Data Analyst NanoDegree P1: Test a Perceptual Phenomenon

1. The independent variable is whether the test has congruent words or incongruent words. The dependent variable is the time it takes for the participant to name the ink-colors in the list.

2. I will perform a paired t-test, since the test results are in pairs, as they are from the same test subject. Judging by the description of the effect ("Stroop Effect", 2015), I expect the mean of the results for the congruent test will be less than the mean of the results for the incongruent test. Hence, I will perform a one-tailed test, with an α-level of 0.05.

   An appropriate set of hypotheses for this task would be:

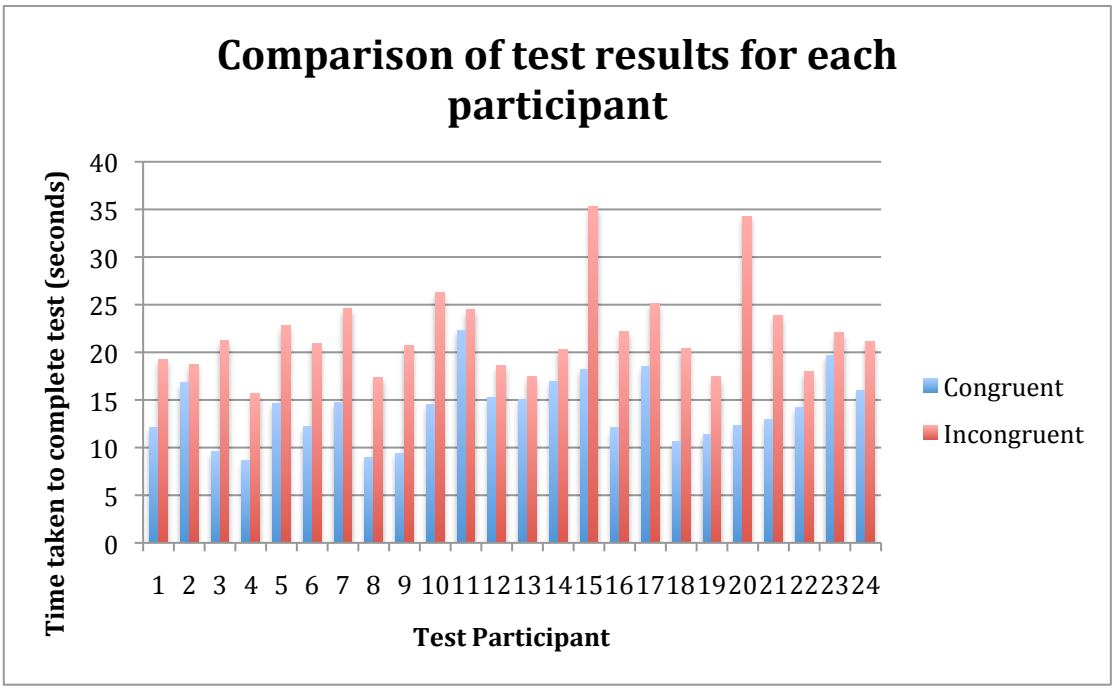
   H_0: $\mu_i - \mu_c <= 0$

   H_A: $\mu_i - \mu_c > 0$

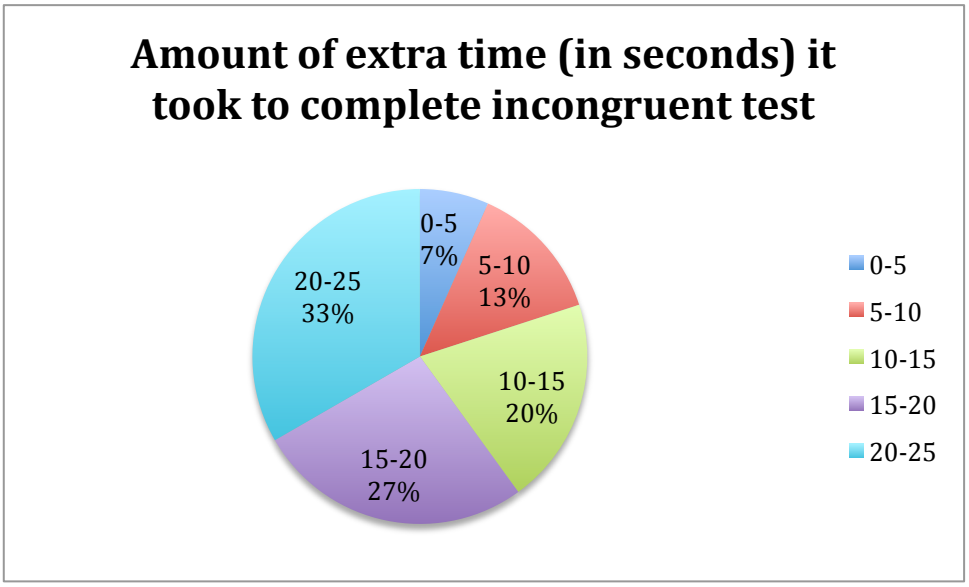
   where μ_c stands for the mean of the population of results for congruent test, and μ_I stands for the mean of the population of results for the incongruent test.

3. The difference between each pair of test results (n=24) averaged to 7.9648 (s = 4.8648).

4. The first graph shows a comparison of results of each test, for each test participant. One can see that for each participant, the time it took to complete the test with incongruent words was larger than the time it took to complete the test with congruent words.



The second graph shows a pie chart displaying how much longer it took test subjects to complete the incongruent test versus the congruent test. In every case, the difference was positive, and most test subjects needed between 20-25 seconds of extra time.



5. The results of the t-test are as follows:

   $t(23)=8.02$, $p < 0.0001$, one-tailed

   Hence, we reject the null hypothesis, at a significance level of 0.05, and can conclude that the average time it takes people to complete the test with incongruent words is significantly longer than the time it takes them to complete the test with congruent words. This result matches my expectations.

   The confidence interval on the mean difference is:

   95% CI = (6.26, 9.67)

6. The observed effects could be because of a difference in processing the two styles of information, colour, and the letters of the word itself. The brain processes words more quickly than colour, it is an automatic process, whilst processing colour takes focused thought and takes longer. Furthermore, processing the confusion between two differing pieces of information in the incongruent test takes more time. ("Stroop Effect", 2015)

   A variation on the Stroop Effect shows a relationship between numerical digits and physical sizes, called the Numerical Stroop Effect ("Stroop Effect", 2015). A digit can be displayed in a large font or small font, and tests comparing incongruent digits took longer than tests comparing congruent digits.

Bibliography

Stroop effect. (2015, October 16). In *Wikipedia, The Free Encyclopedia*. Retrieved 00:39, November 16, 2015, from https://en.wikipedia.org/w/index.php?title=Stroop_effect&oldid=686068625