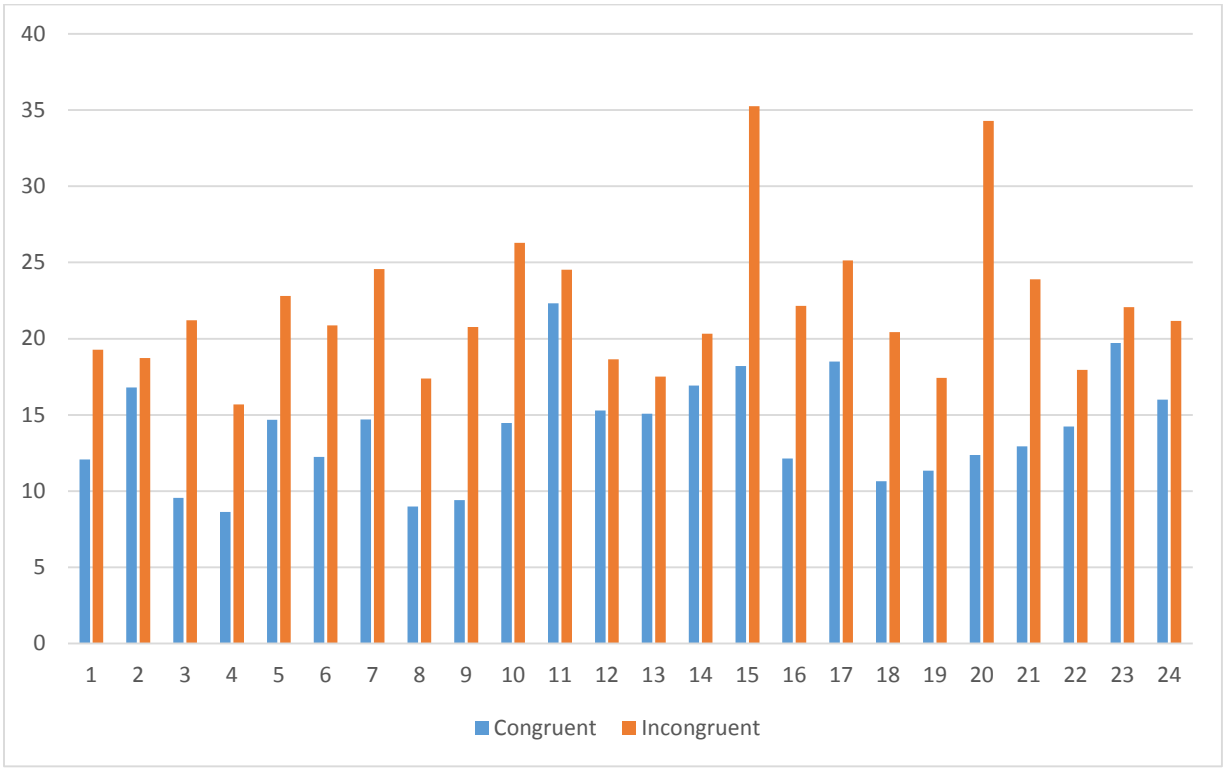
1) In the experiment word condition (congruent or incongruent) is an independent variable. (ie. whether the word is displayed or not in the color that matches name). Dependent variable is the time it takes to name the ink colors in equally sized lists.
2) The null hypothesis is that two population means (μ_c and μ_i) are the same. The alternative hypothesis is that means differ:

H_0: $\mu_c = \mu_i$

H_A: $\mu_c \neq \mu_i$

I will be performing paired 2 tail T-test. T test is applicable here because we do not know the population's standard deviation and we have small samples (n is less than 30). Paired test is chosen because we are performing the experiment on the same group of people giving them 2 different conditions and deviations of time can go in either direction.

3) Average time for congruent is 14.05 seconds and for incongruent average time is 22.02 seconds. Average of the difference between times is -7.96 seconds. The standard deviation of difference between times is 4.86 seconds
4)



We can see from the plot that all of the participants had incongruent time higher than congruent.

Difference between congruent and incongruent times for each participant is inconsistent. Some have a big difference while others' times a close to each other.

Congruent times mostly lie between 10 and 15 seconds which is consistent with average I found in the previous question. Incongruent times lie between 15 and 25 seconds.

5) I am going to perform a test with a confidence level of 0.05. There are 23 degrees of freedom. Critical t value for my test is +/- 2.069. Calculated t statistic for the test is (-8.02). t statistic is significant and results of the test are not due to chance. We are rejecting the null hypothesis because t statistics is in the critical region. Therefore, we can conclude that incongruent word condition makes the time to name the color ink significantly longer which matches my expectations.

   $t(23) = -8.02$, $p<0.05$, two tailed.

   The confidence interval for the mean population difference: 95% CI = (-5.91, 10.02) seconds.