1. Congruent and incongruent words are independent variables. The dependent variable is the time needed to say out loudly the color of congruent and incongruent words.

2. Hypotheses:

   We are going to conduct a two tailed, two-sample test. Because we have no information about population mean and standard deviation. We have two samples and we want to know how different these samples are from each other and if this difference occurs because the two population means differ from each other or by chance. The degree of freedom is 23.

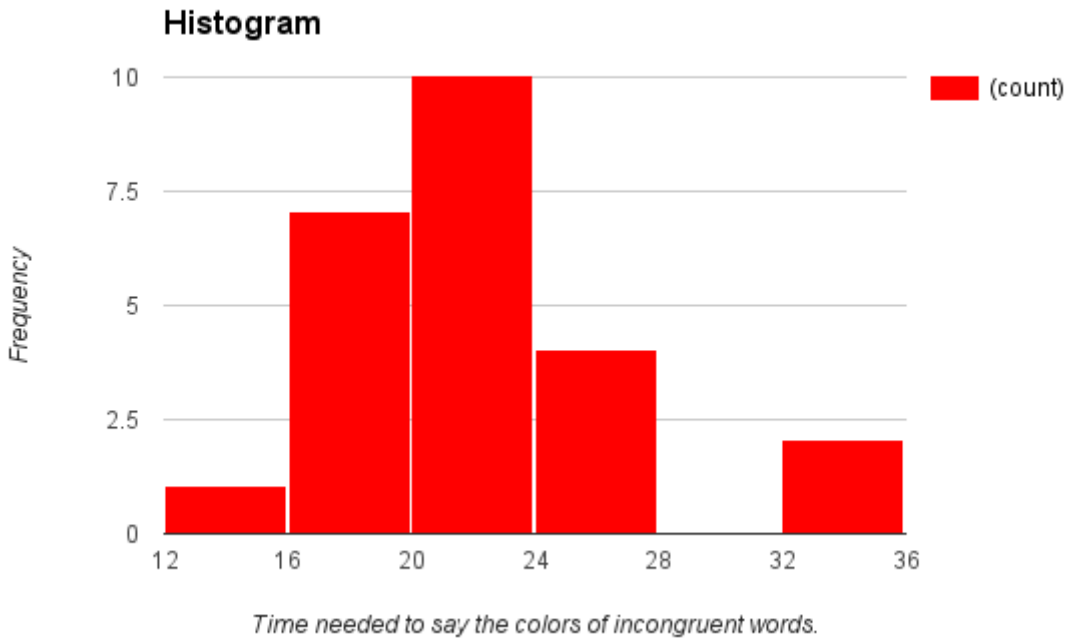
   H0 >>> The null hypothesis. It suggests that the mean values of two populations are approximately equal. $\mu\_cong = \mu\_incong$ or $\mu\_cong - \mu\_incong = 0$, in other words, there will be no significant difference between the time needed to say out loud the color of congruent words and the time to say out loud incongruent words.

   HA >>> An alternative hypothesis suggests that, there will be a significant difference between the time needed to say out loud the color of congruent words and the time to say out loud incongruent words. In other word, the mean values of two populations will be significantly different from each other. $\mu\_cong =! \mu\_incong$ or $\mu\_cong - \mu\_incong =! 0$

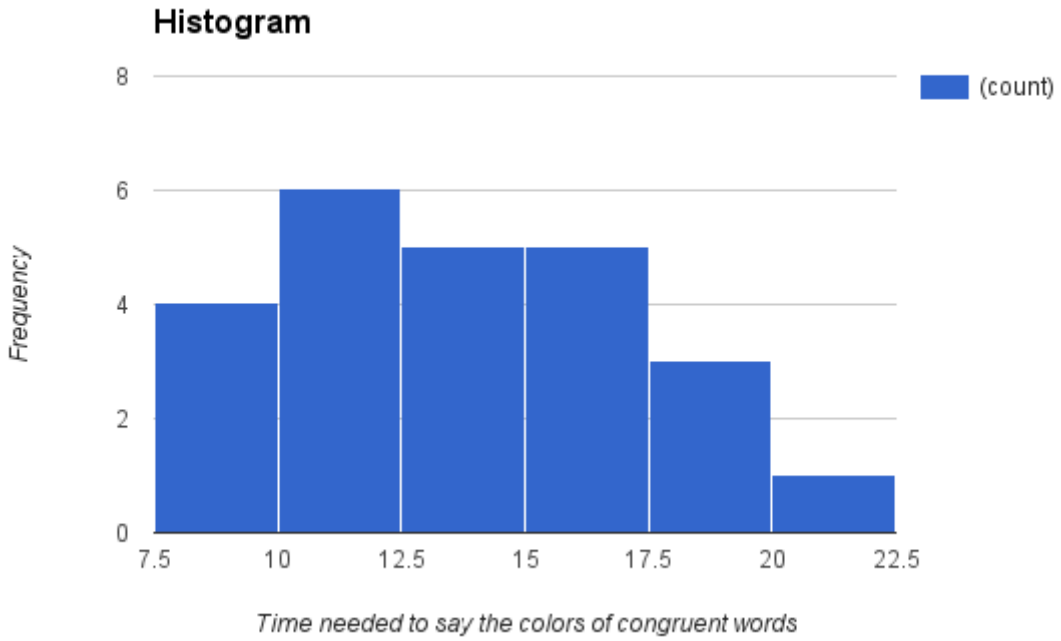
   I am going to use t-test, because we want to reveal if there is a difference between sample means because they represent two different populations or by chance. The samples have the same size – 24, less than 30.

3. The mean value of congruent results is 14.05 and of incongruent results is 22.02. The data has no mode value. The median values respectively are 14.36 and 21.02 for congruent and incongruent results.

   The variance of congruent results is 12.67. The variance of incongruent results is 23.01. So the sample standard deviations are respectively 3.56 and 4.80.



4.



Both congruent and incongruent results have kind of normal distribution.

5. We implement t test for one dependent sample. Based on certain calculations, we found the standard error to be 0.99. Thereby the t statistic is 8.02. We take 95% as a confidence level on the difference of sample means. So @ = 0.05. Since it is a two-tailed test, t critical is 2.069. 8.02 > 2.069. It means we reject the null hypothesis. So the results are statistically significant. Confidence interval is: difference of means – margin of error, difference of means + margin of error. CI = 5.91 to 10.02
6. In order to find out what is the reason of such a difference we will compute the coefficient of determination, denoted $r^2 = t^2/(t^2 + df) = 64.3204/87.3204 = 0.74$ It tells us that 74% of the difference occurs because they samples represent two different populations.