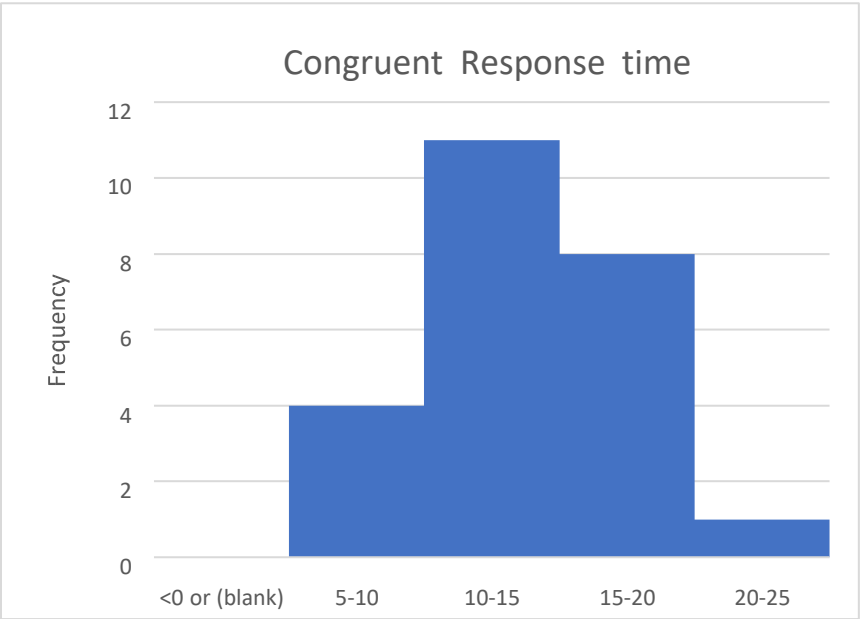
Due to the lack of a population standard deviation. Our test has a t-distribution. Further there is two dependent samples of data which means the 2 tailed dependent t-test is what we need to use

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		Difference	
Sample size (n)	24.000	Sample size (n)	24.00	Sample size (n)	24.0
Mean	14.051	Mean	22.02	Mean	-8.0
Medium	14.233	Medium	20.88	Medium	-7.6
min	8.630	min	15.69	min	-14.6
max	22.328	max	35.26	max	-6.5
Range	13.698	Range	19.568	Range	-5.87
STD	3.559	STD	4.80	STD	1.9

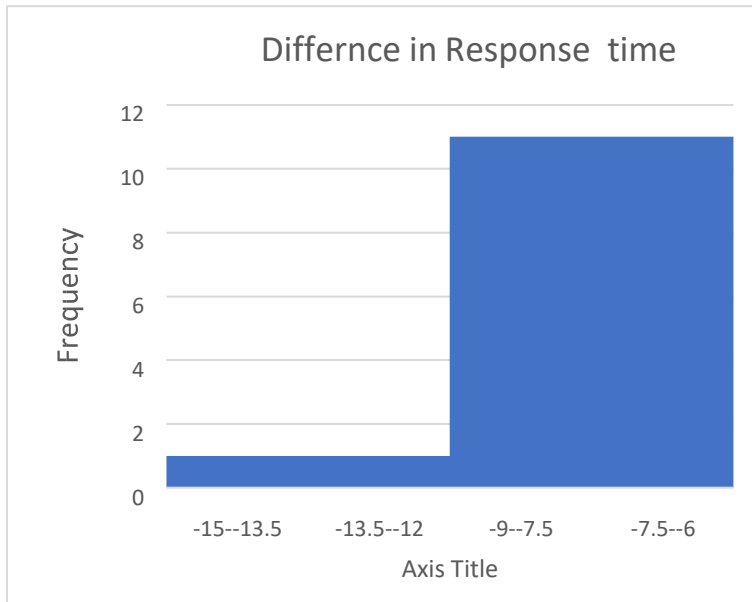
bin count	4.90	bin count	4.90	bin count	4.9
IQR	11.35183	IQR	13.051	IQR	-1.7

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.
- a. A histogram of the congruent response time to set a base line of the response time of the subjects when the color and word match.

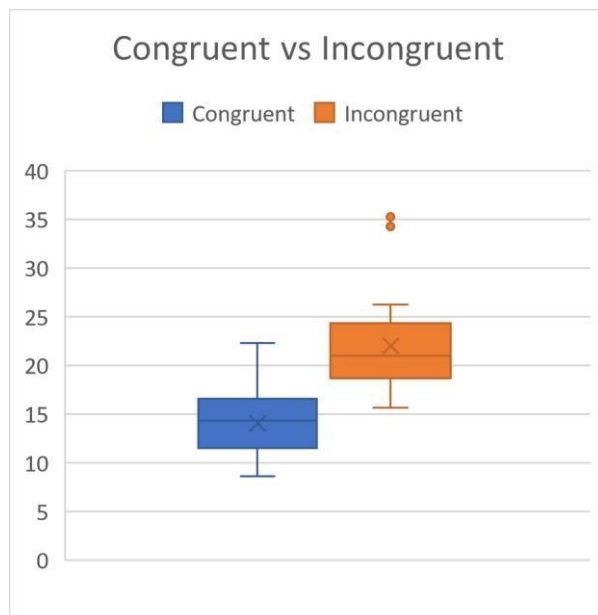




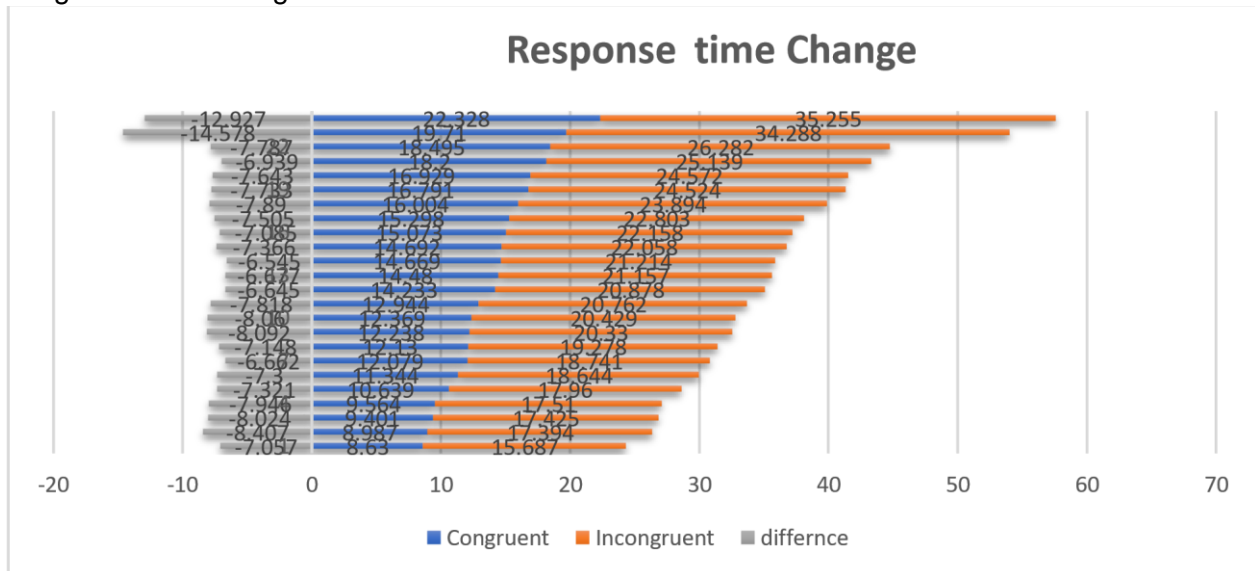
This graph will show the difference in response time between the congruent and incongruent tests.



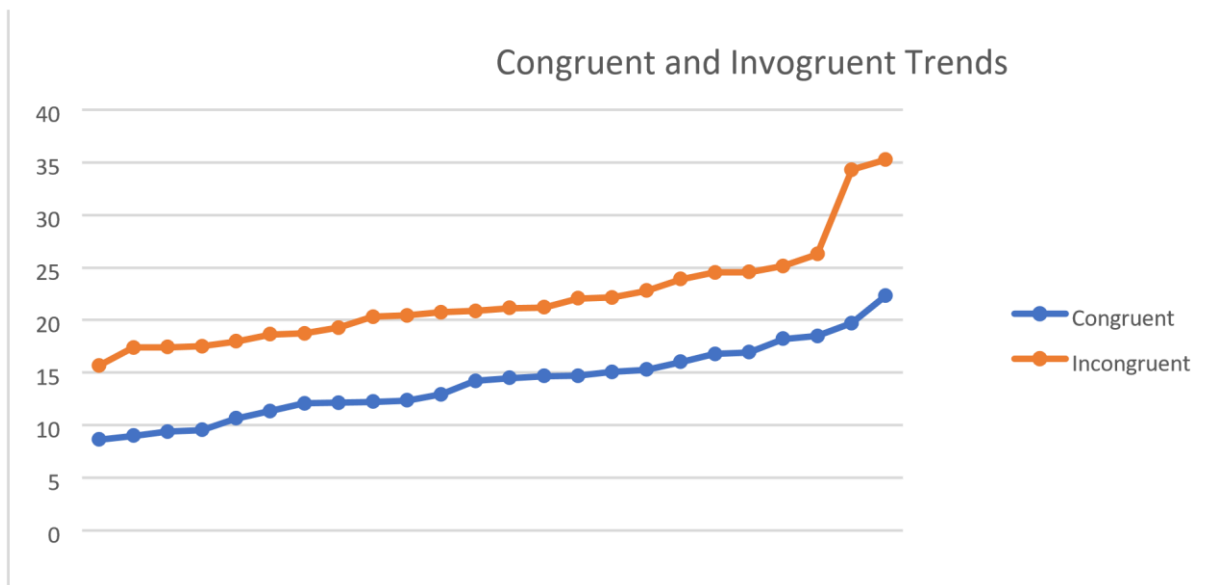
The below box and whisker graph will show the range of the data and possible outliers.

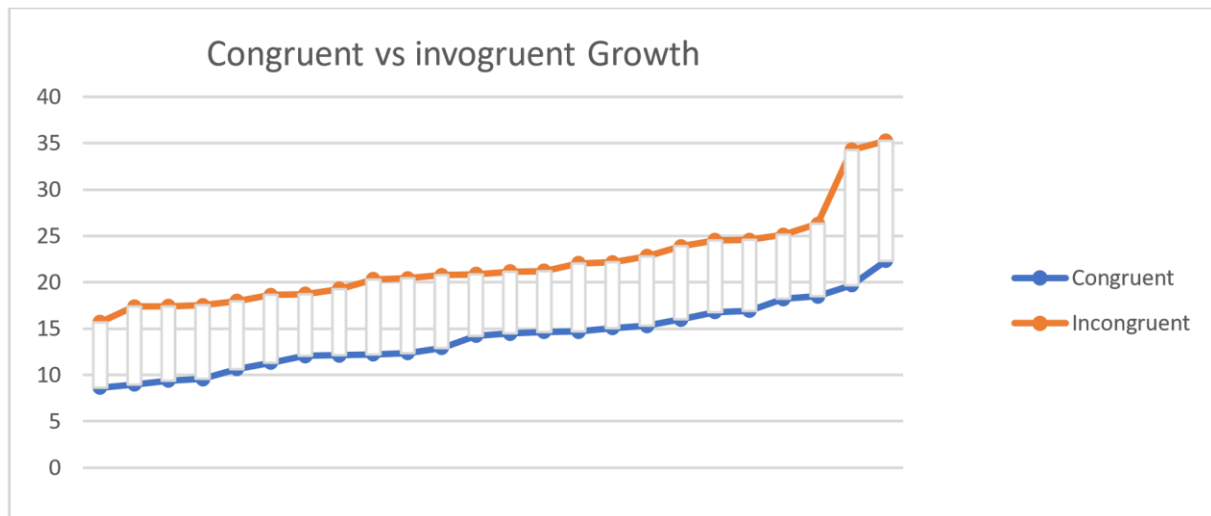


Horizontal bar graph showing the further disparity between the three data sets, difference, congruent and incongruent.



The next two Dot-Line graphs show and track the individual difference and use a bar to further highlight the growth per subject between the congruent and incongruent test.





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?

With the null hypothesis in mind we do a two-tail test with a Hypothesized mean difference of 0 or null.

Two-tail results from Excel:

t-Test: Paired Two Sample for Means

Variable				
				1
				14.05113 Mean
				22.01591667
Variable 2	Variance	12.66903	23.01175704	
Observations		24	24	
Pearson Correlation	0.35182	Hypothesized Mean		
Difference	0	df	23	t Stat -8.02071
P(T<=t) one-tail	2.05E-08	t Critical one-tail		
	1.713872	P(T<=t) two-tail	4.1E-08	t
Critical two-tail	2.068658			

The null hypothesis says that there will be no significant differences in the response time between the two data set, congruent and incongruent. As we can see from the statistical test and the many graphs provided there is in fact a significant difference in the two data sets. With this data in mind we must reject the null hypothesis.

The data did match up with my expectations. I expected that there would be a large difference in response time, because the subjects would have to take a few seconds to adjust to what their original reaction would be