



Quantitative Methods in Psychology

CLPS 0900 (CRN 15679)

Fall 2012

Course Meeting Place: Foxboro Auditorium, Kassar House

Course Meeting Time: MWF 11:00-11:50 a.m.

Instructor:

Kathryn T. Spoehr

Office hours location: 256 Metcalf

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Website: <http://cog.brown.edu/~spoehr/>

Office hours: W 1:00 – 3:00 (or send email to make an appointment)

Teaching

Neal Fox

Assistants:

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Office hours: M 3-5 pm in 401 Metcalf

Th 7:30-9 pm in 107 Metcalf (Computer Lab)

or by appt.

Patrick Heck

Office location: 404 Metcalf

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Office hours: Tu 3-5 pm in 323 Metcalf (Krueger Lab)

W 7:30-9 pm in 107 Metcalf (Computer Lab)

or by appt.

Course Goals and Objectives:

By the end of the semester students who successfully complete this course should:

- know how to collect useful and meaningful data
- know the appropriate methods for analyzing different kinds of data
- know why those methods work from a mathematical standpoint
- know how to analyze data using a calculator, a spreadsheet, and computational tools such as Matlab and SPSS
- understand the uses of data and how to interpret data

Course Format:

1. Class Meetings: The course will meet MWF 11:00 — 11:50 pm) for lecture. **Questions are encouraged** – getting your confusions cleared up right away is very important to doing well in the course. The handouts, slides and/or examples worked out in class will be posted on the course website within a day or two following the lecture. Because class attendance is expected, no detailed lecture notes will be provided by the instructor. The last class meeting will be on Friday, December 7th (see *Course Schedule* below).

2. Canvas course website: Assignments, announcements, handouts and slides from the lectures, links to supplementary materials, and test/homework grades will be posted on the [Canvas course website](#), and students will submit their assignments electronically through the Assignments area of the website. All registered students will automatically added to the website for this course. For the first two weeks of the semester non-registered students will be able to log onto the course site using a guest login. After the course registration deadline only registered students will be able to access the site.
3. The CLPS Computer Laboratory (Room 107 Metcalf): The CLPS Computer Lab has open user hours from 7-10 pm Sunday through Thursday. You can come to do course work and assignments with other students in the course; a CLPS0900 teaching assistant will be present at least one evening per week. Feel free to bring your own laptop or to use one of the PC's in the room. We will inform you of any changes in the hours.

Books and Materials:

1. Required Textbook: Howell, David C. (2004). *Fundamental Statistics for the Behavioral Sciences* (7th Edition). Wadsworth. (available at the Brown Bookstore). Abbreviated "H" in the course schedule and assignments.

Links to other supplementary readings, statistical simulations, online tutorials, and data sets for the homework problems can be found on the course website.

2. A scientific calculator such as a Texas Instruments or the Hewlett Packard scientific calculator. The graphing calculator you used to take the SATs will be just fine. Whatever kind of calculator you use should be able to sum up the squares of a bunch of numbers at the same time as it calculates the sum of those numbers. The Brown Bookstore and CVS both carry calculators. Please make sure you know how to operate your calculator -- if you can't find the directions, check the manufacturer's website.

Use of calculators will be permitted during exams and will be needed for doing some homework.

Remember to bring your calculator to every class meeting so that you can work on example problems and data analyses during class; besides, you may need your calculator if a surprise quiz is given.

3. Software and data sets: Homework and in-class demonstrations of procedures will be done using several software packages: MS Excel spreadsheet application, MatLab, and SPSS. All three are available on the computers in public clusters and in the CLPS Computer Laboratory. You may use Excel on your own computer if you own Microsoft Office; MatLab is available for free through Brown's Key Server, but SPSS may only be run on PC computers owned by Brown University.

The longer data sets needed to do some of the problems assigned for homework can be found in Excel format on the website of the textbook's author:

<http://www.uvm.edu/~dhowell/fundamentals/DataFiles/DataSets.html>

Links to this page appear on many of the assignments for the course.

4. Recommended: Computer storage capacity for keeping back-up copies of electronic assignments (in case something goes wrong with *Canvas* or our record keeping) and for transporting assignments between the CLPS Computer Laboratory and other computers. Google Documents, Dropbox or a USB memory stick all work.

Course Requirements:

1. **Exams:** Hour exams will be given on **Wednesday, October 3, and Wednesday, November 7**. Absence from exams is excused only by prior permission of the instructor. The final exam will be on Tuesday, December 22 at 2:00 p.m. (You must have a Dean's Excuse to take the final exam at time other than the Registrar's assigned date). Unless otherwise announced, *students may use only a calculator and a single page (2-sides) of written notes while taking exams in this course*. Cell phones, computers, tablets and any other communication devices must be turned off and stowed out of sight during all exams. Students requesting ADA accommodations should provide the appropriate documentation to the instructor at least one week in advance of the first exam.
2. **Quizzes:** Seven short quizzes -- generally unannounced -- will be given during lecture at various points during the semester. No make-ups will be allowed, with missed quizzes being counted as a zero. Each student's best five quiz scores will be counted in determining the final course grade. You may need a calculator for quizzes, so get in the habit of bringing one to class with you.
3. **Homework:** Homework is designed to give you practice using the concepts and techniques covered in lectures. Anyone who wants to do well on the exams and quizzes should be sure to keep up with the homework. Problem sets for most weeks are listed in the *Course Schedule* below and in the Assignments area of the course website. Homework is due by the beginning of the lecture period (11:00 am) on the due date unless otherwise noted, and answers to the problem sets will be posted on the course website once the assignments have been reviewed and logged.

You will get homework submission credit for an assignment if you make an obvious good-faith effort to complete each problem with adequate understanding of the concepts involved. Students who have obviously copied solutions from other students will not receive credit for the assignment. Late submissions will be graded on a time-available basis, but no homework will be given submission credit if it is submitted later than the time of next exam. Failure to submit all homework assignments will cause 2 points to be subtracted from the student's final weighted average for the semester (see *Grading* below).

- The homework problems should be completed electronically and submitted via the course website. In the early weeks of the semester you will be using an Excel spreadsheet to do your homework; in later weeks you'll submit SPSS or MatLab output. Although it is a little awkward to enter written responses to short-answer homework problems on a spreadsheet, you can and should put your written responses to the problems that require them into one or more spreadsheet cells.
 - Format for submitting electronic assignments:
 - a. Make sure that the work and the answers for each assigned problem is clearly labeled with the problem number.
 - b. Use the following naming scheme to name the file you submit:
yourlastname,firstinitial,Assign#.xls
 If your instructor was submitting her first assignment it would be named:
spoehrkAssign1.xls
 - Please be sure that your homework is done in a legible type font/size and that you show your work so that partial credit can be given for correct methodology in spite of calculation error. It is helpful to the TAs if you use a bright color (e.g., red) to display the final answer to a problem.
4. **Participation as a subject in experiments:** Each student in CLPS0900 is strongly encouraged to serve as a subject in experiments being conducted in the department. Participation is not

required, but three hours of participation will contribute extra credit toward the final course grade (see *Grading* below). Participation in experiments as a subject, and the subsequent debriefing about the design and aims of the experiment, give students valuable, direct experience with and knowledge of experimental methods in the behavioral sciences. Information about how the Subject Pool works will be posted on the course website.

5. Completion of online surveys: Occasionally surveys and other data-gathering instruments will be posted on the course website. All students are required to complete these exercises, and failure to complete online surveys and other data-gathering instruments will cause 2 points to be subtracted from the student's final weighted average for the semester.

Grading:

Each student's final course grade will be based on the following weights:

- Quizzes (best 5 of 7): 10%
- Exam I: 25%
- Exam II: 25%
- Final exam: 40%

Failure to complete online surveys and other data-gathering instruments (#5 above) will cause 2 points to be subtracted from the student's final weighted average for the semester. Failure to submit all homework assignments will cause 2 points to be subtracted from the student's final weighted average for the semester. Participating for three hours in experiments (#4 above) will add 2 points to the student's final weighted average for the semester.

Course Policies:

- Every student should make a habit of checking the *Canvas* course website daily for announcements and new postings and should set their Canvas notifications so that announcements are sent via email immediately.
- All cases in which there is an apparent violation of the Academic Code will be referred to the Dean of the College's Office, with the Dean's office determining the appropriate penalty if it is determined that a violation has occurred. The full text of the Academic Code can be found at the following website:
http://www.brown.edu/Administration/Dean_of_the_College/curriculum/academic_code.php
- The following are considered to be violations of the Academic Code:
 1. Giving help to or receiving help from anyone else during an exam or quiz.
 2. Use of unauthorized notes or books on quizzes and exams when they have been disallowed.
 3. Use of cell phones, computers, tablets, and/or devices other than calculators during exams.
 4. Transmitting to or receiving from any other student information on the content of or answers to quizzes and exams.
 5. Copying from another student or having anyone do for you any take-home work for the course that counts toward the final grade (e.g., homework, take-home exam questions).

Course Schedule:

Reading assignments, homework, and other assignments are indicated below. The reading for each class meeting covers the material that will be discussed in class on that date (and occasionally other topics as well). The Assigned Reading column sometimes suggests some web-based activities you can try with particular Web-Linked Resources that will increase your understanding of the assigned reading.

All written homework should be submitted via the website by the beginning of class on the date assigned. You will find copies of data files for many of the problems on website of the textbook author, David Howell. **You can save yourself the effort of having to type in all that data by going to:**

<http://www.uvm.edu/~dhowell/fundamentals/DataFiles/DataSets.html>

Notes: (*H*) = your textbook written by David Howell; (*WL*) = web link available under Additional Resources on course website; (*FPP*) chapters on probability theory from Freedman, D., Pisani, R., & Purves, R. (1978) *Statistics*. New York: W. W. Norton. Available under Additional Resources on course website

Date	Topic	Reading	Homework
W 9/5	Introduction: Why Study Statistics?	H: Ch. 1	
F 9/7	Sampling, Measurement, Distributions	H: Ch. 2	
M 9/10	Graphical Representation; Central Tendency		
W 9/12	The Mean and the Variance	H: Ch. 3-4	
F 9/14	Normal Distribution and z-scores	H: Ch. 5	Assignment #1: Using Excel: Ex. 2.8, 2.10, 2.12, 2.16, 2.18, 2.20, 2.26; Ex. 3.2, 3.18, 3.20, 3.22; Ex. 4.8, 4.14, 4.16, 4.22
M 9/17	Percentiles and Scaling of Distributions	H: Ch. 6	On Course Website: Complete Initial Student Survey by midnight, Sunday 9/16
W 9/19	Probability and Set Theory		
F 9/21	Conditional Probability	H: Ch. 7 FPP: Ch. 13	Assignment #2: Using Excel: Ex. 5.2, 5.10 (each data set should have at least 10 scores), 5.14; Ex. 6.2, 6.4, 6.10, 6.12, 6.14, 6.16, 6.18.
M 9/24	Permutations and Combinations	FPP: Ch. 14	
W 9/26	The Binomial Distribution		On Course Website: Complete first Instructor's Reality Check survey (under Quizzes)
F 9/28	Sampling and the sampling distribution of the mean		Assignment #3: Using Excel: Ex. 7.2, 7.4, 7.8, 7.16; from FPP Ch. 13: Exercise Set B problems 1-6, Exercise Set C problems 1-5, Exercise Set D problems 1-6 ; from FPP Ch. 14: Exercise Set B problems 1-3, Review Exercises 1-3.
M10/1	Introduction to Hypothesis Testing	H: Ch. 8	

Date	Topic	Reading	Homework
W 10/3	<i>Exam 1</i>		
F 10/5	Single-Sample Hypothesis Testing (z-test)	Howell's <i>Shorter SPSS Manual (AR)</i>	
M 10/8	<i>Holiday – No Class</i>		
W 10/10	Types of Test Error; Effect Size		
F 10/12	Hypothesis Testing for Probabilities (Binomial, Sign, and Multinomial Tests)		Assignment #4: Using Excel: Ex. 8.2, 8.4, 8.6, 8.16, 8.20
M 10/15	Non-parametric tests: Chi-square goodness of fit		
W 10/17	Non-parametric tests: Chi-square Test of Independence	H: Ch. 19	
F 10/19	t-distribution and Single-Sample Hypothesis Tests		Assignment #5: Using Excel: Ex. 8.12, 8.14; Using SPSS: Ex. 19.6, 19.12, 19.14, 19.26
M 10/22	Sampling Distribution of the Difference	H: Ch. 12	
W 10/24	Hypothesis Testing: Differences between Correlated Samples		On Course Website: Complete second Instructor's Reality Check survey (under Quizzes)
F 10/26	Hypothesis Testing: Differences between Independent Samples	H: Ch. 13, 14	Assignment #6: Using Excel: Ex. 12.6, 12.8, 12.10, 12.14
M 10/29	Interval Estimation		
W 10/31	Effect Size & Test Power	H: Ch. 15	
F 11/2	Correlation & Covariation	H: Ch. 9	Assignment #7: Using SPSS: Ex. 13.4, 13.6, 13.12.: Ex. 14.8, 14.10, 14.12, 14.14
M 11/5	The Correlation Coefficient; Spearman's r for ranked data		
W 11/7	<i>Exam 2</i>		
F 11/9	Regression I: Introduction		
M 11/12	Regression II: Predicting X from Y	H: Ch. 10	
W 11/14	Regression III: A Taste of Multiple Linear Regression		
F 11/16	Regression IV: Examples	H: Ch 11	Assignment #8: Using SPSS: Ex.9.2, 9.4, 9.20: Ex. 10.2, 10.20, 10.24
M 11/19	Analysis of Variance: Underlying Logic		

Date	Topic	Reading	Homework
W 11/21, F 11/22	<i>Thanksgiving Break – No Class</i>		
M 11/26	1-Way Analysis of Variance	H: Ch. 16	
W 11/28	1-Way Analysis of Variance and Post-Hoc Tests		
F 11/30	2-Way Analysis of Variance	H: Ch. 17	<u>Assignment #9:</u> Using Excel or SPSS: Ex. 11.8 (use variables X_1 and X_2 only), 11.10, 11.18; [Note: Make sure to use the revised version of the MIreault dataset provided with this assignment on <i>Canvas.</i>]
M12/3	1- and 2- Way Analysis of Variance: Examples		
W 12/5	Non-parametric Analyses		
F 12/7	Wrap-up and Information about the Final Exam		<u>Assignment #10:</u> Using SPSS: Ex. 16.2, 16.18, 16.20, 16.22, 16.26; 17.12, 17.13, 17.32

Final Examination: Friday, December 21, 2012 at 2:00 pm
(You must have a Dean's Excuse to take the Final Exam at another time!)