Final Project

STA209-04: Applied Statistics

February 11, 2019

In this project you will work in groups of three to formulate and answer a research question of your choosing. Completion of this project requires effective application of knowledge gained throughout the semester in study design, data collection and organization, data summary and visualization, statistical inference, and the communication of statistical results to general audiences. It is highly encouraged that your research question stem from topics you find interesting or are passionate about. In my experience, the more fun/excitement I have with/for a topic, the higher quality my work. There will be several checkpoints throughout the semester before the culmination of the project, which is a 10-minute presentation and short (3 page) research paper. The ability to succinctly and clearly communicate a large volume of information is an important skill and major aspect of this project.

Learning Goals

Upon successfully completing this project, you will be able to:

- Plan and execute a statistically sound study answering a research question using data.
- Collect, communicate, and analyze data to reach a sound scientific conclusion regarding a research question.
- Work cooperatively as a member of a statistical team, managing deadlines and other relevant constraints.

Timeline

Mon, 2/25: Groups due (emailed to me by 11:59pm)

Fri, 3/01: Proposals due (emailed to me by 11:59pm)

Fri, 4/19: Data and data dictionary due (emailed to me by 11:59pm)

Mon, 4/22: Meeting and presentation times decided

Fri, 4/26: Presentation outline and preliminary results due (emailed to me by 11:59pm)

Week of 4/29: Individual group meetings

Week of 5/06: Class presentations

Mon, 5/13: Final paper due (emailed to me by 11:59pm)

Details

Groups

Each team will consist of three students from class. You are free to choose your own group members. Anyone who does not contact me about their group prior to the deadline will be randomly assigned to a group with less than three members.

Research Proposal

Research proposals should include:

1) A thoughtful research question (or multiple questions)

2) A plan for obtaining data that addresses your research question

3) A description of any anticipated challenges (think about study design, biases, ethics, etc.)

Research proposals should contain 1-3 sentences for each of the above requirements. The use of proper statistical language is expected. You may consider myself (the instructor) as the reading audience. Your descriptions may be provided in the format of a numbered list or as a coherent paragraph.

If you are struggling to come up with a topic, or you are concerned with the feasibility of your topic, I strongly encourage you to contact me. I am happy to help your group find something that is both interesting and appropriate in scope.

Data and Data Dictionary

Your group will turn in a cleaned copy of your data set and descriptions of each variable. This file can be a csv, excel spreadsheet, or minitab dataset. It should contain clearly named variables with short descriptions of each provided in a separate attachment. When turning in your data and dictionary, you are expected to describe where the data came from in the body of your email.

Meeting and Presentation Times

Groups will sign up for a private meeting to take place (potentially in lieu of class) during the week of 4/29. Your group will deliver its final presentation to the entire class exactly one week after this meeting (i.e: you are signed up for the same day of the week for both weeks).

Presentation Outline and Preliminary Results

The purpose of this portion of the assignment is to make the group meeting productive. I expect your group, at minimum, to submit a one page outline describing your presentation plans. After your group meeting I won't look at your outline or preliminary results again - they are simply a starting point for our discussion.

Final Presentation

Presentations will be 10 minutes and delivered during class a week after your group's private meeting. Your presentation should clearly outline your research question, how your data were collected, the patterns you found in your data, statistical inference, and practical conclusions. See the resources section below for more information on giving a scientific presentation. Also note that you will be expected to peer review the presentations given by other groups, this will be done completely in class.

Final Paper

Final papers should be no more than three (3) pages in length, *including* figures and tables, but *not including* an optional abstract or references. The paper should contain the following components: a title, a background section, a methods section, a results section, a discussion section, and references. If you are unsure of how to structure these sections, please visit the links in the Resources section below for guidelines and examples. Recognize that staying under this three-page restriction will take a fair bit of planning. It also means that everything you include in your paper should be important.

DASIL

The Data Analysis and Social Inquiry Lab (DASIL) is an excellent campus resource that can help you acquire and prepare data that might otherwise require tools beyond the scope of this course.

USCLAP

The Undergraduate Class Project Competition (USCLAP) is a competition for introductory undergraduate statistics students. The requirements of the competition are very close to those of this assignment's final paper. This is an excellent resume builder and several Grinnell students have won or placed in the past.

Resources

- Final paper examples
- Final paper guidelines
- Presentation tips