Course Syllabus
Psy 521/621 Univariate Quantitative Methods
Fall 2020

Instructor

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Meeting Times and Location

Class: Tu-Th 10:00–11:50 AM, online via Zoom. Lab: Wed 2:00-3:05 PM, online via Zoom.

Lab Instructor/Teaching Assistant

Stefanie Fox. Email: stfox@pdx.edu. Office hours: appointment. Lab materials are on d2L at: https://d2l.pdx.edu/d2l/home/824766

Required Text

Myers, J.L., & Well, A.D., & Lorch, R.F.,Jr. (2010). *Research design and statistical analysis (3rd Edition)*. Mahwah, NJ: Erlbaum. ISBN: 978-0-8058-6431-1. Please read the 3rd edition, because exams will be based on this edition. Electronic access to the text is available through the library (sign in and click on "Taylor & Francis eBooks").

Overview

This course is designed to give students the necessary skills to analyze research projects. Together with the second course (Psy 522/622 Multiple Regression and Multivariate Quantitative Methods offered Winter term), this class will be a thorough and reasonably comprehensive introduction to understanding, critically evaluating, conducting, and writing about analyses for most studies in behavioral and social science-related disciplines.

Readings

Readings are from the required text and from supplemental articles and chapters. See attached schedule to be used as a guideline for when the readings should be completed. Note that you will get more out of class if the readings are complete prior to class meeting. Some students also prefer to revisit the readings after lectures, and I think this is a good strategy.

Grades

Grades are based on an average of the three homework assignments with total percentages assigned the following grades: $\geq$ 90 = A, 85-89.9 = B+, 80-84.9 = B, 75-79.9 = C+, 70-74.9 = C. Your course grade will be based on three homework assignments (45%), two exams (45%), and ten brief lab reports (10%). **Exams** will include short answer (paragraph length), multiple choice, and computations/output interpretation. I will give you a one-page "review sheet" (just a list of topics and a larger set of short answer questions) one week prior to the exam. **Homework assignments** will include computer assignments, result summaries and interpretation, reading an example journal article, and some hand calculation problems. Homework assignments will be due at the beginning of class on the dates indicated on the schedule. **Brief lab reports** are due at the beginning of lab the following week and will involve fairly minimal work outside of lab. Each will be graded on a 5-point scale. The purpose of these assignments is simply to demonstrate you participated and to spend a little time reflecting on the purposes of the lab. Late assignments are not accepted without penalty (10% per day late), except for cases of illness, family emergencies, or occasionally other crises. Please contact me ahead of time if you are going to miss the deadline for any reason.

Software

The labs and assignments for this course will primarily use SPSS (Statistical Package for the Social Sciences) but will include some work with R, the free statistical software package. During the current online session the department is supplying individual copies of SPSS and R is free and can be downloaded from: http://www.r-project.org/. Lecture and lab material will generally use R Studio, a windows interface, available free at https://rstudio.com/products/rstudio/. No manual or book for either software program is required. If you would like an additional reference, there are several useful guides to using SPSS or R that are good. For SPSS, I have some preference for the book by Samuel B. Green & Neil J. Salkind . *Using SPSS for Windows and Macintosh, 8th Edition*. ISBN: 0134319885), and, for R, I have some preference for the book by D. W. Gerbing *R Data Analysis without Programming*. Routledge: New York. ISBN: 0415657202. You may be able to acquire one of the last couple of editions of the SPSS book for less money, which will work just fine. Don't spend a lot of time getting stuck on software implementation--either Stefanie or I can provide additional assistance. **Don't be afraid to ask.**

Web Page Material

The website for the class, http://web.pdx.edu/~newsomj/uvclass, will have handouts and many overheads in pdf format (only as they are covered in class), the syllabus, supplemental readings, and links to useful statistics sites. Under "Stats Notes," there is also some additional lecture information on most of the topics covered in the course, although the material is discussed in less depth. See also several good links at the bottom of the page for SPSS and R tutorials and other valuable resources.

My Teaching Philosophy

In general, I work very hard at teaching, and so I expect students to work very hard at learning. This course will be a lot of work, but I think that you will find, in the end, you will learn a great deal. I have a heavy emphasis on concepts. To me, the concepts and theoretical constructs in statistics are fundamental to understanding and using statistics well—they are also the part I love most about it (ok, maybe "love" is too strong). Understanding the concepts and the big picture first will help you remember many more details. Don't worry about ever having to memorize formulas; you can always look those up in a book if you need to. And what I'd like you to avoid is a recipe approach where you follow steps to get a result without understanding what you are doing. If you follow a menu-driven recipe for getting through an analysis of variance, without understanding why you are conducting the test, how to interpret it when it's completed, and when to use it, I've failed miserably in my job. Despite my bias toward conceptual aspects of statistics, I also believe that the practical applications are extremely important. We will do as much application as possible, a great deal of which will involve real data sets.

Keeping a couple of things in mind about the nature of statistics and the strategies for learning statistics will help you a great deal in this course. **Statistics is not math**. Only a very rudimentary math knowledge (eighth grade algebra probably!) is needed for understanding statistics, even at a fairly deep level. Statistics is like mathematics, however, in that it must be practiced to be learned. One has to work on exercises, analyze different problems, and get experience with different analytic situations in order to absorb the information. Do not think that you can just read through the material and remember everything. Learning statistics is also **like learning a foreign language** in that nearly all concepts are represented by Roman or Greek letters. Each represents an important concept, and, if you do not keep up with that "vocabulary," soon you will not be able to translate any longer, leading you to fall behind. Do not lose sight of the fact that learning statistics also is **like learning other subjects** (psychology, biology, history etc.), because there are a variety of terms and practical details you that will need to *memorize*. Statistical analyses are valuable practical tools, but they are based on some rather **weird concepts**, making learning statistics different from any other subject. Approaching the subject with an open mind, reconsidering your assumptions and past learning strategies will take you much further. Finally, I am quite aware that many of you may have **high anxiety** about this course or learning statistics, but I want to assure you that I am here to help in any way I can. I firmly believe that each one of you are not only capable of learning and doing well in this subject, but I know from many years of experience that even those who start out the most anxious about the course wind up doing very well and many are surprised to find they have a real knack and affinity for the topic. **Please don't be afraid to ask for help!**

Disabilities

I am happy to make any necessary arrangements with students who have a disability and are in need of academic accommodations. If you have not done so already, please contact the Disability Resource Center, 116 Smith Memorial Student Union, https://www.pdx.edu/disability-resource-center/, Email: drc@pdx.edu, for assistance and any testing arrangements. I would appreciate it if you would check with me as soon as possible to discuss any needed accommodations and to make sure that I have received a faculty notification letter. If any aspects of instruction or course design result in barriers to your inclusion or learning, please let me know.

Sexual Harassment, Sexual Violence, and Discrimination

As an instructor, one of my responsibilities is to help create a safe learning environment for my students and for the campus as a whole. Please be aware that as a faculty member, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information about sexual harassment, sexual violence or discrimination to a confidential employee who does not have this reporting responsibility, you can find a list of those individuals or contact a confidential advocate at 503-725-5672. For more information about Title IX please complete the required student module Creating a Safe Campus in your D2L.

Course Schedule

There will also be a few supplemental readings, which are listed below (*) and are available for download from the course website (secured by password). In addition to these topics, a number of other practical topics will be covered in class along the way, including issues related to using SPSS and R, data entry, data cleaning, data management, research design issues, and interpreting printouts.

When a main section number, such as 6.3, is listed as optional reading, this implies that subsections under the heading are also optional. For example, Sections 6.3.1 and 6.3.2 are also optional if Section 6.3 is listed.

General Topic	**Class/Lab Dates**	**Reading Assignments**	***Optional Sections***
Lab 1 Intro to SPSS and R	9/30		
Descriptive and inferential statistics	10/1,10/6	○ Chapter 2: Exploring the data ○ Chapter 5: Further development of the foundations of statistical inference, *Sections 5.1 through 5.4 only* ○ *Optional review readings:* *Hays (1971) Rules of Summation; *Gravetter & Wallnau (1995). Basic Mathematics Review; *Welkowitz, Ewen, & Cohen (1982) Chapter 4 Measures of Central Tendency, Chapter 5 Measures of Variability, Chapter 6 Transformed scores; Myers et al. (2010) Chapter 1: Planning the Research	○ *2.7* ○ *5.2.3 through 5.2.9* ○ *All*
Lab 2 Descriptive statistics	10/7		
t-tests: Comparing two means with a continuous dependent variable	10/8,10/13	○ *Hahs-Vaughn & Lomax (2013), *section 5.2 only* ○ Chapter 5: Further development of the foundations of statistical inference, *Sections 5.5 through 5.9 only* ○ Chapter 6: The *t* distribution and its applications	○ *5.1, 5.2.2.2, 5.2.2.4* ○ *5.6, 5.8* ○ *6.8, 6.9*
Lab 3 t-tests	10/14		
Chi-square: Single and two-group comparisons when the dependent variable is dichotomous	10/15,10/20	○ Chapter 4: Developing the fundamentals of hypothesis testing using the binomial distribution ○ *Howell (2010). Chapter 6: Categorical data and chi-square. ○ *Delucchi (1993). Use and misuse of chi-square. *pp. 298-304 only*.	○ *4.3.2, 4.5* ○ *6.5, 6.8, 6.11, 6.12* ○ *None*
Lab 4 Chi-square	10/21		
Correlation, simple regression, reliability ***Homework 1 Due Thurs, Oct 22***	10/22,10/27	○ Chapter 2: Exploring the data, *Section 2.7 only* ○ Chapter 18: Introduction to correlation and regression ○ Chapter 19: Looking at data: Relations between quantitative variables, *Sections 19.1, 19.2, and 19.5 only.* ○ *Furr, R.M., & Bacharach, V.R. (2013). Chapter 6: Empirical Estimates of Reliability. In *Psychometrics: An Introduction, 2nd Edition.*	○ *None* ○ *18.5.3, 18.5.4, 18.6.3, 18.7.2, 18.7.3* ○ *None* ○ *pp. 152-161*
Lab 5 Correlation, simple regression, reliability	10/28		
One-way ANOVA and follow-up tests	10/29,11/3	○ Chapter 8: Between-subjects designs: One factor ○ Chapter 10: Contrasting means in between-subjects designs	○ *8.3, Box 8.1, 8.7, Box 8.2, Box 8.3, Box 8.4* ○ *10.10*
Lab 6 One-way ANOVA and follow-up tests	11/4		
Factorial ANOVA and simple effects ***Midterm Exam Thurs Nov 5***	11/5,11/10	○ Chapter 9: Multifactor between-subjects designs ○ Chapter 10: Contrasting means in between-subjects designs, *section 10.10 only*	○ *Box 9.1, 9.2.1, 9.4, 9.5, 9.7, 9.9,* ○ *None*
Lab 7 Factorial ANOVA and simple effects	~~11/11~~	***No Lab – Veteran's Day***	
Within-subjects ANOVA ~~***Homework 2 Due Thurs, Nov 12***~~	11/12,11/17	○ Chapter 14: One-factor repeated-measures designs	○ *14.2.1, 14.5.1, 14.9, Box 14.2*
Lab 8 Within-subjects ANOVA	11/18		
ANOVA with mixed designs ***Homework 2 Due Thurs, Nov 19***	11/19,11/24	○ Chapter 15: Multi-factor repeated measures and mixed designs	○ *15.2.1, 15.2.3, 15.3.1 (but Table 15.7 required), 15.3.4, 15.4, 15.5, 15.6, 15.8.6, 15.10*
Lab 9 ANOVA with mixed designs	11/25		
Thanksgiving (no class)	11/26		
Ordinal data and loglinear analyses	12/1	○ *Green, J.A. (1988). Loglinear Analysis of Cross-Classified Ordinal Data: Applications in Developmental Research. *Child Development, 59*, 1-25. ○ *Howell (2013). Chapter 18: Resampling and nonparametric approaches to data, *pp. 659-673 only* ○ *Nussbaum. Chapter 6 "Basic Nonparametric tests for Ordinal Data." In Nussbaum, E. M. (2014). *Categorical and nonparametric data analysis: Choosing the best statistical technique*. New York: Routledge.	○ *None* ○ *None* ○ *None*
Lab 10 Ordinal data and loglinear analyses	12/2		
Distributions, assumptions, robustness, power, limitations, and controversies ***Homework 3 Due Thurs, Dec 3***	12/3	○ Chapter 5: Further development of the foundations of statistical inference, *5.2.3 through 5.2.9 only* ○ *Cohen, J. (1992) A power primer. *Psychological Bulletin, 112*, 155-159. ○ *Kline, Chapter 3 "What's wrong with statistical tests—and where do we go from here." Kline, R. B. (2004). *Beyond significance testing: Reforming data analysis methods in behavioral research*. Washington, DC: APA ○ *Fraley, R. C., & Vazire, S. (2014). The N-pact factor: Evaluating the quality of empirical journals with respect to sample size and statistical power. *PloS one, 9*, e109019.	○ *None* ○ *None* ○ *None* ○ *None*
Final Exam, Tues, December 8 10:15-12:05 (note: length of time for the test may be restricted)			