Bryn Mawr College

The Graduate School of Social Work and Social Research

Data Analysis I

#540

Fall, 2003

Thomas Vartanian

Office Hours: By Appointment

Course Description

*Data Analysis I* will give students the fundamental tools to both interpret and analyze data. The first half of the course will cover some basic concepts of descriptive statistics, such as measures of central tendency, dispersion, and correlation. The first half will also introduce students to regression analysis. The second half of the course will cover probability theory and the basic concepts of inductive statistics, including sampling, developing hypotheses, estimation, and conducting significance tests. At the end of the course we will cover analysis of variance and the analysis of covariance.

The course will include computer related assignments for each of the techniques taught above. Both SPSS and SAS for windows will be taught in the class. SPSS will be taught because much social work research is performed in SPSS, enabling you to speak the same language as your research colleagues. SAS will be taught because it is a major statistical software package that is used in the U.S. government and in many academic fields including social work, sociology, and economics. SAS also contains procedures that are not available in SPSS, making SAS a more powerful computer package than SPSS. We will hopefully also be able to use a third statistical software package, STATA, which has relatively simply but very advanced methods of examining data.

The data used for these computer projects comes from the Panel Study of Income Dynamics (PSID) from the University of Michigan. The PSID is a longitudinal data set spanning years 1968 to 2001. When weights are used with the PSID it is representative of the U.S. population. We will be examining a sample of women on welfare to see, for example, how long they spend on welfare and predictors of AFDC spell length. We will also get data from the PSID web site and examine this data using SAS, SPSS, and STATA.

While this two-semester sequence cannot cover all of the statistical techniques available to researchers, it will lay down the foundation for students to understand the fundamentals of statistics. Hopefully, with the brief mathematical training through the class and an understanding of probability theory, students will be able to continue to learn more about particular statistical techniques after they complete the course.
### Course Requirements:

Students are expected to complete all reading before class sessions (some may not be listed on the syllabus but will be given to you several weeks in advance). Students will also be expected to complete all computer assignments (approximately 6 assignments) two weeks after they are distributed. There will also be a mid-term exam (in the 8th week of class) and a final exam (during the final exam period) in this class. The two exams each count for 45% of your grade while the computer projects count for 10% of the grade. We will also read and discuss a few journal articles that relate to the type of statistical analysis we are examining. Students will present one or two articles to the class in this first semester. Students will need at least a 70% average to successfully complete this class.

### Textbooks

Alan Agresti and Barbara Finlay, *Statistical Methods for the Social Sciences*, Prentice Hall


<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
<th>Readings</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Introduction: Variable Types, Levels of Measurement, Descriptive Statistics</td>
<td>Agresti and Finlay, chapters 1-2; Cody, chapter 1, Appendix A</td>
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<td>2</td>
<td>Tables and Graphs, Measures of Central Tendency and Measures of Dispersion</td>
<td>Agresti and Finlay, chapter 3; Cody, chapter 2</td>
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<td>3</td>
<td>The Normal Distribution, Standard Scores, Probability Distributions, Point Estimation, and Confidence Intervals for Means and Proportions</td>
<td>Agresti and Finlay, Chapter 4; Cody, chapter 3</td>
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4 Statistical Inference: Estimation and Significance Tests. Testing Differences in Means, Type I and Type II errors.

   Agresti and Finlay, Chapters 5-6

5 Probability; Binomial Distributions; Comparison of Two Groups; begin OLS Regression Analysis

   Agresti and Finlay, chapter 7, 9

   Cody, chapter 6


6 Ordinary Least Squares Regression Analysis, with interval and nominal scale independent variables; Correlation

   Agresti and Finlay, chapter 9

7 Intervening Variables, Partial Correlation, and Regression

   Agresti and Finlay, chapter 10

8 **Mid - Term Exam**

9 Multiple Regression and Correlation

   Agresti and Finlay, chapter 11

   Cody, Chapter 9


10 Multiple Regression and Correlation; Regression Interactions; Using Log Dependent Variables in OLS Models.

   Agresti and Finlay, Chapter 11

11 The Association Between Categorical Variables and other Non-Parametric Tests

Agresti and Finlay, chapters 8

12 Analysis of Variance and Analysis of Covariance

Agresti and Finlay, chapter 12

Article: TBA

13 Analysis of Variance and Analysis of Covariance

Agresti and Finlay, chapter 12


14 Review

15 Final Exam B During the final examination period, or the week after classes end.