# EDWARD TUFTE'S 'THE VISUAL DISPLAY OF QUANTITATIVE INFORMATION' – GRAPHICAL INTEGRITY

Dr Alexandra Anderson

The University Of Sheffield.

Q-Step

A step-change in quantitative social science skills

Funded by the Nuffield Foundation, ESRC and HEFCE

Nuffield Foundation

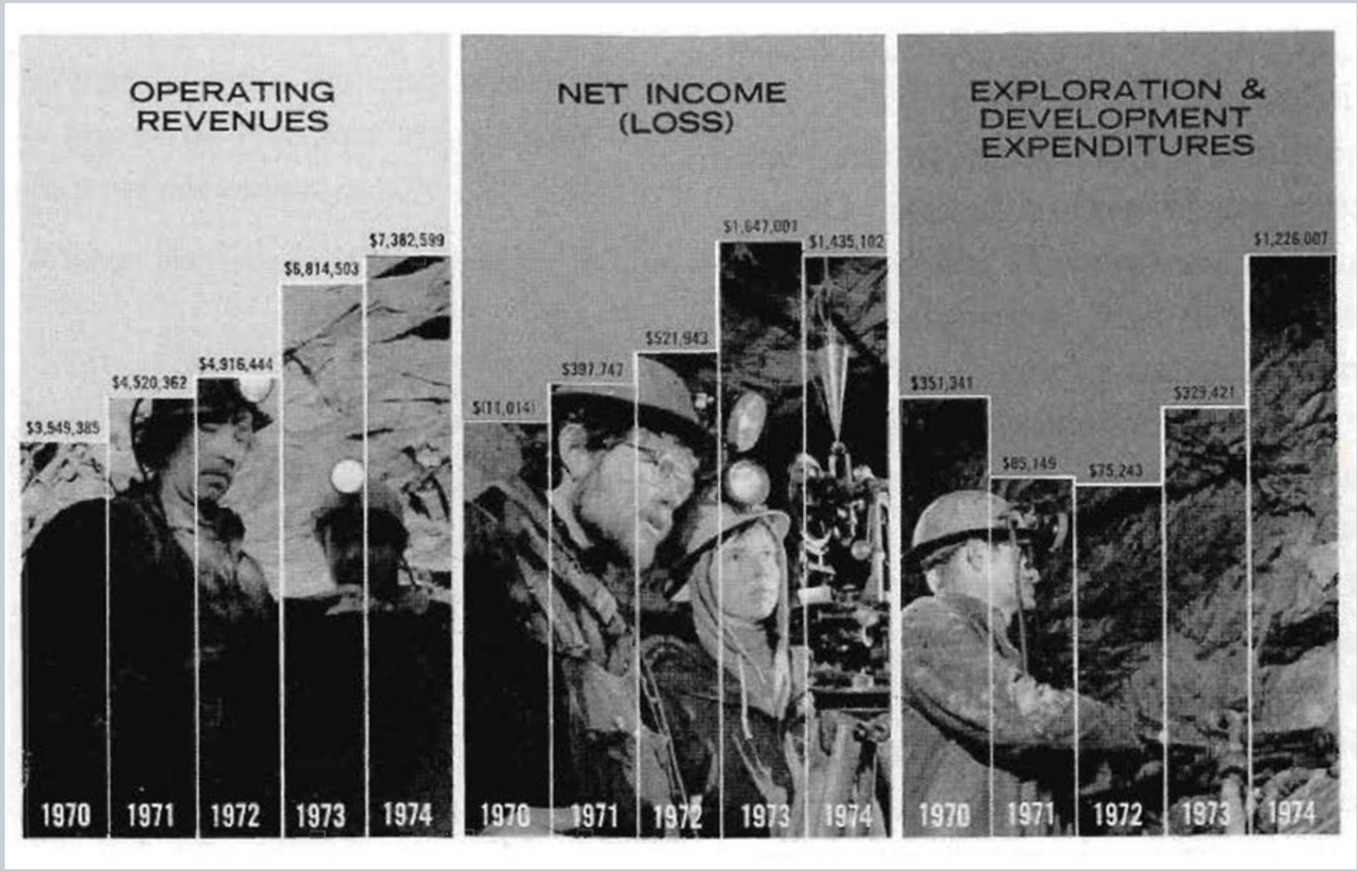
# TUFTE'S PRINCIPLES OF GRAPHICAL INTEGRITY

The first two

1. The representation of numbers, as physically measured on the surface of the graphic itself, should be directly proportional to the numerical quantities represented.

2. Clear, detailed, and thorough labeling should be used to defeat graphical distortion and ambiguity. Write out explanations of the data on the graphic itself. Label important events in the data.

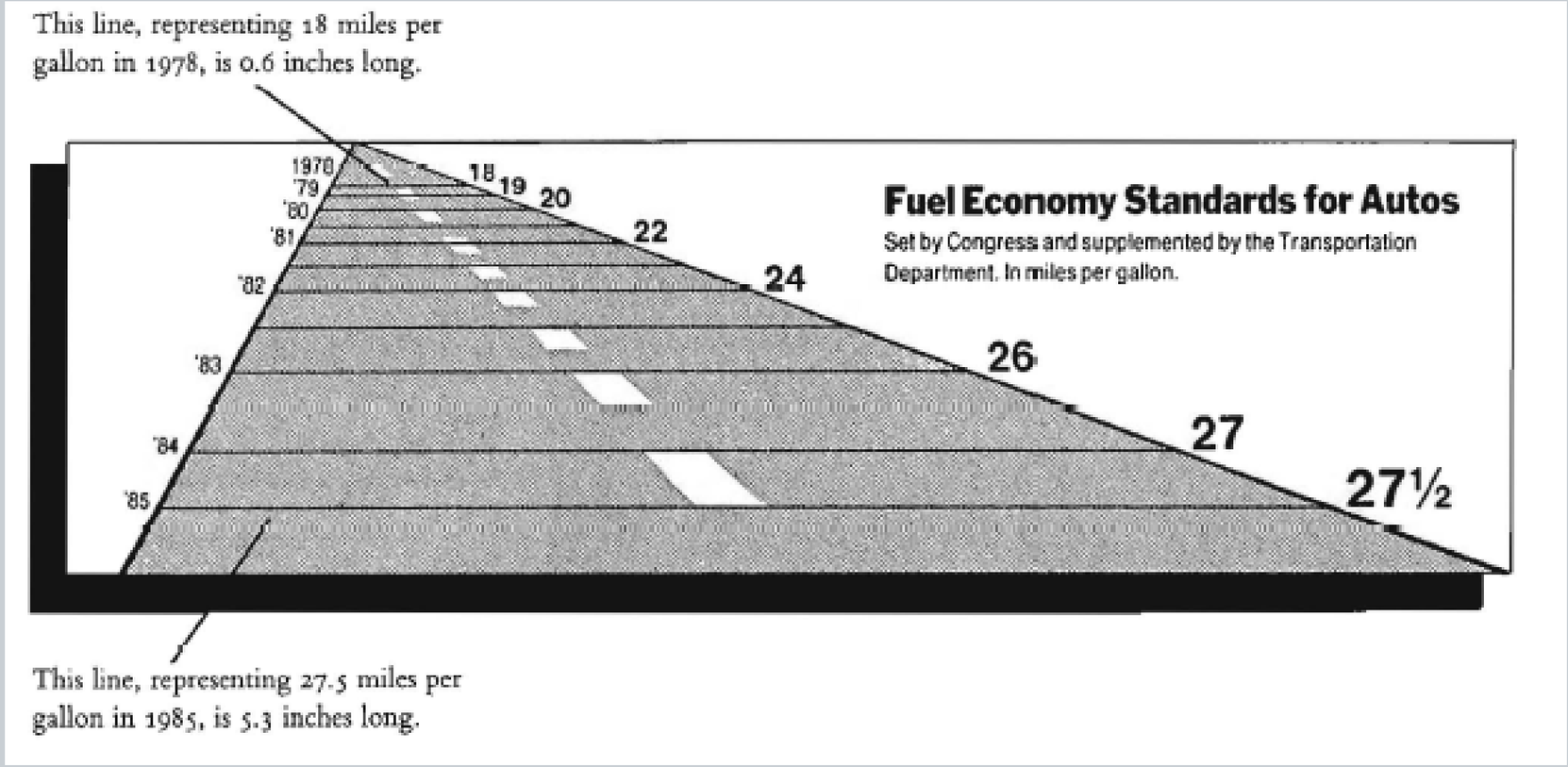
# FOR EXAMPLE...




Day Mines, INC. (1974). Annual Report, p. 1 – From Tufte (2007)

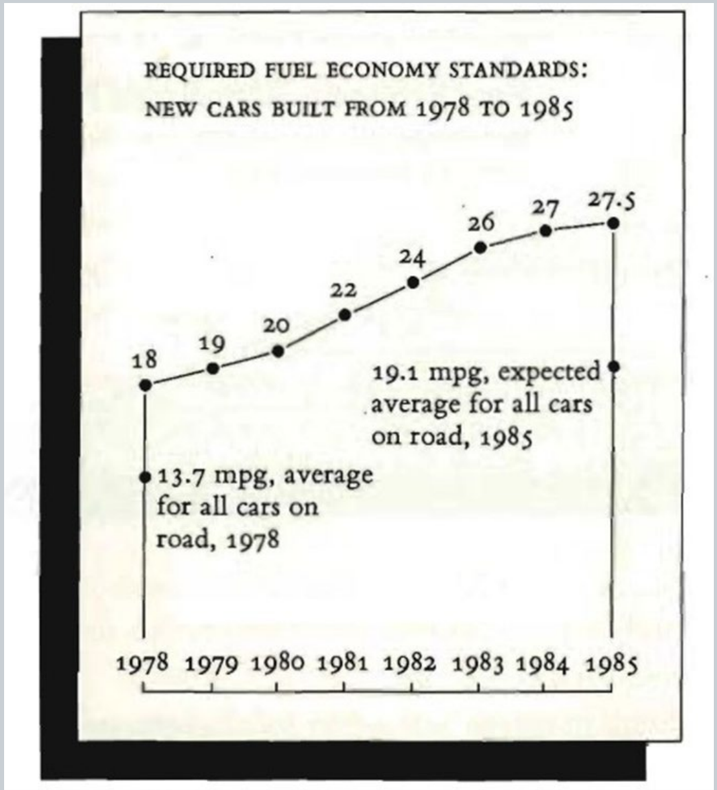
# THE LIE FACTOR

$$\text{Lie Factor} = \frac{\text{size of effect shown in graphic}}{\text{size of effect in data}}$$




New York Times (August 9, 1978), p. D-2, – From Tufte (2007)

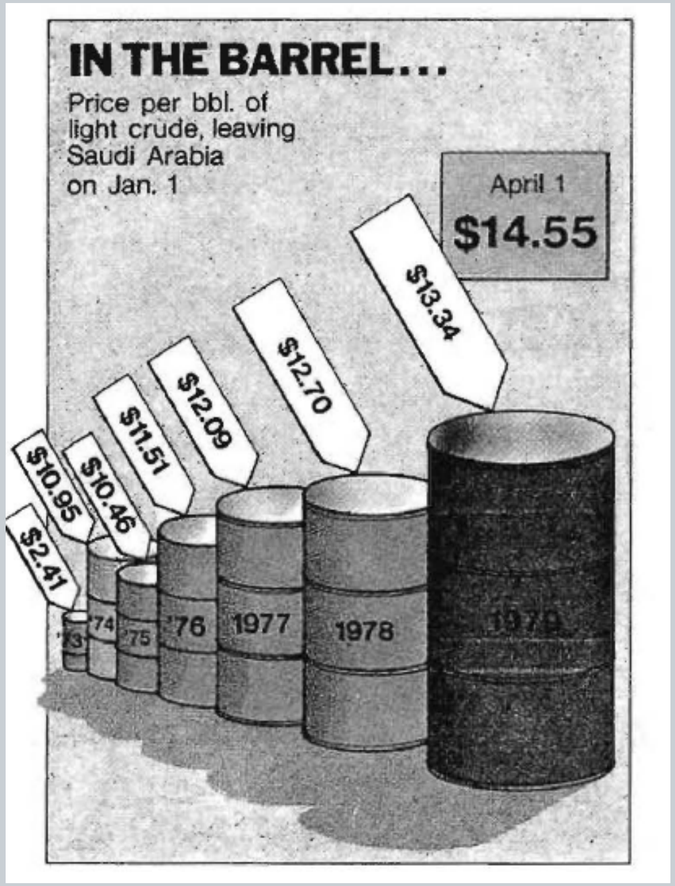
# INSTEAD… WE HAVE TUFTE'S "NON-LYING" ALTERNATIVE



# TUFTE'S PRINCIPLES OF GRAPHICAL INTEGRITY

3) Show data variation, not design variation.

# FOR EXAMPLE...

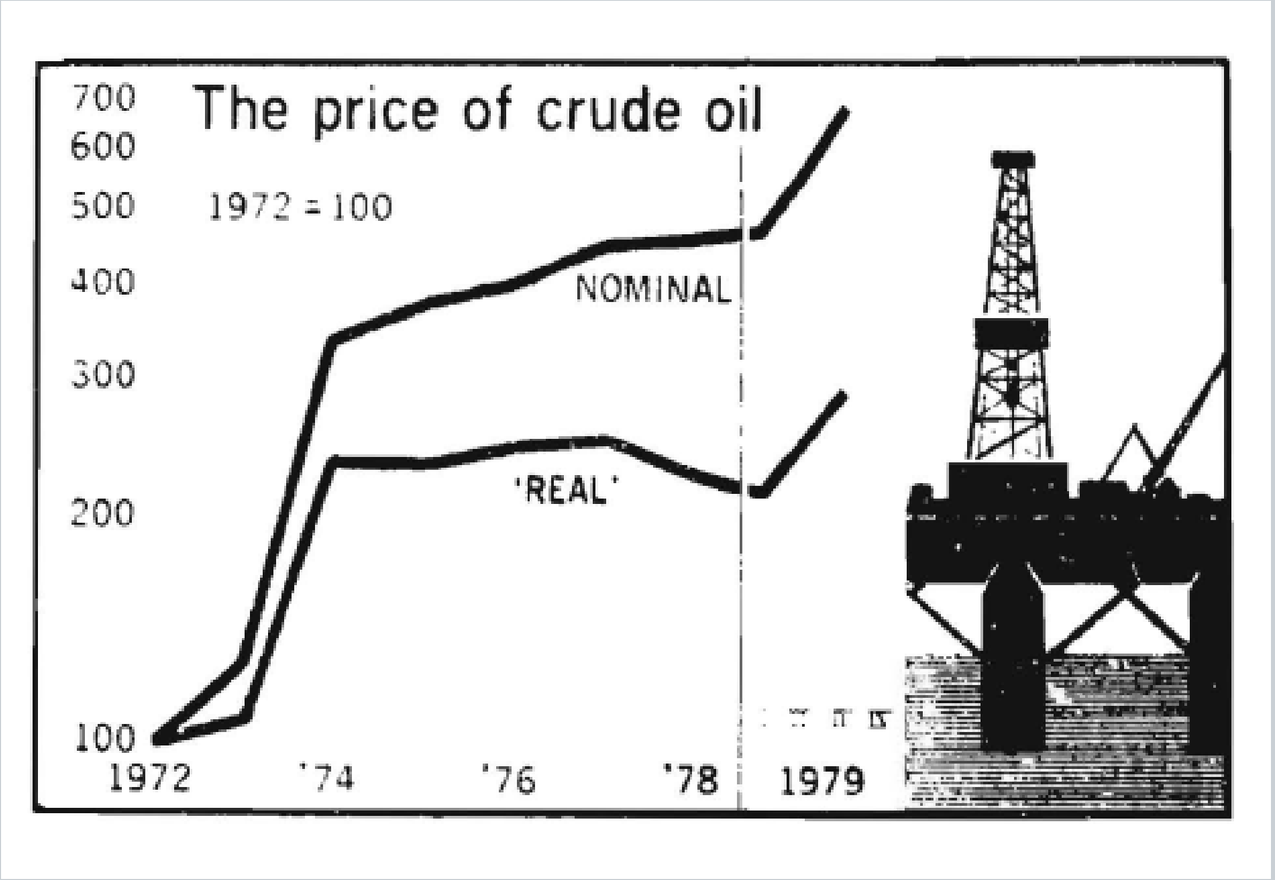



Time, (April 9 1979) p. 57, in Tufte (2007).

# TUFTE'S PRINCIPLES OF GRAPHICAL INTEGRITY

4) In time-series displays of money, deflated and standardized units of monetary measurement are nearly always better than nominal units.

# FOR EXAMPLE...

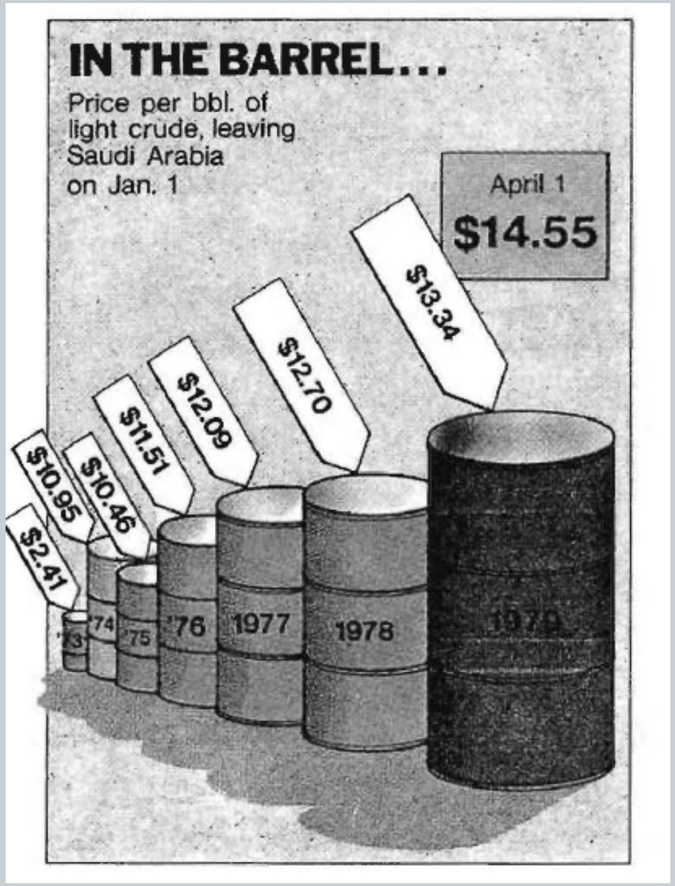



Sunday Times, London, (December 16 1979) p. 54, in Tufte (2007).

# TUFTE'S PRINCIPLES OF GRAPHICAL INTEGRITY

5) The number of information-carrying (variable) dimensions depicted should not exceed the number of dimensions in the data.

# FOR EXAMPLE...

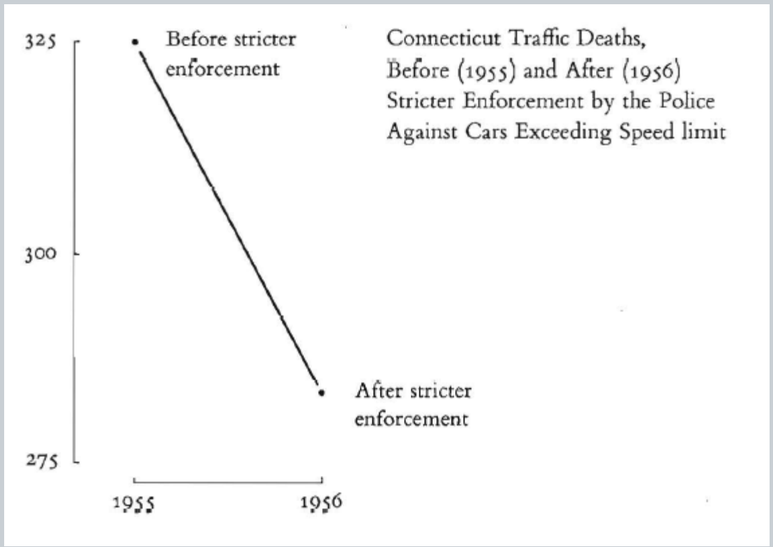


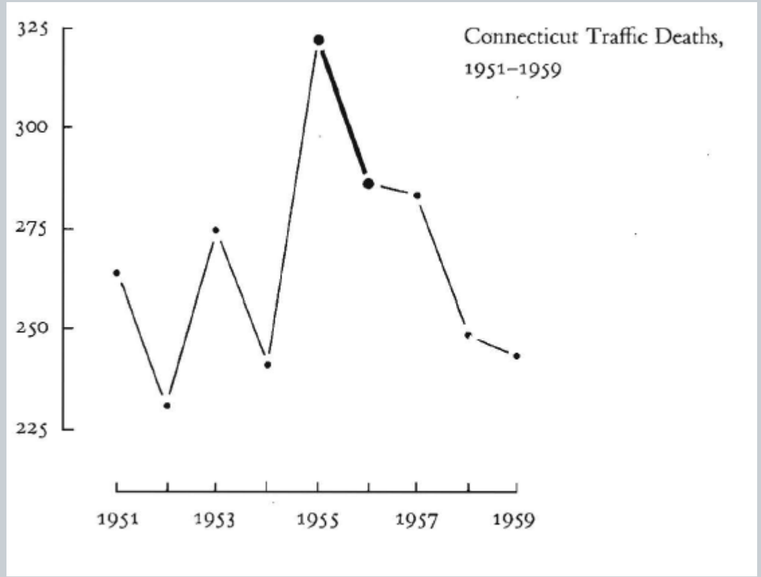

Time, (April 9 1979) p. 57, in Tufte (2007).

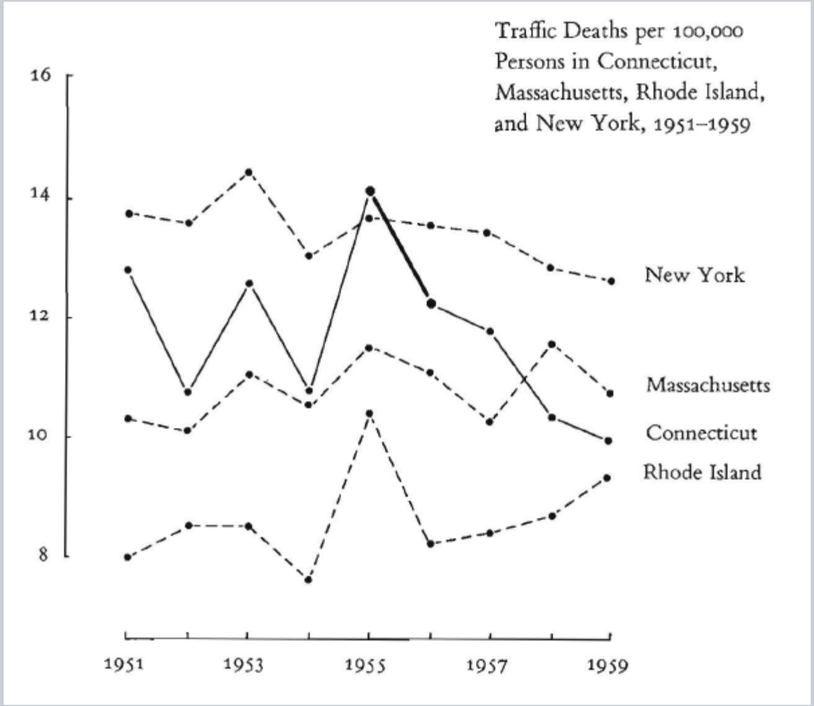
# TUFTE'S PRINCIPLES OF GRAPHICAL INTEGRITY

6) Graphics must not quote data out of context.

# FOR EXAMPLE...


325
300
275
Before stricter enforcement
After stricter enforcement
1955
1956
Connecticut Traffic Deaths, Before (1955) and After (1956) Stricter Enforcement by the Police Against Cars Exceeding Speed limit


325
300
275
250
225
1951
1953
1955
1957
1959
Connecticut Traffic Deaths, 1951–1959


16
14
12
10
8
1951
1953
1955
1957
1959
Traffic Deaths per 100,000 Persons in Connecticut, Massachusetts, Rhode Island, and New York, 1951–1959
New York
Massachusetts
Connecticut
Rhode Island

# TUFTE'S PRINCIPLES OF GRAPHICAL INTEGRITY

1. The representation of numbers, as physically measured on the surface of the graphic itself, should be directly proportional to the numerical quantities represented.

2. Clear, detailed, and thorough labeling should be used to defeat graphical distortion and ambiguity. Write out explanations of the data on the graphic itself. Label important events in the data.

3. Show data variation, not design variation.

4. In time-series displays of money, deflated and standardized units of monetary measurement are nearly always better than nominal units.

5. The number of information-carrying (variable) dimensions depicted should not exceed the number of dimensions in the data.

6. Graphics must not quote data out of context.

The University Of Sheffield.

Q-Step
A step-change in quantitative social science skills
Funded by the Nuffield Foundation, ESRC and HEFCE

Nuffield Foundation