Project on testing a perceptual phenomenon between congruent and incongruent Dataset

# Dependent and Independent variable

The condition - a **congruent** words condition and an **incongruent** words condition - is **independent variable**. The **performance of the participant** is **dependent variable**. The operational definition of the performance is the time it takes to name the ink colors in equally-sized lists

# Set of Hypothesis and Statistical test

The set of hypothesis that, I prefer for the given dataset is **Null Hypothesis and Alternative Hypothesis**

Where,

**Null Hypothesis is H0**

There is no difference in population means of response time under congruent and incongruent scenarios ( **μC (greater than or equal to) μI**), which can be mathematically described as **,**

**H0: μC  ≥ μI**

**Alternative Hypothesis is Ha**

There is a small or lesser difference in population means of response time under congruent scenario than incongruent scenario (**μC (lesser than) μI** ), which can be mathematically described as,

**HA: μC < μI**

**(where μ is a population mean, the subscript "C" represents the congruent words condition, and the subscript "I" represents the incongruent words condition.)**

The Statistical test that, I prefer to use is **One Tailed Dependent Sample t-test**.

A one-tailed, dependent samples t-test comparing the difference in means (the time to name the ink colors for congruent words and incongruent words) should be performed. With this test, we seek to determine whether there is enough evidence in the provided sample of data to infer that the congruent words mean color recognition time is less than the incongruent words mean color recognition time for the entire population and not just the sample data.

A t-test is appropriate because the population variance is unknown and the sample size is less than 30. When the sample size is less than 30, the sample data no longer approximate a normal distribution, which makes the use of a Z-value inappropriate. The following assumptions are required for t-tests for dependent means:

**Characteristics:**

* Interval or ratio scale of measurement (approximately interval)
* Random sampling from a defined population
* Samples or sets of data used to produce the difference scores are linked in the population through repeated measurement, natural association, or matching
* Scores are normally distributed in the population; difference scores are normally distributed

# Measure of Central tendency

For congruent values,

N = 24

Mode = 22.328,

Mean = 14.051125

Median = 14.3565

Sample Standard Deviation (**σ) = 3.56**

For incongruent values,

N = 24

Mode = 35.255,

Mean =22.01591667

Median = 21.0175

Sample Standard Deviation (**σ) = 4.80**

# Visualization of Dataset

# *Congruent*

# 

# Incongruent

# 

# The above Two visualization is The Data analysis of Congruent and Incongruent data, with data in x-axis and frequency in y-axis shows that the Corresponding values of stroop effect data

# 

# Statistical Test

**One Tailed t-test for 99% ( α )= 0.01**

**Degree Of Freedom = 23**

**Critical statistics( tcrit )= -2.50**

**T - statistics (t) = -8.02**

**P-value = < .0001**

# Conclusion and Decision

Thus from the above **Statistical test** we can conclude that **Null Hypothesis (Ho)** should be **rejected**, Since the **T-Statistics lies in the Critical region** and **Alternate Hypothesis(Ha)** is **Accepted.**

**References:**

[https://classroom.udacity.com/nanodegrees/nd002/parts/0021345402/modules/458220420175460/lessons/4601188734/concepts/46251285610923#](https://classroom.udacity.com/nanodegrees/nd002/parts/0021345402/modules/458220420175460/lessons/4601188734/concepts/46251285610923)

Statistics lesson in Udacity