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

Independent variable: The colour of the words and it's name, they are either coupled the same or different.
Dependent variable:
"The variable being affected by the independent variable" -> The total time it takes to name all of the colour 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.

Null: That the difference between the two conditions is zero.
Alternative: That the difference between the two conditions is not zero.

H_o: $\mu_{diff} = 0$

H_A: $\mu_{diff} \neq 0$ (a two-tailed test)

H_o = Null hypothesis

H_A = Alternative hypothesis

μ_{diff} = The population mean difference

Stroop Test Results:
Congruent: 9.3 **Incongruent:** 17.9

What kind of statistical test do you expect to perform?
Because the data given is of two samples with 2 populations, they are dependent paired because we are taking two measurements per person. It is true that we have less than 30 samples, we are unsure of the population standard deviation, and the distribution should be normal. (Gaussian). *Each of these conditions are met.*

Test: Paired t-test

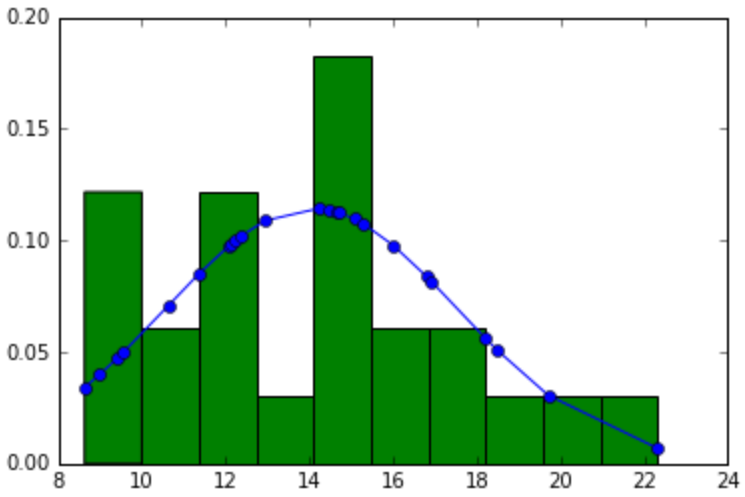
3. Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and at least one measure of variability.
X_c = Congruent sample
X_i = Incongruent sample
Congruent X_c
mean : 14.05
standard dev: 3.55

Incongruent X_i
mean : 22.015
standard dev: 4.797

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.

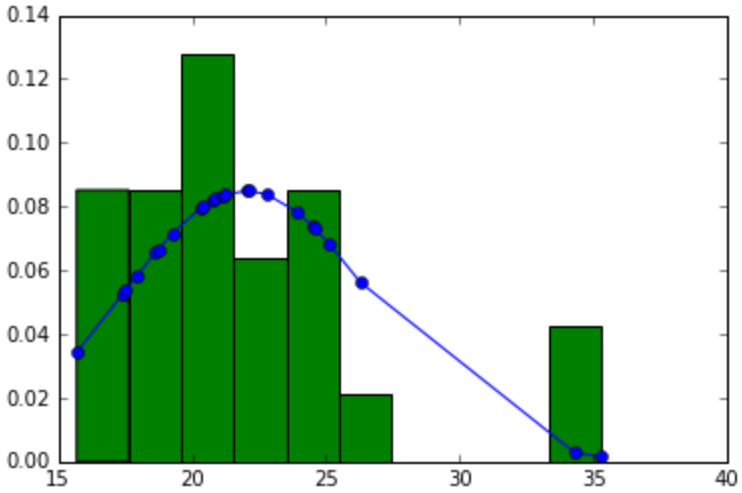
Congruent Normalised PDF function - Histogram

- It has a slightly longer right tail, but it resembles a (shorter) normalised distribution. (Slightly skewed to the right.)

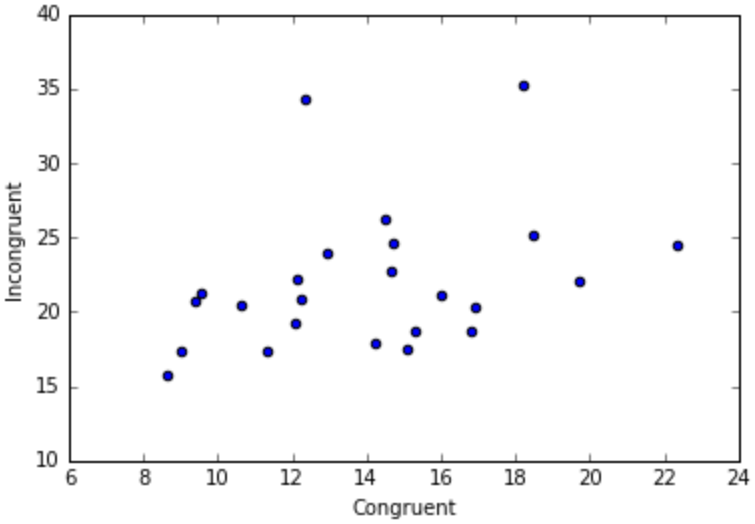


Incongruent Normalised PDF function - Histogram

- It has a much steeper right tail(due to the frequency around 30), but it resembles a (shorter) skewed right distribution.



Here is a scatter plot with Congruent values on the x-axis and Incongruent values on the y-axis. It shows that on average, X values are always followed by higher Y values.



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?

Alpha level = 0.05 (two tailed)
t-statistic = 8.0207
ci = (-10.02, -5.91056465273)
t-critical=value = 2.069
Df=23

Reject the null hypothesis! This definitely is significant as the p-value is less than 5%.

Conclusion -> As expected, it definitely takes more time to read aloud the incongruent values compared to the congruent values.

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!
Pass.