STATISTICAL GRAPHICS FOR VISUALIZING DATA: INTRODUCTION

William G. Jacoby
ICPSR and Michigan State University

ICPSR Summer Program
July 27-29, 2009

http://polisci.msu.edu/jacoby/icpsr/graphics

I. **Visual Representations of Quantitative Information**

   A. Graphs have always been an important part of the statistical sciences

   B. Historical development and past uses

   C. Currently used often in data analysis and statistics

II. **Evolution of Statistical Graphics**

   A. Major advances in graphical methodologies

   B. Research on psychology of graphical perception

   C. Evolution and wide availability of powerful computing equipment and high-resolution graphical displays

III. **Two Types of Graphics**

   A. Used for different purposes

   B. Analytical graphs

   C. Presentational Graphs

IV. **Objectives of Graphical Approaches to Data Analysis**

   A. Exploring the contents of a dataset

   B. Finding structure in data

   C. Checking assumptions of statistical models

   D. Communicating results

V. **Advantages of Graphical Displays**

A. Useful summaries for large, complex datasets

B. Graphs not as reliant upon underlying assumptions as are numerical summaries

C. Greater interaction between researcher and the data

VI. **Two Interacting Components**

A. Graphs encode information

B. Human perception and cognition decode information

VII. **Graphs Versus Tables**

A. Small number of specific values— use a table

B. Large number of values and/or focus on patterns— use a graph

VIII. **Graphical Perception**

A. Pattern perception versus table look-up

B. Cleveland's theory of pattern perception