

Educational Research and Measurements 6300
Applied Statistical Methods in Education
First Summer Session 2003
Instructor: Seock-Ho Kim

Syllabus

Course Description and Objective

Techniques for describing and summarizing data for educational research studies. Applications of the standard normal distribution and the use and interpretation of standard scores. Inferential statistics for one and two population studies including means, proportions, and correlations (*Graduate Bulletin* 2002-2003). Prerequisite: ERSH 4200/6200

The overall goal of the course is to present an introduction to statistics that emphasizes working with data and statistical ideas. The content of the course is divided into three parts:

1. Understanding data
2. Understanding inference
3. Application topics in inference

In order to achieve the overall goal, the course will involve readings of the text, a series of assignments to reinforce the key concepts, a set of computer exercises, and three examinations.

Textbooks

- Moore, D. S. (2000). *The basic practice of statistics* (2nd ed.). New York: W. H. Freeman and Company.
- Green, S. B., & Salkind, N. J. (2003). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.
- Huck, S. W. (2000). *Reading statistics and research* (3rd ed.). New York: Longman.

Suggested Supplementary Texts

- American Psychological Association (1994). *Publication manual of the American Psychological Association* (4th ed.). Washington, DC: Author.
- Hays, W. L. (1994). *Statistics* (5th ed.). Fort Worth, TX: Harcourt Brace College Publishers.

Marascuilo, L. A., & Serlin, R. C. (1988). *Statistical methods for the social and behavioral sciences*. New York: W. H. Freeman and Company.

Moore, D. S., & McCabe, G. P. (2003). *Introduction to the practice of statistics* (4th ed.). New York: W. H. Freeman and Company.

Rosenthal, R., & Rosnow, R. L. (1991). *Essentials of behavioral research: Methods and data analysis* (2nd ed.). New York: McGraw-Hill.

A copy of 'Solutions to Exercises' from the *Instructor's Guide* will be distributed in class.

Assignments, Projects, Examinations, and Evaluation

A number of exercises will be assigned and each student is expected to complete the exercises independently. All work must be completed and turned in on time. All work should be lucid, orderly, and self-contained. A set of computer exercises will also be assigned. Specific requirements for the computer exercises will be distributed later.

There will be two midterm examinations on June 18 (Wednesday, 11:00 am-1:45 pm) and on June 25 (Wednesday, 11:00 am-1:45 pm) and a final examination on July 3 (Thursday, 11:00 am-1:45 pm). The examinations will be administered in class. The examinations will be composed predominately short answer items. Copies of sample examinations will be distributed later.

Grades will be based on completion of the assigned exercises (20%), on the computer exercises (20%), and on the three examinations (20% each). Grades will be assigned as follows: A (above 90%), B (between 80% and 90%), C or worse (below 80%). Full attendance of lectures is required.

Advice

On any aspect of the course, see Seock-Ho Kim, 325U Aderhold from 9:00 am to 11:00 am on Tuesday and Thursday or by appointment. For appointments or replies to brief questions, send email to skim@coe.uga.edu or call me at 542-4224 (office) or 310-1218 (home). If I am not available when you call 542-4224, you may also call and leave a message at 542-4110 (i.e., the main office of the Department of Educational Psychology). If you leave a message, I will probably reply by email, rather than call you back.

Mike Jordan's office is 320C Aderhold (542-6053, mjordan@coe.uga.edu), and his office hours are 10:00 to 11:00 am on Monday, Thursday, and Friday.

Class Procedures and Activities

The class will be conducted so as to maximize understanding of key statistical concepts. To facilitate this intention, most class sessions will include one or more of the following:

- Illustration of key concepts developed through assigned readings.
- Identification and discussion of these concepts in actual research settings.

- Analysis and discussion of selected problems involving these concepts.

The computer lab (618 Aderhold) has been scheduled for this class on every Friday (11:00 am-1:45 pm). There are three computer sessions, and we will meet at the computer lab.

Course Outline

June 12

Part I. Understanding Data

Chapter 1. Examining Distributions

Section 1.1. Displaying Distributions with Graphs

Section 1.2. Describing Distributions with Numbers

Section 1.3. The Normal Distribution

June 13

Computer Lab 1. BPS 2.0 CD and Internet

Computer Lab 2. SPSS/SAS

June 16

Chapter 2. Examining Relationships

Section 2.1. Scatterplots

Section 2.2. Correlation

Section 2.3. Least-Squares Regression

Section 2.4. Cautions about Correlation and Regression

Section 2.5. Relations in Categorical Data

June 17

Chapter 3. Producing Data

Section 3.1. Designing Samples

Section 3.2. Designing Experiments

June 18

Midterm 1

Chapters 1-3

June 19

Part II. Understanding Inference

Chapter 4. Probability and Sampling Distributions

Section 4.1. Randomness

Section 4.2. Probability Models

Section 4.3. Sampling Distributions

June 20

Computer Lab 3. SPSS/SAS

Computer Lab 4. SPSS/SAS

June 23

Chapter 5. Probability Theory

Section 5.1. General Probability Rules

Section 5.2. The Binomial Distributions

Section 5.3. Conditional Probability

June 24

Chapter 6. Introduction to Inference

Section 6.1. Estimating with Confidence

Section 6.2. Tests of Significance

Section 6.3. Making Sense of Statistical Significance

Section 6.4. Error Probabilities and Power

June 25

Midterm 2

Chapters 4-6

June 26

Chapter 7. Inference for Distributions

Section 7.1. Inference for the Mean of a Population

Section 7.2. Comparing Two Means

Section 7.3. Inference for Population Spread

June 27

Computer Lab 5. SPSS/SAS

Computer Lab 6. SPSS/SAS

Computer Lab 7. SPSS/SAS

June 30

Chapter 8. Inference for Proportions

Section 8.1. Inference for a Population Proportion

Section 8.2. Comparing Two Proportions

July 1

Part III. Topics in Inference

Chapter 9. Inference for Two-Way Tables

Section 9.1. Two-Way Tables

Section 9.2. The Chi-Square Test

July 2

Chapter 10. One-Way Analysis of Variance: Comparing Several Means

Section 10.1. The Analysis of Variance F Test

Section 10.2. Some Details of ANOVA

Chapter 11. Inference for Regression

Section 11.1. Inference about the Model

Section 11.2. Inference about Prediction

Section 11.3. Checking the Regression Assumptions

July 3

Final Examination

Chapters 7-10

Tentative Assignments

Review Exercises

Due Date

Chapter 1: 1.75, 1.82, 1.88 June 13
 Chapter 2: 2.91, 2.93, 2.100 June 17
 Chapter 3: 3.62, 3.68, 3.75 June 18
 Chapter 4: 4.57, 4.61, 4.63 June 20
 Chapter 5: 5.55, 5.57, 5.61 June 24
 Chapter 6: 6.75, 6.79, 6.83 June 25
 Chapter 7: 7.61, 7.65, 7.69 June 30
 Chapter 8: 8.35, 8.38, 8.39 July 1
 Chapter 9: 9.10, 9.15, 9.20 July 2
 Chapter 10: 10.12, 10.14, 10.18 July 3

June 2003

1	2	3	4	5	6	7
8	9	10	11	12	13	14
				Chap 1	Lab 1-2	
					Prob 1	
15	16	17	18	19	20	21
	Chap 2	Chap 3	Exam 1	Chap 4	Lab 3-4	
		Prob 2	Prob 3		Prob 4	
22	23	24	25	26	27	28
	Chap 5	Chap 6	Exam 2	Chap 7	Lab 5-7	
		Prob 5	Prob 6			
29	30					
	Chap 8					
	Prob 7					

July 2003

1	2	3	4	5
Chap 9	Chap 10-11	Final		
Prob 8	Prob 9	Prob 10		

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