



Kelleher and Wagener<sup>1</sup> explain that people are better able to perceive length and position than line width, colour hue or tint and marker size (or area), so length and position should be used when it's important to show the actual values of a data set, while line width, colour, and area should be used to show patterns or relative values

## Using Colour

- ⤴ It's usually best to keep grids, axis labels, borders, etc. in shades of grey, to bring attention to coloured data.
- ⤴ Ensure your use of colour is meaningful in relation to the patterns being discussed. Most visualisation tools will provide options.
- ⤴ Two or three colours in varying shades can be more informative and easier to take in than many colours.
- ⤴ Use contrasting colours to show differences, and similar colours to show analogy.
- ⤴ If you are using colour to visualise quantitative data, you may want to use a graduation from light to dark, with low values lighter and high values darker

## Visualisation tools

Most quantitative and qualitative data analysis software now includes a variety of visualisation options: e.g. Excel can export a wide range of graphs and figures, while nVivo offers a wordle-type tool. Third party apps and tools allow for more elaborate visualisations and the potential for easily sharing them, e.g. [Google Earth](#) for visualising geographic data ([MapMakerpedia](#), [KoboMap](#) and Google's [fusion tables tutorial](#) can help you get started with mapping). [Google Charts](#) offers a range of free visualisation tools, the outputs of which can be embedded into web sites, while [Many Eyes](#) works on the principle that if you upload your data, other people can generate their own visualisations too.

There is a list of [free data visualisation tools](#) from the Guardian, which has pioneered making UK political and social data publicly available and encouraging imaginative approaches to visualisation. Techjaws.com recommend [15 free applications to create effective data visualisations](#) and datavisualization.ch has its own [selected list](#). Computer World's [30 free tools for data visualization and analysis](#) provides not only a list of tools, but a convenient table which shows what each tool is good at as well as the required skill level, platform, and how it handles data storage.

Web Designer Depot's [50 great examples of data visualization](#) includes tools which connect to social media, music and other web services. For example, TwittEarth shows live tweets covering a 3D globe, while We Feel Fine takes the emotional temperature of the blogosphere. With the rise of digital social networks have come a host of tools for conducting network analytics, e.g. [cytoscape](#), [SocialAction](#) and [NetMiner](#), and these are increasingly used for visualising other complex structures such as molecular structures and biological processes. [CETIS](#) has collected sample visualisations of social network data and other open/public data.

**Infographics** require really creative visual thinking so not everyone will be comfortable creating them from their own data, but they do have huge impact. Try [visual.ly](#) and [creately](#) for some free tools and examples or [inkscape](#) for a free drawing tool.

## Examples of data visualisation

[50 Great Examples of Data Visualization](#) provides examples of amazing data visualisations for a range of uses and audiences.

Many public databases now have visualisation built in so that you can generate new viewpoints on the data as you explore it. [GapMinder](#) is an accessible database of global health and poverty statistics and is popular in the teaching of social sciences, while [CarbonVisuals](#) provides a map-based interface on the carbon footprint of UK public buildings.

Other research projects that have made innovative use of visualisation tools include:

- ✧ connect globally with people who share your research interests
- ✧ [The Fair Trading Project](#), UK HE research project looking at fair trade.
- ✧ [Breath](#), UK, Wellcome Trust funded project.
- ✧ [Action Science Explorer](#) (US, science research community).

### Additional information

As a researcher you should be aware of your responsibilities with respect to, amongst other things, IPR, research ethics, information security, data protection and mobile computing. If you need advice please see the Plymouth University [Research Degrees Handbook](#) and ask your research supervisor for guidance.

### Further information

Kelleher and Wagener<sup>1</sup> offer ten guidelines for effective data visualisation in scientific publications, though their points may serve use for those in the social sciences as well.

Kelleher, C., and Wagener, T. (2011) Ten Guidelines for Effective Data Visualisation in Scientific Publications. In *Environmental Modelling and Software*, June 2011, pp. 822-827.

Stone, M. (2006) [Choosing colors for data visualisazation](#). Business Intelligence Network.

Kosslyn, S.M. (1989) Understanding Charts and Graphs. In *Applied Cognitive Psychology*, 3 (1989), pp. 185-226.

Few, S. (2010) [Data Visualization for Human Perception](#). In Soegaard, M. and Dam, R.-F. (eds) *Encyclopedia of Human-Computer Interaction*. Aarhus, Denmark.

Cascade project interns' [animation about data visualisation](#)

[TED Talk with David McCandless about data visualisation](#)

[TED Talk on visuals for global poverty statistics](#)