

Math 222 - Project 6

Due Friday, March 16

1. In the 1970s, an experiment was conducted in Florida to test whether seeding clouds with silver iodide could increase the amount of rain that they produced. On 52 separate days, clouds were randomly either seeded with the chemical by an airplane or not seeded. Then the volume of rainfall produced (in acre-feet) was measured by radar over the next 24 hours. The data from the experiment can be found in the file `CloudSeeding.csv`.
 - (a) Use the bootstrap method to make a confidence interval for the difference in mean rainfall between the treatment and control clouds. Be sure to include a graph of the bootstrap distribution and an explanation of what your results mean about cloud seeding.
 - (b) Use the bootstrap method to make a confidence interval for the difference in median rainfall between the two groups of clouds. How do the bootstrap distributions and confidence intervals in part (a) and (b) differ?
2. The General Social Survey (GSS) asked this question: “Have you attended religious services in the last week?” The responses for individuals with at least a high school degree are contained in the file `services.csv`.
 - (a) Make a 2-way table showing the relationship between education level and religious attendance. Display the association with a segmented bar graph and/or a mosaic plot. Explain what you see.
 - (b) Is there a statistically significant association between religious attendance and education level? Describe the nature of the association and its strength. Clearly state your hypotheses and conclusions.
 - (c) Remove the column for people whose highest degree was high school. Repeat the test for association between religious attendance and education. Do you still get the same results? Explain.
 - (d) Combine all three columns of data from the last part, and compare individuals whose highest degree was high school with individuals who have completed a degree beyond high school. Estimate the size of the difference in religious attendance between these two groups.
 - (e) Write a short summary explaining the overall relationship between religious attendance and education level.