**TEST A PERCEPTUAL PHENOMENON:**

**BACKGROUND INFORMATION**

In the congruent words condition, the words being displayed are color words whose names match the colors in which they are printed: Example RED, BLUE.

In the incongruent words condition, the words displayed are color words whose names do not match the colors in which they are printed: Example PURPLE, ORANGE.

**QUESTIONS FOR INVESTIGATION:**

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

Independent variable: An independent variable is an variable which is manipulated in order to test the effect on the dependent variable.

Dependent variable: An dependent variable is the variable tested and measured in the experiment. The dependent variable is dependent on independent variable.

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

The null hypothesis must be the mean for an color recognition for the congruent words equal to or greater than the mean of incongruent words. The other way is congruent word mean is less then an incongruent word.

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Statistic** | **Congruent** | **Incongruent** | **Difference (C-I)** |
| n | 24 | 24 | 24 |
| x̄ | 14.05 | 22.02 | -7.96 |
| Median | 14.36 | 21.02 | -7.67 |
| s2 | 12.67 | 23.01 | 23.67 |
| s | 3.56 | 4.80 | 4.86 |
| SE | 0.73 | 0.98 | 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.**

The number of participating data of congruent and incongruent are which has data in the x-axis and time in the y-axis.

**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?**

At the 99% confidence level (α = .01) and 23 degrees of freedom, the critical statistic value for a one-tailed test in the negative direction is -2.5. The calculated t-statistic for the difference in color recognition time means of the congruent and incongruent word data is -8.02. Since the t-statistic is in the critical region, the null hypothesis is rejected. With the data presented, it is very unlikely that the 7.96 second difference in mean time for color recognition for the congruent data vs. the incongruent data is obtained if the two means are actually the same . By conventional criteria, this difference is considered to be extremely statistically significant.

**6. Optional: What do you think is responsible for the effects observed? Can you think of an alternative or similar task that would result in a similar effect? Some research about the problem will be helpful for thinking about these two questions!**

My hypothesis for the effects observed is that the brain dominantly focuses on reading the word rather than recognizing a color when the eyes are presented with a colored word. To recognize a color, one has to override the brain's natural tendency of reading the word. This override takes time and is likely not always successful, which means re-analyzing a word after the error is recognized, which costs more time.