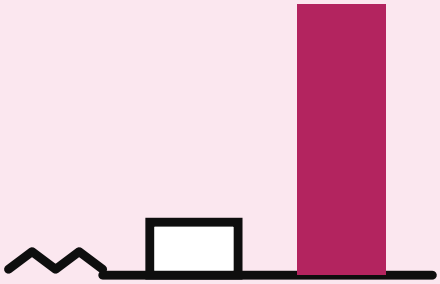
Concept

Lie factor

The size of a change in the chart divided by the size of that change in the data. If it equals 1, the chart is faithful; if it is larger, it exaggerates.



In Spanish
Factor de mentira

Origin
Tufte (1983)

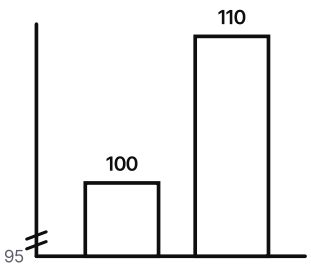
What problem it addresses

It explains how a chart with correct data can mislead through its axes, scales or shapes. It gives design a way to check whether what is drawn is proportional to the data.

An example

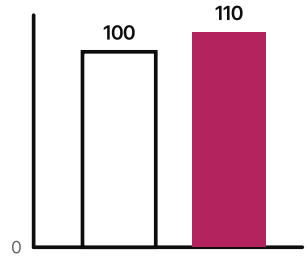
An illustrative example: sales rise from 100 to 110, a 10% increase.

Truncated axis



The axis starts at 95 and one bar is three times as tall as the other. **Sales seem to have soared.**

Axis from zero



The bars measure 100 and 110. **You see the real rise, which is small.**

With the truncated axis, the drawing grows 200% for data that rise 10%: a lie factor of 20.

Why it happens

1 

We read the size of the drawing as if it were the size of the data;

2 

if the scale is cut or the shape grows in height and width, the drawn change exceeds the real one;

3 

and the impression sticks even when the numbers are written down.

Applications in design

Use it like this

Before publishing, compare how much the drawing changes with how much the data change.

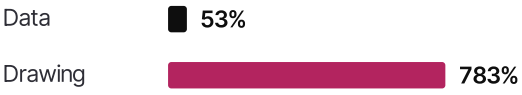
Avoid

Bars on a truncated axis and shapes that grow in height and width at once.

Don't fall for it

Check where the axis starts before trusting the shape: read the numbers, not just the drawing.

14.8



What the research says

In a New York Times chart cited by Tufte, the fuel economy standard for new cars rose 53% (from 18 to 27.5 miles per gallon), but the drawing grew 783% (Tufte, 1983).

●●● **Solid evidence.** It is an example from the book, not an experiment. Experiments do show that truncating the axis makes differences look more severe, even when the break is marked on the chart (Correll, Bertini and Franconeri, 2020).

Connections

Used in

- Data visualization

Related to

- Framing effect
- Deceptive patterns (dark patterns)

Authors and works

1983	**Edward R. Tufte**	Proposed the measure and its underlying rule: what is drawn should be proportional to the quantities it represents.
2020	**Michael Correll, Enrico Bertini and Steven Franconeri**	In three experiments, found that truncating the axis makes differences seem more severe, in both bar and line charts.

Sources

Original sources

- Tufte, E. R. (1983). The visual display of quantitative information. Graphics Press.
- Correll, M., Bertini, E., & Franconeri, S. (2020). Truncating the y-axis: Threat or menace? In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems. ACM. View source (https://arxiv.org/abs/1907.02035)

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