Presenting Your Results

Presented by:

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Objectives

At the end of this workshop, you will possess:

- An understanding of basic statistical concepts to support your impact reporting

- Several approaches for presenting and displaying your impact data

- A brief glimpse into the world of data visualization

Agenda

- Primer of Basic Statistics

- Overview of Graphic Display

- Introduction of Data Visualization

- Next Steps
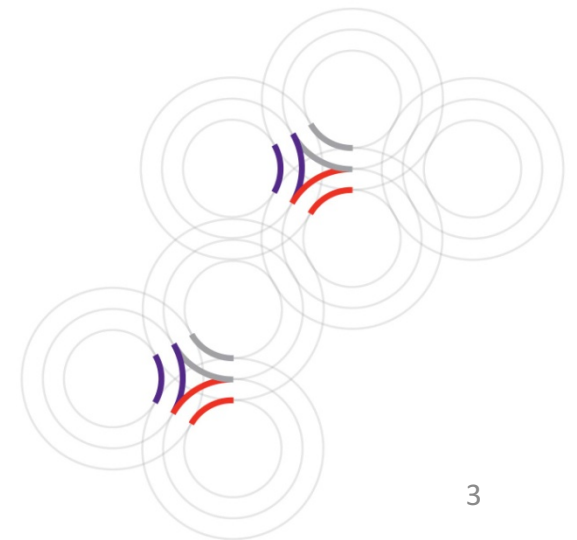
Introduction

data, *dātä,, n.pl.* facts given, from which others may be inferred:–*sing.* **daˈtum(q.v.)**

Types of Data

- Primary – data you collect yourself

- Secondary – secondhand data

- Qualitative – descriptive

- Quantitative – numerical

- Discrete – limited values

- Continuous – any value

Levels of Measurement

- **Nominal** – No order or ranking can be imposed on the data

- **Ordinal** – Has an order, but the intervals between measurements are not meaningful

- **Interval** – Precise differences between units of measure, but no true zero point

- **Ratio** – highest level of measurement
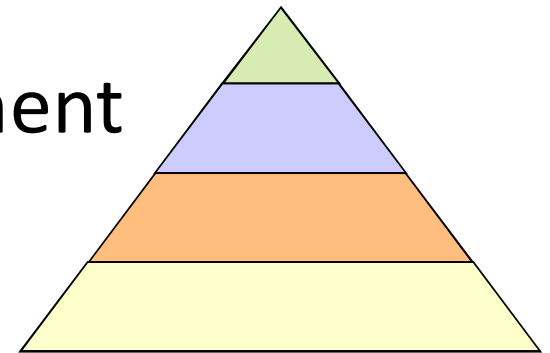
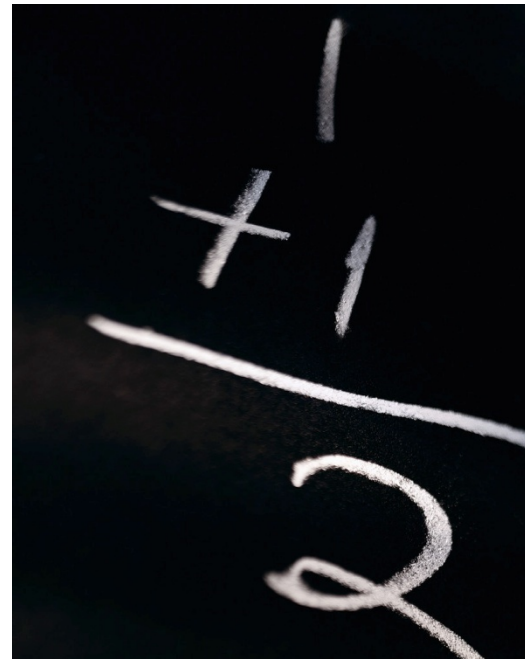# Socio-Economic Status: Different Levels of Measurement

- **Nominal** – Profession
- **Ordinal** – Household income categories
- **Interval** – Rating scale
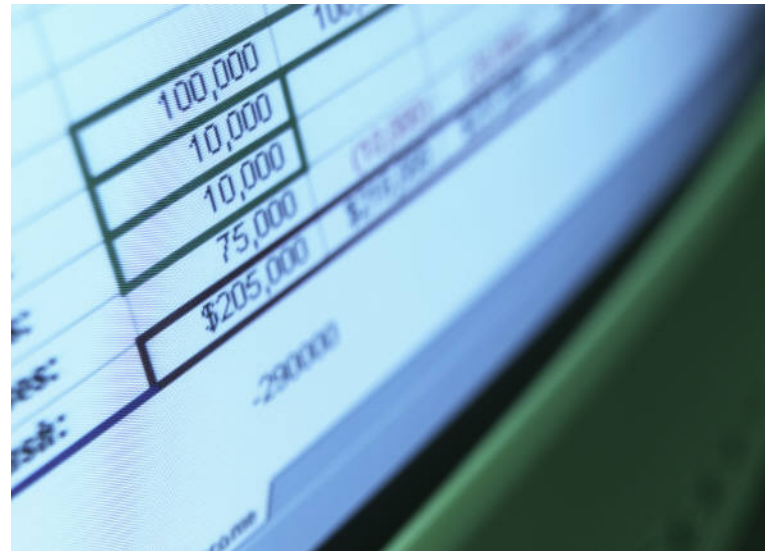- **Ratio** – Annual household income

Numerical Summaries

- Average - mean, median, mode

- Range
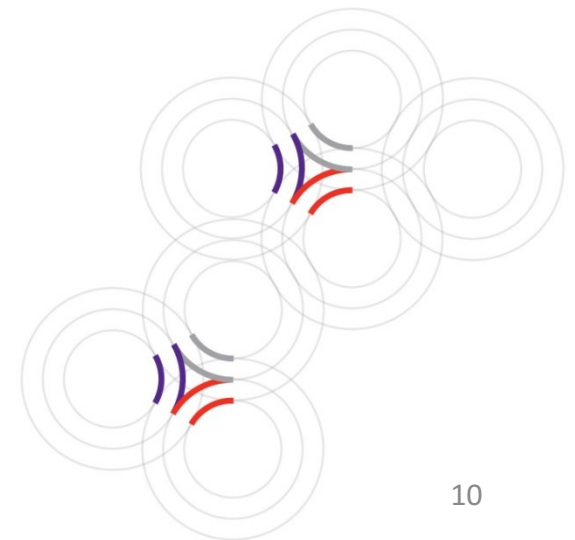
- Skew

Organizing Data

- Database
- Spreadsheet
- Tables
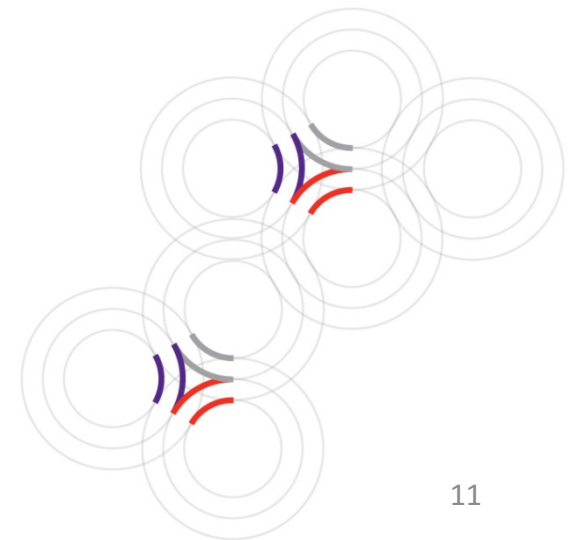
General Principles of Graphic Display

- Present meaningful data
- Define the data unambiguously
- Present the data efficiently
- Do not distort the data

Components of Charts

- Title
- X-Axis
- Y-Axis
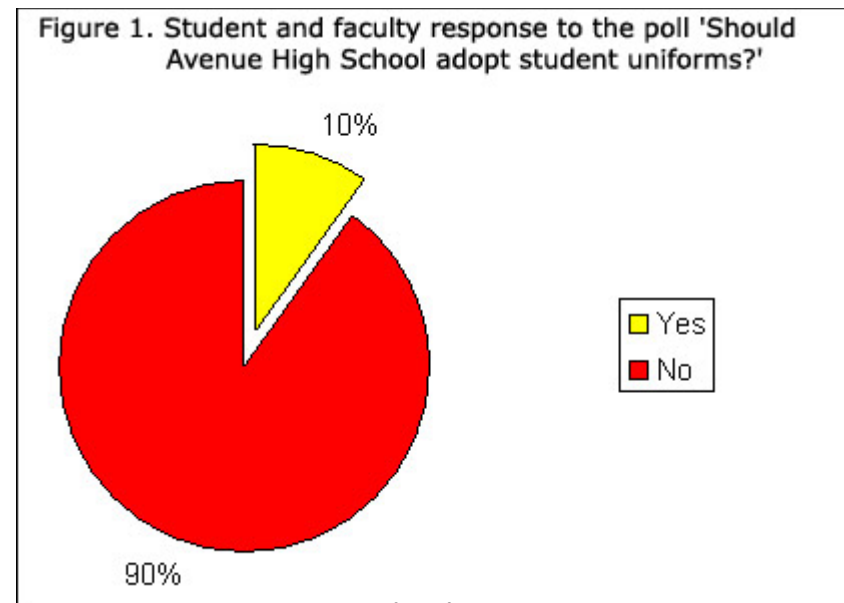- Legend
- Source
- Data

Types of Charts

- Pie charts
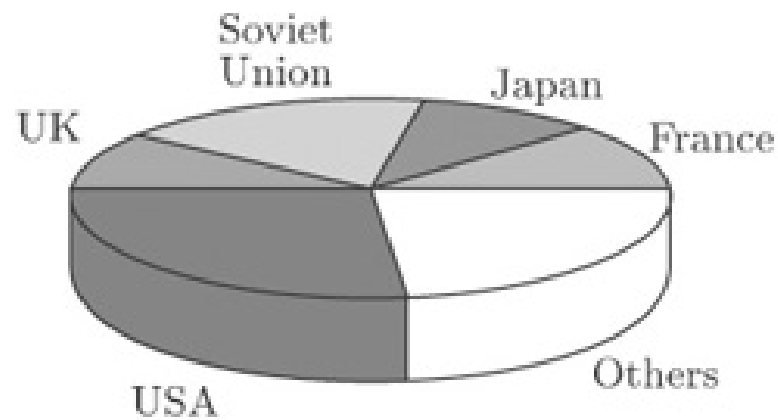- Bar charts
- Line graph
- Scatterplots

Pie Chart

- Distribution of categorical data
- Not especially interesting
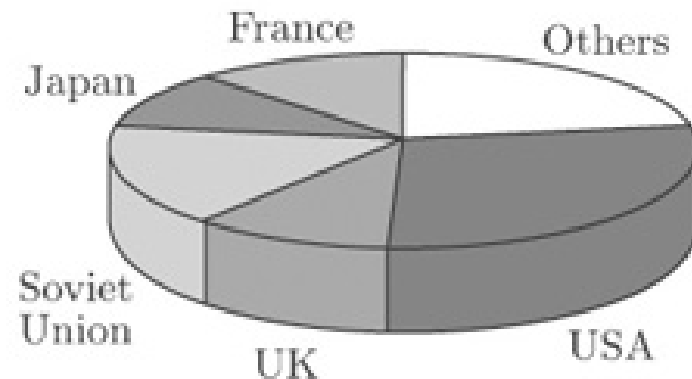- Never make three-dimensional

Figure 1. Student and faculty response to the poll 'Should Avenue High School adopt student uniforms?'

3-D Pie Chart:
Nuclear Power Stations

(a)

(b)

Bar Chart

- Display relationship between categorical variables and quantitative variables
- Can be vertical or horizontal
- Never make three-dimensional

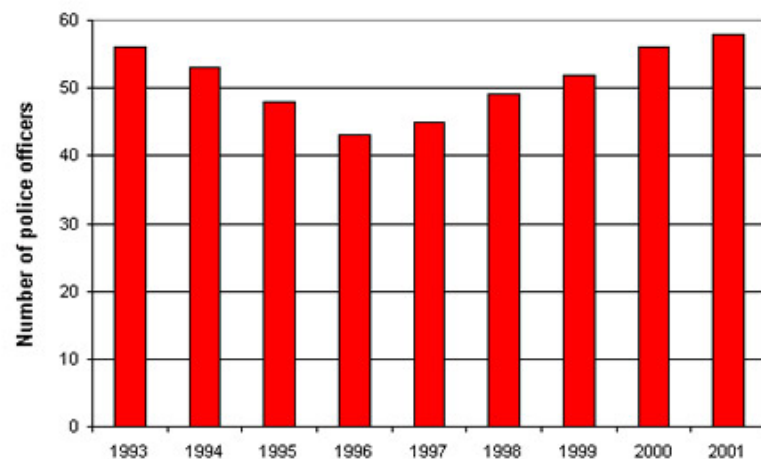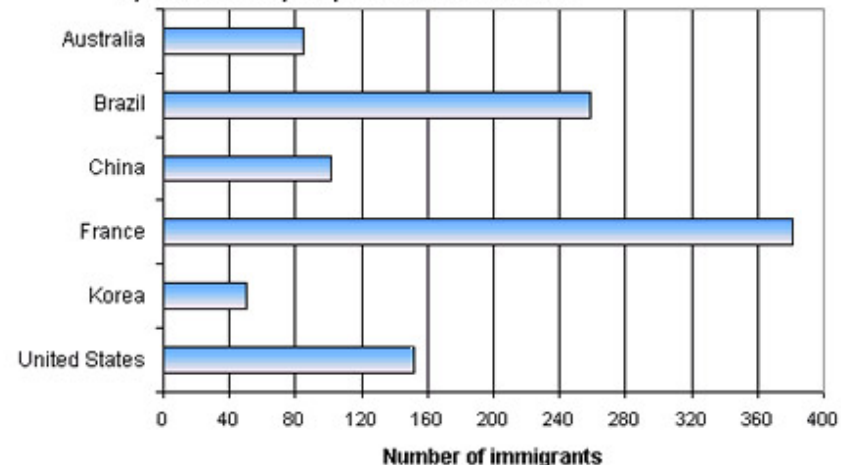Figure 1. Number of police officers in Crimeville, 1993 to 2001

Figure 3. Number of students at Diversity College who are immigrants, by last country of permanent residence

Group Bar Chart

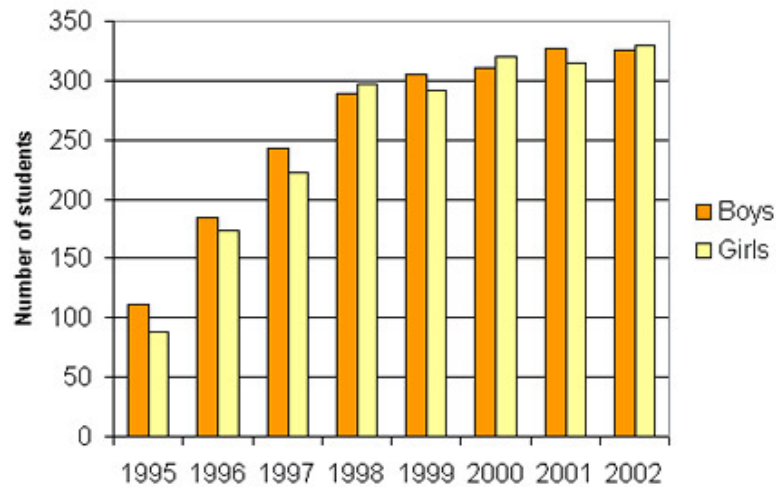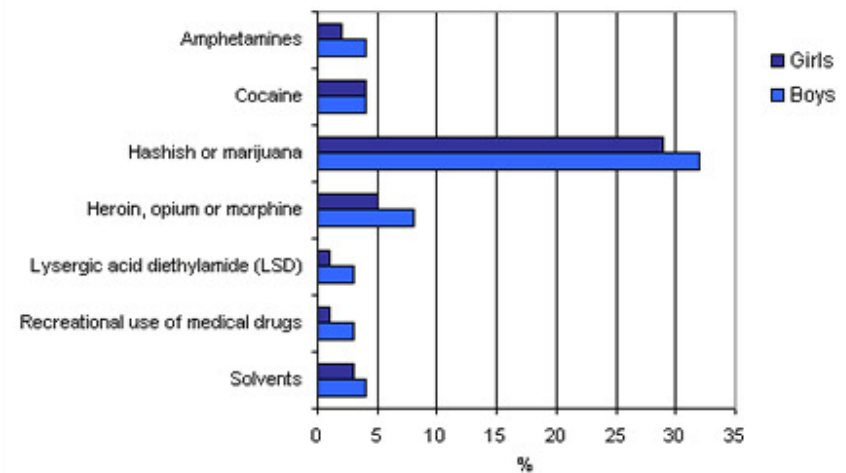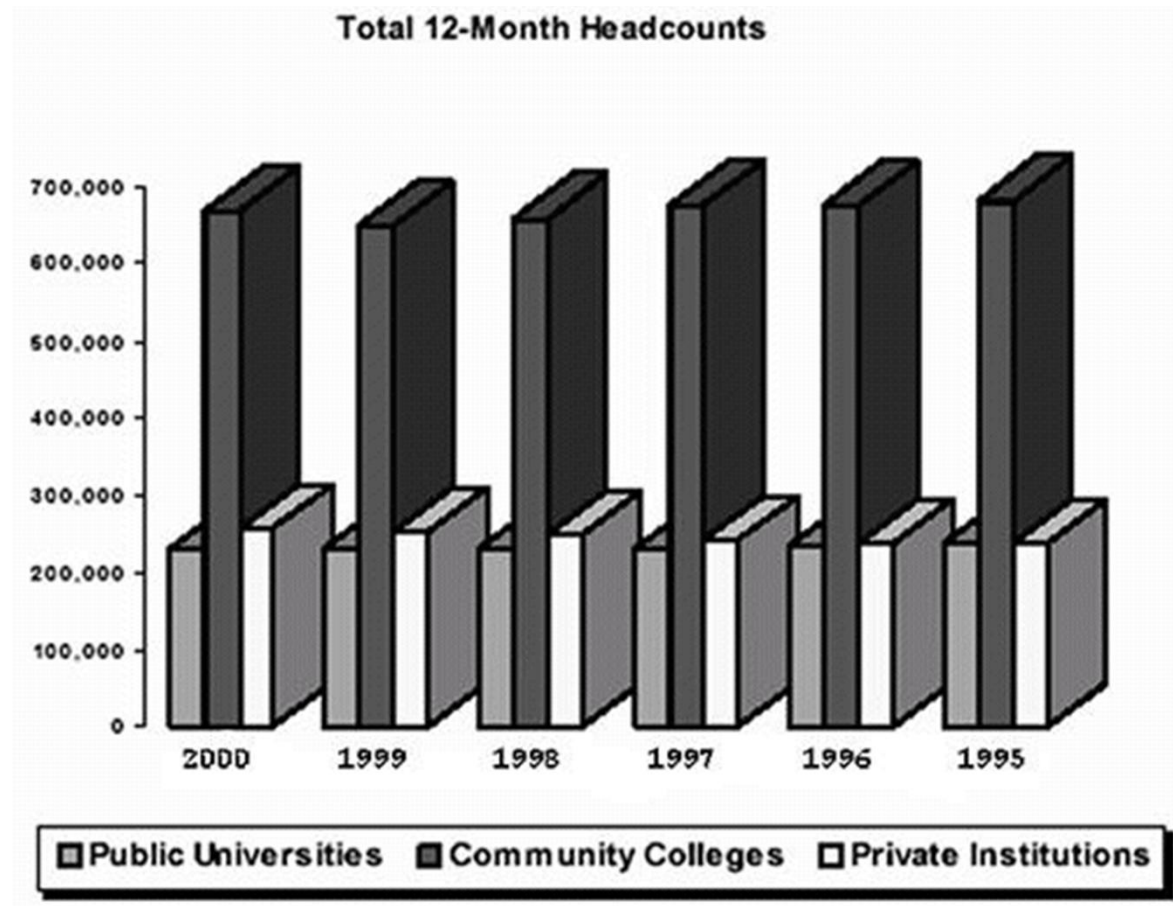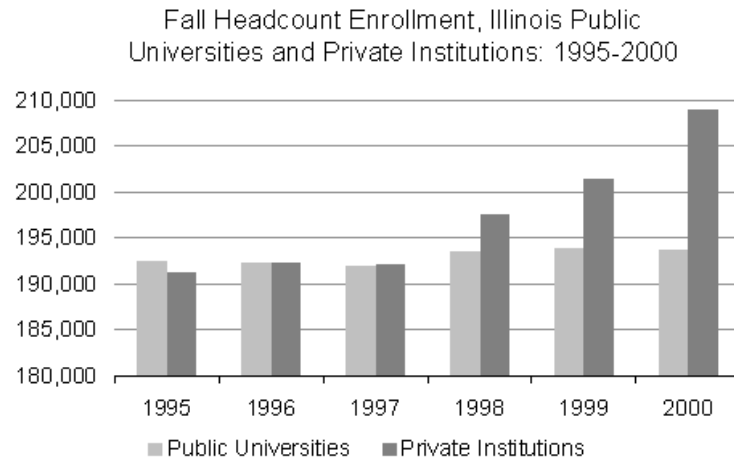Figure 2. Internet use at Redwood Secondary School, by sex, 1995 to 2002

Figure 4. Drug use by 15-year-old students in Jamie's school, by gender

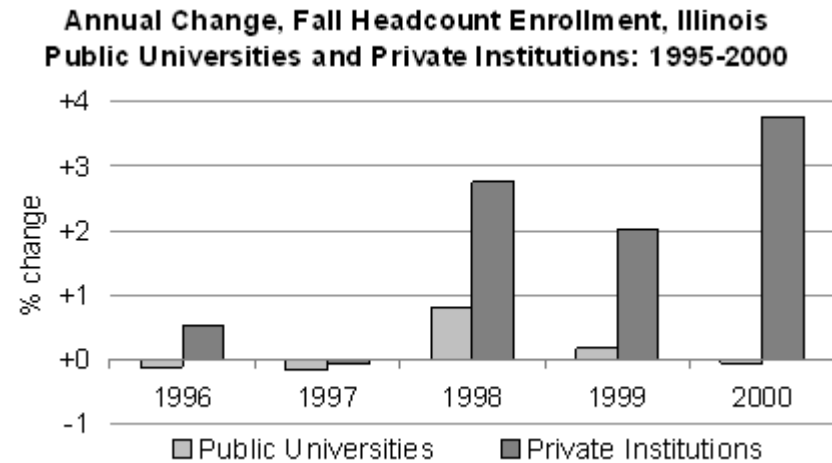# A Really Bad Bar Chart

The Corrected Chart

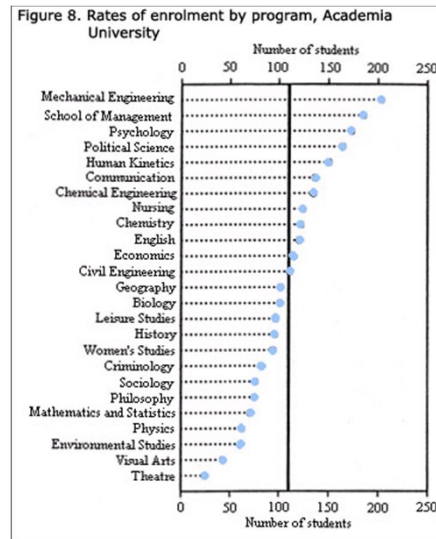Fall Headcount Enrollment, Illinois Public Universities and Private Institutions: 1995-2000

source: Illinois Board of Higher Education, Data Book, 2004

Annual Change, Fall Headcount Enrollment, Illinois Public Universities and Private Institutions: 1995-2000

Other Types of Bar Charts

Composition of Federal Receipts, FY 2000 and FY 2007 (Billions of current dollars)

Stacked Bar Charts

Figure 8. Rates of enrolment by program, Academia University

Dot Graph

Figure 1. Number of students who like chocolate chip cookies best
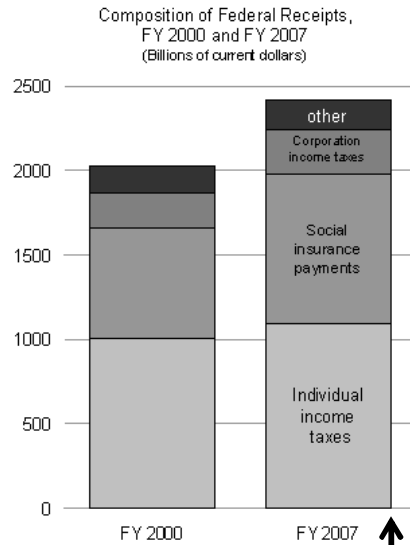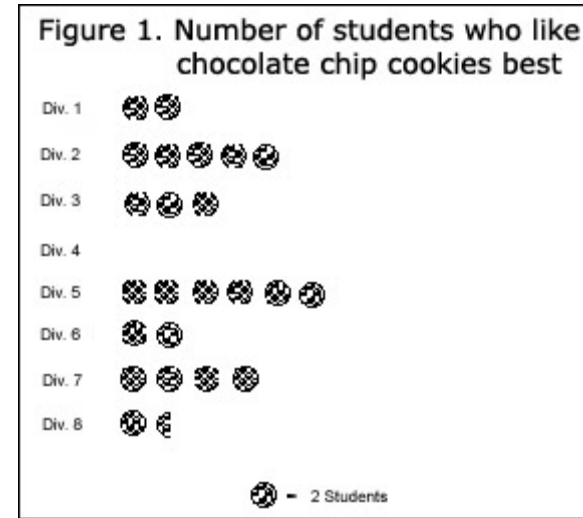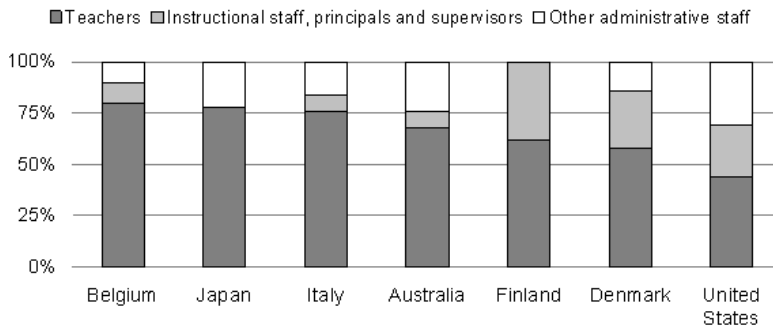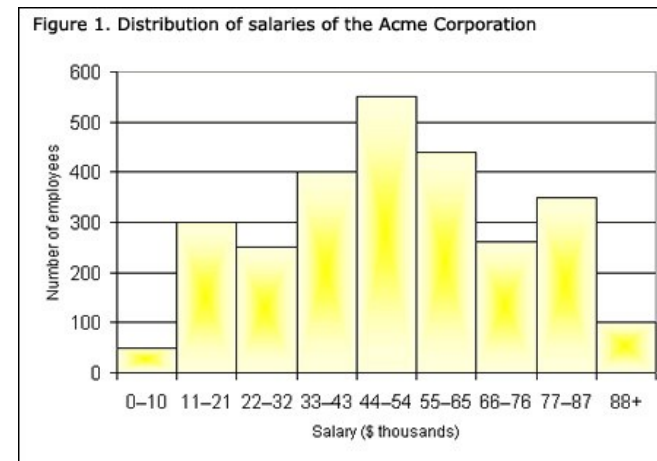
Pictograph

Distribution of Educational Staff by Function in Selected Countries: 1995
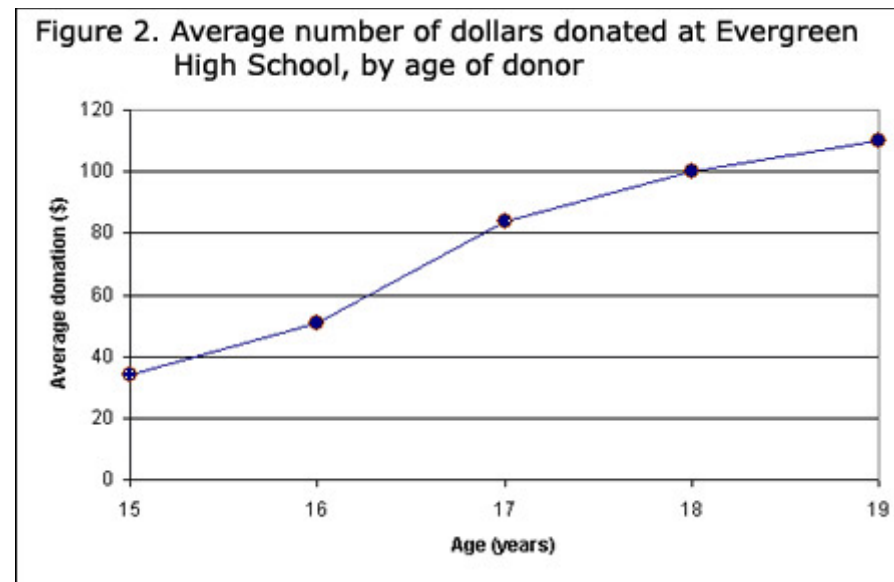Source: OECD Education at a Glance: 1995

Figure 1. Distribution of salaries of the Acme Corporation

Histogram

Line Graph

- Reveal trends and relationships between data
- Also called a time series chart
- Beware of scaling effects

Figure 2. Average number of dollars donated at Evergreen High School, by age of donor
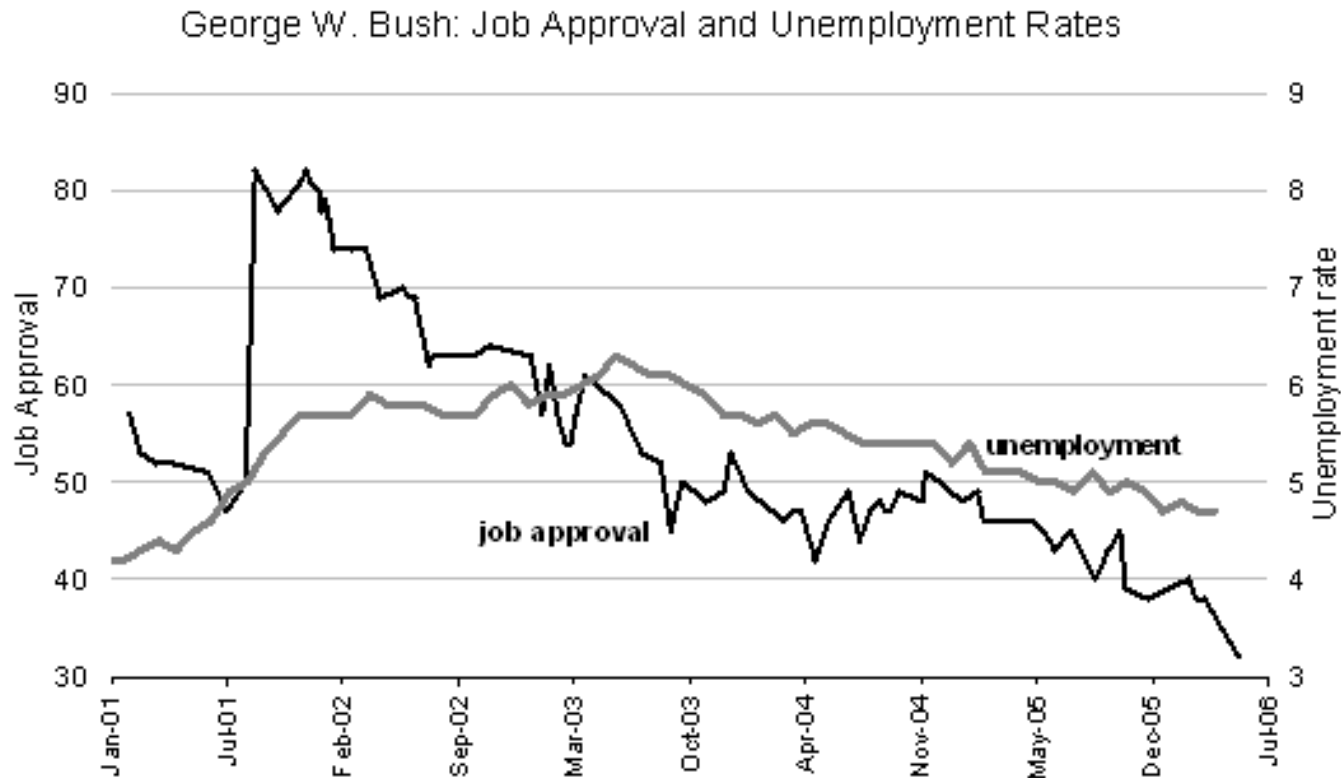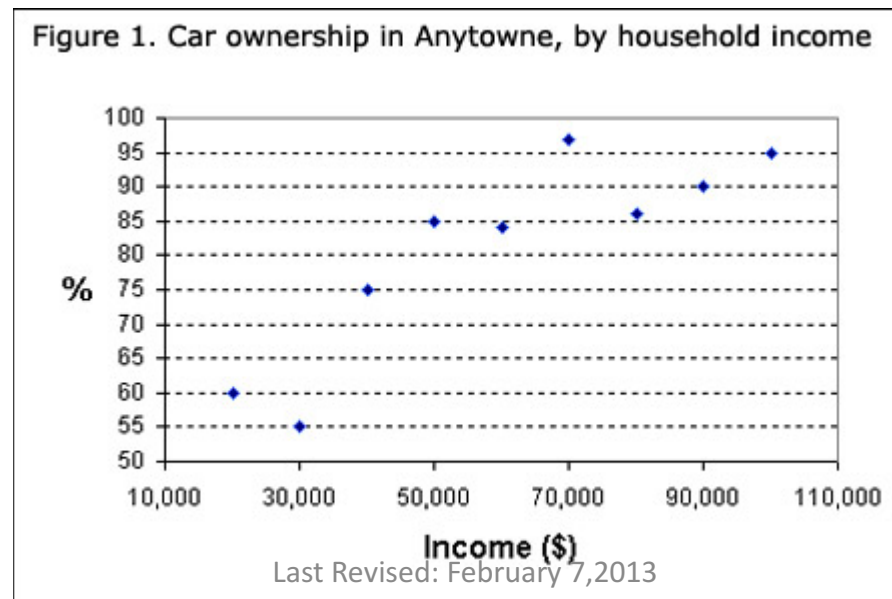
Example of Scaling Effect

Stock prices of two companies: Hypothetical data
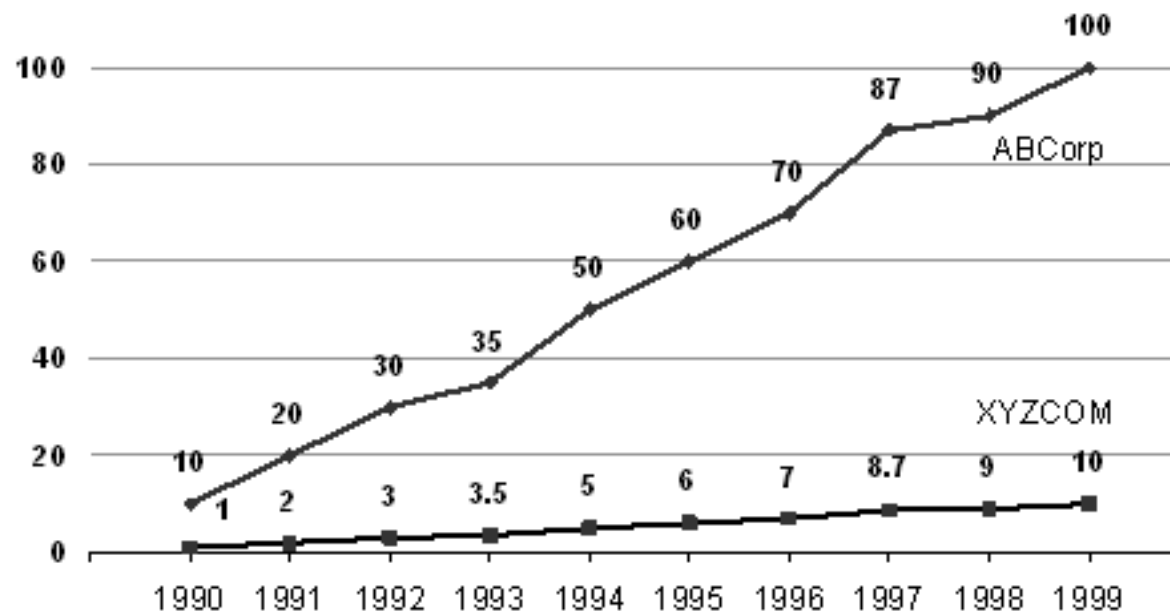
Correcting Scaling Effect

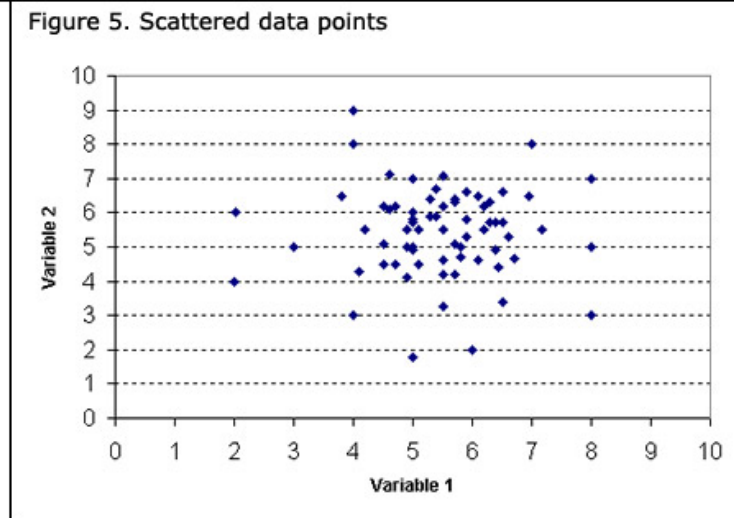George W. Bush: Job Approval and Unemployment Rates

unemployment

job approval
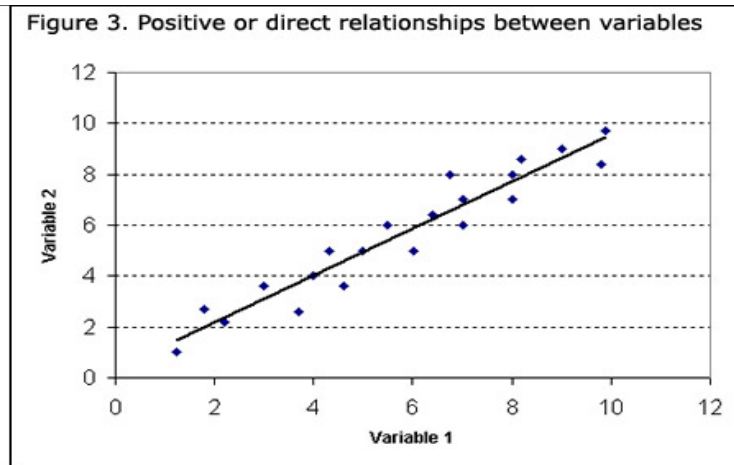
source: Zogby International, "George W. Bush - Job Performance Rating,"
(Zogby special feature) http://www.zogby.com/features/zogbytables4.cfm
unemployment: Bureau of Labor Statistics
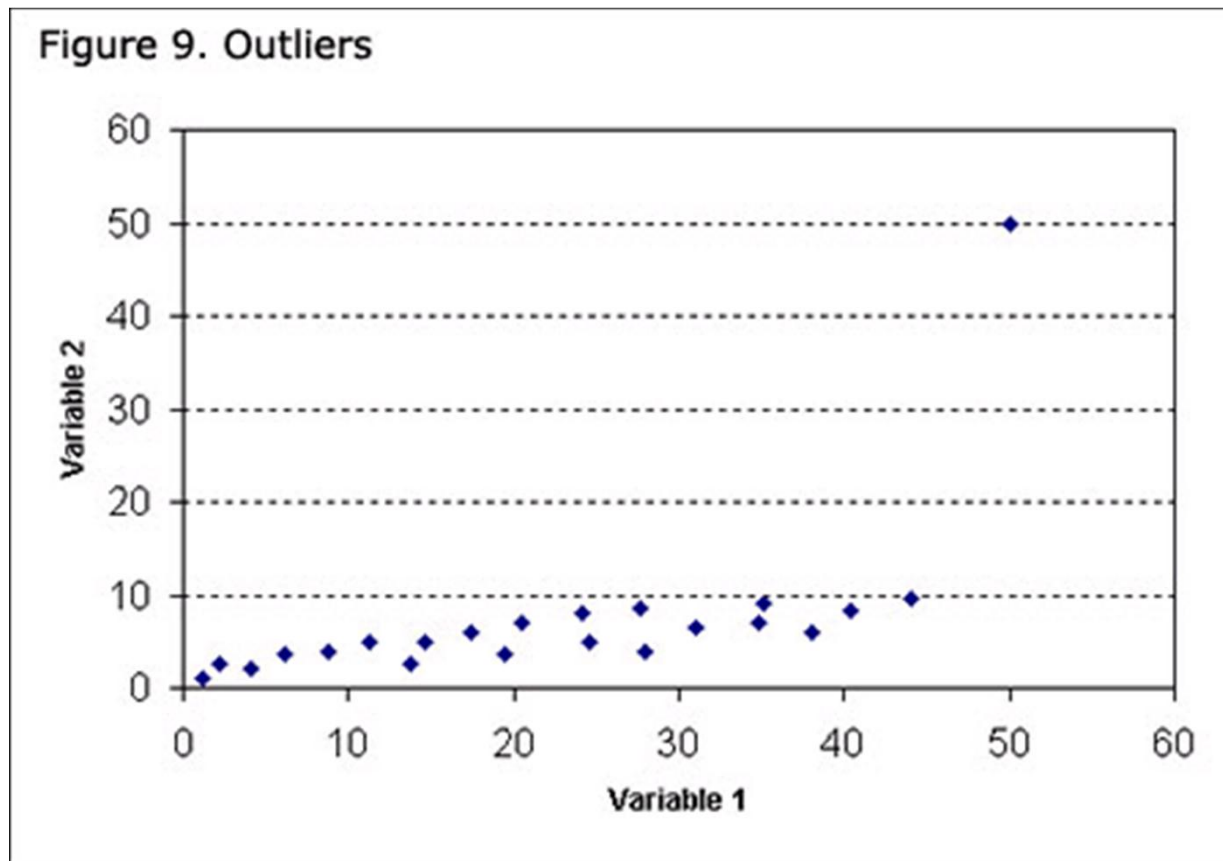
Scatterplot

- Data points are plotted, but not joined

- Pattern reveals relationships between variables

- Can be used to inspect data before doing additional analyses

Figure 1. Car ownership in Anytowne, by household income

Data Correlation

Figure 2. Strong linear relationship of variables

Figure 3. Positive or direct relationships between variables

Figure 4. Negative or inverse relationships

Figure 5. Scattered data points
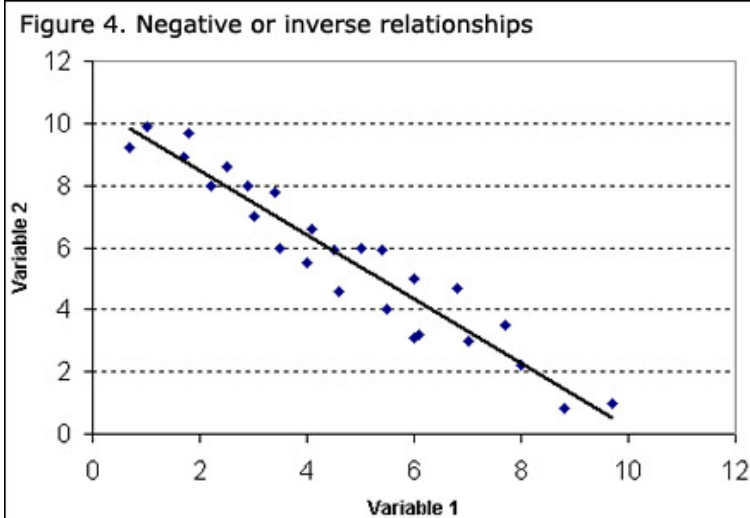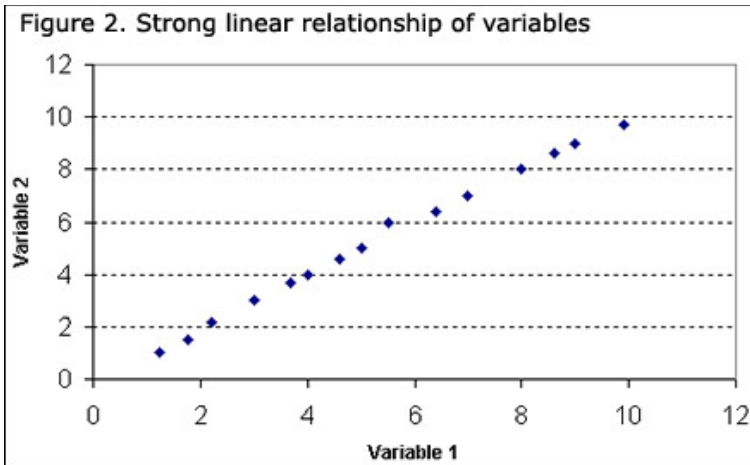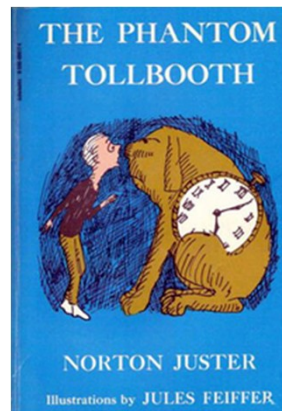
Outliers

Figure 9. Outliers

"Words and numbers are of equal value, for in the cloak of knowledge, one is the warp and the other is the woof. It is no more important to count the sands than it is to name the stars."
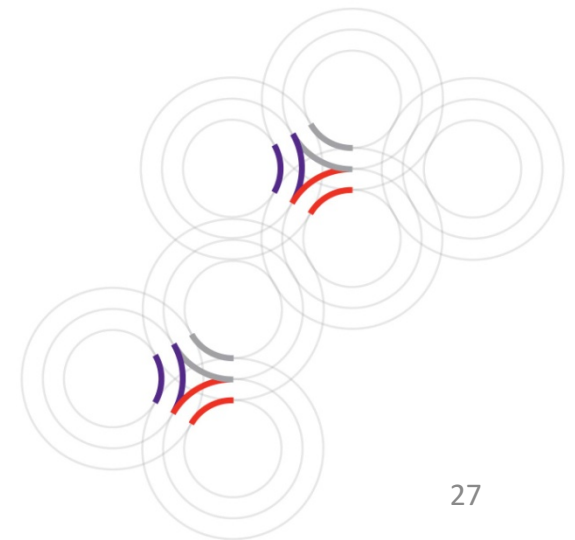
-Norton Juster, The Phantom Tollbooth, 1961

Data Visualization

- Visual representation of data

- Combination of aesthetic form and function

- Provides insight into complex data by presenting it an intuitive way

Summary

- Present fewer numbers

- Contextualize

- Round up or down as much as you can

- Use charts, but try to vary the type

- Add a little of your own personality

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