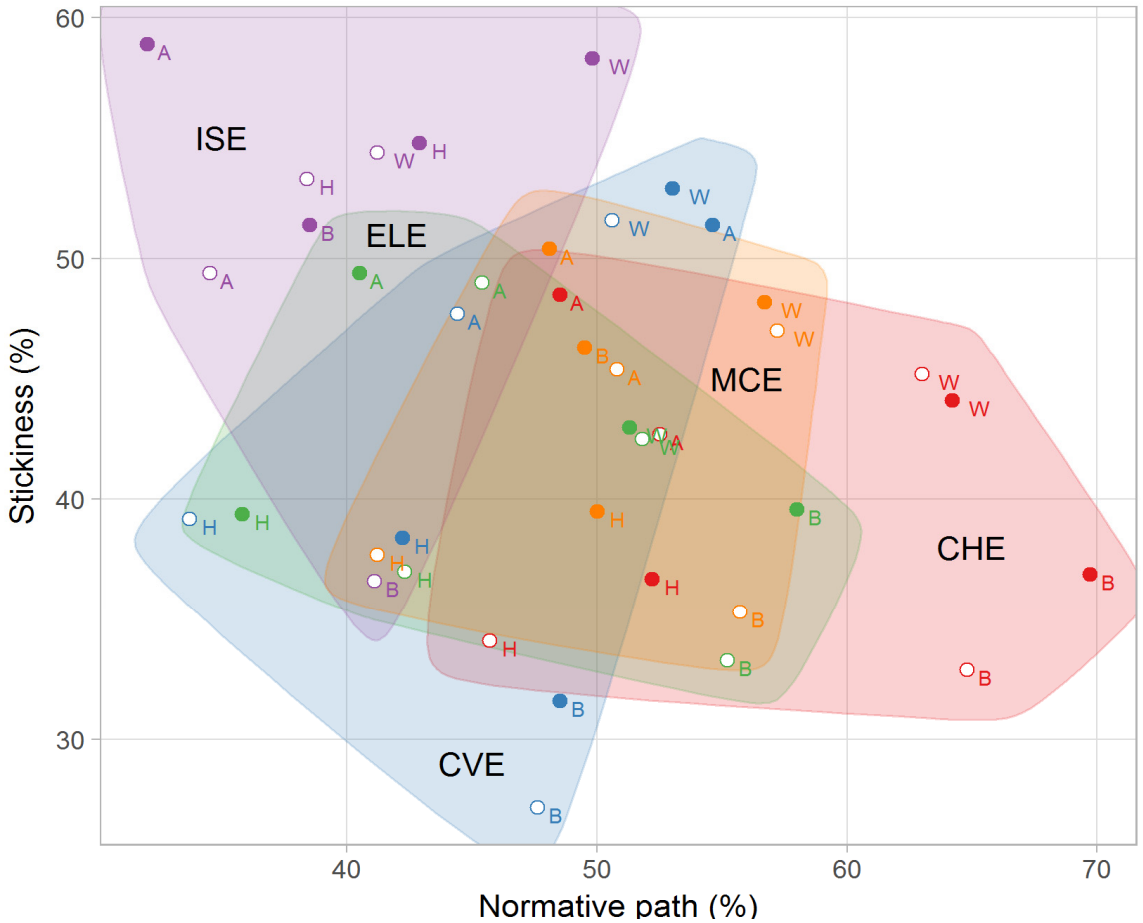
Visual rhetoric and R graphics for the R novice

ME447 Visualizing Data
Fall 2017–18

Richard Layton



ROSE-HULMAN
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We cover three main topics today to introduce the course.

Introductions

Samples

Wk		Agenda
0	R	[tut] Course goals & outcomes
	F	Graphical limitations, portfolio
1	M	[tut] D1 Scatterplots
	T	[tut] Data basics
	R	Discuss today's reading:
	F	[tut] Markdown basics
2	M	[tut] D2 Dot plots
	T	[tut] Subsetting data
	R	Present and discuss D1+critique
	F	[tut] Document design 1
3	M	[tut] D3 Multiways
	T	[tut] Reshaping data
	R	Discuss today's reading:
	F	[tut] Basic file management

Calendar, syllabus, resources

The course is about visual rhetoric: reasoning about quantitative data.

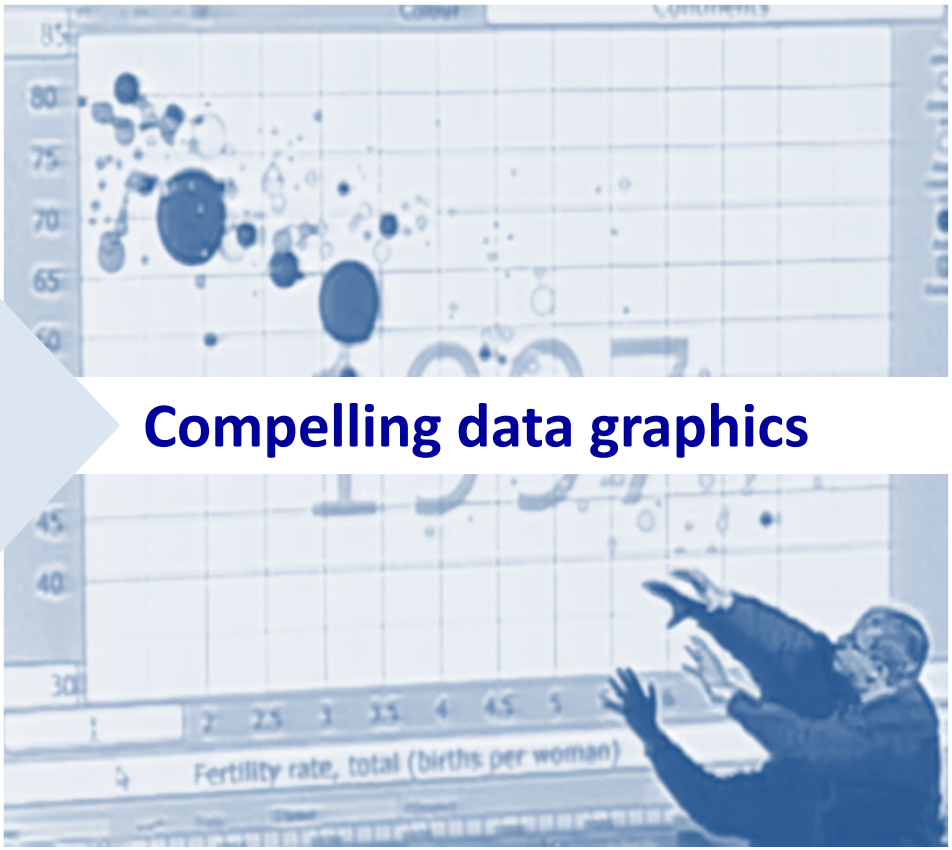
data carpentry and statistics

technical communication

human perception

display design

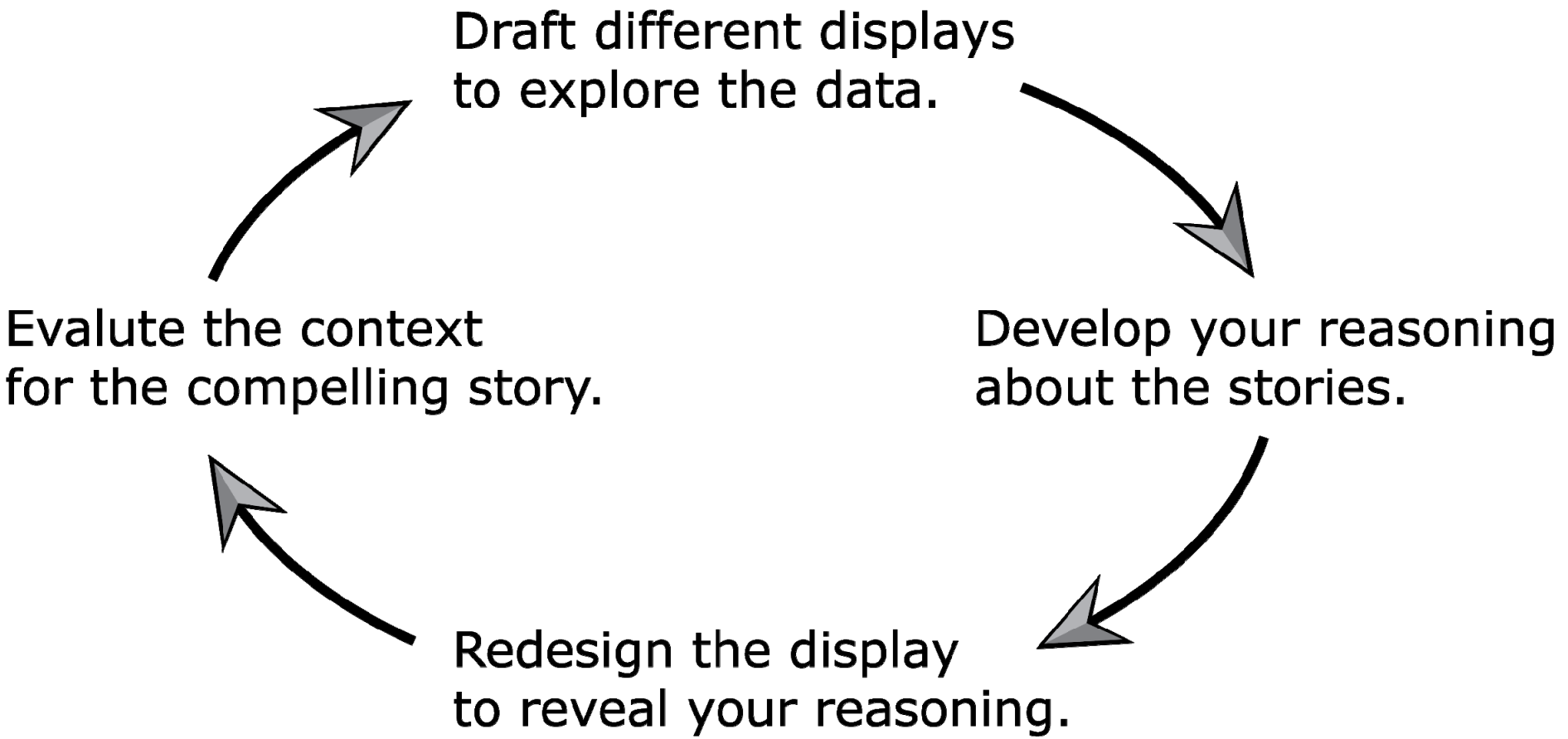
ethics



Compelling data graphics

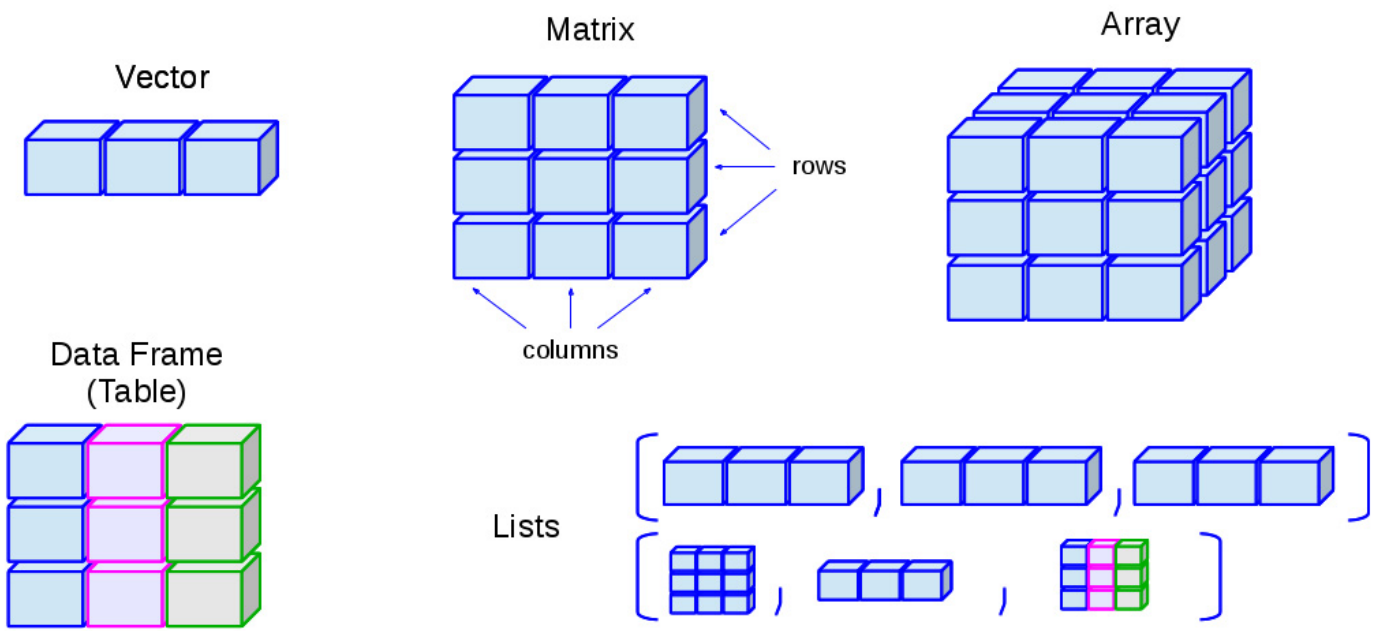
Hans Rosling, https://www.ted.com/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen#t-270297

Creating effective data graphics requires curiosity, imagination, critical thinking, and software fluency.



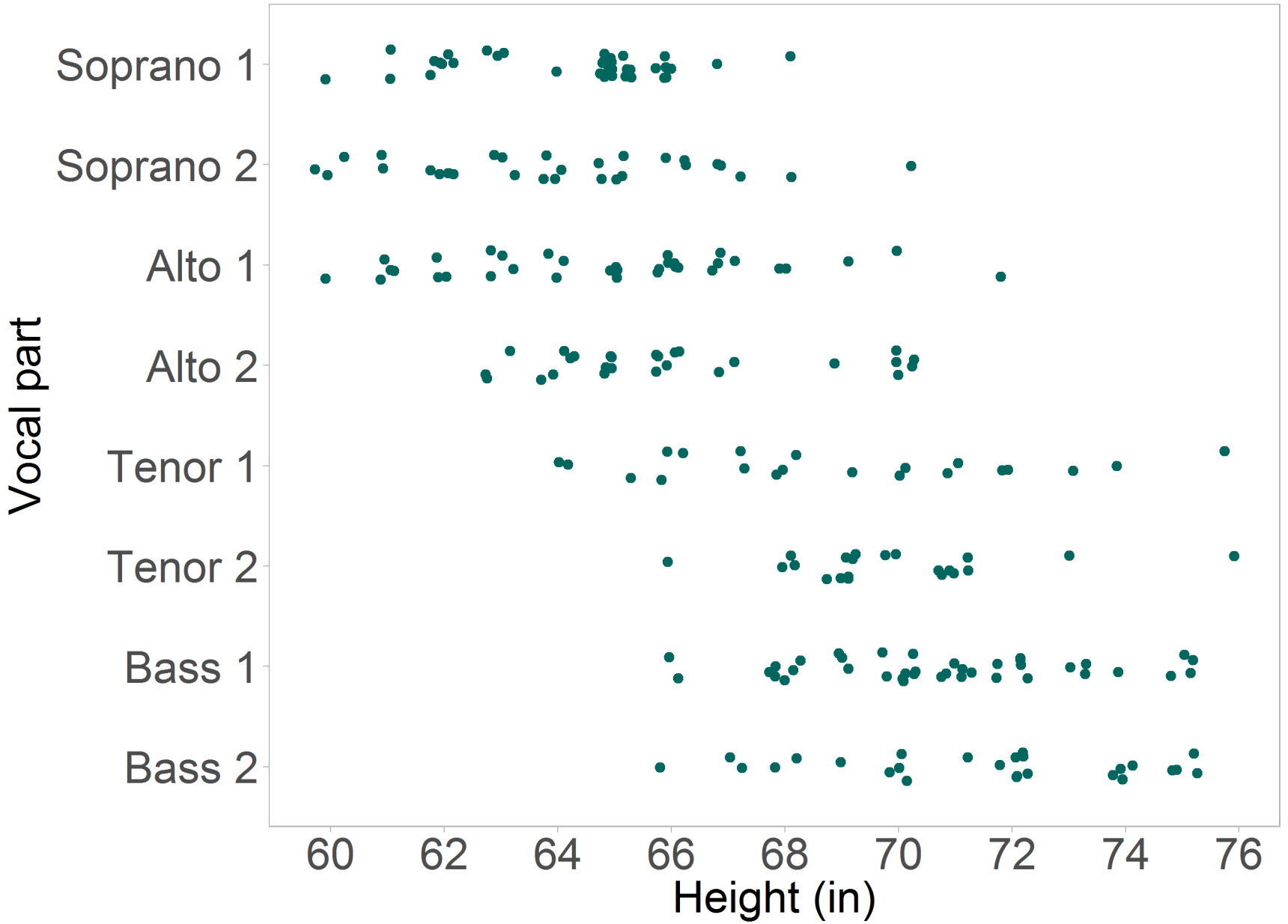
The data – its type and organization – constrains your display design options.

- number of variables
- chronological
- quantitative
- categorical
- continuous
- discrete
- spatial

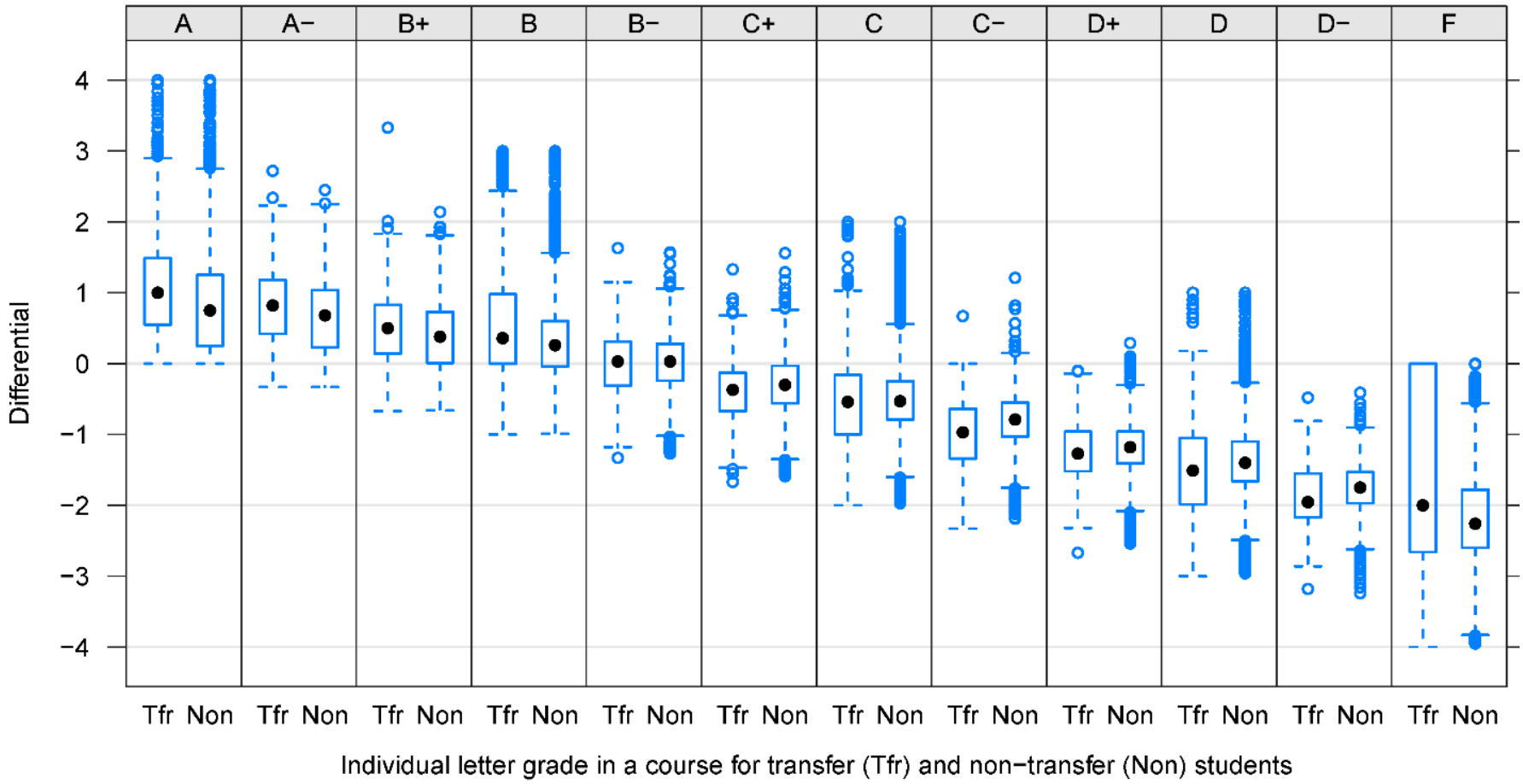


Samples: how data type helps
determine graph type

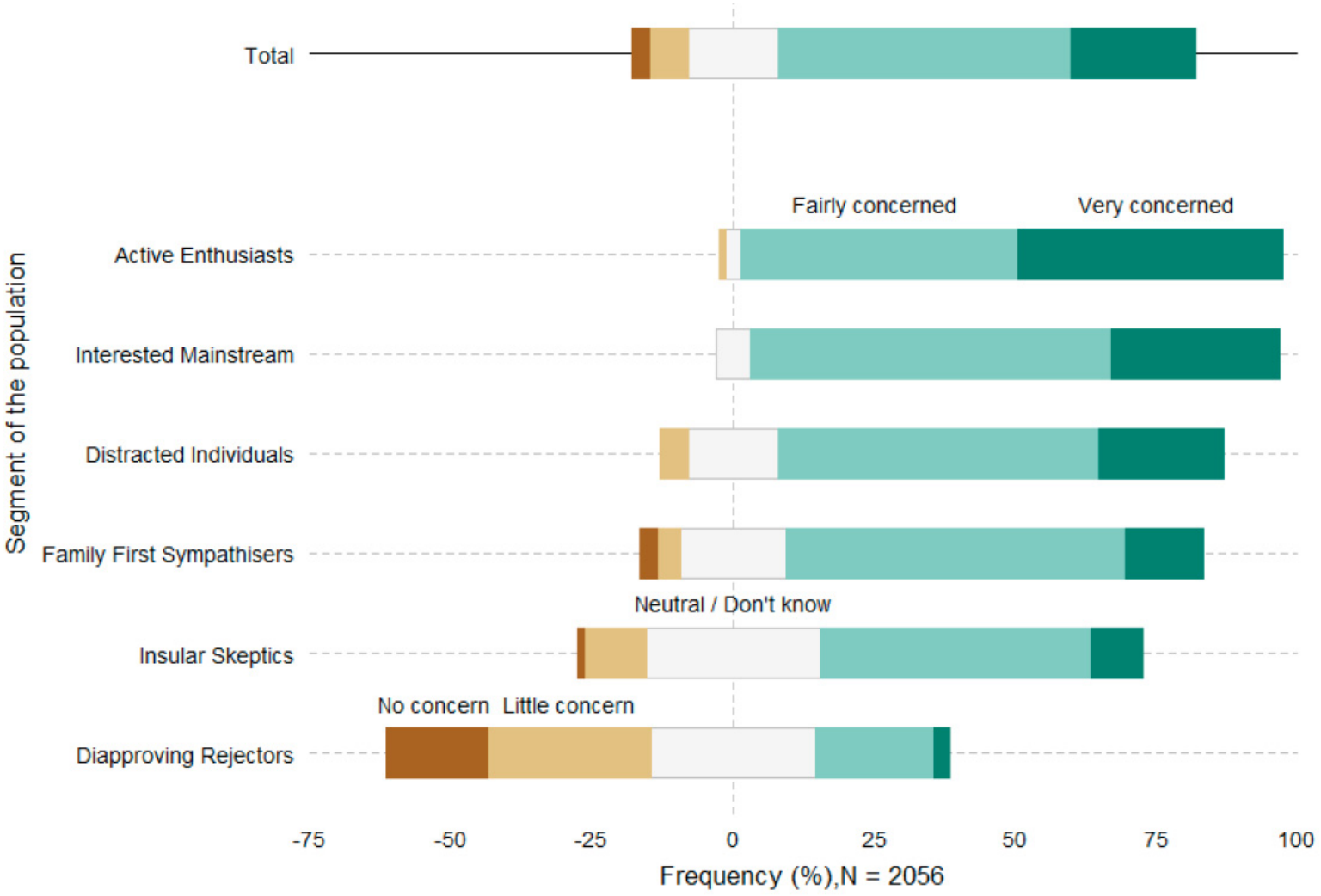
Univariate data: show the data jittered



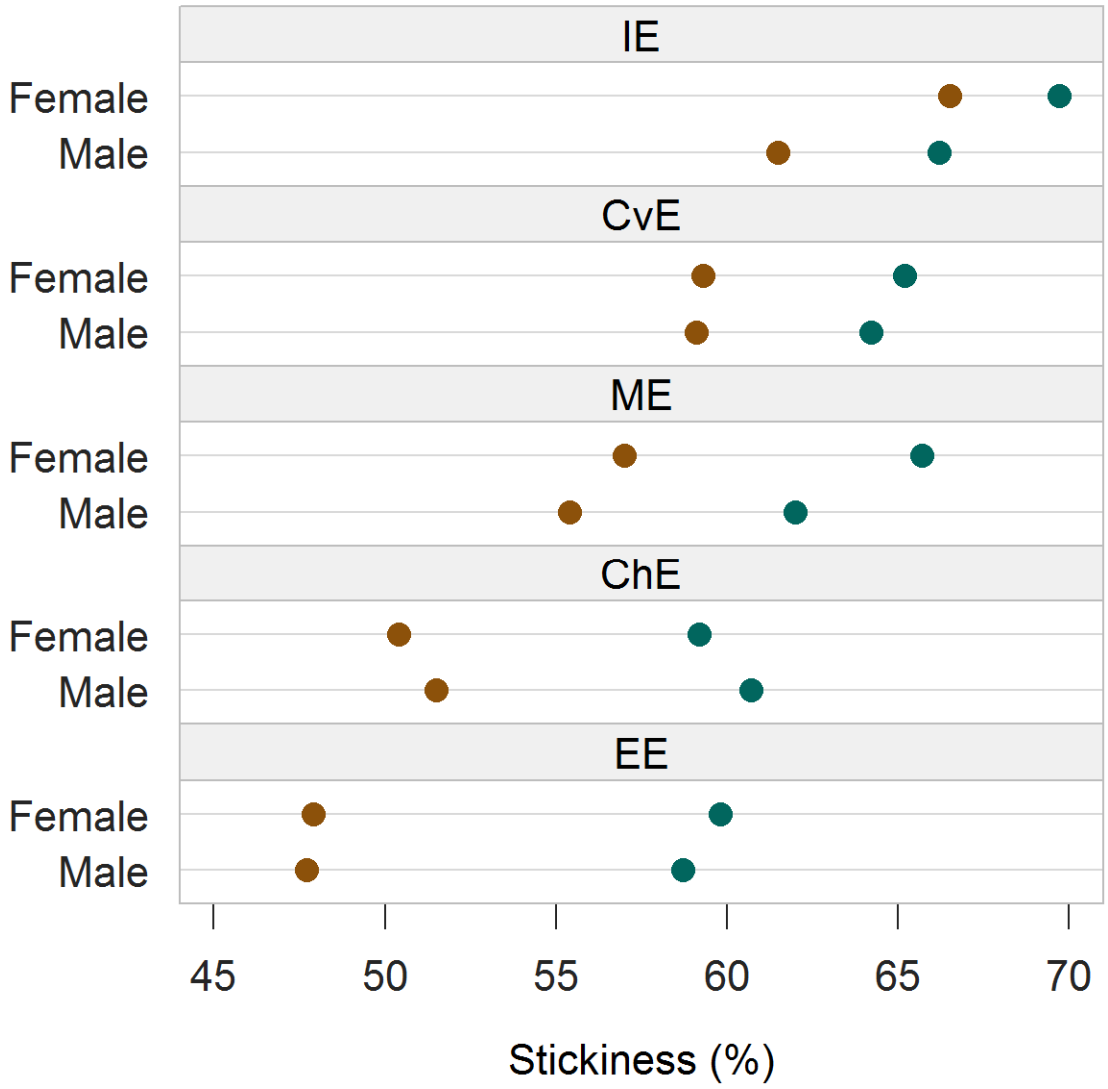
Univariate data: box-plot



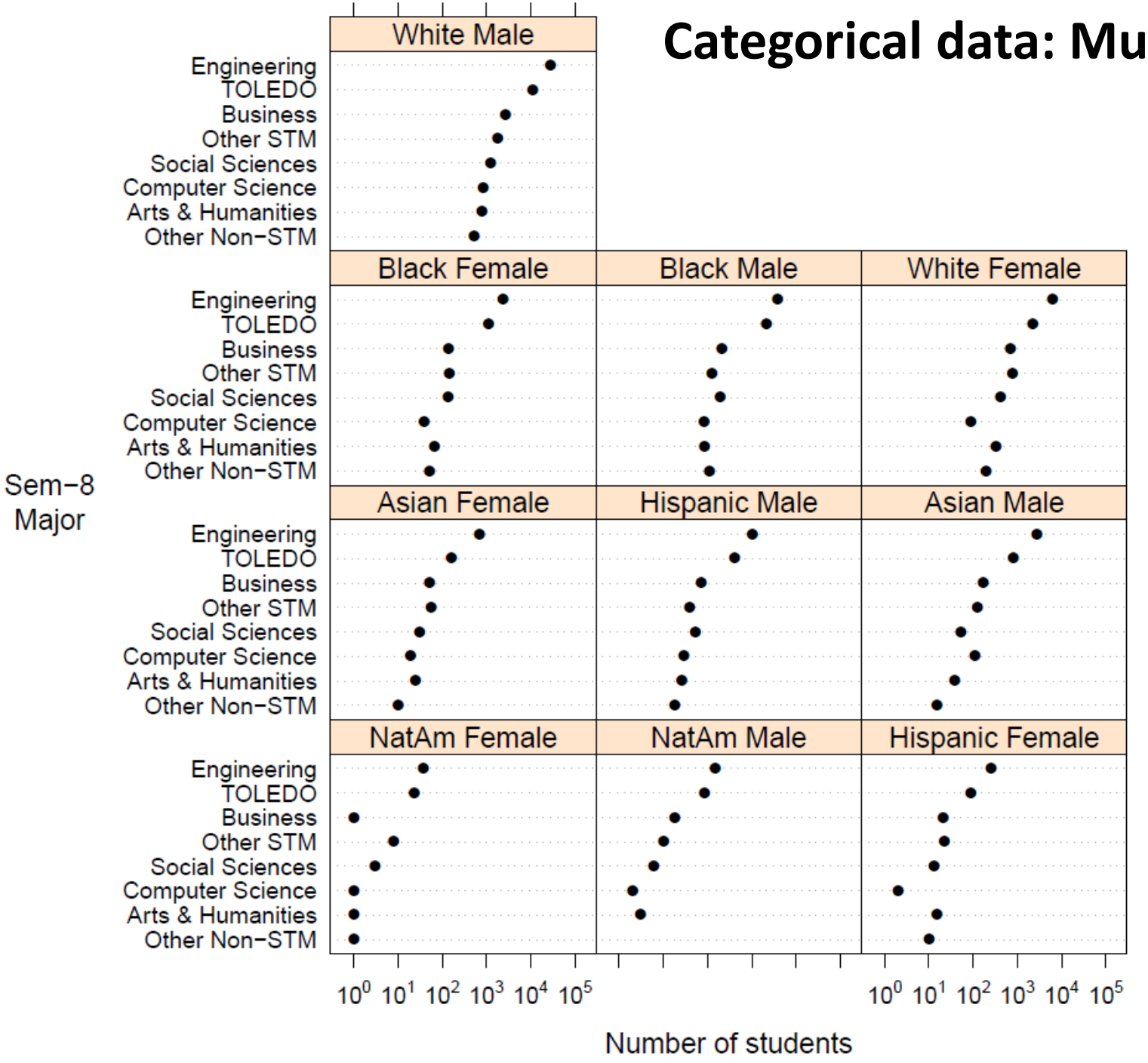
Survey responses: diverging stacked bar



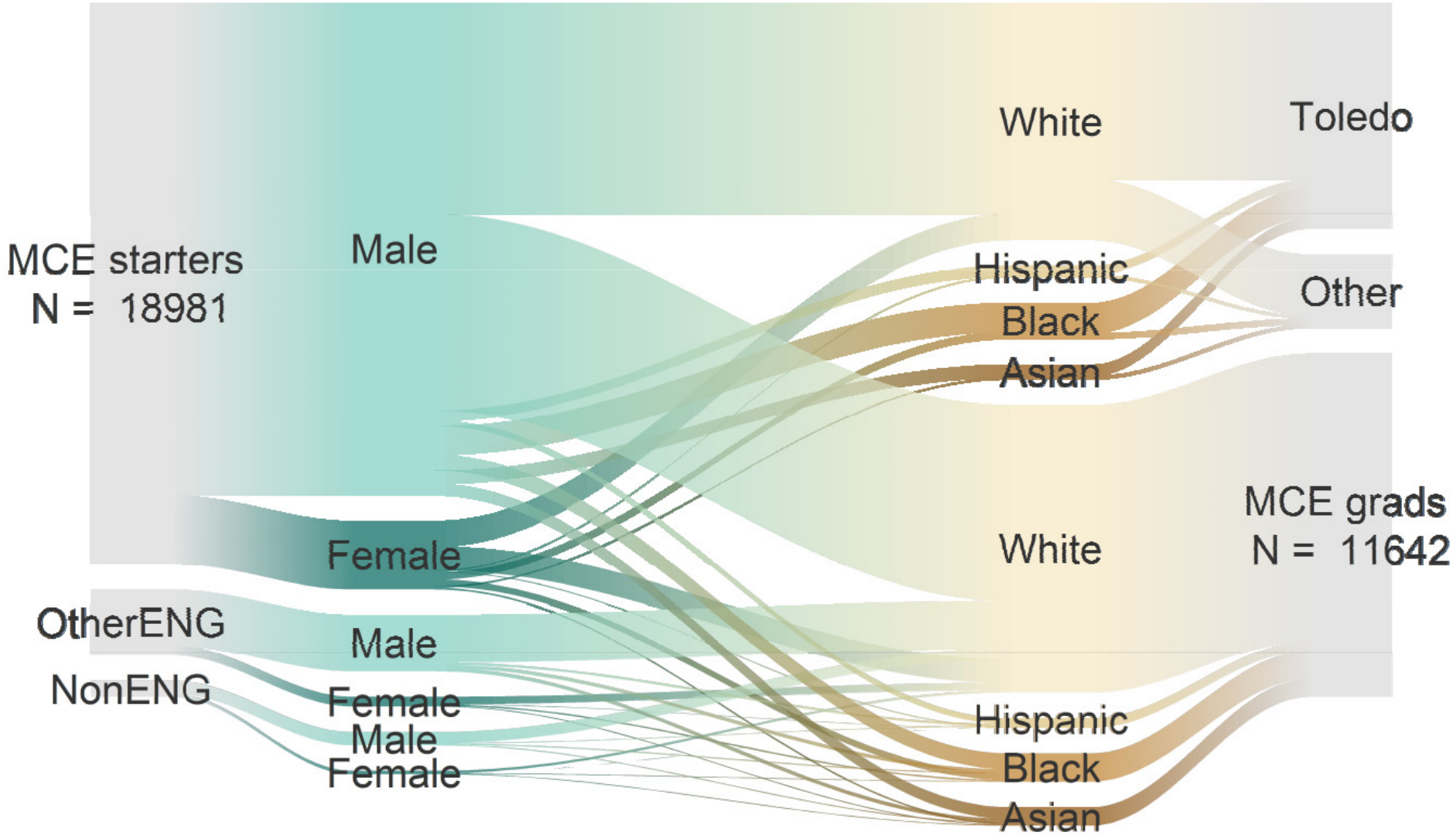
Categorical data: dot plot



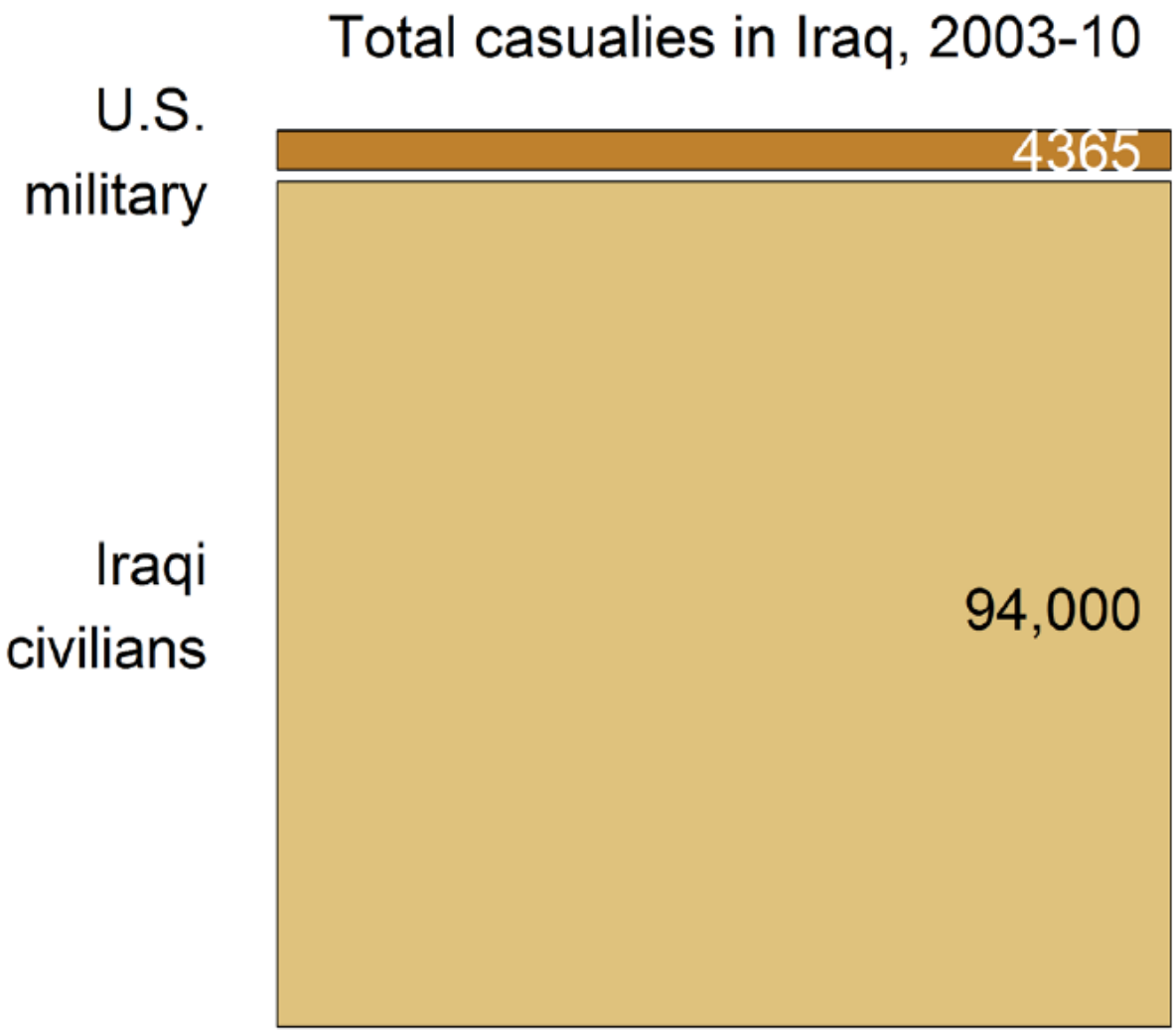
Categorical data: Multiway



Categorical data: Sankey diagram

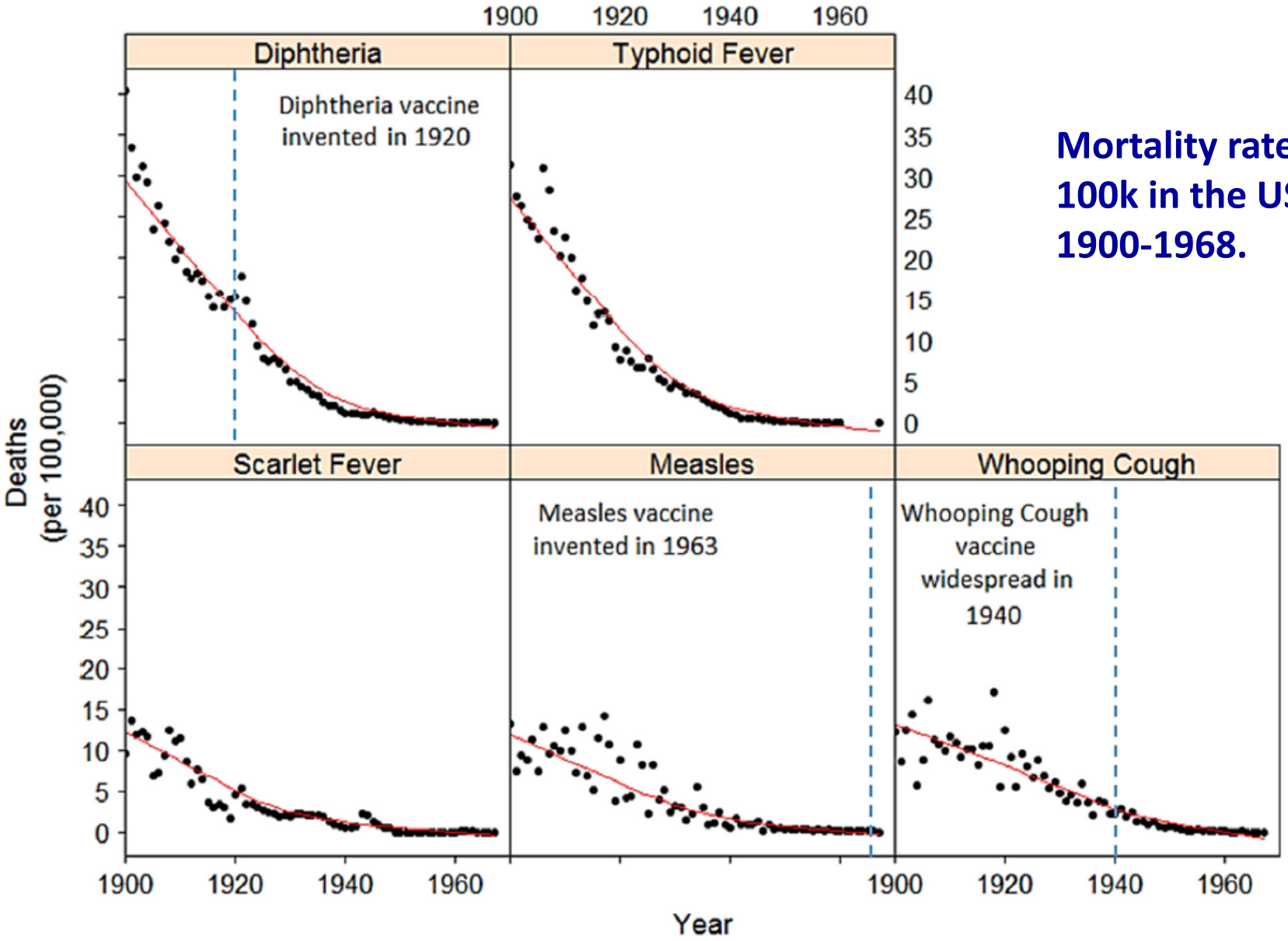


Categorical data: Mosaic plot



KSWAT 41st bring medical care to children (2008) by DanielWest, https://www.dvidshub.net/image/103082/.
Funeral of seaman Jesse Pelham (2000) by Jeff Hall, https://www.dvidshub.net/image/1081508/.

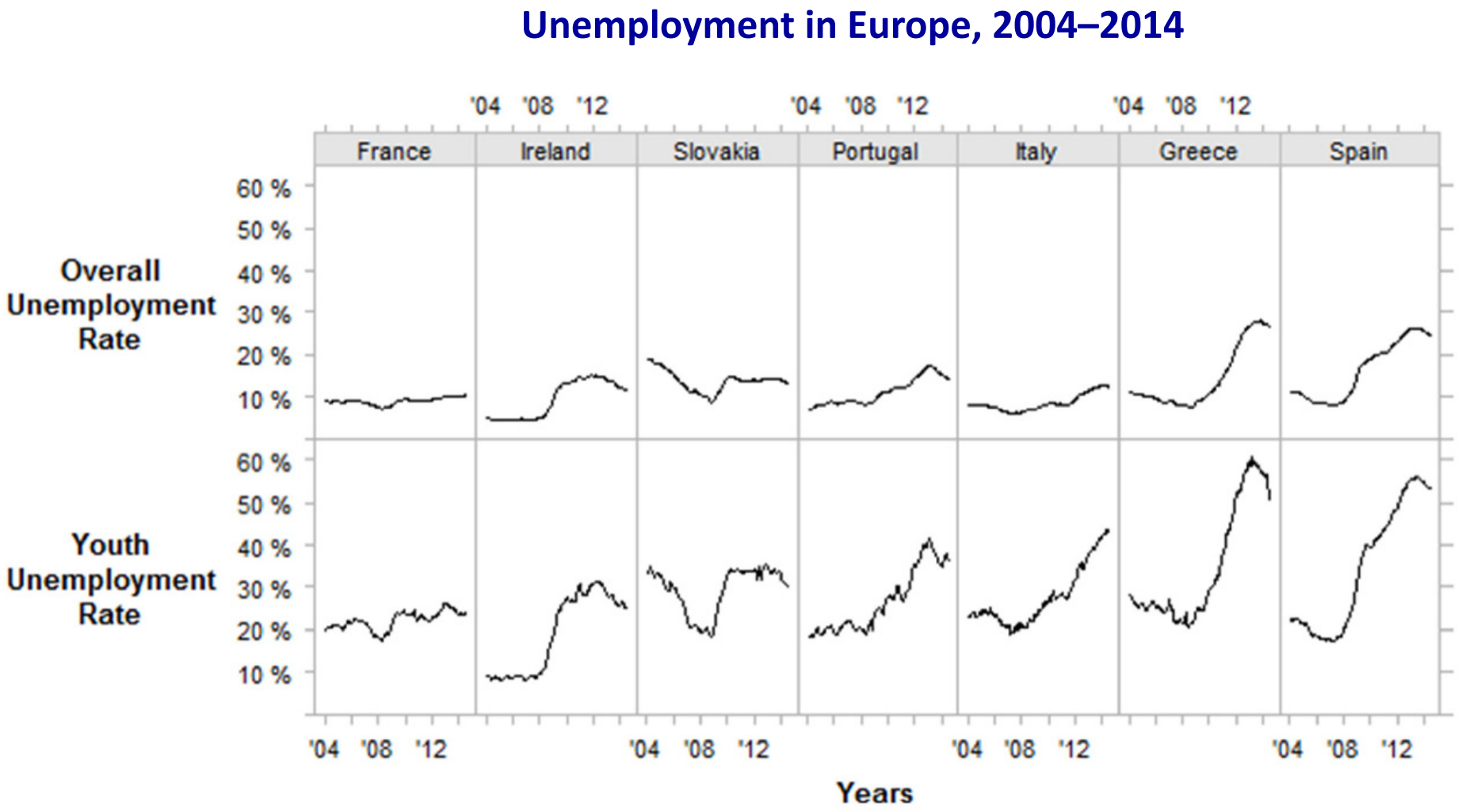
Bivariate data: Small multiples



Mortality rates per 100k in the US, 1900-1968.

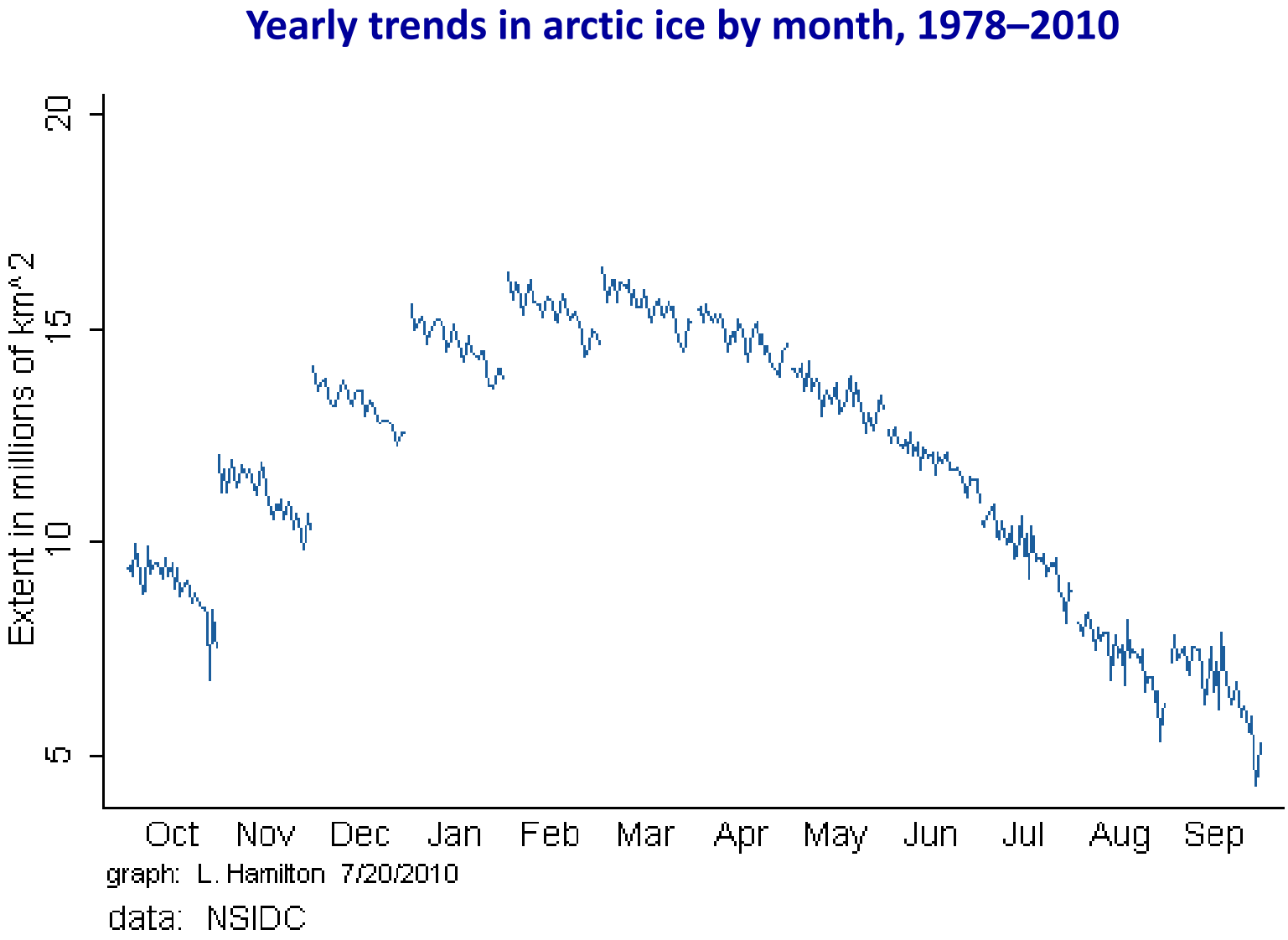
Meredith Pitsch (2014) ME497 portfolio

Time series data: Small multiples



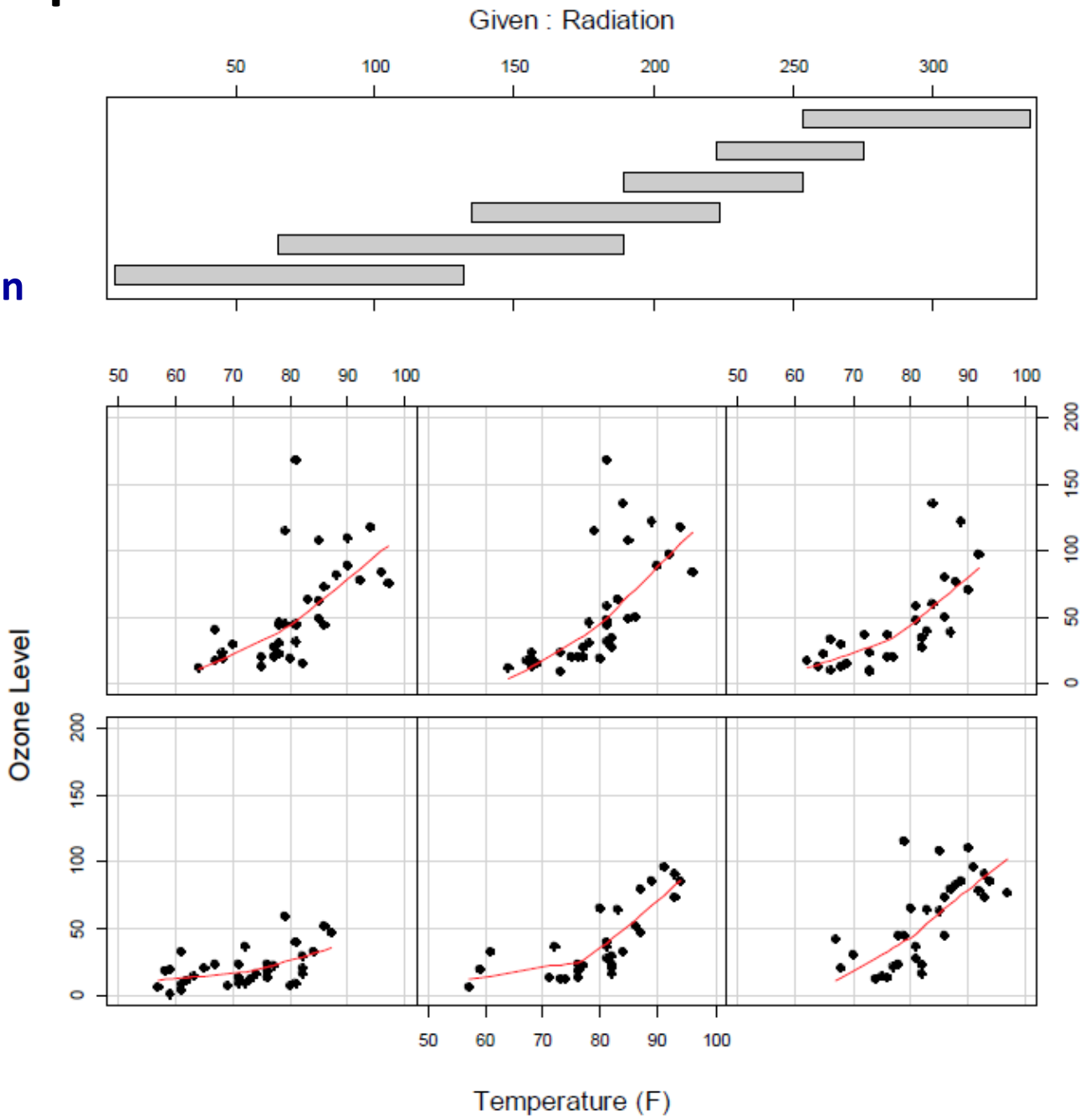
Felix Winkelmann (2014) ME497 portfolio

Cyclic data: Cycle plot



Tri-variate data: Co-plot

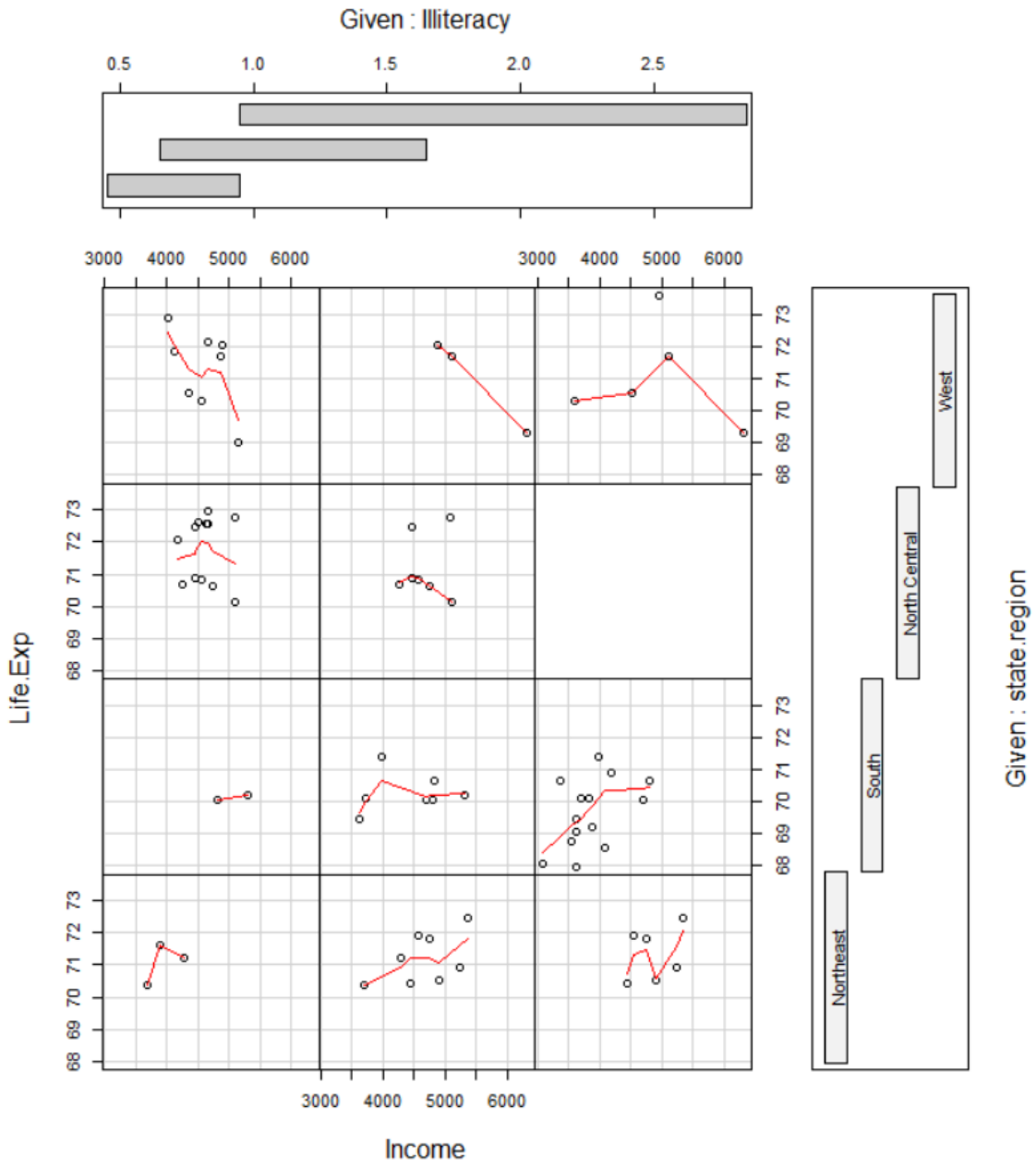
Ozone level as a function of temperature and solar radiation



Four-dimensional data: Co-plot

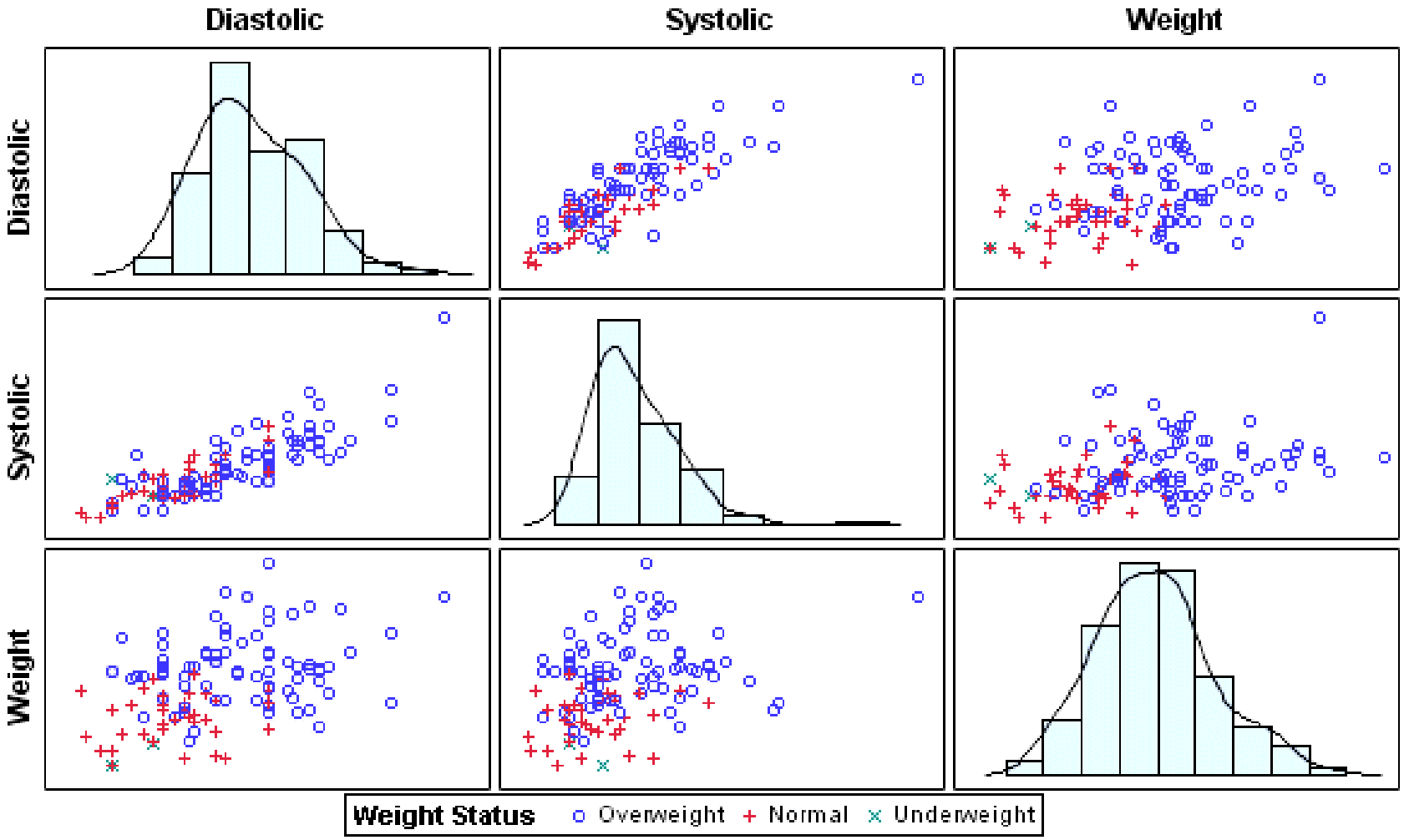
Life expectancy as a function of

- **income**
- **level of literacy**
- **geographic region**



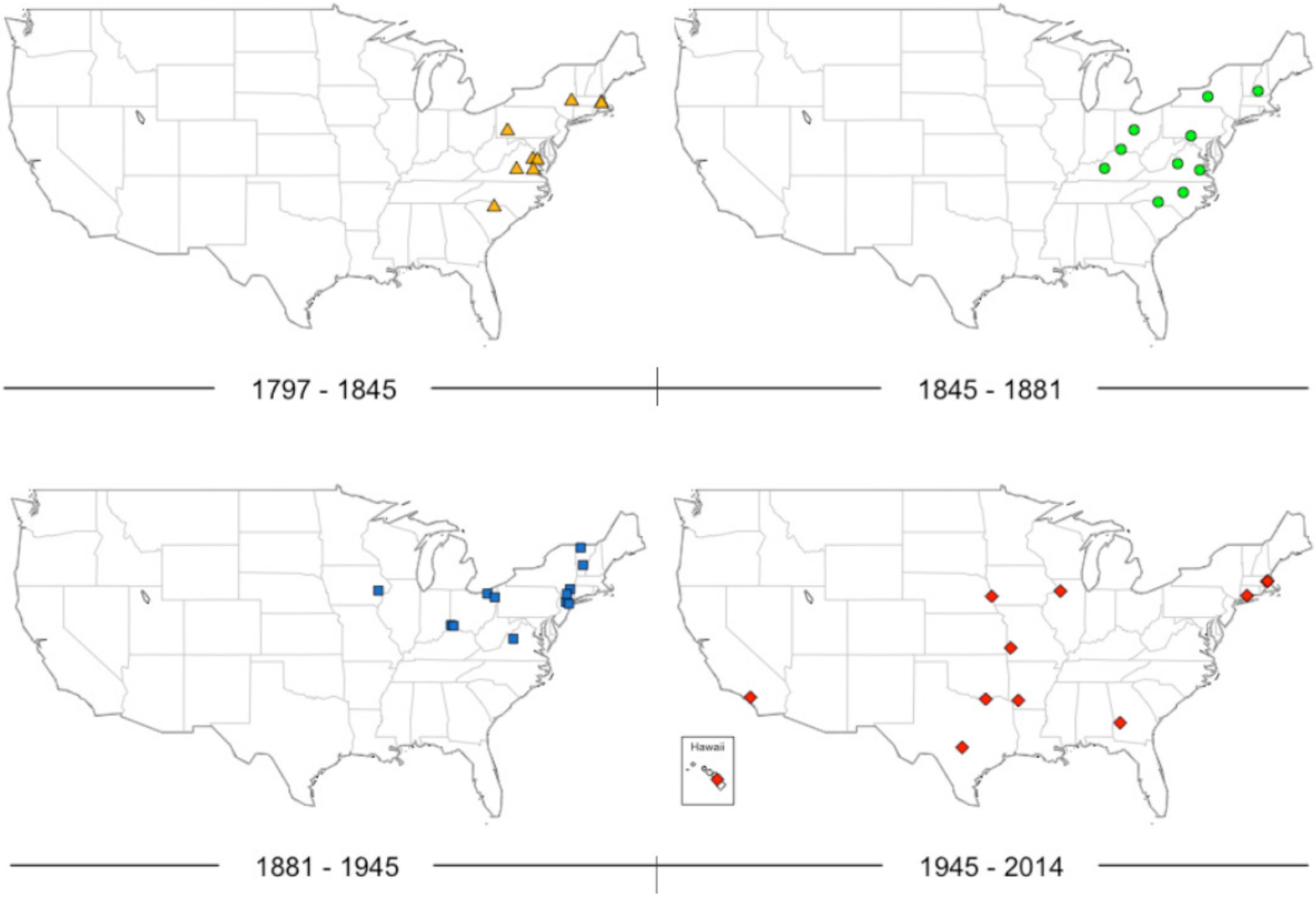
Multivariate data: scatterplot matrix

Blood pressure in heart disease patients under 50



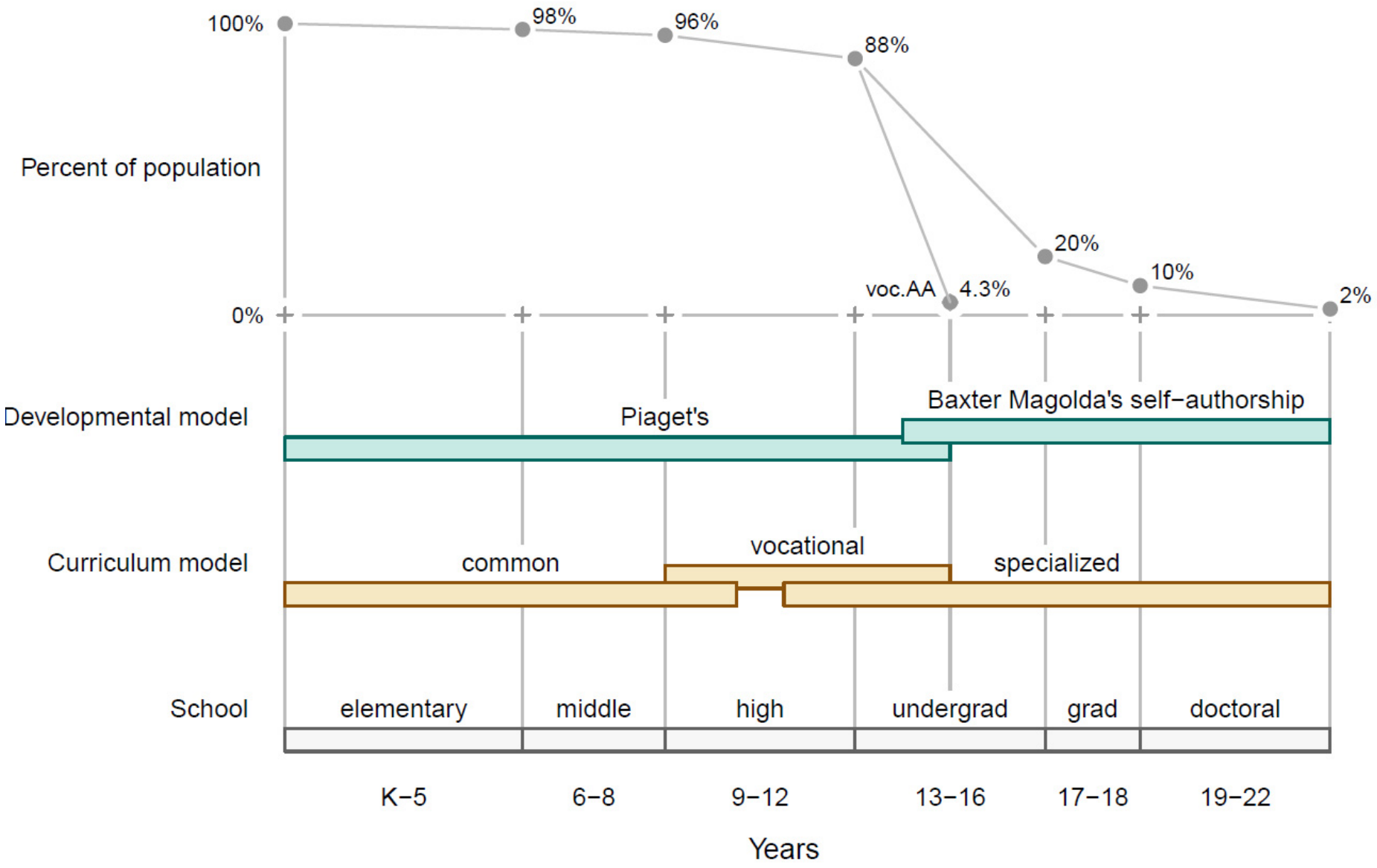
Spatial data: Maps

Birthplaces of US presidents, 1797 –2014

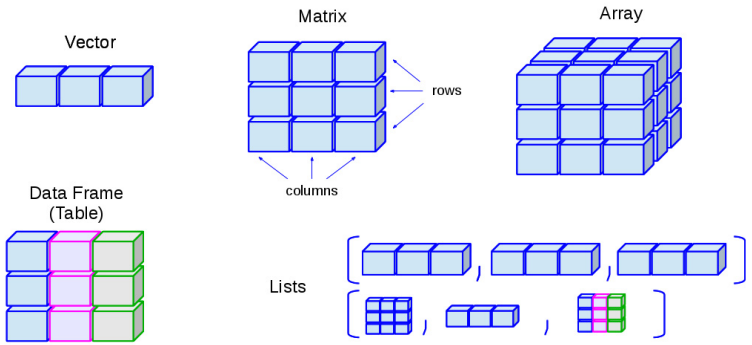


Jonas Wullbrandt (2014) ME497 portfolio

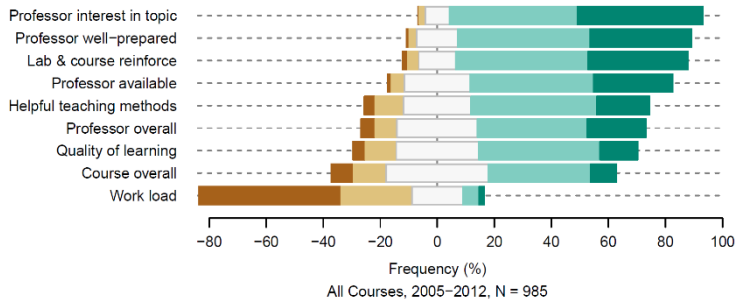
Creating original designs



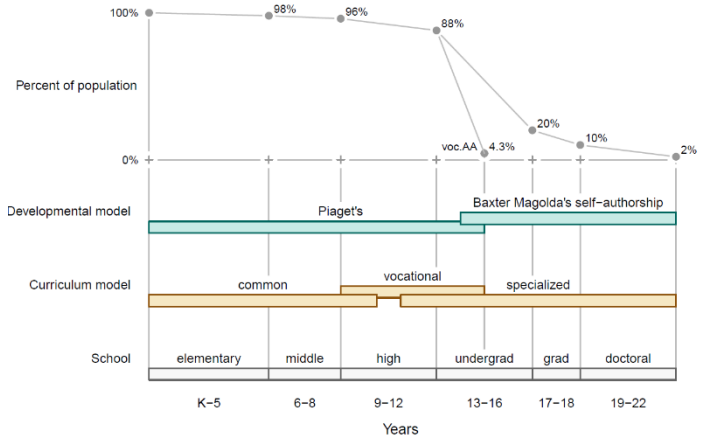
Implications for the designer



Grasp the structure of your data.



Explore the data using graph types suited to the data.



Create new designs when conventional designs fail to tell the story.

Syllabus, calendar, resources