

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

independent variable: incongruent words or congruent words

dependent variable: the time it takes to name the ink colors in equally-sized lists

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

$$H_0 : u_{\text{congruent}} = u_{\text{incongruent}}$$

The time it takes to name the ink color of the incongruent words is same to the time of congruent words

$$H_1 : u_{\text{congruent}} \neq u_{\text{incongruent}}$$

The time it takes to name the ink color of the congruent words is not same to the time of incongruent words

Dependent t-test

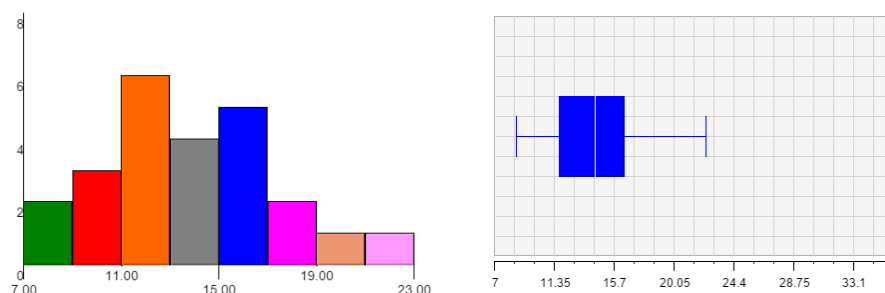
Because they are 2 samples in 2 different conditions

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

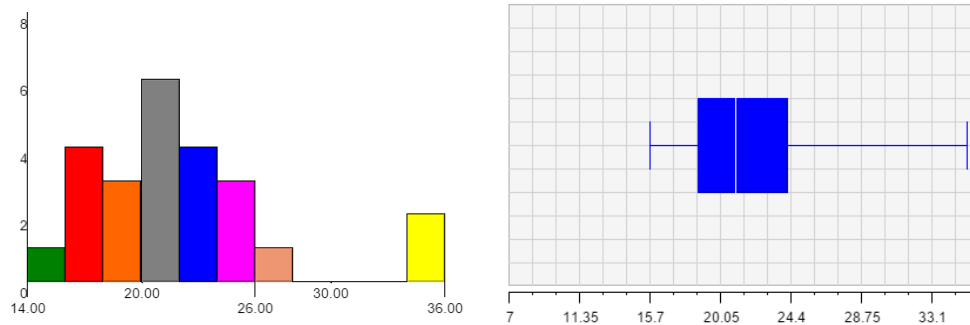
	Congruent	Incongruent
mean	14.051125	22.01591667
variance	12.66902907	23.01175704

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.

4.1 Congruent



4.2 Incongruent



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?

confidence level: 5%

critical statistic value: -2.069 and 2.069

	Congruent	Incongruent
mean	14.051125	22.01591667
variance	12.66902907	23.01175704

s=4.865

$$t = \frac{\mu_0 - \mu_A}{s/\sqrt{n}}$$

$t = (14.051 - 22.016) / (4.865 / (24)^{0.5}) = -8.02$

Because $t = -8.02$ is smaller than the critical value -2.069, we must reject H_0

In conclusion, the time it takes to name the ink colors for Congruent is significantly different with that for Incongruent.

The results match up with my expectations

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!

For the Incongruent words, the color naming process may be disturbed by the word itself.

Or for the congruent words, the words help us to name the color much faster.

A similar task maybe, name the shape of different geometry with right or wrong name printed on it, record the time it takes.