**Memory Game**

For this activity, follow the instructions that your instructor gives you.

**Discuss the Following Questions**

1. What would be an appropriate research question for this study?
2. Is this an experiment or observational study?
3. What is the statistic that is of interest in the research question?

* Use the statistical software of your choice (e.g., R, SAS, StatCrunch) to examine the distribution of the sample data.

1. Describe the distribution of the data. Make sure to include all 3 characteristics of a distribution.
2. What statistical method might you use to help answer this research question?
3. What conditions need to be met in order to use the *t*-test approach? Are they met?
4. What would be the null and alternative hypothesis statements that would be used to answer the research question? Write out the hypothesis statements in both words and symbols.

H0:

Ha:

1. Did you choose to make a one-tailed or two-tailed hypothesis test? Why?

* Use the statistical software of your choice (e.g., R, SAS, StatCrunch) to conduct a hypothesis test using the *t*-test approach.

1. Find the *p*-value. Make sure that you find the appropriate *p*-value for a one-tailed or two-tailed alternative hypothesis statement. The default for each software is to conduct a two-tailed *p*-value.
2. Sketch a plot of the distribution that would describe how the *p*-value was found.
3. Where did you center the plot? Explain why.
4. Where did you put the location of the sample statistic on the plot?
5. Provide an interpretation of the *p*-value.
6. Provide an answer to the research question.

**EXTENSIONS**

1. Can you generalize these results to all individuals that could take this test? Why or why not?
2. Can you make any cause-and-effect conclusions? Why or why not?
3. How is this a double-blind experiment?
4. Is there a better way you could design this experiment?
5. Conduct a randomization test for this study in *StatKey*. How do the randomization test results compare to the *t*-test approach results found above?
6. Consider both the randomization test approach and the *t*-test approach. Is one better to use than the other? When would you use one and not the other? Could you use the randomization test approach to conduct a hypothesis test for this study? Why or why not?
7. Should a researcher decide whether or not to conduct a one-tailed or two-tailed test before or after collecting data?
8. How is a *p*-value for a one-tailed test related to a two-tailed test?