

1. What is our independent variable? What is our dependent variable? ← $\mu\mu\mu$

In this task, independent variable is the property of congruence between the alphabets of the words and the color of the words used in displaying alphabets of the words. Whereas dependent variable is the time taken to identify the color used in displaying words.

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 appropriate set of hypotheses are :

H₀: The difference between completion time between population means of congruent and incongruent conditions is zero (both are equal $\mu_c = \mu_i$).

H_a: Both population means of congruent and incongruent conditions are unequal (having a significant difference $\mu_c \neq \mu_i$).

We will use paired t-test on data because sample is dependent and the size is less than 30. The standard deviation of the data is also unknown.

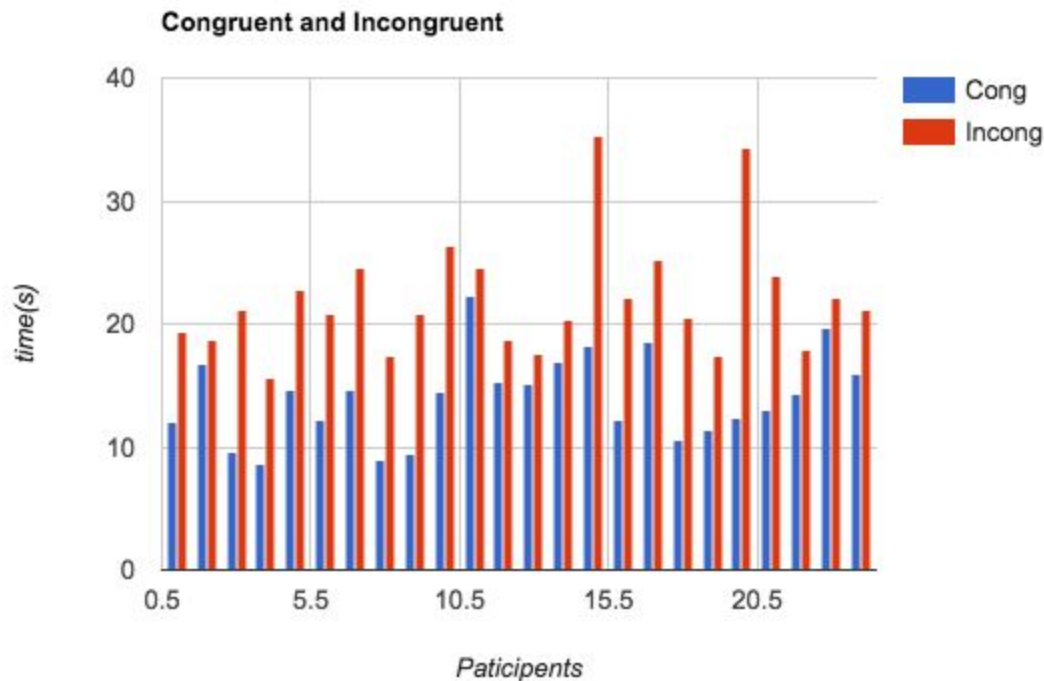
3. Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and at least one measure of variability.

	Congruent	Incongruent
Mean	14.05	22.015
Standard Deviation	3.56	4.80

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.

In the plot provided below, this can be easily observed that time taken for congruent is always less than the time taken for incongruent conditions.

Both samples are normally distributed whereas two of the participants are taking more than 34 seconds.



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?

After performing the statistical test,

$\alpha = 0.05$

df = 23

t-statistic = 8.0207

t-critical = 1.714

Hence we can say that $t\text{-statistic} > t\text{-critical}$, by this we can conclude that both population means of congruent and incongruent conditions are unequal (having a significant difference).

Credits :

1- Udacity lectures

2- <http://www.rapidtables.com/tools/bar-graph.htm>

3- <https://faculty.washington.edu/chudler/java/ready.html>