

UNIVERSITY OF MICHIGAN

Sociology 510
Statistical Methods I
Mark Mizruchi
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This course is the first of a two-semester sequence required of all sociology department graduate students. It consists of two weekly class sessions plus a lab-discussion. In the first semester we cover basic concepts of probability, sampling distributions, confidence intervals, and statistical inference. The lab sessions will be used to discuss problems encountered in the lectures and written assignments and to develop statistical computing skills. The course assumes no prior knowledge of statistics and no mathematical knowledge beyond high school algebra.

Requirements

Requirements for this course include homework (problem-solving) assignments, a term project (to be described in class), and midterm and final examinations. The text is *Essentials of Statistics for the Behavioral Sciences* (Sixth Edition) by Gravetter and Wallnau (hereafter referred to as "GW"). Purchase of the book is strongly recommended but not required. Other readings will be posted on the class Ctools site. Access to a calculator is also recommended. All readings, including those in the textbook and those listed as recommended, are optional. If you can absorb the material without doing the readings, that is fine. But you are responsible for the material in the readings.

COURSE OUTLINE¹

September 8: Introduction to the course; the role of statistics in social scientific research, its relation to theory, conceptualization

¹ Subject to change

Reading: GW, pp. 2-16

September 10: Reliability, validity, and causality

Reading: Alan Agresti and Barbara Finlay, *Statistical Methods for the Social Sciences* (Third Edition), pp. 357-365; Travis Hirschi and Hanan C. Selvin, *Principles of Survey Analysis*, pp. 37-51; Barry Glassner, *Essential Interactionism*, pp. 3-13.

September 15: Levels of measurement; frequency distributions

Reading: GW, pp. 17-25, 34-49

September 17: Measures of central tendency and dispersion

Reading: GW, pp. 56-77, 85-95

September 22: Probability I: Introduction

Reading: Thomas H. Wonnacott and Ronald J. Wonnacott, *Introductory Statistics for Business and Economics*, Fourth Edition, pp. 69-83

September 24: Probability II: Conditional probability and independence

Reading: Wonnacott and Wonnacott, pp. 85-97

September 29: Discrete and continuous random variables; expected value

Reading: Wonnacott and Wonnacott, pp. 110-111, 134-139; John Neter, William Wasserman, and G.A. Whitmore, *Applied Statistics*, Third Edition, pp. 146-150, 153-154, 164-166, 166-168 optional

October 1: Populations vs. samples; the normal distribution

Reading: GW, pp. 140-156

October 6: Distribution of sample means; the central limit theorem

Reading: GW, pp. 161-183

October 8: Hypothesis testing using the normal distribution

Reading: GW, pp. 189-198, 203-209

October 13: One and two-tailed tests; Type I and Type II errors

Reading: GW, pp. 211-215, 199-202

October 15: Confidence intervals

Reading: Wonnacott and Wonnacott, pp. 254-259

October 20: No class; midterm study break

October 22: Sample variance; degrees of freedom

Reading: GW, pp. 96-102

October 27: Review; MIDTERM EXAMINATION DISTRIBUTED

October 29: Student's T distribution

Reading: GW, pp. 233-241, 246-250

November 3: Two population hypotheses

Reading: GW, pp. 258-268, 271-276

November 5: Repeated measures T-tests

Reading: GW, pp. 288-295, 296-303

November 10: Analysis of Variance I- Oneway ANOVA

Reading: GW, pp. 336-357, 358-363

November 12: Analysis of Variance II- Comparison of individual means

Reading: GW, pp. 364-369

November 17: Analysis of Variance III- Repeated measures

Reading: GW, pp. 379-389, 390-391

November 19: Introduction to Regression

Reading: GW, pp. 449-462

November 24: Regression and Correlation

Reading: GW, pp. 423-437

December 1: The binomial distribution; the chisquare distribution

Reading: GW, pp. 472-491, 493-494

December 3: Introduction to contingency table analysis

Reading: same as previous

December 8: Partial correlation

Reading: none

December 10: Review; FINAL EXAMINATION DISTRIBUTED