Sociology 124D: The Intuition of Social Research
Tuesdays and Thursdays 1:30-2:50pm
Building 160 (Wallenberg), Room 120

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Office Hours: By appointment

Course Description and Goals

Understanding the intuition behind key statistics in social science research. The focus will be on reverse-engineering statistical tests by starting with asking what information we would need to answer questions about social life. From here, we will find that apparently complicated statistical tests are simply following the same logic necessary to reach conclusions about social life. Nearly all statistical tests start from the foundations of probability sampling, mean group differences, and variability. With these foundational concepts, students will understand the intuition behind (and similarity between) standard t-tests and the mechanics of multivariate regressions. By focusing on providing students with a firm grasp of the basic foundations of statistics, students will be better prepared to understand the purpose and logic of more complex statistical tests, which serve to answer social science’s most interesting questions.

The goals of this course are to enable you to:
- Use your intuition to inform and demystify statistics
- Apply relevant statistical tests to investigate interesting social questions
- Understand and critique statistical analyses you see reported in the world
- Developing analytic, critical thinking, and public speaking skills

Processes of the Course

Class:
Class meets twice a week for an hour and twenty minutes. On Tuesdays, we will focus solving a statistical problem by exclusively using our own intuition to reverse-engineer the statistical topic at the conceptual level. On Thursdays, we will see how well our intuitive problem solving matches the formal statistical solution’s terminology and formulas.

Readings:
All readings will be posted as .pdf files on the class Canvas website (canvas.stanford.edu) so you do not need to purchase any books. Uploaded selections will come from the primary textbook A First Course in Statistics (6th Edition) by McClave and Sincich. Furthermore, short selections from The Cartoon Guide to Statistics by Gonick and Smith will similarly be uploaded to Canvas to add some color to the material.
Finally, to delve deeper and extend these core readings, we will draw upon supplementary material from a variety of sources, including news articles/polls, as well as statistics blogs (e.g., fiveThirtyEight.com) and videos (e.g., TED talks).

Assessments and Evaluations

**Grade Composition:**
- **Final Project Presentation:** 30%
- **Homeworks:** 30% (6 homeworks x 5%)
- **Connection Notecards:** 7% (7 notecards x 1%)
- **Happiness Journal/Dataset:** 8%
- **Attendance/Participation:** 25%

**Final Project Presentation (30%):**
The final project presentation will be a presentation on a comprehensive project of the statistical principles introduced in the course. You will be asked to apply the concepts you have learned throughout the entire course to your own “happiness” dataset populated throughout the quarter. We will discuss the details of the presentation later in the quarter.

**Homeworks (30%):**
After every Thursday class, you will be assigned a homework which will be aimed at the big picture lessons from the week’s topic. The homeworks will be due before noon on the following Tuesday. The purpose of the homeworks is twofold: (1) to assess your understanding of the content we covered during the week, and (2) give you practice applying the statistics we learned in class to empirical data and present the results in an appropriate manner. Accomplishing both of these tasks in the homeworks will give you excellent preparation for the final project presentation.

**Connection Notecards (7%):**
Before you leave class on Thursday, you will be asked to succinctly relate our intuition-derived solution from our Tuesday class to the formal statistical solution we learn about in our Thursday class. You get credit for the connection notecards based on completion, not based on correctness. They are intended to explicitly compare how our intuition matches formal statistics.

**Happiness Journal/Dataset (8%):**
The final project on which you will present will be applying statistics learned throughout the course to real empirical data. In this case, you will generate the data yourself. At the beginning of the quarter, I will send you a Google spreadsheet where you will fill out how happy you are as well as other variables for analysis every day throughout the quarter. Instructions and the spreadsheet link will be provided on the first day of class.

**Attendance/Participation (25%):**
**Attendance**
This is the easy part: show up! Most learning will occur in class, as you will be unable to engage with your classmates without being in class.
Participation

Participation is absolutely vital in this class. On Tuesdays, there is no reading assigned because we will rely on our own intuition and logic to help us collectively answer statistical questions. This is highly interactive and requires engaged participation. On Thursdays, we will relate our intuitive answers to formal statistics outlined in course materials. The success of these sessions will depend on each of us being prepared and engaged.

In addition, you will earn participation credit for two short (5 minute) presentations before the final presentation, each aimed at getting you practice and feedback before the final project presentation. Details and schedule will be provided on the first day of class.

Class Schedule

**Week 1  Introduction and Key Concepts**

June 21  Introduction to course, overview of syllabus and course requirements.

*Readings Due*  • None

June 23  Probability Sampling, Signal (Group Differences), and Noise (Variability)

*Readings Due*  • McClave and Sincich selection 1
  • Gonick and Smith selection 1
  • Supplemental selection 1

  • [Homework 1 sent out]

**Week 2  Hypothesis Testing and T-Tests**

June 28  The Intuition

*Readings Due*  • None

*Homework Due*  • Homework 1 due at noon

June 30  The Statistics

*Readings Due*  • McClave and Sincich selection 2
  • Gonick and Smith selection 2
  • Supplemental selection 2

  • [Homework 2 sent out]
Week 3  Simple Linear (Univariate) Regressions

July 5  The Intuition

Readings Due
- None

Homework Due
- Homework 2 due at noon

July 7  The Statistics

Readings Due
- McClave and Sincich selection 3
- Gonick and Smith selection 3
- Supplemental selection 3
- [Homework 3 sent out]

Week 4  Correlation Does NOT Equal Causation

July 12  The Intuition

Readings Due
- None

Homework Due
- Homework 3 due at noon

July 14  The Statistics

Readings Due
- McClave and Sincich selection 4
- Gonick and Smith selection 4
- Supplemental selection 4
- [Homework 4 sent out]

Week 5  Multivariate Regressions

July 19  The Intuition

Readings Due
- None

Homework Due
- Homework 4 due at noon

July 21  The Statistics

Readings Due
- McClave and Sincich selection 5
- Gonick and Smith selection 5
- Supplemental selection 5
- [Homework 5 sent out]
Week 6  Regressions with Longitudinal Data
July 26  The Intuition

Readings Due  • None
Homework Due  • Homework 5 due at noon

July 28  The Statistics

Readings Due  • McClave and Sincich selection 6
• Gonick and Smith selection 6
• Supplemental selection 6

• [Homework 6 sent out]

Week 7  Model Uncertainty and Robustness
August 2  The Intuition

Readings Due  • None
Homework Due  • Homework 6 due at noon

August 4  The Statistics

Readings Due  • McClave and Sincich selection 7
• Gonick and Smith selection 7
• Supplemental selection 7

Week 8  Final Project Presentations
August 9  Final Project Presentations

Readings Due  • None
Homework Due  • Final Project Presentations

August 11  Final Project Presentations

Readings Due  • None
Homework Due  • Final Project Presentations
Course and University Policies

Office Hours
Office hours are by request and I strongly encourage students to come see me for office hours. Please feel free to contact me even if you don’t have a specific question and you would just like to generally chat about the course or research. If you need to reach me quickly, email is fastest. I am also happy to answer any questions immediately prior to or following class.

Laptops
According to the latest research, laptops are detrimental to the classroom environment—not just because people check their email obsessively, but also because bright, pixilated screens distract the people around you. Accordingly computer use in class is prohibited. If you have a documented disability and need to use a laptop in class, please come talk to me about it.

University Policies

The Honor Code
The Honor Code is Stanford’s statement on academic integrity first written by Stanford students in 1921. It articulates University expectations of students and faculty in establishing and maintaining the highest standards in academic work. It is agreed to by every student who enrolls and by every instructor who accepts appointment at Stanford. The text of the Honor Code can be found here: https://communitystandards.stanford.edu/student-conduct-process/honor-code-and-fundamental-standard

Office of Accessible Education (OAE)
Students who may need an academic accommodation based on the impact of a disability must initiate the request with the Office of Accessible Education (OAE). Professional staff will evaluate the request with required documentation, recommend reasonable accommodations, and prepare an Accommodation Letter for faculty dated in the current quarter in which the request is being made. Students should contact the OAE as soon as possible since timely notice is needed to coordinate accommodations. The OAE is located at 563 Salvatierra Walk (phone: 723-1066; website: http://studentaffairs.stanford.edu/oaе).

Counseling and Psychological Services (CAPS)
CAPS is available to help students who experience a wide variety of personal, academic and relationship concerns. Contact (650) 723-3785 (24 hours a day).