

L2: Fri, Jan. 29.

Announcements

- Tuesday study sessions 5-6 p.m. in B205.
- Writing prompt under "Assignments" on Canvas — your responses are due at 11:59 p.m. Monday (upload to Canvas; do not bring in hard copy).

Today: Group work

- Read the Cartoon Guide, pages 1-13
- Respond to the questions in the handout AS A GROUP (take 30 minutes to do this) (IT HAS 2 SIDES)

Class/lecture

- ~~• We will create our own histogram, stem & leaf plot, and relative frequency table (?)~~
- we will discuss (briefly) other ways of visualizing data.

Characteristics of good/effective graphical displays.

(Edward Tufte, The Visual Display of Quantitative Information, 1983)

- Show the data
- Induce the viewer to think abt. substance, rather than abt. methodology, graphic design, the technology of graphics produc'n, or smth. else
- Avoid distorting what the data has to say
- Present many numbers in a small space
- Make large data sets coherent
- Encourage the eye to compare different pieces of data
- Reveal the data at several levels of detail, from broad overview to fine structure
- Serve a reasonably clear purpose: descript'n, explorat'n, tabulat'n, or decoration
- Be closely integrated with the statistical & verbal descript'ns of a data set

GRAPHICS REVEAL DATA

Minard was a pioneer of the use of graphics in engineering and statistics. He is most well known for his cartographic depiction of numerical data on a map of Napoleon's disastrous losses suffered during the Russian campaign of 1812 (in French, *Carte figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813*). The illustration depicts Napoleon's army departing the Polish-Russian border. A thick band illustrates the size of his army at specific geographic points during their advance and retreat. It displays six types of data in two dimensions: the number of Napoleon's troops; the distance traveled; temperature; latitude and longitude; direction of travel; and location relative to specific dates.[2] This type of band graph for illustration of flows was later called a Sankey diagram, although Matthew Henry Phineas Riall Sankey used this visualisation 30 years later and only for thematic energy flow.

The original description in French accompanying the map translated to English:[3]

Figurative Map of the successive losses in men of the French Army in the Russian campaign 1812-1813. Drawn by Mr. Minard, Inspector General of Bridges and Roads in retirement. Paris, 20 November 1869. The numbers of men present are represented by the widths of the colored zones in a rate of one millimeter for ten thousand men; these are also written beside the zones. Red designates men moving into Russia, black those on retreat. – The informations used for drawing the map were taken from the works of Messrs. Thiers, de Ségur, de Fezensac, de Chambray and the unpublished diary of Jacob, pharmacist of the Army since 28 October.

In order to facilitate the judgement of the eye regarding the diminution of the army, I supposed that the troops under Prince Jérôme and under Marshal Davoust, who were sent to Minsk and Mobilow and who rejoined near Orscha and Witebsk, had always marched with the army.

Modern information scientists say the illustration may be the best statistical graphic ever drawn.[2] French scientist, physiologist and chronophotographer Étienne-Jules Marey first called notice to Minard's dramatic depiction of the fate of Napoleon's army in the Russian campaign, saying it "defies the pen of the historian in its brutal eloquence".[4]

Noted information designer Edward Tufte says it "may well be the best statistical graphic ever drawn"[5] and uses it as a prime example in *The Visual Display of Quantitative Information*. [6] Howard Wainer identified Minard's map as a "gem" of information graphics, nominating it as the "World's Champion Graph". [7]

Arthur H. Robinson wrote that Minard was 'a cartographic pioneer in many respects' and pointed out that his famous map (of Napoleon's march) was only one of 51 thematic maps he created during his lifetime.[8]