Test a perceptual phenomenon

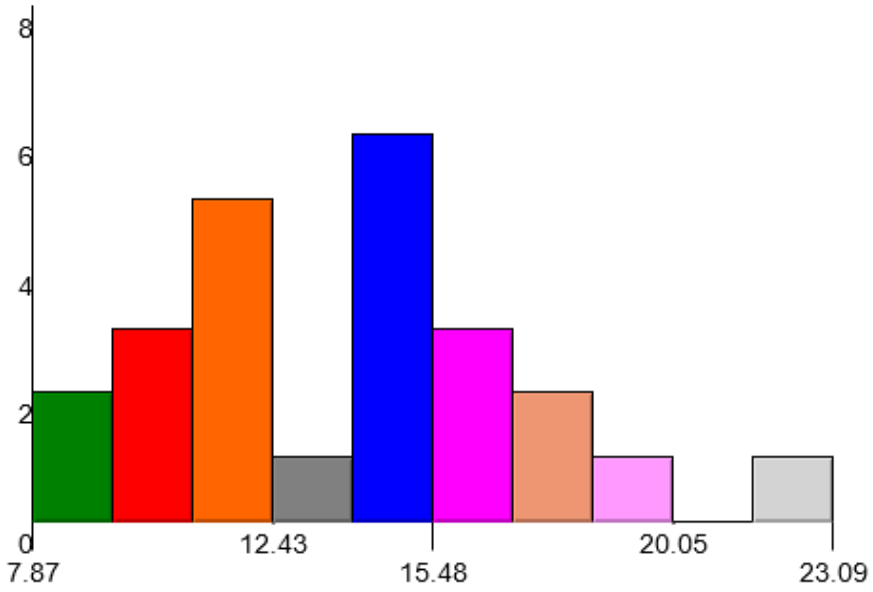
1. **What is our independent variable? What is our dependent variable?**
    - The independent variable is the Stroop task and the dependent variable is the time recorded from both the conditions.

2. **What is an appropriate set of hypotheses for this task? What kind of statistical test do you expect to perform? Justify your choices.**
    - The null hypothesis would be Ho = 0. There is no difference in population means of response time under incongruent and congruent conditions (H0: $\mu C = \mu I$),
    - The alternative hypothesis would be Ha: $\mu C < \mu I$ (i.e the population mean of the response time under incongruent condition will be significantly larger than the time under congruent condition.)
    - I would like to perform 1 tailed test as I would like to look for the effects in a specific direction.
    - This would be a t-test as there are less than 30 samples and we don't know the population standard deviation.
    - We should choose an independent sample test due to the following reason https://libguides.library.kent.edu/spss/independentttest.
    - We are choosing 1 tailed test because we want to check if the mean is greater than x in a specific direction.

3. **Report some descriptive statistics regarding this dataset. Include at least one measure of central tendency and at least one measure of variability.**
    - Median would be a right central tendency.

- We can find the average distance between each data value and the mean.
- The following are the mean and standard deviation of the datasets:
  Mean difference -7.96
  Standard deviation 4.86

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.**
   - This is the visualized data of the first sample.
   - The distribution is bimodal distribution.



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?**

- The confidence intervals are -13.21, -2.71. This shows that the sample mean falls between these intervals.
- The t-statistic is -8.2 which falls under the critical region with a critical value of -1.714.
- The p-value is less than 0.0001. This difference is considered to be extremely significant.
- Since the t-statistic falls under the critical region, the null hypothesis is rejected.

Conclusion – Since the null hypothesis is rejected there is a difference between the sample means. The mean of the incongruent sample is higher than the mean of the congruent sample. The participants took more time to recognize the color in the incongruent condition. The results were as expected as it is difficult to identify the color in the incongruent condition.