Statistics for Behavioral Scientists
PSYC UN1610/1611 (4 points)
Spring 2024

Instructor: Christopher Baldassano, c.baldassano@columbia.edu
Lectures: Tuesdays & Thursdays 10:10-11:25am
Lab (You must register for UN1610 **and** one section of UN1611):
- 001: Thursdays 2:10-4:00pm (TA: Taylor Chamberlain)
- 002: Thursdays 4:10-6:00pm (TA: Iddo Gefen)
- 003: Thursdays 4:10-6:00pm (TA: Naeun Oh)

Office Hours: You are welcome to attend any office hours regardless of your lab section.

Prof Baldassano	Wednesday afternoons: book at https://baldassano-oh.youcanbook.me/
Taylor Chamberlain	9-11am Fridays: https://columbiauniversity.zoom.us/j/4940585112
Iddo Gefen	9-11am Mondays: https://columbiauniversity.zoom.us/my/iddogefen
Naeun Oh	2:30-4:30 Mondays: https://columbiauniversity.zoom.us/my/naeunoh.meetings

Course Description
This course provides an introductory overview to the basic statistical concepts and procedures used in experimental research. The focus is on becoming familiar with how to interpret and perform statistical tests, in order to design experiments and interpret their results. It is not a course on mathematical theory; no mathematical skills beyond basic algebra are required. The course is instead intended to provide a basic degree of scientific literacy, with an emphasis on the psychological sciences. In addition to the lectures, students will participate in a mandatory laboratory section that meets once a week. Lab activities will consist primarily of hands-on data analysis using R, applying the concepts introduced in lecture.

Role in the Psychology Curriculum
For the Psychology major, and for the Psychology Post-Bac certificate program, this course counts toward the statistics requirement. For the Neuroscience & Behavior major, this course counts toward the P3 (statistics/research methods) requirement. For the Psychology concentration, this course counts as an elective.

Course Requirements
Attendance
After the Change of Program period ends, we will start taking attendance by assigning a Plickers card to each student. There are 24 classes after Change of Program and everyone automatically gets 4 excused absences. Therefore, attending 20 of these classes will give you 100% attendance grade. If you will be absent for an extended period of time please contact Prof Baldassano. All classes are streamed and recorded on Zoom, but watching on Zoom does not count as attendance. Note that attendance is only a small part of your grade, so there is no major penalty for missing classes; this is meant to encourage you to attend in-person whenever you can, since this is best way to ensure that you stay on track with the material.

Lab Assignments
Labs will be posted online on Monday morning each week. You can work on the lab at any point during the week, but it is expected that you will need help to finish all the parts of the lab, and you should attend the Thursday session corresponding to your lab section to get help from your TA. Note that TAs cannot guarantee a fast turnaround time to answer questions outside of their designated lab time. You can discuss the lab with other students in the class if you wish, but all code and text you write should be your own (not copy-pasted from another student). Labs are intended to be turned in by Thursday night, but can be turned in later without penalty.

Written assignments
Homework. Practicing new knowledge is important in any subject, all the more so for statistics. Your homework assignments provide you with a chance to test your knowledge, cement concepts before we build on them in further lectures, and make instructive mistakes.

- **Homework assignments must represent your own—and only your own—work.** You may not collaborate or share answers with other students. See the Academic Integrity section below for additional information.
- **Show your work!** You will receive more of your points for using a correct method, as opposed to coming to a correct answer. This means that making a silly math error early on needn't cause you to lose all points for a question, even if that error makes your final answer wrong. It also means that you will not receive many points for a correct answer if the TAs cannot see how you arrived at it.
- **Homework is due at the beginning of class.** Points will be deducted per half day past the due date of the assignment, which will always be at 10:10am (when our class starts). If you have not finished your homework before class, the late penalty will be the same if you turn it in during or directly after class as if you turn it in any time before 10:10pm that night.

Projects. In place of in-class exams, you will instead demonstrate your understanding of course concepts by completing a series of data-analysis projects. Think of these projects as take-home exams. Some important notes about projects:

- **Projects 1-3 should be completed within a 48-hour window of your choosing, and are due a week after they are assigned.** You should not open the project until you are ready to start your 48-hour window (your start time is tracked in Posit.cloud). In your submitted project, note the date and time that you started and finished working.
- **Project 4 is longer, and you can use the entire 1-week period to complete it.** You do not need to pick a 48-hour window. The project is not intended to take an entire week of work to complete, but is longer than the other projects and covers material from the whole course.
- **You are expected to work alone.** You may use any reference resources (lecture notes, readings, online resources), but you may not receive specific help on the questions in the project from fellow students, friends, internet message boards, **language models like ChatGPT or Copilot**, or any other outside source. Receiving help from anyone on your projects for this class is considered the same as cheating on an exam, and will be reported to Columbia as academic misconduct. See the Academic Integrity section below for additional information.

- **Note that the first couple of projects are weighted less strongly toward your final grade than the latter two.** If you don't do as well as you would have liked on the first project, make sure to meet with your TA or the instructor to go over what you did wrong (but also what you're doing right!), so that you can improve your grade as the projects increase in value.

Grading

This class is not graded on a curve, so your grade will be determined only by your own work, not by how well you do relative to the other students. Your grade will depend on the following:

Attendance: 10%	Project 1: 10%
Lab Assignments: 5%	Project 2: 10%
Homework: 30%	Project 3: 15%
	Project 4: 20%

Grades will only be rounded to the nearest 0.1% and then assigned to letters as follows:

A+: 98-100%	B+: 87-89.9%	C+: 77-79.9%	D: 60-69.9%
A: 93-97.9%	B: 83-86.9%	C: 73-76.9%	F: 0-59.9%
A-: 90-92.9%	B-: 80-82.9%	C-: 70-72.9%	

Academic Integrity

Academic honesty includes presenting only your own work in your assignments. Taking credit for work that is not your own is a serious violation within the academic community, and anyone found to be cheating in this class will be reported to the university. In this course, academic dishonesty includes receiving unauthorized help on your projects or homework assignments, copying another student's work, copying answers from online sources, or helping other students with their work. Detailed definitions and examples of academic dishonesty (and a rundown of the consequences) are available at http://www.college.columbia.edu/academics/integrity.

If you find yourself in a position where it feels like getting answers from another person is your only option, please reach out to your instructor and/or your TA before going elsewhere. It's always preferable to deal with any issues before they get so bad that they become overwhelming, so please do come to us if you're feeling stressed out about the class workload or if there's a concept you're just not understanding. Getting help before a homework assignment is due, and before a project is assigned, is always going to be the best option, but even if you're reaching out after that, we'd rather you come to us rather than resorting to cheating. If you have an issue that you'd rather not talk about with us, you may contact your academic advisor or dean; or a Psychology Program Advisor (DUS); or the counselors at Columbia's CPS.

Students with Disabilities

In order to receive disability-related academic accommodations for this course, students must first be registered with their school Disability Services (DS) office. Detailed information is available online for both the Columbia and Barnard registration processes. Refer to the appropriate website for information regarding deadlines, disability documentation requirements, and drop-in hours (Columbia)/intake session (Barnard). Please note that students who ordinarily receive extra time to complete in-class exams are not generally eligible to receive more time to complete the projects in this course.

There is no required textbook, but all lectures have an **optional** reading (available in Courseworks) intended to provide a reference for a deeper understanding of the material.

Date	Topic	Readings (Optional)	Lab	Due
1/21	Introduction	Poldrack Chapter 1		
1/23	Variables and Measurement	Poldrack Chapter 2	#1	
1/28	Data Visualization	Tufte Chapter 1		
1/30	Central Tendency and Variability	Gonick Chapter 2	#2	
2/4	Correlation	Crump Chapter 3		HW 1
2/6	Linear Regression	Dancey Chapter 12	#3	
2/11	Inference	Irizarry Chapter 15		HW 2
2/13	Bootstrapping	Moore Chapter 16	#4	
2/18	Null Hypothesis Testing	Statistical Investigations Chapter 1		HW 3
2/20	Permutation Testing (Part 1)	Good Chapter 1	#5	
2/25	Permutation Testing (Part 2)	Good Chapter 1		Project 1
2/27	Probability	Poldrack Chapter 3	#6	
3/4	Probability Distributions	Intro Stats Chapters 5 & 7		HW 4
3/6	Binomial Test	Kernler Chapter 6	#7	
3/11	z Test	Intro Stats Chapter 9		HW 5
3/13	t test	Gonick Chapters 8 & 9	#8	
3/14				Project 2
3/25	Mid-semester review			
3/27	Rank tests	Moore, McCabe, Craig Chapter 15	#9	
4/1	Chi-Square test	Hannay Chapter 17		HW 6
4/3	ANOVA (Part 1)	Dancey Chapter 10	#10	
4/8	ANOVA (Part 2)	Dancey Chapter 11		HW 7
4/10	P-hacking	Poldrack Chapter 17	#11	
4/15	Effect Size	Ellis Chapter 1		Project 3
4/17	Power Analysis	Poldrack Chapter 10	#12	
4/22	Bayes Rule (Part 1)	Stone Chapter 1		HW 8
4/24	Bayes Rule (Part 2)	Poldrack Chapter 11	#13	
4/29	Analytic Strategy	McElreath Chapter 1		HW 9
5/1	Review & Future Directions			
5/8				Project 4