Group Quiz #3

Each student in your group needs to take the role of writer/recorder for portion of the quiz (as indicated). They will be responsible for helping the group come to consensus and also for writing the group's agreed upon response.

Writer/Recorder (#1–5): _____ (name)

Use for Questions 1–13

Since it is known that people tend to eat most of what they serve themselves, obesity researchers were interested in examining whether the size of a bowl unknowingly biases how much ice cream a person serves him/herself. In particular, they asked the following research question.

> **Does the size of the bowl affect how much
> ice cream a person eats?**

Their study consisted of 42 nutrition experts who attended an ice cream social celebrating the success of a colleague. The participants were randomly assigned either a smaller (17 oz) or a larger (34 oz) bowl, and then each participant self-served the amount of ice cream in her/his bowl. After serving themselves, each nutritionist's bowl was weighed and the amount of ice cream was recorded. The data presented here are the amounts of ice cream for the smaller and larger bowls.

Smaller bowl
6.0 4.8 1.8 4.8 4.9 6.2 5.2 7.7 1.6 7.2 3.6 5.4 6.8 4.1 4.6 6.8 5.8 3.9 2.8 1.1 5.9

Larger bowl
11.3 8.0 9.1 9.9 6.2 2.5 2.9 5.0 9.0 6.3 3.1 3.4 8.5 5.1 3.7 4.6 8.7 3.4 7.8 8.1 4.8

1. Identify the treatment variable used in the study.

2. Identify the response variable used in the study. Also say whether it is categorical or quantitative

3. Enter the data into a TinkerPlots^{TM} case table. Calculate and report the observed difference in means.

4. The null hypothesis that needs to be modeled is that there is no difference in the mean ice cream weights between the participants with the large bowls and the participants with the small bowls. Create a TinkerPlots^{TM} sampler so that you can carry out a randomization test to model the null hypothesis. Sketch the sampler you will use below. Be sure to specify whether the sampling device(s) are sampling with or without replacement.

5. Carry out the randomization test to model the experimental variation expected for the null hypothesis. Simulate 500 randomizations. Sketch the plot of the results below. Be sure to label the axes. Provide tick marks and values for full credit.

Writer/Recorder (#6–9): _____ (name)

6. Describe using the context of the problem what each case (dot) in this distribution represents.

7. Describe the shape of the plot. Also compute and report the mean and standard deviation.

8. On the plot displayed previously, shade the area of the plot that indicates results that a statistician would define as likely results. Show or explain how you computed the endpoints for the shaded area.

9. On the plot displayed previously, also add a vertical line at the result that the research team observed in their actual study.

Writer/Recorder (#10–13): _____ (name)

10. Provide a clear answer to the research question *and* a justification for this answer based on the statistical evidence of the observed result and the variation in the simulated results.

11. Compute and report the *p*-value based on the observed result. Show your work for full credit.

12. Interpret the *p*-value you computed.

    The *p*-value of _____ is the probability of …

13. Use the *p*-value you computed to evaluate the compatibility of the observed data with the hypothesized model and answer the research question. (Note: You may or may not come to the same conclusion as you did in Question #10.)

Please print all group member's names on the first page of the quiz.