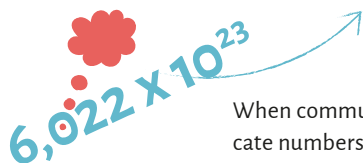


Numbers and statistics



III. GET STARTED

by JEAN-PAUL BERTEMES

When communicating science, it is often necessary to communicate numbers and statistics, as they provide scientific evidence in a lot of cases. However, special care should be taken here, because it can't be assumed that every recipient knows the strengths and weaknesses of different statistical methods or has sufficient contextual knowledge to be able to evaluate numbers, statistical results or risks. Is a hundred deaths a lot or a little? Isn't a two-degree rise in global temperature actually quite pleasant?

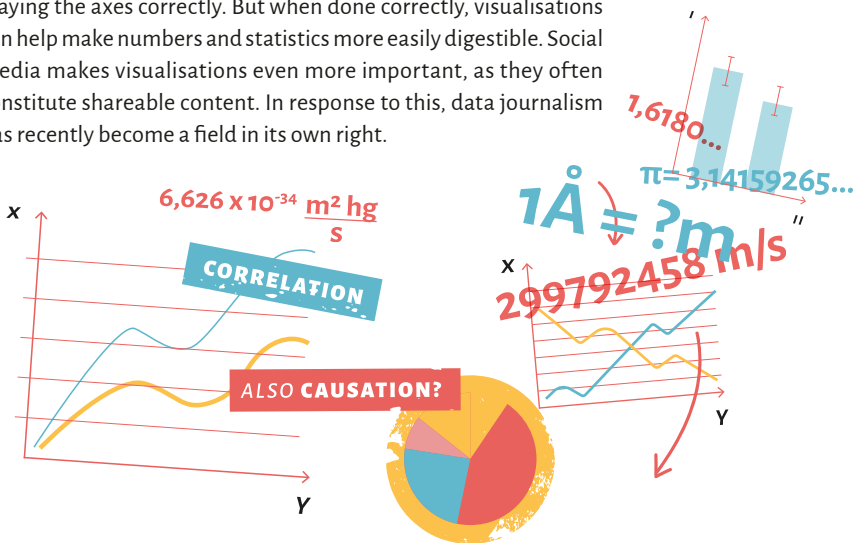
When dealing with particularly large or small numbers, for example, it is important to give readers a sense of scale. The distance between the Sun and the Earth is about 150 million kilometres. That is hard to imagine. How long would it take to get there on a train travelling at 250 km/h? Nearly 70 years... that makes the distance more comprehensible.

When using projections and simulations, it is important to communicate not only the result, but also the uncertainties and background information about the method. During the COVID-19 crisis, epidemiologists were sometimes accused of trying to predict the future like clairvoyants. Perhaps because the projections were sometimes poorly communicated by the media? "Scientists predict 20,000 deaths by March!" More nuanced information would emphasise that the model predicts a certain number of deaths based on the current state and data, assuming that nothing changes – and that changes in behaviour might have a significant impact on the results. For reasons of transparency it is also wise to emphasise uncertainties, by indicating for example the positive, negative and middle scenario. Otherwise, the risk is high that the next news is: "The scientists were wrong. Not exactly the predicted number..." When you indicate uncertainties, it is good to use numerical ranges rather than verbal statements ^[29].

And when communicating statistics, be aware of the common risks of interpretation. For example, if a study finds that people who drink a lot of red wine live longer, does this automatically mean that it is because of the red wine or because of something else? People can be too quick to assume causation from a mere correlation.

In many cases, context is very important. This is the case when talking about risks, for example. What is the risk of a drug worth if you don't compare it with the risk of the disease it prevents? Only then can the recipient decide what risk they are willing to take. Or if you indicate growth as a percentage, it is important to also provide absolute figures as a reference. If a company increases its sales by 100 per cent compared to the previous month, it makes a difference whether the company sold one item last month or a million. Or, if the management of a company received a 5 per cent pay rise and the staff received a 10 per cent increase, it doesn't necessarily mean that the employees received more in absolute terms.

Visualisations are particularly important in this area. But beware of possible manipulations! For example, compressing or stretching graphs to make values appear more blatant or harmless. Or not displaying the axes correctly. But when done correctly, visualisations can help make numbers and statistics more easily digestible. Social media makes visualisations even more important, as they often constitute shareable content. In response to this, data journalism has recently become a field in its own right.



Recommended reads:

- ♦ Kerr et al. (2021), *The effects of communicating uncertainty around statistics on public trust: an international study*. <https://doi.org/10.1101/2021.09.27.21264202>
- ♦ Bauer et al. (2014), *Warum dick nicht doof macht und Genmais nicht tötet; Über Risiken und Nebenwirkungen der Unstatistik*. Campus Verlag. ISBN:9783593500300; <https://doi.org/10.1101/2021.09.27.21264202>