"Case-based Social Statistics I"

Winter 2007

Professor: Mark S. Handcock

Syllabus

MOS ≡ *Mind on Statistics* text.

CHS ≡ *A Casebook for a First Course in Statistics* text.

Lecture	Date	Topics	Readings
1		Introduction to Statistical ideas: Why Statistics? An analysis of evidence: Statistics in the Public eye.	**MOS** Ch. 1
2		Statistics in the Social Sciences: Populations and Samples. Two objectives of Statistics: Description verses Inference. The four basic activities of Statistics. Classifying the various types of data-sets. Looking at a batch of data: stem-and-leaf displays, frequency distributions, histograms and other graphical displays	**MOS** 2.1 – 2.3, 2.5 ↪ "Old Faithful" geyser (p. 5-6)
3		Summarizing a batch of data: Concept of location. Measures of the "typical" value: mean, mode and median.	**MOS** 2.4, 2.6 ↪ "International Adoption Rates"
4		Summarizing a batch of data: Concept of variability. Measures of variability: the range, variance, standard deviation. Quantifying the shape of the distribution: Percentiles: quartiles, interquartile range. Summarizing distributional shape: box-plots and scatter-plots.	**MOS** 2.4, 2.6 ↪ The performance of stock mutual funds
5		Introduction to Applied Probability. Understanding random situations. Components of a Random Experiment: Sample spaces, Outcomes, and Events.	**MOS** 6.1 – 6.2
6		Concepts of Probability: frequency theory, theoretical and subjective probabilities. The probability of a event.	**MOS** 6.3 ↪ The flight of the space shuttle Challenger
7		Working with events and outcomes: Venn diagrams, describing events. Conditional probabilities and independence. Working with probabilities.	**MOS** 6.4 ↪ Random drug and disease testing
8		Random variables and their properties: the probability distribution of a discrete random variable. The mean and standard deviation of a probability distribution: definition and applications.	**MOS** 7.1

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9	Modeling the relationship between random quantities: the joint probability distribution of two random variables; the covariance and correlation of two random variables	**MOS** 11.1 ↪ Perceptions of the New York City subway system: safety and cleanliness
10	Useful specific distributions – the uniform and binomial distributions.	**MOS** 7.2
11	The Normal (Gaussian) distribution: definition and applications. Approximation of the binomial distribution by the Normal distribution.	**MOS** 7.3 – 7.4
12	Introduction to Statistical Inference. Random sampling and sampling distributions: sampling distribution of the sample mean $\overline{X}$.	**MOS** 8.1 – 8.3 ↪ The Central Limit Theorem for census data (p. 48 - 50)
13	The standard error of the mean. The Central limit theorem: theory and applications. The standard error of a binomial proportion.	**MOS** 8.4 ↪ The Central Limit Theorem for census data
14	Inference about the population mean: point and interval estimation of a population mean; Confidence intervals based on the t-distribution: assumptions and interpretation.	**MOS** 9.1 – 9.3 ↪ The return on stocks in the Over the Counter market
15	Prediction intervals for a future observation. Inferences about proportions: point and interval estimates; confidence intervals for a binomial proportion.	**MOS** 9.1, 9.5 ↪ Volume and weight from a vineyard harvest (p. 95-99)
	Summary and Review class (how far have we come)	