1. What is our independent variable? What is our dependent variable?
The independent variable is the condition of the test. If the word is congruent, that means the word color and the word name are the same, or if the word is incongruent, when the word color and the word name are different.
The dependent variable is the time record to name the ink colors.

2. What is an appropriate set of hypotheses for this task? What kind of statistical test do you expect to perform? Justify your choices.
H0: For the whole population, there is no significant difference to name the color of the words whether is congruent or incongruent
HA: When there a significant difference to the whole population to name the color of the words when the condition is congruent or incongruent.

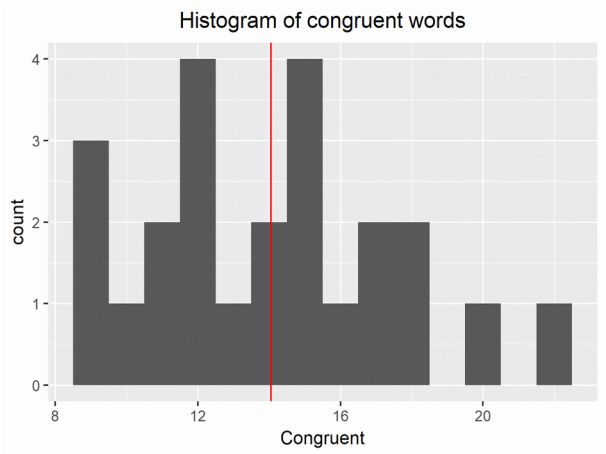
H0: $\mu congruent = \mu incongruent$
HA: $\mu congruent \neq \mu incongruent$

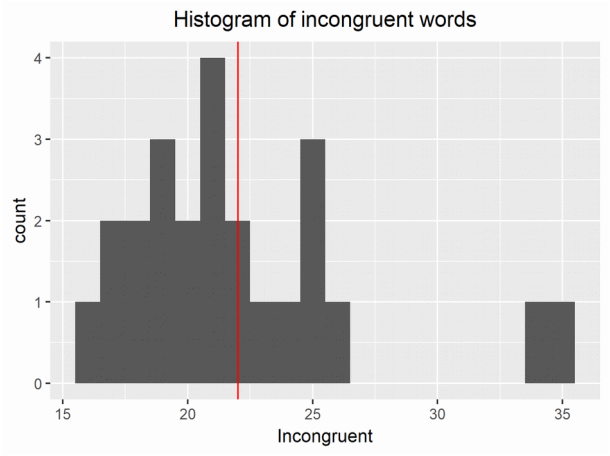
I will use dependent t-test for a paired samples. Because I have just samples, with the same subject, and I don't have the parameters for population.

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

Congruent mean = 14.051s
Incongruent mean = 22.016s
Point estimate = -7.965s
Standard deviation from difference = 4.865s

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.





There are histogram of two groups of data. In the second plot we can see something close to a normal distribution with a peak and a outlier on the left. Otherwise, in the first plot we cannot see a normal distribution.

The red lines are the means

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?

n = 24
df = 23
Confidence level = 99%
t-critical vaule = ± 2.807
Congruent Mean = 14.051
Incongruent Mean = 22.016
Point estimate = -7.965 (Difference of means)
S (SD of the difference) = 4.865
t-Statistic = -7.965 / (S / sqrt(n)) = -8.021
P value is less than 0.0001

Since t-statistic is -8.021 and far from t-critical value (-2.807) I reject the null hypotesis. The results match with my expectation because when I did the stroop effect test my times to name colors were very different.

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!

In my opinion our brain try to read the word automatically, then we get confused to name the incongruent color.
I find the numerical stroop effect. The experiment shows 2 digits are shown with different values or different physical sizes. In the numerical task the participants have to say which digit is numerical higher. In the physical test, they have to say which is physically higher.