

Course Syllabus USP 534 Data Analysis Spring 2009

Instructor

[Jason Newsom, Ph.D.](mailto:newsomj@pdx.edu), Office: 470P Urban Center, Phone: 503-725-5136, Fax: 503-725-5100, Email: newsomj@pdx.edu. Web page: <http://www.upa.pdx.edu/IOA/newsom>. Office hours: By appointment, but please feel free to call, email, or even stop by for briefer questions.

Lab Instructor/Teaching Assistant

Nicole Iroz Elardo, Office: Urban Center 470S-2. Email: irozelardo@yahoo.com.

Course Meeting Times

Tue, 4:00-6:30 pm, Clay Building 202. Lab meeting times: Tue 6:40-7:30 pm, Cramer Hall 324.

Overview

This course is designed to give students the necessary skills to analyze research projects. Together with the second course (USP 554/654 Data Analysis II offered in the Fall), this course will be a thorough and reasonably comprehensive introduction to understanding, critically evaluating, conducting, and writing about analyses for most studies in social science-related disciplines.

Prerequisites

This course assumes that you have had some introduction to statistics as an undergraduate. (I realize for some of you, this may have been some years ago.) We will spend the first three weeks reviewing basic inferential statistics. You also should have some understanding of research designs. I will make available some optional readings that will help provide additional review if you need it.

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

Your course grade will be based on three homework assignments and two exams, each worth half of your course grade. **Exams** will include short answer (paragraph length), multiple choice, and computations/output interpretation. I will give you a one-page review sheet 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. No late assignments will be accepted.

SPSS

Many of the assignments for this course will use a statistical software package called SPSS (Statistical Package for the Social Sciences). SPSS is not the only statistical package available. I choose SPSS for this course for several reasons: (1) because it is more widely used than other statistical packages, (2) it is probably the easiest statistical package to use, (3) it is available to instructors and students at PSU, and (4) it is available at nearly every university in the U.S. SPSS is available on the computers in Room 230 of the Urban Center and several other computer labs on campus. An SPSS manual is not required for this class; everything you need to know about the program is available under the help menu in the software and will be covered in class or lab. However, if you want additional reference, the following book is an accessible introduction to SPSS: Samuel B. Green & Neil J. Salkind (2008). *Using SPSS for the Windows and Macintosh: Analyzing and Understanding Data (Fifth Edition)*. Upper Saddle River, NJ: Prentice Hall. ISBN: 0136005969. You may be able to acquire the third or fourth edition for less money and they will work just fine. Either Nicole or I can provide additional assistance.

Calculator

Everyone should have a calculator to use for the course. Nothing fancy is needed; a calculator you get out of a cereal box will work just fine. It can be handy to have one with a summation function (Σ key), but it is not required.

My Teaching Philosophy

In general, I work very hard at teaching, and so I expect students to work very hard at learning. I have a heavy emphasis on concepts, especially when it comes to statistics. 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). Despite my bias toward conceptual aspects of statistics, I also believe that the practical applications are extremely important. Don't worry about ever having to memorize formulas, you can always look those up in a book if you need to. 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.

Statistics Is a Weird Subject: How to Learn It

It's not math and it's not a regular substantive course...it's statistics. Despite what many statistics teachers say, statistics is not math. It's also not a course like political science or biology. Statistics really includes elements of mathematics, substantive material, and a foreign language, and it is important to realize its multifaceted nature. So, please try to keep an open mind. Don't approach the subject only as mathematics or only as a substantive course; you will miss more than half of what you need to learn. Here's my advice, which I hope will be helpful:

- **It's not like math, it is like math.** Statistics is considerably different from mathematics. In fact, the math required for this course is no more complex than what is needed to balance a check book. 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. You may need to read and apply the material several times. *So, don't wait until the last minute!!!!!!!!!!!!!!!!!!!!!!!!!!!!*
- **It's like a foreign language.** Statistics does, however, use a lot of symbols like Greek letters, and for this reason it is a bit like learning a foreign language. Think of the symbols as a foreign language vocabulary that has to be learned in order to understand the sentences.
- **It's like other courses.** In this course, there will also be a great deal of practical, conceptual, and other substantive information that will have to be learned; so, you will also have to read the text material, study concepts, and do some memorization like other substantive courses.
- **It's progressive.** Everything builds on everything else. Don't let any misunderstandings slip through the cracks, or it will snowball on you. Please see Nicole or me if you have questions!!
- **It's weird.** Statistics is a unique and unusual topic involving some very abstract and weird ideas. The peculiar nature of the subject makes the material very difficult to learn and retain. Despite its seemingly abstract nature, statistics are extremely useful tools that will make you a highly skilled and valued researcher.

A Note on Statisticophobia

Although not an official phobia, many of us have a real and unavoidable fear of all those numbers and Greek symbols. If you are a sufferer of statisticophobia, please don't worry, I fully understand how you feel. Also, remember that you are not alone, and I'll make sure you make it through the course. Believe it or not, most of you will actually wind up finding it interesting; at the very least, you will no longer have a morbid fear of it. I am always available to help, and your classmates can also be an excellent source of support. Chances are if you are having problems, so is someone else. *Please don't be afraid to ask for help!*

Web Page Material

You can find additional lecture information on most of the topics is available at my website, <http://www.upa.pdx.edu/IOA/newsom/>, under "Stats Notes". The current two-course sequence will cover most of the same topics but in much greater depth. Go to "Data Analysis I" for handouts from this class.

Course Schedule

Text

Myers, J.L., & Well, A.D. (2003). *Research design and statistical analysis* (2nd Edition). Mahwah, NJ: Erlbaum. ISBN:0-8058-4037-0

There will also be a few supplemental readings, which are listed below (*). These readings will be available for download from the course website. In addition to these topics, a number of other practical topics will be covered in class, including: issues related to using SPSS; data entry, cleaning, and management; secondary data sources and analysis; 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 6.3 is listed.

General Topic	Class Dates	Reading Assignments	Optional Sections
Design	4/7	<ul style="list-style-type: none"> o *Schutt (2001), Chapter 6 o <i>Optional review readings: *Welkowitz, Ewen, & Cohen (1982) Chapter 4 Measures of Central Tendency, Chapter 5 Measures of Variability, Chapter 6 Transformed scores</i> 	<ul style="list-style-type: none"> o pp. 196-201. o All
Descriptive and inferential statistics	4/14	<ul style="list-style-type: none"> o Chapter 2: Looking at data: Univariate distributions o Chapter 5: Estimation and hypothesis tests: The normal distribution (<i>sections 5.1 through 5.9 only</i>) 	<ul style="list-style-type: none"> o 2.4.4, 2.6.2, 2.6.4 o 5.2.1, 5.2.2, 5.4.3, 5.4.4, 5.6, 5.7
t-tests: Comparing two-groups with a continuous dependent variable	4/21	<ul style="list-style-type: none"> o Chapter 5: Estimation and hypothesis tests: The normal distribution (<i>sections 5.10 through 5.12 only</i>) o Chapter 6: Estimation, hypothesis tests, and effect size: The <i>t</i> distribution o Section 5.6: Inferences about population means: The correlated-samples case 	<ul style="list-style-type: none"> o 5.11 o 6.3, 6.4, 6.6, 6.7, 6.9 o None
Homework 1 Due Tuesday, April 28			
Chi-square: Single and two-group comparisons when the dependent variable is dichotomous	4/28	<ul style="list-style-type: none"> o *Welkowitz, Ewen, & Cohen (1982) Chapter 17, Chi Square o Chapter 4: Probability and the binomial distribution 	<ul style="list-style-type: none"> o None o 4.4, 4.5, 4.6
Midterm Exam May 5			
Correlation and Reliability	5/5	<ul style="list-style-type: none"> o Chapter 3: Looking at data: Relations between quantitative variables o Chapter 18: More about correlation (<i>except 18.2.2 and 18.4</i>) o *Kaplan & Saccuzzo (1982) Chapter 4 Reliability 	<ul style="list-style-type: none"> o 3.5 through 3.9 o 18.2.2, 18.3.1, 18.3.3, 18.3.4, 18.3.5, 18.3.6, 18.4 o All technical boxes
One-way ANOVA and follow-up tests	5/12	<ul style="list-style-type: none"> o Chapter 8: Between-subjects designs: One factor o Chapter 9: Contrasts among means 	<ul style="list-style-type: none"> o 8.5.2, 8.6, 8.7.4 o None
Homework 2 Due Tuesday, May 19			
Factorial ANOVA and simple effects	5/19	<ul style="list-style-type: none"> o Chapter 11: Multifactor between-subjects designs: Significance tests in the two-way case o Chapter 12: Multifactor between-subjects designs: Further developments 	<ul style="list-style-type: none"> o 11.6.2, 11.7.2, 11.8 o 12.3, 12.5, 12.6, 12.7
Within-subjects ANOVA	5/26	<ul style="list-style-type: none"> o Chapter 13: Repeated-measures designs 	<ul style="list-style-type: none"> o 13.2.4, 13.3, 13.5, 13.6, 13.7, 13.8
Homework 3 Due Tuesday, June 2			
ANOVA with Mixed Designs	6/2	<ul style="list-style-type: none"> o Chapter 14: Mixed designs: Between-subjects and within-subjects factors 	<ul style="list-style-type: none"> o 14.3, 14.4.2, 14.4.4, 14.5, 14.9
Final Exam, Tuesday, June 9, 3:30 –5:20 pm			

If you have a disability and are in need of academic accommodations, please notify me immediately to arrange needed supports.