PSYC830: STATISTICAL METHODS IN PSYCHOLOGY I
FALL 2020

Lecture: T/Th 3:00pm-4:15pm (synchronous, Zoom & TBD)
Lab: TBD (asynchronous, Zoom)

Instructors:
Dr. Patrick Harrison
Atiyah Hamilton-Barlow

COURSE OVERVIEW

There are two interrelated goals for this course. The first is to better understand the applications of basic statistics (descriptives, Z-tests, t-tests, ANOVA) by analyzing data in statistical packages (SPSS, R, etc.). The ability to run analyses, interpret the obtained results, and draw substantive conclusions will be critical for understanding your own program of research.

The second goal is to impart a very real understanding of the theoretical underpinnings of these statistics, especially with regard to certain key assumptions and the resulting effects of violating these assumptions.

Overall, we will strive to provide a balance between the mathematical components of these statistics and the practical applications that you will encounter in your own research. Next semester, you will explore regression analysis and the general linear model in more detail. This course is designed to help you build a strong foundation for your quantitative knowledge.

INSTRUCTIONAL TEAM

Instructor
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he/him/his

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Teaching Assistant
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Office Hours:
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she/her/hers

STATEMENT OF INCLUSION

Atiyah and I are committed to making PSYC830 a safe space. It is important to us that ALL students are able to succeed in this course regardless of race/ethnicity, sexuality, gender identity, age, ability, income, religion, background, etc. If you ever feel that your right to learn and participate in this course has been violated by us or any of your peers, please do not hesitate contact us.

As your instructors, we affirm our commitment to:
- respecting the dignity and essential worth of all individuals
- promoting a culture of respect throughout the university community
- rejecting bigotry, discrimination, violence, or intimidation of any kind
- practicing personal and academic integrity and expect it from others
- promoting the diversity of opinions, ideas, and backgrounds that is the lifeblood of the university

UNC-Chapel Hill safe zone

COURSE STRUCTURE

The class is structured around two core required components. The first is the Tuesday and Thursday "lectures" which will cover all of the fundamental concepts that make up the course. The second is the Friday lab in which Atiyah will cover model estimation using various software packages. While R is the “official” software package used in this class, you will have the opportunity to explore SPSS and SAS as well.

COURSE MATERIALS

SOFTWARE

You will also need access to R, SPSS, and SAS. R is the platform we will be using in this course to analyze data. We will also be using SPSS and SAS. You can access all of three, free of charge, through Virtual Lab or Virtual Computing Lab (https://sils.unc.edu/it-services/remote-access/its-virtual-lab) or online at https://rstudio.com/.

We will also use SPSS extensively in the course, especially in the lecture portion of the class. If you choose to purchase it you can get it here (specific instructions for purchase are posted on Sakai): http://www.onthehub.com/spss/

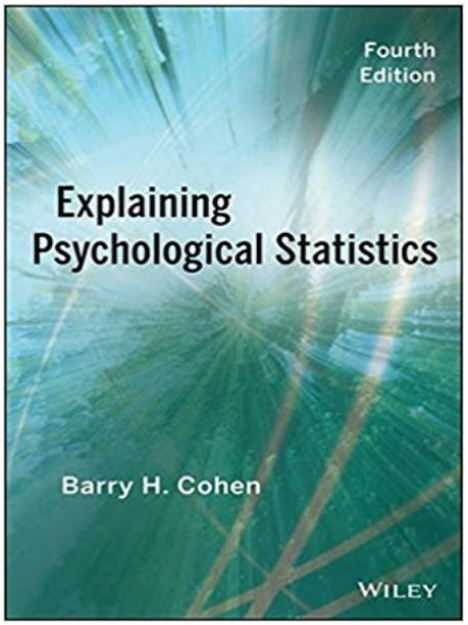
READINGS

The required readings will serve as supplements to material discussed in class. I will also include additional primary source readings that will be made available on the course website (Sakai - sakai.unc.edu). These readings include, but are not limited to:

Cohen, B. H. (2013). Explaining Psychological Statistics (4th Edition). Hoboken, NJ: John Wiley & Sons, Inc. ISBN: 978-1-118-43660-8

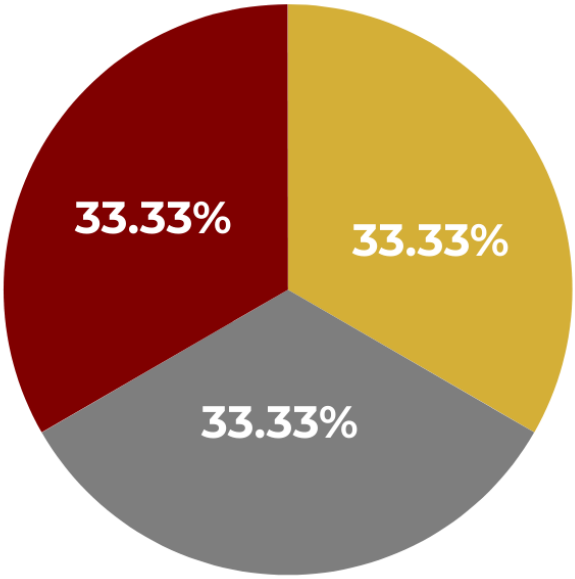
Tabachnick, B.G. and Fidell, L.S. (2013). Using Multivariate Statistics. Pearson, Boston.

Thurstone, L. L. (1937). Psychology as a quantitative rational science. Science, 85, 228–232. https://doi.org/10.1126/science.85.2201.227



COURSE EVALUATION

Course grades will be assigned based on a three components: (1) 33.33% of the course grade will reflect the score obtained on an in-class midterm exam with scores ranging from 0 to 100%; (2) 33.33% of the course grade will reflect the score obtained on a cumulative take-home final exam with scores ranging from 0 to 100%; and (3) 33.33% of the course grade will reflect the percent of possible points obtained on approximately six to eight take-home problem sets assigned throughout the semester; there may be additional problem sets depending on the pace of the course. using a four point system reflecting poor (1), fair (2), good (3), and excellent (4) performance. Final letter grades will be assigned based on the following percentiles derived using the weighting scheme described above: 90%-100%=HP; 80%-89.9%=P; 70%-79.9%=LP; and below 70%=F.



ASSIGNMENTS (SEMI-WEEKLY)

MIDTERM EXAM (IN-CLASS)

FINAL EXAM (TAKE-HOME)

Scores for problem sets are assigned using a four point system reflecting poor, fair, good, and excellent performance. More specifically:

4=excellent: shows clear grasp of all of the main concepts and work is fully or nearly free of errors. Any errors that exist are both small in number and in importance. Nearly nothing could be done to improve performance with additional work.

3=good: shows a general understanding of the main concepts, but not all work is error free. Errors may be small in number and larger in importance, or vice versa, but not both. Some observable improvement could be shown with additional work.

2=fair: shows a modest understanding of main concepts, where more understanding is demonstrated than not. Errors are larger in both number and importance. Significant improvement could be shown with additional work.

1=poor: shows a general lack of understanding of the main concepts, where less understanding is demonstrated than not. Many errors are present, particularly involving core concepts. The problem set would need to be completely revised with additional work.

Late problem sets turned in within one week of the due date will automatically receive one point; problem sets will not be accepted beyond one week past the due date. Permission to submit a late problem set must be requested prior to the due date; otherwise the problem set will not be accepted and will receive a score of zero.

RATIONALE FOR WHAT WE DO

BIG PICTURE

Why do we study statistics? Well, there are a lot of reasons. No matter what type of research you conduct, the common thread is statistics. Some of you may never use t-tests again. Some of you will use ANOVA frequently. Most of you will use some form of the general linear model (GLM) which will be discussed in more detail next semester.

I notice quite a bit of ambivalence when individuals are taught statistics. One of my mentors taught me that statistics is similar to climbing a mountain. I recognize that for some of you, this is thrilling. For others, this is probably terrifying. Regardless, you have to pace yourself. One step at a time. We will start slowly, and by the end of the course, you will be surprised by how more statistical knowledge you have gained. The view from the summit will be unbelievable.

I recognize that your paths will take you different places and your need for a given statistic will vary. However, a well-rounded psychologist has background in all of these techniques. My goals is to give you a sampling of these techniques.

THE FINE PRINT

Academic Integrity: By enrolling in this class, you have agreed to adhere to UNC's Honor Code. If you have any questions about the code, refer to: http://advising.unc.edu/for-faculty/academic-policies-and-procedures/unc-honor-code/.

Honor Code and Policy on Collaborative Work

The honor code is in effect for this course. Students shall not misrepresent others' work as their own, and will give full credit for others' contributions to the extent that these are allowed within the parameters of an assignment.

For homework assignments, students are encouraged to consult with one another in the following ways: you may discuss the requirements of the assignment, the interpretation of your results, and the proper application of models within R or SPSS. For instance, you might write some R syntax to fit a model and obtain an error message but not be able to figure out why you are getting the error. You might then ask another student to look at your code to see what you might have done wrong, or you might ask, "How did you get R to do such and such?" You should not, however, write collaborative R code (i.e., as a group). Your code should be your own. Likewise, you might ask another student if your interpretation of a particular result is correct, such as "The slope estimate indicates the amount of change in the outcome per 1-unit change in the predictor, right?" You should not, however, present someone else's interpretation as your own (e.g., say, "Hey, can you tell me how to interpret this stuff?").

COURSE SCHEDULE

Subject to change with notification*

DATE	TOPIC	SUPPLEMENTAL READINGS	DUE DATES
Week 1			
T 8/11	Course Introduction	Thurstone (1937)	
Th 8/13	Measurement	Cohen Ch. 1, pp.1-10	
F 8/14	Lab 1 (introduce Problem Set 1		
Week 2			
T 8/18	Basic Concepts	Cohen Ch. 1-3	
Th 8/20	Basic Concepts		
F 8/21	Lab 2 (introduce Problem Set 2)		Problem Set 1 Due
Week 3			
T 8/25	Basic Concepts	Cohen Ch. 4-5	
Th 8/27	Hypothesis Testing		
F 8/28	Lab 3 (work on Problem Set 2		
Week 4			
T 9/1	One-Sample *t* -Test	Cohen Ch. 6	
Th 9/3	Two-Sample *t* -Test	Cohen Ch. 7	
F 9/4	Lab 5 (introduce Problem Set 3)		Problem Set 2 Due
Week 5			
T 9/8	Paired-Samples *t* -Test	Cohen Ch. 11	
Th 9/10	Power	Cohen Ch. 8	
F 9/11	Lab 6 (introduce Problem Set 4)		Problem Set 3 Due
Week 6			
T 9/15	General Linear Model	Cohen Ch. 12	
Th 9/17	ANOVA		
F 9/18	Lab 7 (introduce Problem Set 5)		Problem Set 4 Due
Week 7			
T 9/22	ANOVA	Cohen Ch. 12	
Th 9/24	ANOVA		
F 9/25	Lab 8 (work on Problem Set 5)		

COURSE SCHEDULE

Week 8			
T 9/29	Post Hoc Tests in ANOVA	Cohen Ch. 13	
Th 10/1	Post Hoc Tests in ANOVA		
F 10/2	Lab 8 (work on Problem Set 5)		
Week 9			
T 10/6	Planned Contrasts in ANOVA	Cohen Ch. 13	
Th 10/8	Review		
F 10/9	Lab 9 (Review)		Problem Set 5 Due
Week 10			
T 10/13	Midterm		Midterm Exam
Th 10/15	Factorial ANOVA	Cohen Ch. 14	
F 10/16	Lab 10 (introduce Problem Set 6)		
Week 11			
T 10/20	Factorial ANOVA	Cohen Ch. 14	
Th 10/22	Factorial ANOVA		
F 10/23	Lab 11 (work on Problem Set 6)		
Week 12			
T 10/27	Simple Effects in ANOVA	Cohen Ch. 14-15	
Th 10/29	Repeated Measures ANOVA		
F 10/30	Lab 12 (introduce Problem Set 7)		Problem Set 6 Due
Week 13			
T 11/3	Repeated Measures ANOVA	Cohen Ch. 15	
Th 11/5	Repeated Measures ANOVA		
F 11/6	Lab 12 (introduce Problem Set 7)		Problem Set 6 Due
Week 14			
T 11/10	Effect Size and Power in ANOVA	Tabachnick & Fidell	
Th 11/12	Back to the General Linear Model	pp. 190-191	
F 11/13	Lab 13 (work on Problem Set 7)		
Week 15			
T 11/17	Review/Closing Remarks		Problem Set 7 Due
Final Exam Week			
	Final Exam		Final Exam Due