Test a Perceptual Phenomenon Project:

In this project, we are going to investigate a phenomenon from experimental psychology called the stroop affect (stroop dataset). We will use excel and statplus in our analysis to help us in investigation.

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

   Our independent variables will be the congruent and incongruent variables. The dependent variables will the time it takes to name the ink color.

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

   The hypotheses test for this task will be two hypotheses: Null and alternative hypotheses HA & H0. Is that wages the total population mean for response time is equal or same for the both congruent and incongruent conditions.
   HA , Is that wages the total population mean for response time is not equal or same for the both congruent and incongruent conditions.

H0: estimate of the population mean1 = estimate of the population mean2
HA: estimate of the population mean1 ≠ Estimate of the population mean2

H0: $\mu 1 = \mu 2$

HA: $\mu 1 \neq \mu 2$

I think t-distribution will be our statistical test because our both conditions are dependent variables. In addition, they are seemed to have normal distribution. Further, the population standard deviation is not known and our sample size is not large (n=24). So, we will compare the two dependent conditions data sample. Moreover, the appropriate statistical in specific will be a two tailed dependent t-test.

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

Congruent:

Variable #1 (Congruent)			
Count	24	Mean Deviation	2.85311
Mean	14.05113	Second Moment	12.14115
Mean LCL	12.54814	Third Moment	16.51486
Mean UCL	15.55411	Fourth Moment	382.53837
Variance	12.66903		

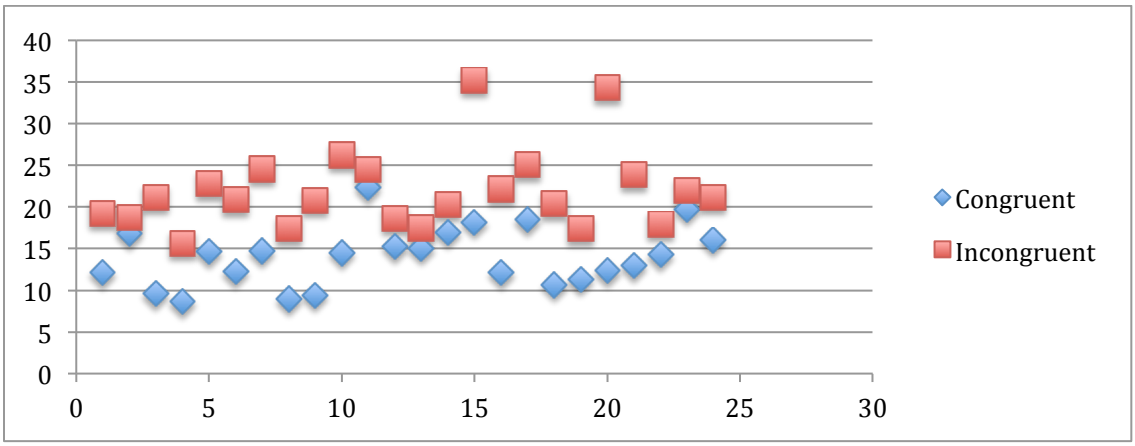
Standard Deviation	3.55936	Sum	337.227
Mean Standard Error	0.72655	Sum Standard Error	17.43722
Coefficient of Variation	0.25331	Total Sum Squares	5,029.80640
	Adjusted Sum Squares	291.38767	
Minimum	8.63		
Maximum	22.328	Geometric Mean	13.62240
Range	13.698	Harmonic Mean	13.20000
	Mode #N/A		
Median	14.3565		
Median Error	0.18587	Skewness	0.39038
Percentile 25% (Q1)	11.89525	Skewness Standard Error	0.45216
Percentile 75% (Q3)	16.20075	Kurtosis	2.59511
IQR	4.30550	Kurtosis Standard Error	0.80154
MAD (Median Absolute Deviation)	0.82900	Skewness (Fisher's)	0.41690
Coefficient of Dispersion (COD)	0.19768	Kurtosis (Fisher's)	-0.20522

Incongruent:

Alpha (significance level)	5.%		
Variable #2 (Incongruent)			
Count	24	Mean Deviation	3.40115
Mean	22.01592	Second Moment	22.05293
Mean LCL	19.99030	Third Moment	150.07509
Mean UCL	24.04154	Fourth Moment	2,392.98287
Variance	23.01176		
Standard Deviation	4.79706	Sum	528.382
Mean Standard Error	0.97920	Sum Standard Error	23.50068
Coefficient of Variation	0.21789	Total Sum Squares	12,162.08449
	Adjusted Sum Squares	529.27041	
Minimum	15.687		
Maximum	35.255	Geometric Mean	21.58220
Range	19.568	Harmonic Mean	21.20346
	Mode #N/A		
Median	21.0175		

Median Error	0.25051	Skewness	1.44914
Percentile 25% (Q1)	18.71675	Skewness Standard Error	0.45216
Percentile 75% (Q3)	24.0515	Kurtosis	4.92047
IQR	5.33475	Kurtosis Standard Error	0.80154
MAD (Median Absolute Deviation)	2.94050	Skewness (Fisher's)	1.54759
Coefficient of Dispersion (COD)	0.15524	Kurtosis (Fisher's)	2.68890

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.



The response time that it takes to name the ink colors in congruent condition is shorter than that incongruent condition it takes as can be seen in the above graph.

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?

Our test statistics (8.02) is greater than t-critical value (2.068) as can be seen in the below table. Thus, the null hypothesis is rejected. Furthermore, the response time that it takes to name the ink color will be affected by the dependent variables including congruent and incongruent conditions. Yes ,the result matched up my expectations.

Descriptive Statistics				
VAR	Sample size	Mean	Standard Deviation	Variance
Congruent	24	14.05113	3.55936	12.66903
Incongruent	24	22.01592	4.79706	23.01176
Paired two-sample t-test				
Degrees of Freedom	23			

Hypothesized Mean Difference	0		
Pooled Variance	17.84039		
Test Statistic	8.02071		
Pearson R	0.35182		
Two-tailed distribution			
p-value	4.10300E-8	Critical Value (5%)	2.06866