Visualizing composite data on the Lexis surface

What share of a population features attribute *i* at period *t* and age *x*?
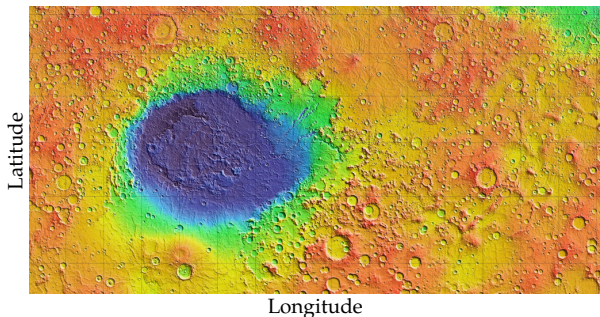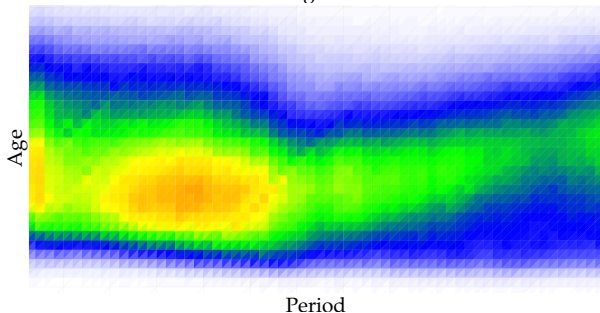
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Predefined Visual Spaces

A spatial map
The surface of Mars with elevation encoded by colour. *NASA 2000.*
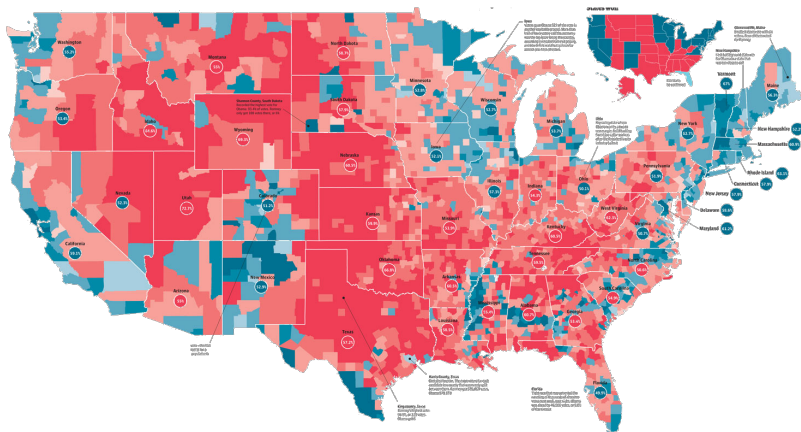

A temporal map
Fertility rates in Scotland since 1945 with rate encoded by colour. *Modified from Riffe 2011.*

Plotting data: Magnitudes vs. Compositions

Easy		𝕳𝖆𝖗𝖉

$$187\frac{\text{Deaths}}{10\,000\,\text{Persons}} \quad\Longleftarrow\quad \begin{pmatrix} 93 & \text{Neoplasm} \\ 40 & \text{Cardiovascular} \\ 23 & \text{Respiratory} \\ 12 & \text{Accident} \\ 19 & \text{Other} \end{pmatrix}$$

Single value   composed of   n-dimensional vector

$\Downarrow$ expressed as

$$\begin{pmatrix} 0.50 & \text{Neoplasm} \\ 0.21 & \text{Cardiovascular} \\ 0.12 & \text{Respiratory} \\ 0.06 & \text{Accident} \\ 0.11 & \text{Other} \end{pmatrix}$$
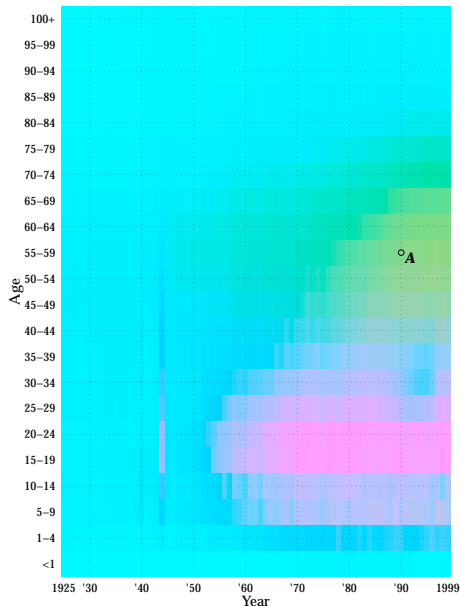
n-dimensional simplex

Binary compositions on a surface

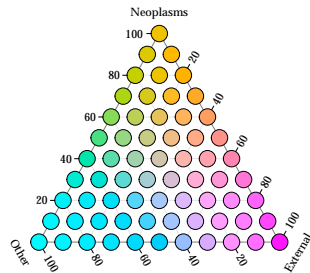**Divergent colour scale**
US presidential election 2012.
Proportion of people voting for Democrats vs. Republicans.
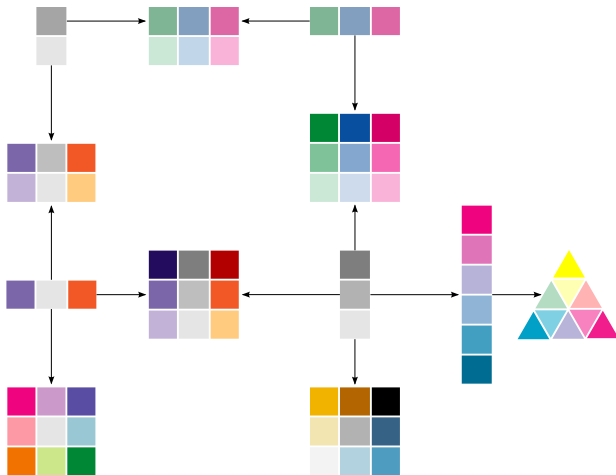*Guardian Graphics 2012.*

Ternary compositions on a surface

Ternary-balance-scheme
Proportion of people dying from a given cause by time and age. *France, total population.*
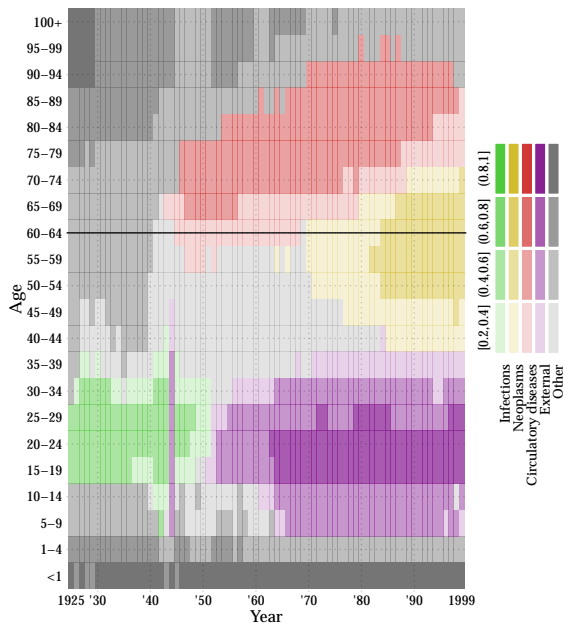
Brewers Typology of Colour schemes

Colour scheme typology
Basic colour schemes and combinations of them. *Redrawn from Brewer (1994).*

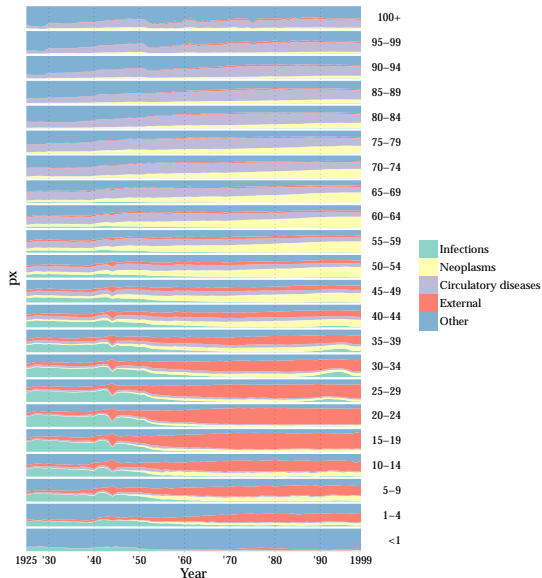# N-dimensional compositions on a surface

Qualitative sequential scheme
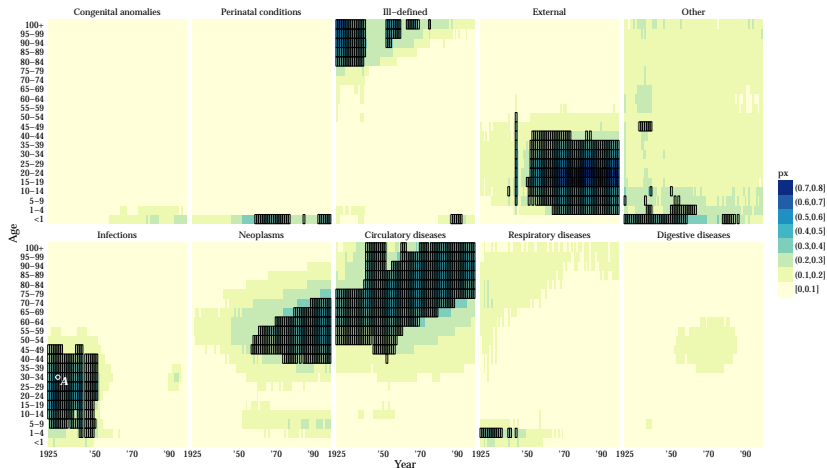Proportion of people dying from the most prominent cause in a given time and age.
France, total population.

N-dimensional compositions on a surface

Age-wise-area-chart
Proportion of people dying from a given cause by time and age.
France, total population.

N-dimensional compositions on a surface

Small-multiples
Proportion of people dying from a given cause by time and age. *France, total population.*

References

Brewer, Cynthia A. (1994). "Color Use Guidelines for Mapping and Visualization". In: ed. by Alan M. MacEachren and D. R. Fraser Taylor. Vol. 2: Visualization in Modern Cartography. Modern Cartography Series. Academic Press. Chap. 7, pp. 123–147.

Guardian Graphics (2012). *US election 2012 results visualised*. Online 2015–01–15. URL: http://www.theguardian.com/news/datablog/2012/nov/07/us-elections-2012-results-map.

MOLA Science Team (2000). *Mars topography (MOLA dataset) with poles*. Online 2015–01–15. NASA. URL: http://mola.gsfc.nasa.gov/images/mercat.jpg.

Riffe, Tim (2011). *Equilateral Lexis Triangles?* Online 2015–01–15. URL: https://sites.google.com/site/timriffepersonal/DemogBlog/equilaterallexistriangles.

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