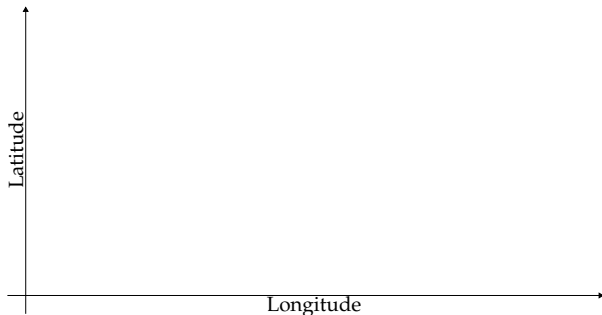# Visualizing Composite Data on the Lexis Surface
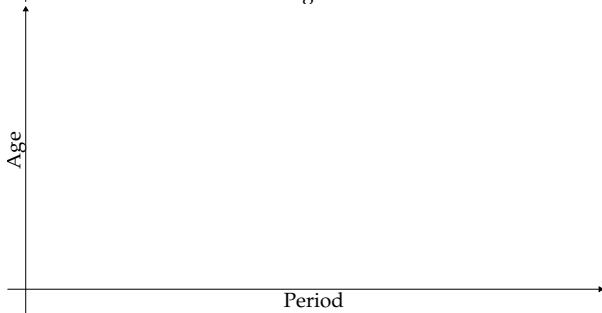
What share of a population features attribute i at period t and age x?

Jonas Schöley

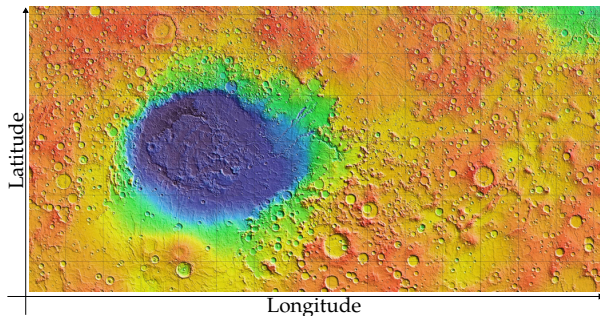schoeley@demogr.mpg.de

Predefined Visual Spaces

Latitude

Longitude

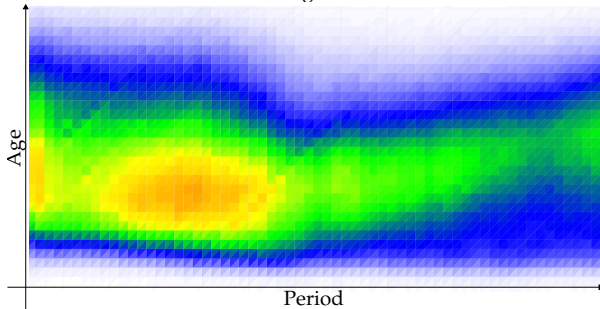**A spatial map**.

Age

A temporal map.

Period

Predefined Visual Spaces

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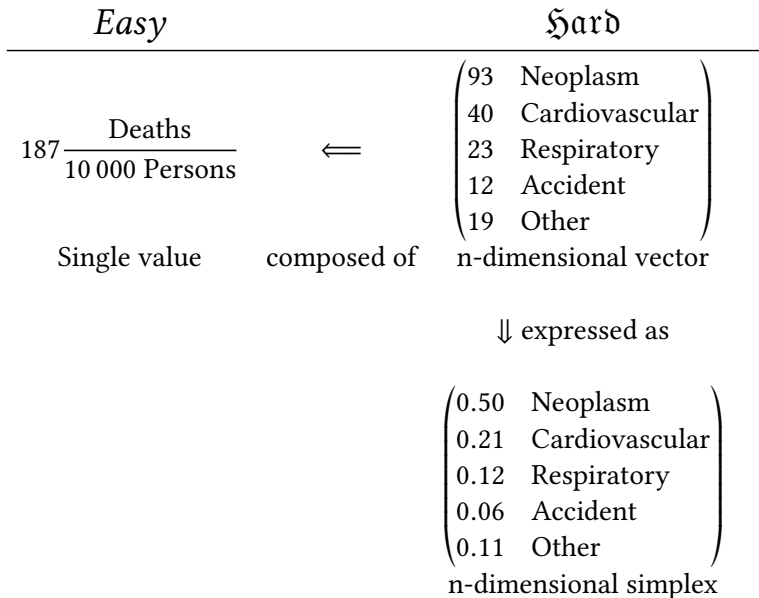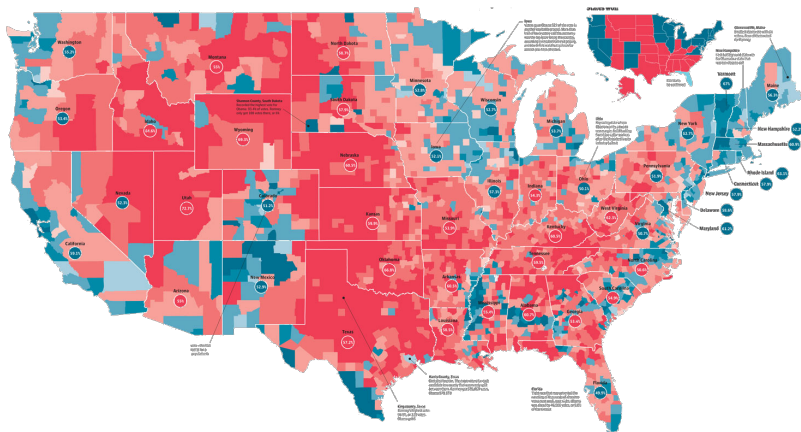with elevation
encoded by colour.
NASA 2000.

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

Plotting Data: Magnitudes vs. Compositions

Easy		$\mathfrak{Hard}$
$187 \dfrac{\text{Deaths}}{10\,000\,\text{Persons}}$	$\Longleftarrow$	$\begin{pmatrix} 93 & \text{Neoplasm} \\ 40 & \text{Cardiovascular} \\ 23 & \text{Respiratory} \\ 12 & \text{Accident} \\ 19 & \text{Other} \end{pmatrix}$
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
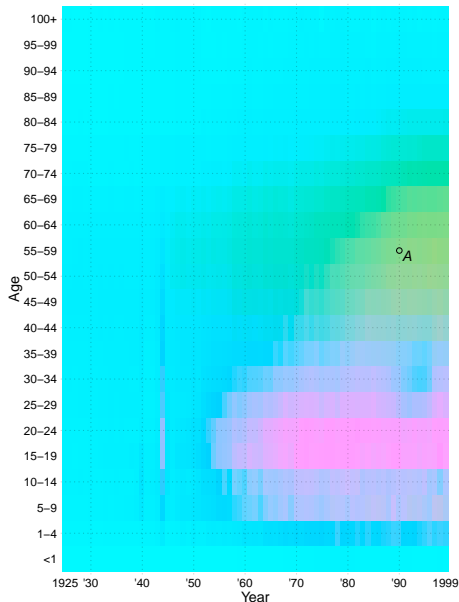
Binary Compositions on a Surface

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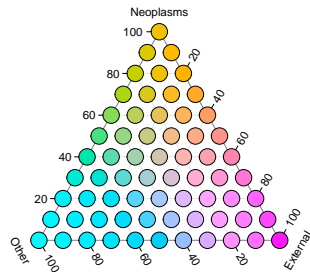US presidential election 2012.
Proportion of people voting for Democrats vs. Republicans.
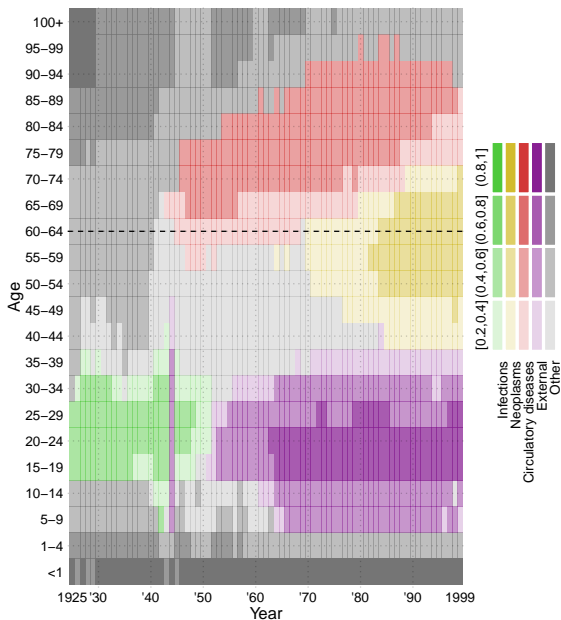*Guardian Graphics 2012.*

Ternary Compositions on a Surface

Ternary-balance-scheme
Proportion of people dying
from a given cause by time
and age. *France, total population.*
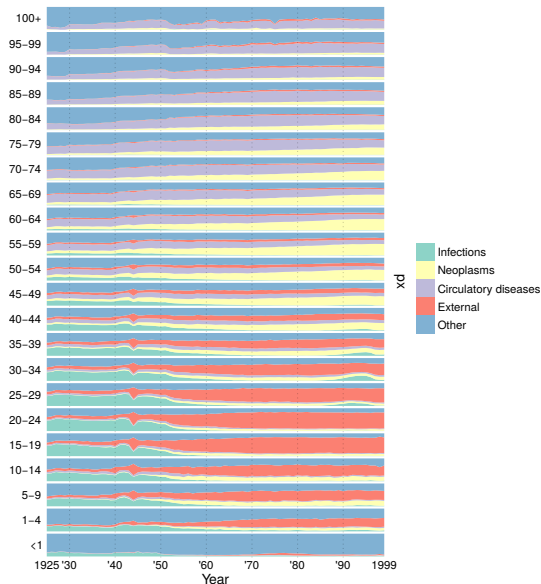
N-dimensional compositions on a surface

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

Interlude: Brewers Typology of Colour Schemes

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

Cont'd: 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.

Cont'd: N-dimensional Compositions on a Surface

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

References

Jonas Schöley and Frans Willekens (2015).
"Visualizing compositional data on the Lexis
surface". In: *PAA 2015 conference paper*

https://github.com/jschoeley/viscomplexis

References

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

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