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

Answer:-

Our independent variable is word condition and dependent variable is time takes to name the ink color for each condition.

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

Answer:-

If **xa** = mean of the time taken in congruent word condition and

xb = mean of the time taken in incongruent word condition

xd = mean difference of congruent and incongruent

Then our

Set of hypotheses concerned with population for this task is

Null hypotheses H0 :-

For this task appropriate Null hypotheses is there is same time taken to name the ink color for both incongruent and congruent word condition

uC - ul = 0 or ud =0

Alternative hypotheses Ha :-

For this task appropriate Alternative hypotheses is there is more time taken to name the ink color in incongruent word condition than congruent word condition

uC - ul < 0 or ud < 0

Statistical test :-

In this task we should have to perform **One-direction dependent variable t-test**

We use one direction t-test because time taken to name the ink color in incongruent word condition is greater than congruent word condition.

We use t-test because

1. We have less than 30 sample.
2. We do not know the population standard deviation.
3. We use dependent variable test because participants take part in both conditions are same.

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

Answer:-

Mean of congruent(xa) and incongruent(xb) word conditions is:-

xa = 14.05

xb = 22.02

Mean difference of congruent(xa) and incongruent(xb) word conditions is:-

xd = -7.96

Standard deviation of congruent(sa) and incongruent(sb) word conditions is:-

sa = 3.56
sb = 4.80

Standard deviation of difference of congruent(sa) and incongruent(sb) word conditions is:-

sd = 4.86

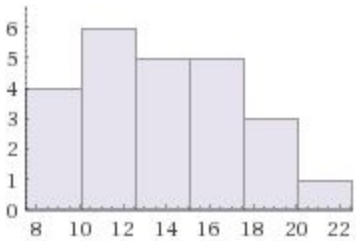
Standard Error (**SE**) :-

SE = sd/sqrt(n)

SE = 0.99

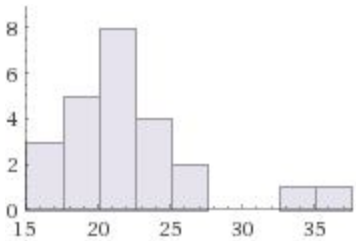
4. Provide one or two visualizations that show the distribution of the sample data. Write one or two sentences noting what you observe about the plot or plots.
Answer:-

Histogram for Congruent:-



I observe from above histogram that our distribution is approx uniform distribution and frequency is max at range of time (10-12).

Histogram for Incongruent:-



I observe from above histogram that our distribution is normal distribution and frequency is max at range of time (20-22.5).

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?
Answer:-

Let take the value of alpha = 0.05

DF = 23
t-critical = -1.714

95% Confidence Interval (CI) :-

{ xd - t-critical*SE , xd - t-critical*SE }

CI = { -9.80 , -6.22 }

t-statistic:-

t = ud/SE

t = - 8.02

p-value :-

p < 0.0001

Since p-value is very less than alpha value so we **reject the null hypothesis.**
So, from above result we can conclude that in incongruent word condition time taken to name the ink color is statistically greater than time taken to name the ink color in congruent word condition.
Yes, result match up with our expectations as we expect that incongruent take more time in comparison to congruent condition.