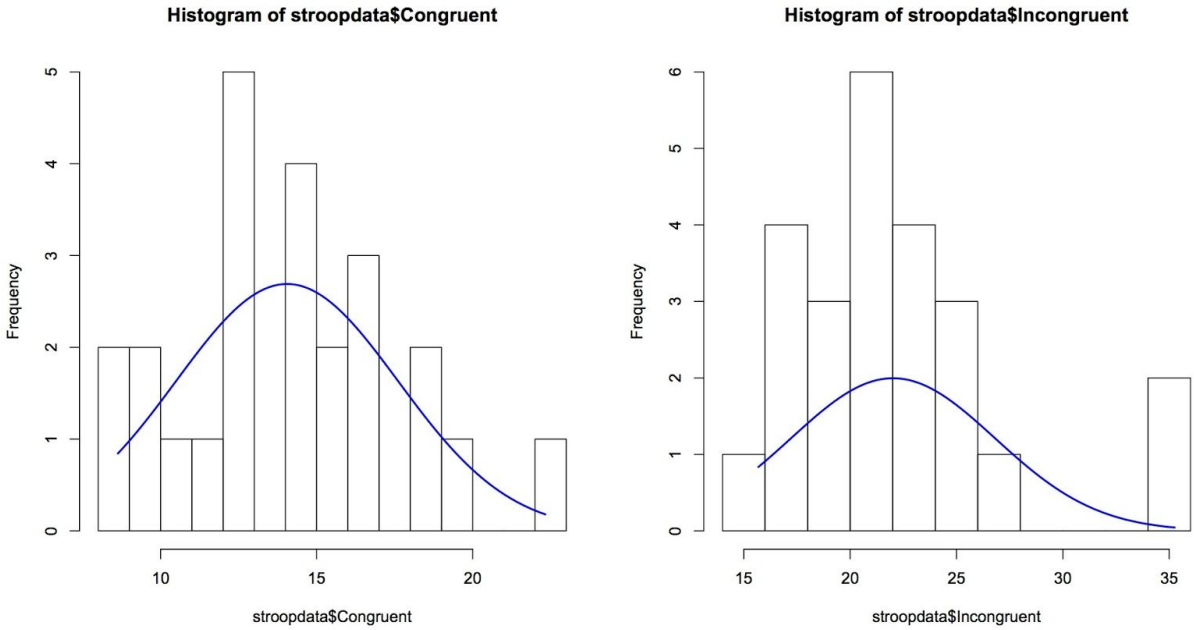
1. What is our independent variable? What is our dependent variable?
Independent variable: whether the ink color and the word are congruent or not
Dependent variable: the time that people name the ink colors

2. What is an appropriate set of hypotheses for this task? What kind of statistical test do you expect to perform? Justify your choices.
Let μ_i denote the population mean of the time that people name the ink colors in the incongruent condition
Let μ_c denote the population mean of the time the people name the ink colors in the congruent condition
H_0: The word won't affect the time that people name the ink colors. ($\mu_i = \mu_c$)
H_a: The word will affect the time that people name the ink colors. ($\mu_i \neq \mu_c$)
I will perform dependent samples t-test of 2 tailed value.
Because we don't know the population variance and the sample mean has a t-distribution with degree of freedom equals to 23, I choose t-test.
Because each participant are involved in both situations, I choose dependent t-test.
And we are trying to figure out whether there is difference between the means rather than one is exactly greater or less than the other, therefore we use t-test of 2 tailed value here.

3. Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and at least one measure of variability.
Let $\bar{x}_i$ denote the average time that participants name ink colors in the incongruent condition.
Let $\bar{x}_c$ denote the average time that participants name ink colors in the congruent condition.

$\bar{x}_i$ = 22.01591667
$\bar{x}_c$ = 14.051125
s = 4.86482691
n = 24
df = 23
SE = s/sqrt(n) = 0.9930286348
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.



The sample data approximately follows the corresponding normal distribution's shape.

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?
CI = 95%
P-value = 5%
T-critical = $\pm$ 2.069
T-statistical = $\frac{\bar{x}_i - \overline{x_c}}{SE}$ = 8.020706944
Therefore, reject the null.
The word will affect the time that people name the ink colors.

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!

Whether the word and the corresponding color are congruent or not is responsible for the effects.
Alternative task: Let two groups of participants be involved in the experiment. In group A(Congruent group), the words being displayed are color words whose names match the colors in which they are printed. In group B(Incongruent group), the words displayed are color words whose names do not match the colors in which they are printed. In each group, we measure the time it takes to name the ink colors in equally-sized lists.