Q1: Independent variables: words's colors. Dependent variables: Candidate response time.

Q2: Null hypothesis: change to incongruent colors has no effect in time response. Alternative hypothesis: response time will vary with change to incongruent colors.
$H_0 : \mu_D = 0$
$H_A : \mu_D \neq 0$

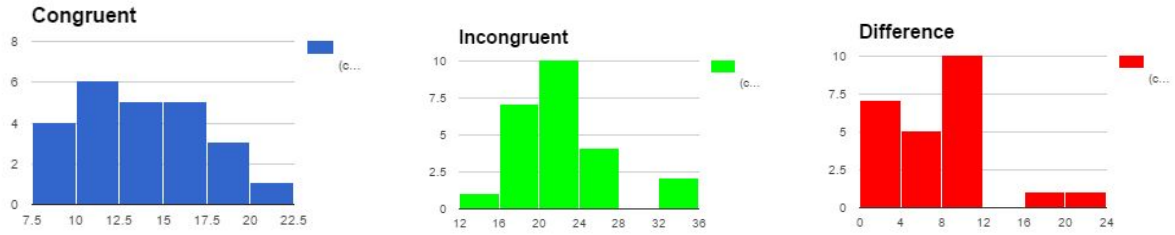
μ_D -> mean difference after change of congruent to incongruent words

To verify this phenomenon it will be used a dependent-samples Two-tailed t-test because: i) we don't know the population data; ii) we have to verify positive and negative variations

Q3:

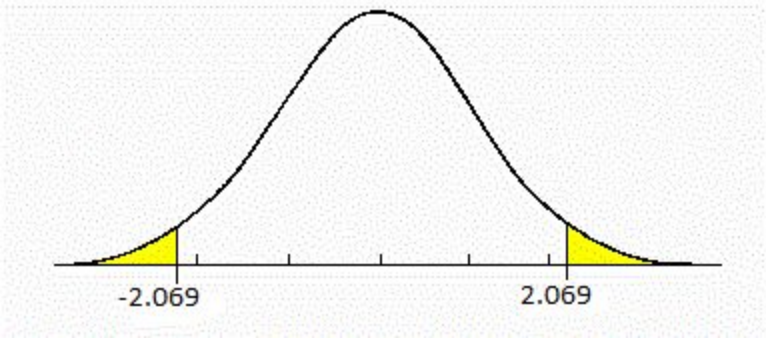
	Mean	Median	SD	Variance
Congruent	14.051125	14.3565	3.559357958	12.66902907
Incongruent	22.01591667	21.0175	4.797057122	23.01175704
Difference	7.964791667	7.6665	4.86482691	23.66654087

Q4:



In the histograms above we can see the different distributions of response time data: i) before changing colors; ii) after change colors; and iii) the difference values of those times. We can see the different means and where the data are concentrated most of the data, being positively biased for congruent and incongruent for normal data and its difference.

Q5:
α= 0.025
N = 24
Df = N-1 = 24-1 = 23
T-critical = +- 2.069



$H_0 : \mu_D = 0$
$H_A : \mu_D \neq 0$

The Standard Deviation of the Differences (S_D) is 4.86 (as we saw at question 3). Then the standard error of the mean $\sigma = \frac{4.86}{\sqrt{24}} = 0.99204334582.$

The mean of difference is 7.96. Then the t-statistic is: $\frac{7.96}{0.99204334582} \simeq 8.02$

Based on t-statistic and t-critical value we reject the null, because we had results statistically significant ($p < 0.025$).

Margin of error for 95% CI: 2.069 * 0.992043345 = 2.05. Confidence Interval: (5.91 , 10.01)

We can conclude that with the exchange to incongruent colors with the words the response time of the tested subjects increases significantly.

Q6: The brain response time to respond to different stimuli may account for the observed phenomenon. A similar example that can be cited is an individual driving down the road and suddenly appear an animal. His brain is working at a steady pace to accelerate the car and has a slight delay in reaction stop.