Stat 322/522: Study Design
Project 2

For this project assignment, you design, collect, and analyze data from a randomized experiment that you run. You work in pairs on the project, so that you can split the effort from data collection. Each member of a team is from the same course, e.g., students in STA 322 should work with other students in STA 322. If you cannot find someone else to work with, contact Prof. Reiter as soon as possible.

Your work should comprise a written report that describes the experimental design and analysis. Please use R Markdown or some other word processor. Turn in one report per team, with all team members' names on the front page of the report. Include your code at the end of the report. Additionally, please upload to the Sakai dropbox a csv file that includes the data that you used for the report. Reports that do not include the code or data will receive a lower grade. Please refer to the course website for the Duke Community Standard requirements for the project.

Due Date: Turn in your project by 11:20 AM on April 25 in class.

Grading: Maximum of 10 points. Grade will be based on appropriateness of experimental design and analysis for the problem, clear justification of your design and analysis choices, and clear explanation of results.

Topic of the Experiment: What are the important factors in designing a paper helicopter? You will run a randomized experiment to answer this question. To make a paper helicopter, you will need regular paper, a scissors, and a paperclip. Instructions are available on Sakai in the Assignments folder.

Answer the following questions in your report, using point estimates and 95% confidence intervals as appropriate.

1. Which factors seem to be the most important for making helicopters that fly longer?

2. Is there any evidence that the effect of rotor length differs by leg width?

3. What would you recommend as the ideal combination to make the helicopter fly long?

When specifying the design, consider ways to make the estimates as accurate as possible and the data collection as convenient as possible. You don't get extra points for being overly complicated in the design. Rather, use what we have learned to help you collect data with an efficient design that allows you to get reasonable estimates. I leave sample size up to you depending on your resources (in this case, your time) and desire for accuracy, but I suggest sampling at least 4 flights at each experimental condition that you include in the design. You are welcome to use any design you like, as long as it helps you answer the questions.