

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

Sol) In our study of Stroop Effect, Independent variable is the test questions(or word conditions), dependent variable is Congruent and Incongruent times

2a) Null and alternative hypotheses are clearly stated in words and mathematically. Symbols in the mathematical statement are defined.

Sol) H0 : -> The time taken to identify the colors for both sets of population will be the same.

H1 : -> The time taken to identify the colors in Incongruent set will be higher than for Congruent Set

2b) A statistical test is proposed which will distinguish the proposed hypotheses. Any assumptions made by the statistical test are addressed.

Can perform t-test as we do not have Population parameters and sample size <30. We expect both the populations to be Normal.

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

Sol) Congruent

Descriptive Stats

Mean = 14.051125, Median = 14.3565, Mode = N/A

Measures of Variability

SD population = 3.559357958, Variance p = 12.66, Interquartile Range = (11.89525, 16.20)

Incongruent

Descriptive Stats

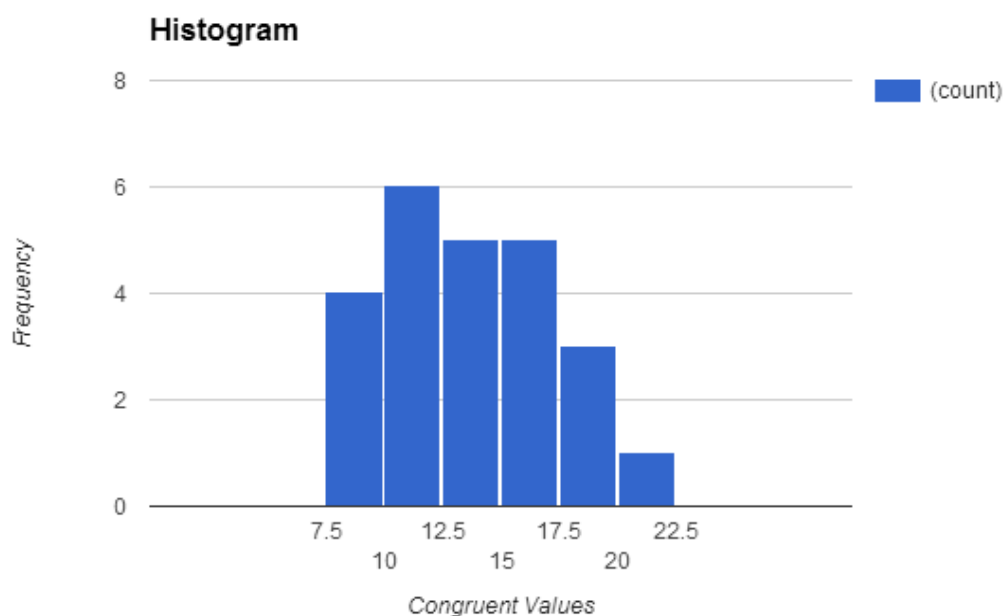
Mean = 22.01591667, Median = 21.0175, Mode = N/A

Measures of Variability

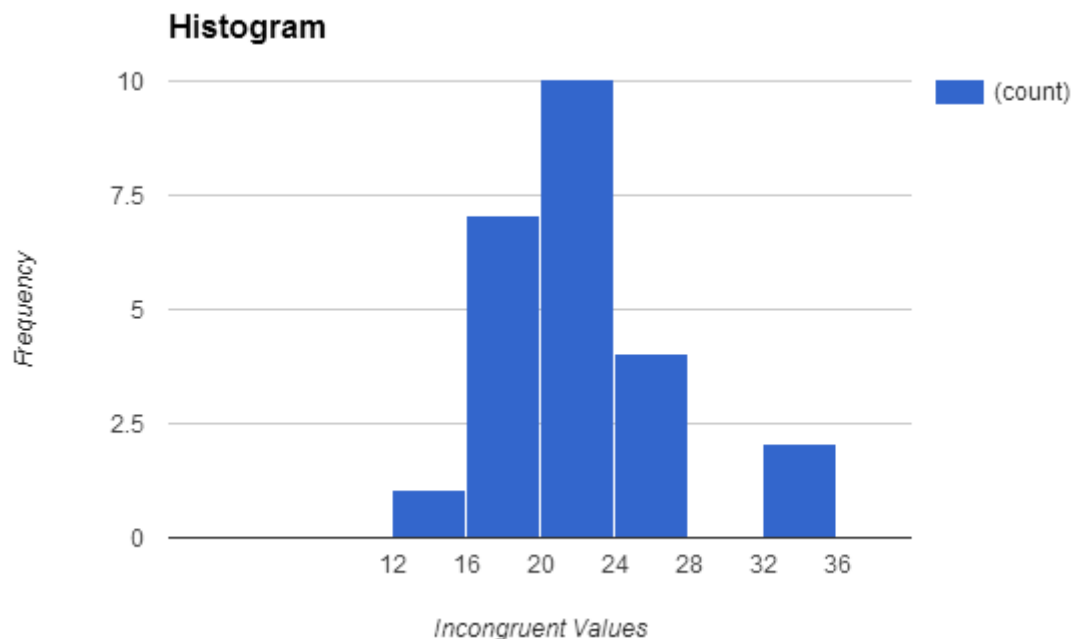
SD population = 4.797057122, Variance p = 23.01, Interquartile range = (18.71 ,24.05)

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.

Sol) The distribution is unimodal, and approaches a normal distribution



The distribution is a bit positively skewed, as mean > median, but on the whole it appears normal



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?

Sol) $SE = \sqrt{S1^2/n1 + S2^2/n2}$
 $= 1.21930284$

This value of SE is correct if the 2 populations are Purely Normal Distributions

For Dependent t-test for Paired Samples we take the difference between 2 samples and then Compute SE

$$SE = 4.86482691/\sqrt{24} = 0.993$$

$$t\text{-stat} = (\mu1 - \mu2)/SE = (22.01 - 14.05)/0.993 = 8.015$$

tCritical at .05 is 1.714 (DF = 23)

tCritical at 0.025 is 2.069 (DF = 23)

Since, Tstat > tCritical, we REJECT the null hypothesis, i.e There is significant difference between the 2 Congruent and Incongruent times

Yes, the results matched with the expectations.