

Psych. 210: Statistics in the Behavioral Sciences

Fall 2014 3 cr

Sections 3 & 4

HYL 102

TIME/PLACE: Sect 3 Tu, Th 10-11:15 (CRN 10917) Sect 4 Tu, Th 1-2:15 (CRN 10918)

INSTRUCTOR: Dr. Tom Hogan, Professor of Psychology

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Office hours: Tu, Th 2:30-3:30 PM, Wed. 10:00-11:00 AM Other times by arrangement.

Teaching Assistants: Tim Divietri, Kirstyn Golden, Bridget Hanley

REQUIRED MATERIALS:

Text: King, B. M., Rosopa, P. J., & Minium, E.W. (2011)

Statistical reasoning in the behavioral sciences (6th ed.). New York: John Wiley & Sons.

Calculator: Get a good calculator at the University bookstore or any other store. You will also need a computer storage device for computer analyses.

EVALUATION PROCEDURES:

There will be five exams, each equally weighted in determining 90% of the final grade. Each exam will be a combination of multiple-choice questions, problems to be worked, and short essays. The approximate schedule for the exams is given in the course schedule below. The fifth exam will be given on the date specified for the final exam. There will also be an optional cumulative exam, given at the time of the final, which may be used to improve one's grade. Make-up exams will be given only in documented emergency cases; the nature of the make-up exam is at the discretion of the instructor. See Angel for the scale to convert percentage grades to letter grades.

Basis for final grade: Five exams (plus 6th, if taken) 95% Homework 5%

ASSIGNMENTS:

"Homework" assignments will be given in almost every class (25 total). These are designed to reinforce material covered in class and are reasonable approximations of problems that will be presented in exams. Assignments missed or completed unsatisfactorily result in a one-point reduction in the homework grade; late or needing to be re-done half-point reduction. Copying homework will be considered academic dishonesty by both the student copying and the student supplying the material. Generally, assignments turned in at one class will be returned at the next class and corrections will be discussed in class. The homework must be completed before it is discussed in class.

ACADEMIC HONESTY: See the University's policy on academic honesty. A student found cheating or engaging in another form of academic dishonesty will be given an F for the assignment.

ADA Statement: In order to receive appropriate accommodations, students with disabilities must register with the Center for Teaching and Learning Excellence (CTLE) and provide relevant and current medical documentation. Students should contact CTLE, 5th floor, St. Thomas Hall, for an appointment. For more information, see <http://www.scranton.edu/disabilities>.

REVISIONS AND ANNOUNCEMENTS: The syllabus is subject to revision. Any revisions will be announced in class.

CLASS ATTENDANCE, PROCEDURES, SUGGESTIONS FOR SUCCESS

Most of what you need to learn is in the textbook. However, class attendance is expected and, except for quantitative geniuses, is normally essential for learning the material. You are responsible for knowing all announcements made in class, including those related to any changes in the attached schedule.

Classes begin and end promptly. Suitable attire and civil behavior are expected in class.

Turn off cell phones, pagers, etc. No flash photography.

Following are basic rules for getting along with the material to be covered:

1. Study the darn stuff. Students sometimes overlook this seemingly self-evident point. Normally you will need to study 2-3 hours outside of class for every hour in class.
2. We cover almost everything in the book. Read it all as we cover each chapter, without me reminding you to do so. Generally, you have to read this stuff slowly! I'll clearly indicate any parts to be skipped. Plus we'll cover a little bit of material not in the book – again clearly indicated.
3. Do all homework assignments. Work additional problems in the "Problems" on your own. This will help things sink in. It is very easy to deceive yourself into thinking you know the material by just reading about it -- it all seems so simple -- but you don't really know it until you work problems.
4. Isn't all this stuff done by computer these days? Some of it is, but you won't know what to ask the computer to do if you don't understand the basic concepts of statistics. We'll concentrate on these basic concepts. However, you will also learn how to apply the procedures using SPSS/PC.
5. Find examples of statistics outside the text, e.g., in journals in your field and in popular media.
6. Become accustomed to speaking and writing in appropriate statistical jargon. (This is part of "eloquentia perfecta.")
7. Don't slide. With few exceptions, each topic and each class builds on previous topics and classes. If you get behind, you won't know what's going on.
8. If you're totally lost at any point, SCREAM! That is, if you become disoriented or confused, call attention to the problem immediately (assuming you're diligently keeping up with the material). Everything fits nicely in the course and it all fits together so if you're lost at some point you'll probably just continue to be lost if you don't immediately scream.
9. Never use the excuse that you're "no good at math." All you need to learn (introductory) statistics is proficiency in arithmetic and the barest elements of algebra.

Side effects: The Course Objectives identify the intended effects of this treatment. Suggestions for Success list ordinary dosage levels to help ensure the treatment works. Minor adjustments may be needed in individual cases. Extensive observational studies, but not placebo-control studies, have revealed certain side effects. These include tick-like clicking of the Options button in SPSS to see what it reveals, aspiration to serve as a tutor for statistics in subsequent semesters, and precipitous decline in math anxiety. In most cases, these symptoms are mild and remission occurs within days. If any of these symptoms persist for more than seven days, consult your professor immediately.

STUDENT LEARNING OBJECTIVES

According to the catalog, Psych. 210 is "An introduction to the basic statistics used in the behavioral sciences, including descriptive statistics, correlation, sampling, hypothesis testing, and inferential statistics."

Following is a more detailed list of the principal learning objectives for the course. Note the correspondence with the topical listing on the course schedule.

Know the basic terminology of introductory statistics.

Be able to identify variables in research reports. Define independent and dependent variables and constants.

Explain the major divisions of statistics and the problems each attacks.

Recognize types of scales (nominal, ordinal, interval, ratio) and their key features.

Given "raw data" be able to organize and summarize it in a frequency distribution and/or graphic form. Know standard conventions for preparing these summaries.

Be able to calculate measures of central tendency (mean, median, mode); and know their special characteristics.

Be able to calculate measures of variability (range, standard deviation, variance); and know their special characteristics.

Be able to describe shapes of distributions in conventional terms.

Be able to use z-scores, standard scores, and percentiles to describe the location of a score within its distribution.

Use z-scores to determine areas under the normal curve; and use table of areas under the normal curve proficiently.

Be able to construct bivariate distributions.

Be able to calculate (Pearson) correlation coefficients.

Identify factors affecting the magnitude of r .

Recognize names of other (zero-order) correlation coefficients, including ICC.

Have a passing acquaintance with multiple correlation and factor analysis.

Be able to calculate predicted scores from regression equations. Determine the standard error of estimate and describe its use.

Be sensitive to the interpretation of correlations in terms of causality, heterogeneity, and linearity.

Describe correlation and regression as a linear model fit on raw data.

Define and apply the key terms related to probability.

State and explain the basic steps in testing a hypothesis.

Apply and explain the z-test for one mean.

Describe hypothesis testing as use of a probability model.

Explain the concept of statistical "significance" (or "significant").

Define the central limit theorem.

Define, calculate, and explain "confidence intervals" (interval estimates) for a variety of statistics.

Explain the difference between the t-test and z-test.

Be able to apply and explain the following t-tests for means:
one sample, two unrelated samples, two related samples

Be able to apply and explain significance tests and confidence intervals for r.

Define type I and type II errors.

Explain the concept of "power" and identify factors affecting the power of statistical tests.

Explain the concept of "effect size" and distinguish between statistical and practical significance.

Be able to explain and interpret one-way ANOVA (F-test).

Be able to explain, interpret 2-way ANOVA and the concept of interaction.

Be able to apply and explain significance tests variances.

Be able to calculate and interpret chi-square.

Recognize non-parametric tests and the problems they address.

Describe non-parametric procedures in terms of assumptions underlying a model; explain concept of robustness.

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Be able to speak and write about statistical matters in a conventional scientific manner.

Demonstrate initial competence in use of SPSS/PC for calculating statistics.

Be able to give reasonable estimates of statistics based on examination of raw data.

COURSE SCHEDULE Psych 210 Fall '14

Fall '14 Schedule		Topic/Chapter	HW (due next class)
26 Aug	Tu	Syllabus, Ch 1 Intro, basic ideas, measures, scales	Journals, 1: 2, 13, 14
28	Th	Chs 2 & 3 Frequency distributions, graphs	2: 1, 2, 4abc, 8 // 3: 2, 6, 13
2 Sep	Tu	Ch 4 Central tendency, Ch 5 Variability	4: 1abc>2b, 6, 15>16
4	Th	Ch 5 Variability + SPSS	5: 8,9,12(draw), 18,30b(SPSS), journal
9	Tu	Start Ch 6: Normal Curve// TEST 1 (Chs 1-5)	6: 3>2, 5>4, 7>8, 12
11	Th	Finish Ch. 6	“
16	Tu	Ch 7 Correlation	7: 1a&b>2, 12,18, 22 (SPSS1+scatter)
18	Th	Ch 7 Correlation	“
23	Tu	Ch 8 Prediction	8: 2, 3, 10, 14, 18
25	Th	Ch 8, 9 + Intro to multivariate + SPSS	Journal ex's of r, SPSS D1
30	Tu	Ch 10 Probability// TEST 2 (Chs 6-9)	10: 2,3,5,6
2 Oct	Th	Ch 10 cont.	“
7	Tu	Ch 11 Sampling distributions	11: 4,6,7,8, 9&10 (draw only)
9	Th	Ch 12 One-sample z-test and t-test	12: 9,12,15,16, 14 on SPSS
14	Tu	Fall BREAK	
16	Th	Ch 13 Effect size and power	13: 2,3
21	Tu	Ch 14 Two-sample t-test// TEST 3 (Chs 10-13)	14: 1,2,4(14.2b), 5,6, 20 not b(SPSS)
23	Th	Ch 14 cont. and Ch 15 t-tests	15: 3, 6 a&c
28	Tu	Ch 16 Tests for r	16: 2,4, + extra
30	Th	Ch 16 Tests for r + SPSS	SPSS D1GPA + journal ex
4 Nov	Tu	Ch 17 Confidence intervals	17: 1, 2, 7, 27, 28
6	Th	Ch 18 One-way ANOVA// TEST 4 (Chs 14-17)	18: 4, 5, 11 on SPSS
11	Tu	Ch 18 One-way ANOVA	“
13	Th	Ch 19 Two-way, n-way ANOVA, interactions	19: 1, 2, 5, 6 + graph
18	Tu	Ch 19 cont	“
20	Th	Ch 20 Chi-square	20: 5, 10 (get C, not omega)
25	Tu	Ch 20 cont + Ch 21 Nonparametric tests	20: 11a&b, 12a & get C
27	Th	Thanksgiving	
2 Dec	Tu	Ch 21 Nonparametrics	
4	Th	Ch 21 Nonparametrics & Wrap-up	Journal assignment
9	..Tu	Finals start. TEST 5 (Chs 18-21)+Optional Cum	