Figure Design

Figures are the most engaging part of papers and presentations. Many people will skim your work and only takeaway anything from the figures, or will only read your work if the figures seem interesting. Figure design is just as, if not more, essential when communicating results to stakeholders and the media. As a result, it is important to make your figures memorable. As a rule of thumb, you should have one figure for each key result.

Unfortunately, making memorable figures which also communicate key points effectively is not easy. As Munzer (2014)[1] says,

> The most fundamental reason that vis design is a difficult enterprise is that the vast majority of the possibilities in the design space will be ineffective for any specific usage context. In some cases, a possible design is a poor match with the properties of the human perceptual and cognitive systems. In other cases, the design would be comprehensible by a human in some other setting, but it's a bad match with the intended task. Only a very small number of possibilities are in the set of reasonable choices, and of those only an even smaller fraction are excellent choices. Randomly choosing possibilities is a bad idea because the odds of finding a very good solution are very low.

Tufte (1983)[2] characterizes graphical excellence as

> [It] consists of complex ideas communicated with clarity, precision, and efficiency...[It] is that which gives to the viewer the greatest number of ideas in the shortest time with the least ink in the smallest space...[It] requires telling the truth about the data.

Many graphics packages use default settings which may not be the result of ideal choices. Visualizing uncertainty is also challenging. This page presents some general guidelines on figure design, but these are not to be treated as dogma, as each case is unique, and breaking some of these rules may create more effective figures in certain cases. Ultimately, data visualization is contextual, and the only way to create effective figures is to understand the structure of your data to have insight into how to honestly guide viewers to relevant take-aways.