

Variables

In Stroop task, independent variable is a list of words with either a congruent words condition or an incongruent words condition. Dependent variable is the time it takes to name the ink colors in equally-sized lists.

Hypothesis and Statistics Tool

A reasonable hypothesis can be that it usually takes shorter time to name a congruent word list than an incongruent word list.

Formally, Null Hypothesis: $\mu_{\text{Congruent}} = \mu_{\text{Incongruent}}$

Alternative Hypothesis : $\mu_{\text{Congruent}} \neq \mu_{\text{Incongruent}}$

Since one individual faced two different conditions in this test, we should apply dependent t-test in the following statistical analysis.

Descriptive Statistics

Central tendency statistics

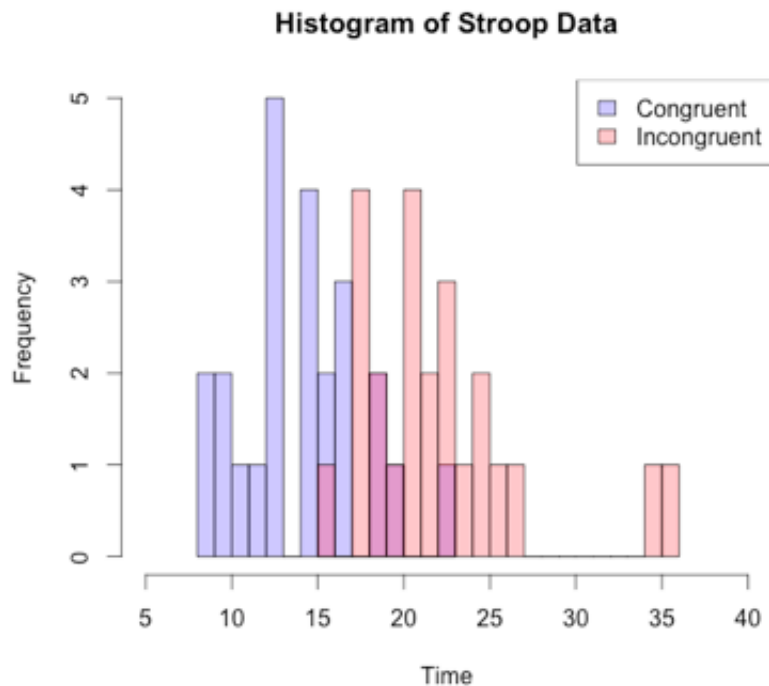
	Congruent	Incongruent
mean	14.05	22.02
median	14.36	21.02
mode	12.08	19.28

Variance

Congruent	Incongruent
12.67	23.01

Distribution of Sample

We can see that both incongruent data and congruent data are right skewed and incongruent data spread on the right of congruent data.



Statistical Test

A two sided $\alpha = 5\%$ dependent t-test was performed and the results are provided below.

t -value = -8.02 with 23 degree of freedom and the associated p-value is 4.103e-08. The 95% confident interval for the mean difference is (-10.02 to -5.91)

Since the p-value is so small, we can successfully reject the null hypothesis. We can 95% confident to say that the average time it takes to finish a congruent word list test is shorter than the average time to finish an incongruent one and 95% of time the difference is between 5.91 to 10.02 seconds.

The result matches my expectation.

Discussion

I think it's because human brain processes words faster than color.

To prove this point, we can present participants' with two equally-sized lists: one is an incongruent word list which is the same as the original Stroop task, the other one is also an incongruent word list but the words are displayed in a different language

that none of participants' understand(for example, Mandarin). The participant's task is to say out loud the *color of the ink* in which the word is printed. We measure the time it takes to name the ink colors in equally-sized lists. To illustrate:

List one

RED	GREEN	BLUE	YELLOW	PINK
ORANGE	BLUE	GREEN	BLUE	WHITE
GREEN	YELLOW	ORANGE	BLUE	WHITE
BROWN	RED	BLUE	YELLOW	GREEN
PINK	YELLOW	GREEN	BLUE	RED

List two

红色	绿色	蓝色	黄色	粉色
橘黄	蓝色	绿色	蓝色	白色
绿色	黄色	橘黄	蓝色	白色
棕色	红色	蓝色	黄色	绿色
粉色	黄色	绿色	蓝色	红色

I expected the mean time of the second group is shorter than the first group.