Scholarship Skills

Scholarship Skills

Andrew Black and David Maier, PSU

Week 8b: Figures

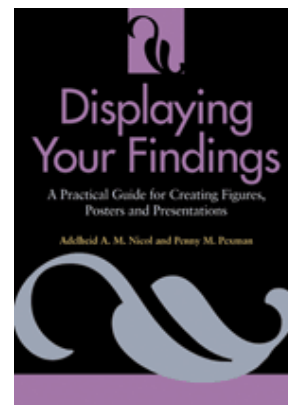Week 8b   1

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Sources

Displaying Your Findings: A Practical Guide for Creating Figures, Posters, and Presentations
Adelheid A. M. Nicol and Penny M. Pexman. American Psychological Association. 2003

$10.85 from Amazon

Practical, somewhat obvious, guidelines.

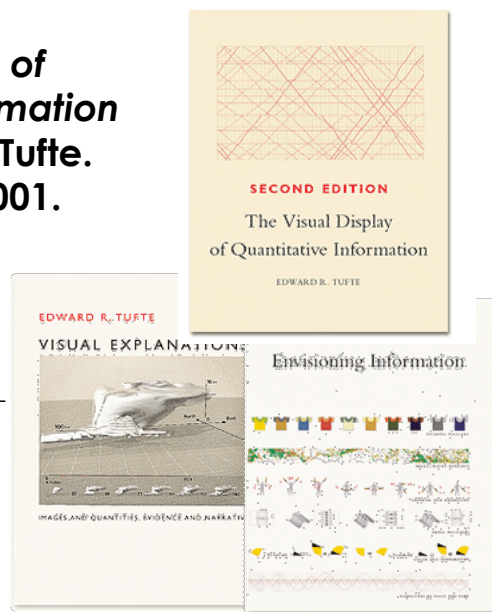Week 8b   2

The *Visual Display of Quantitative Information* (2nd ed.). Edward Tufte. Graphics Press, 2001.

Elevating, beautiful, even spiritual, one of the great books of the 20th century — but can be hard to put into practice
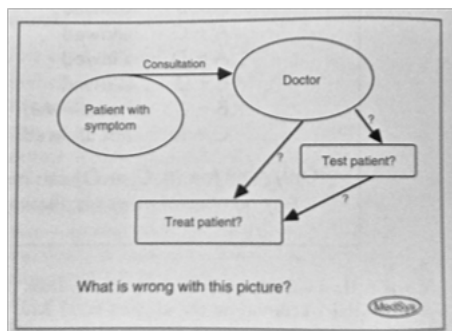

Week 8b   **3**

Dupré Segment 122

Explicit examples are more interesting and informative than vague examples

The patient presents with a symptom, and the doctor must decide whether to order diagnostic tests, and whether to prescribe treatment.
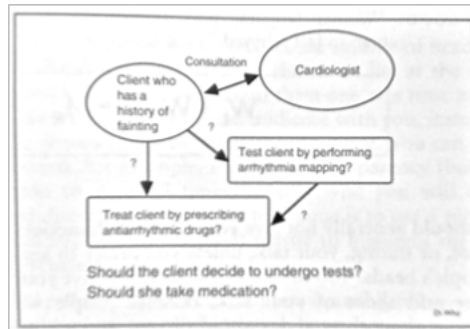
Week 8b   **4**

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Dupré Segment 122

Explicit examples are more interesting and informative than vague examples

The patient presents with a history of fainting, and the physician must help the patient to decide whether to undergo arrhythmia mapping (an invasive procedure), and whether to take antiarrhythmic drugs (which have unpleasant side effects).

Week 8b

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What's a Figure?

Any kind of graph, chart, plot, drawing, or photograph…
that is not a table, and is not running text.

Three parts to a figure:
1. Graph or graphic
2. Legend
3. Caption

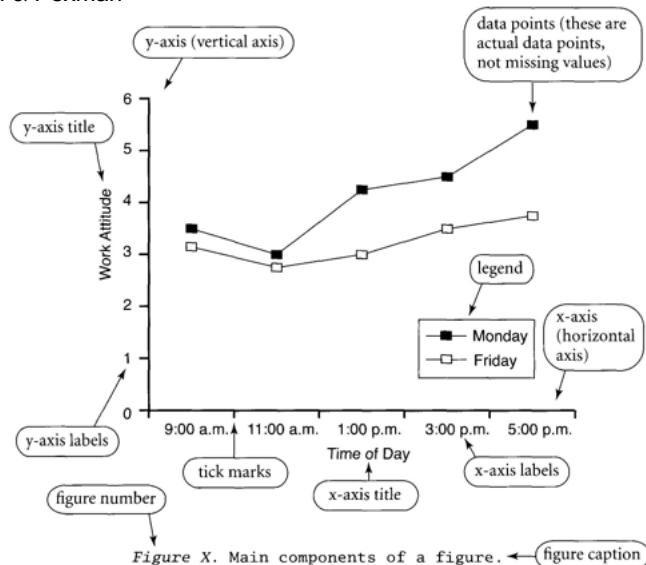Week 8b

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Anatomy of a Figure

from Nicol & Pexman

Figure X. Main components of a figure. ← figure caption

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General Guidelines for Figures

Figure must be relevant to the paper.
> It should move the story along.

Image should be as simple as possible.

Labels should be concise.

Fonts in all figures should be consistent.

Specify units within the figure.

Figures should stand alone.
> All information necessary to interpret the figure
> should be included in the caption.

Week 8b   8

Points to Watch

Figures may be reduced to fit the page.

Are they still legible? Is the type size still appropriate?

Sans serif fonts scale better than serif fonts.

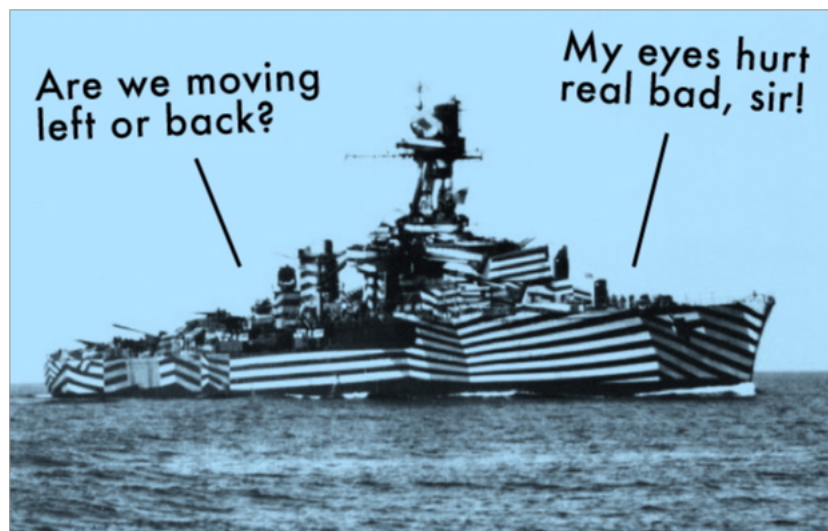**Similar figures (within same article) have similar style.**

All text in same font style, and point sizes don't vary by more than 40%.
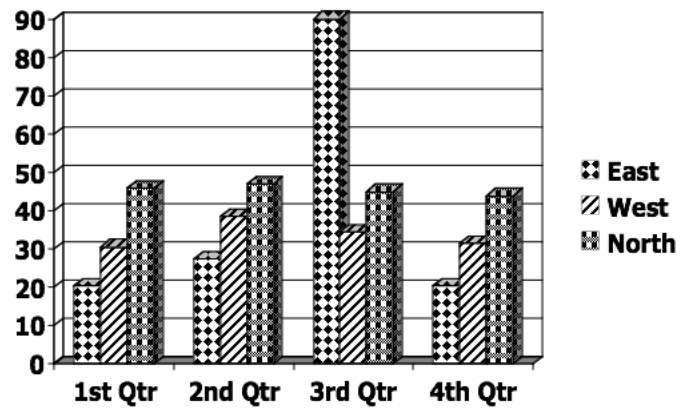
Week 8b   9

Dazzle Camouflage

Week 8b   10

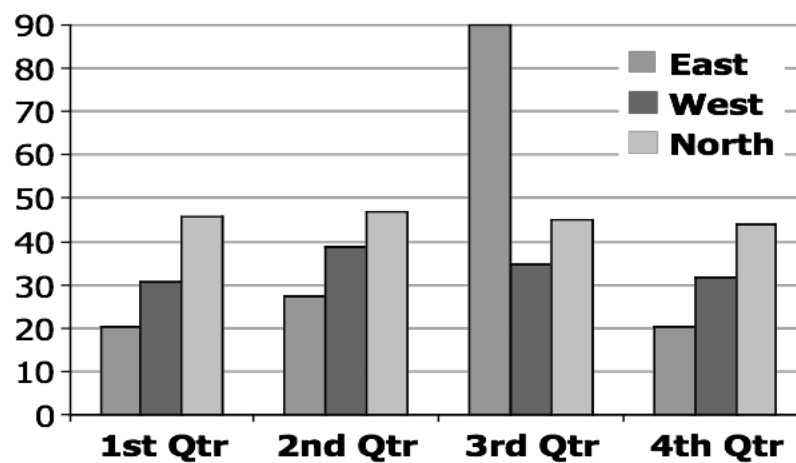Scholarship Skills

Use shading carefully

East
West
North

Week 8b   11

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Prefer Grayscale

East
West
North

Week 8b   12
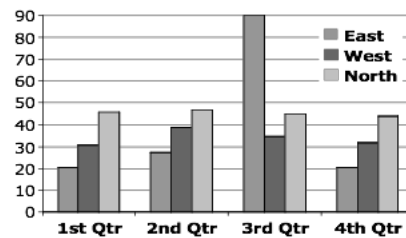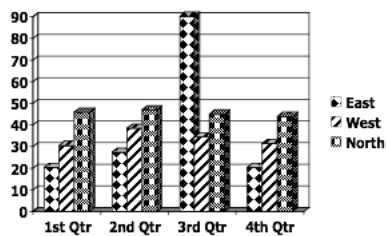
Make the figure easy to read

Avoid Bogus use of 3D

Put legend *in* (not next to) the image, if possible.
    Or avoid legend by labeling the graph directly
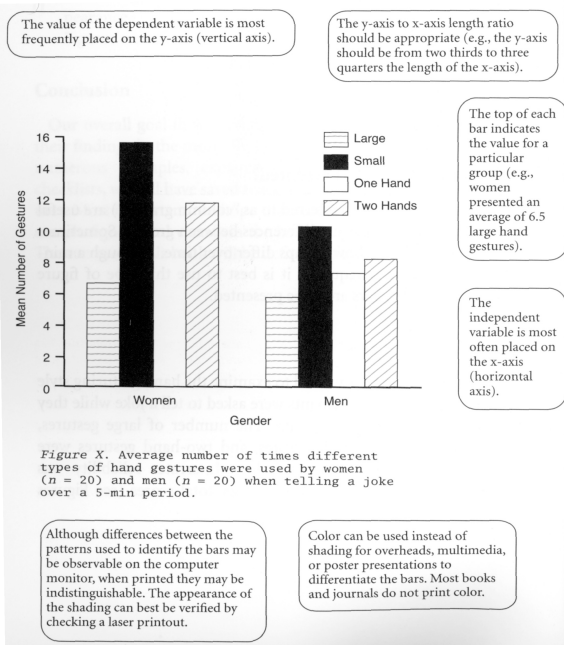
Omit gridlines, or use a pale grey

Omit "walls"

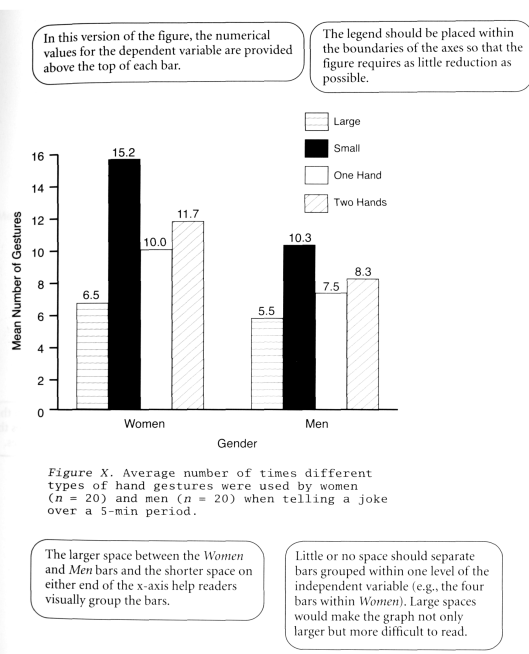**Week 8b**   **13**

1: Bar Charts

Figure X. Average number of times different types of hand gestures were used by women (*n* = 20) and men (*n* = 20) when telling a joke over a 5-min period.

The value of the dependent variable is most frequently placed on the y-axis (vertical axis).

The y-axis to x-axis length ratio should be appropriate (e.g., the y-axis should be from two thirds to three quarters the length of the x-axis).

The top of each bar indicates the value for a particular group (e.g., women presented an average of 6.5 large hand gestures).

The independent variable is most often placed on the x-axis (horizontal axis).

Although differences between the patterns used to identify the bars may be observable on the computer monitor, when printed they may be indistinguishable. The appearance of the shading can best be verified by checking a laser printout.

Color can be used instead of shading for overheads, multimedia, or poster presentations to differentiate the bars. Most books and journals do not print color.

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Another version

Adds numbers to the top of the columns — better than gridlines

In this version of the figure, the numerical values for the dependent variable are provided above the top of each bar.

The legend should be placed within the boundaries of the axes so that the figure requires as little reduction as possible.

Figure X. Average number of times different types of hand gestures were used by women (*n* = 20) and men (*n* = 20) when telling a joke over a 5-min period.

The larger space between the *Women* and *Men* bars and the shorter space on either end of the x-axis help readers visually group the bars.

Little or no space should separate bars grouped within one level of the independent variable (e.g., the four bars within *Women*). Large spaces would make the graph not only larger but more difficult to read.

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Adding graphics to a table

TABLE 2
Our taxonomy of preconditions (column 1), with counts and bars indicating the number of error messages in each category for each refactoring tool (columns 2–5).
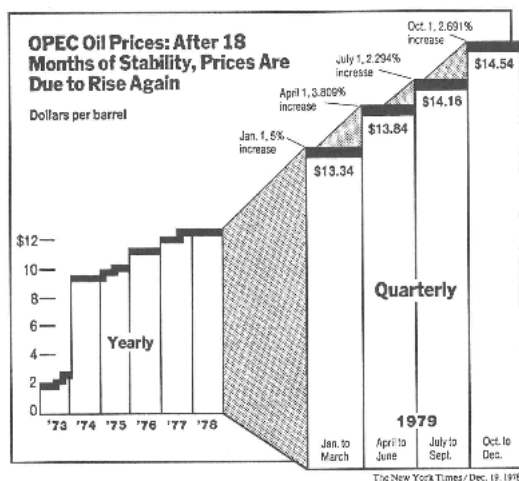
Week 8b   16

Some Principles from Tufte

Show data variation, not design variation

five different vertical scales,

two different horizontal scales

on the left, $10 ~ 0.31 in^2
on the right, $10 ~ 4.69 in^2
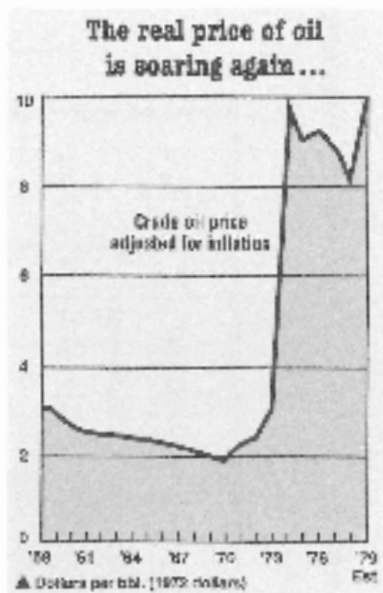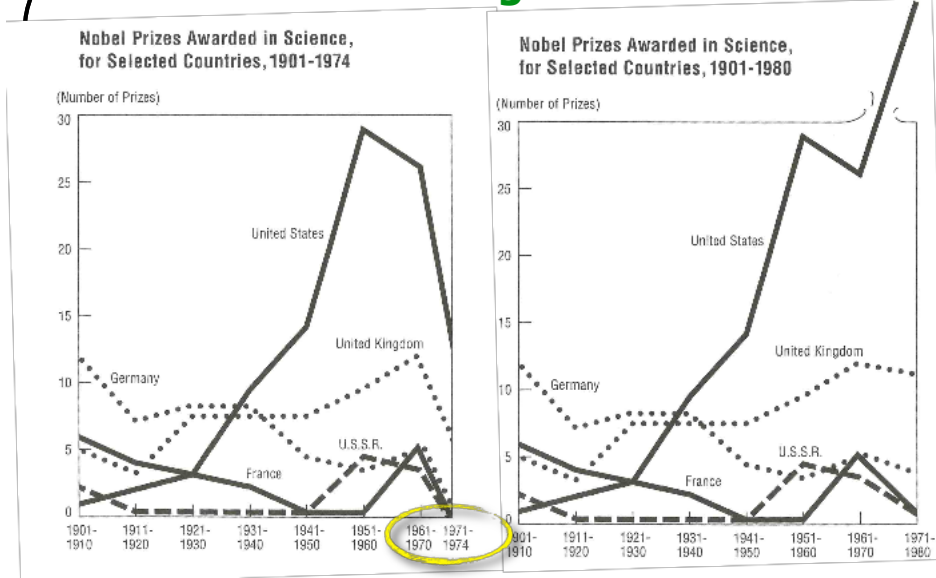
The real story:

Business Week,
April 9, 1979, p99

What's wrong with this?

Nobel Prizes Awarded in Science, for Selected Countries, 1901-1974
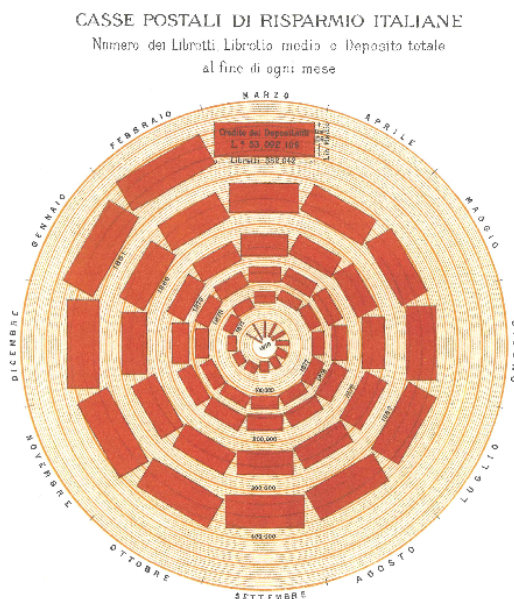
Nobel Prizes Awarded in Science, for Selected Countries, 1901-1980

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Number of dimensions in the graphic should not exceed the number of dimensions in the data
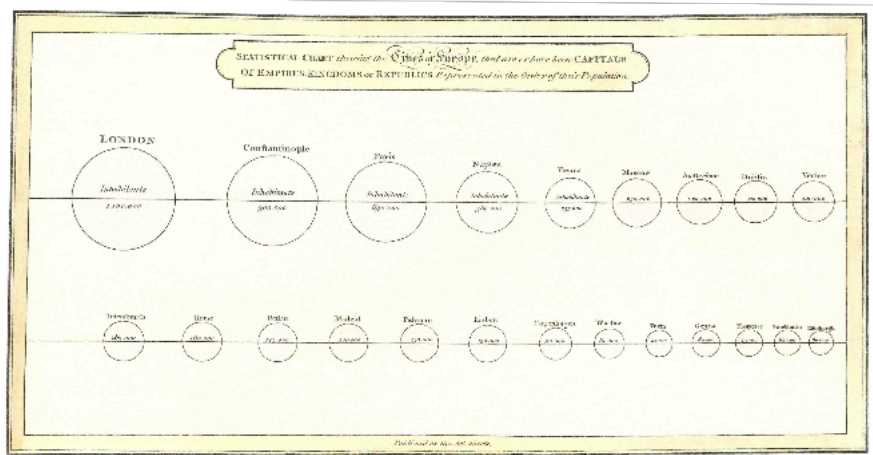
• Number of accounts, average Lira amount, and month

CASSE POSTALI DI RISPARMIO ITALIANE
Numero dei Libretti Libretto medio e Deposito totale
al fine di ogni mese

Week 8b

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Counter-example (from Playfair):
uses circles to show 1-dimensional population data

Week 8b   21

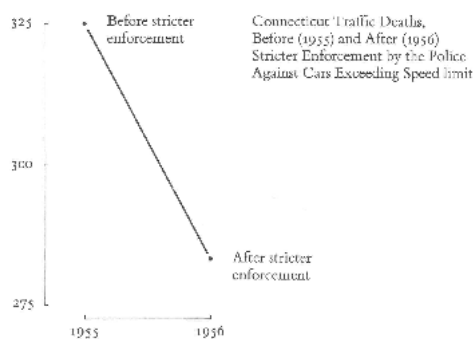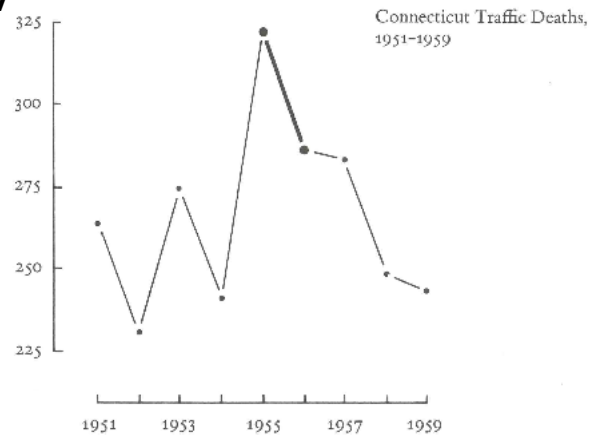**Scholarship Skills**

Don't show data
out of context

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Let's add some context! A few more data points add immensely to the story:

Connecticut Traffic Deaths, 1951–1959

Week 8b   **23**