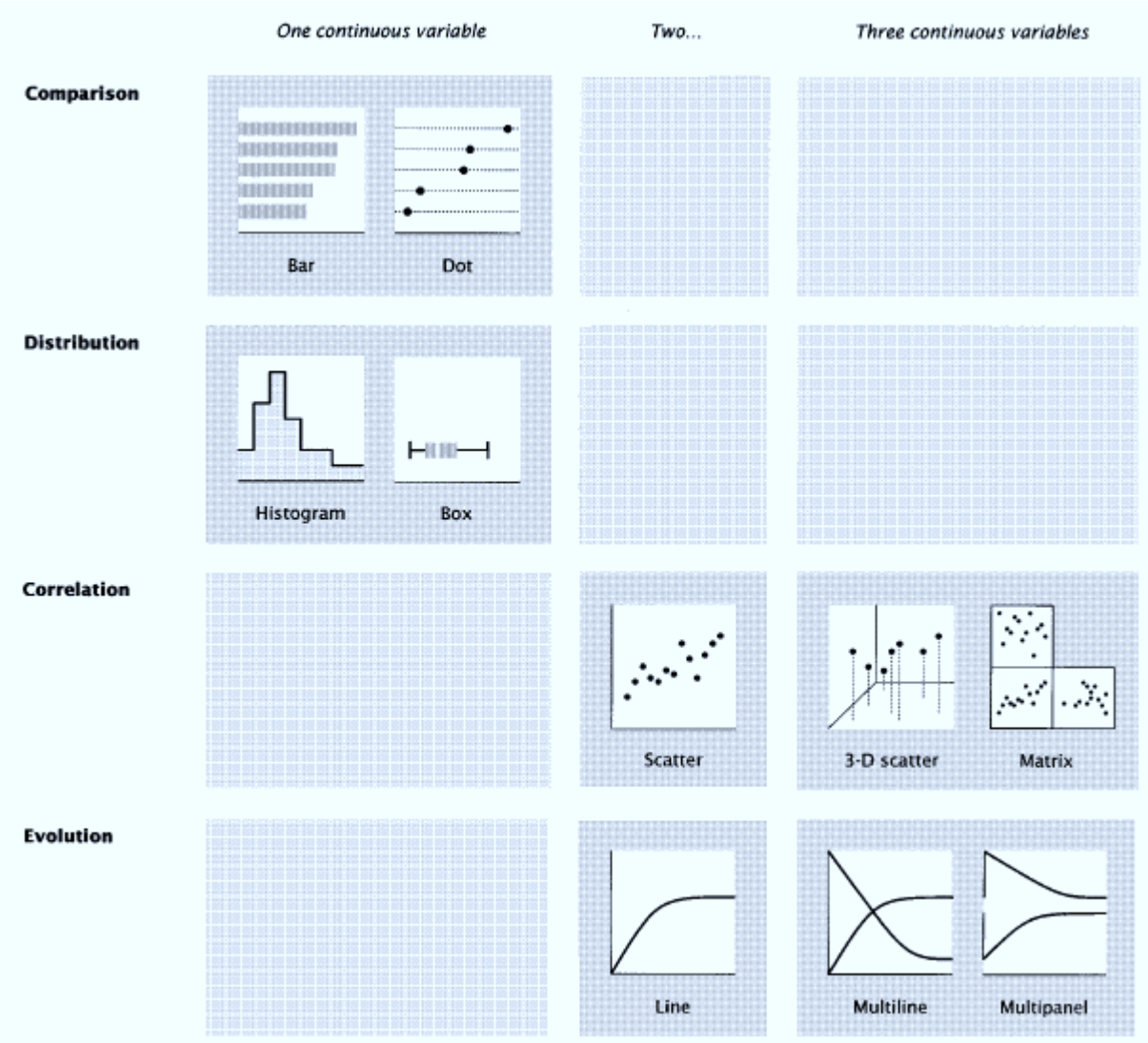
Relating data structure and graph design

ME447 Visualizing Data
Spring 2019–20

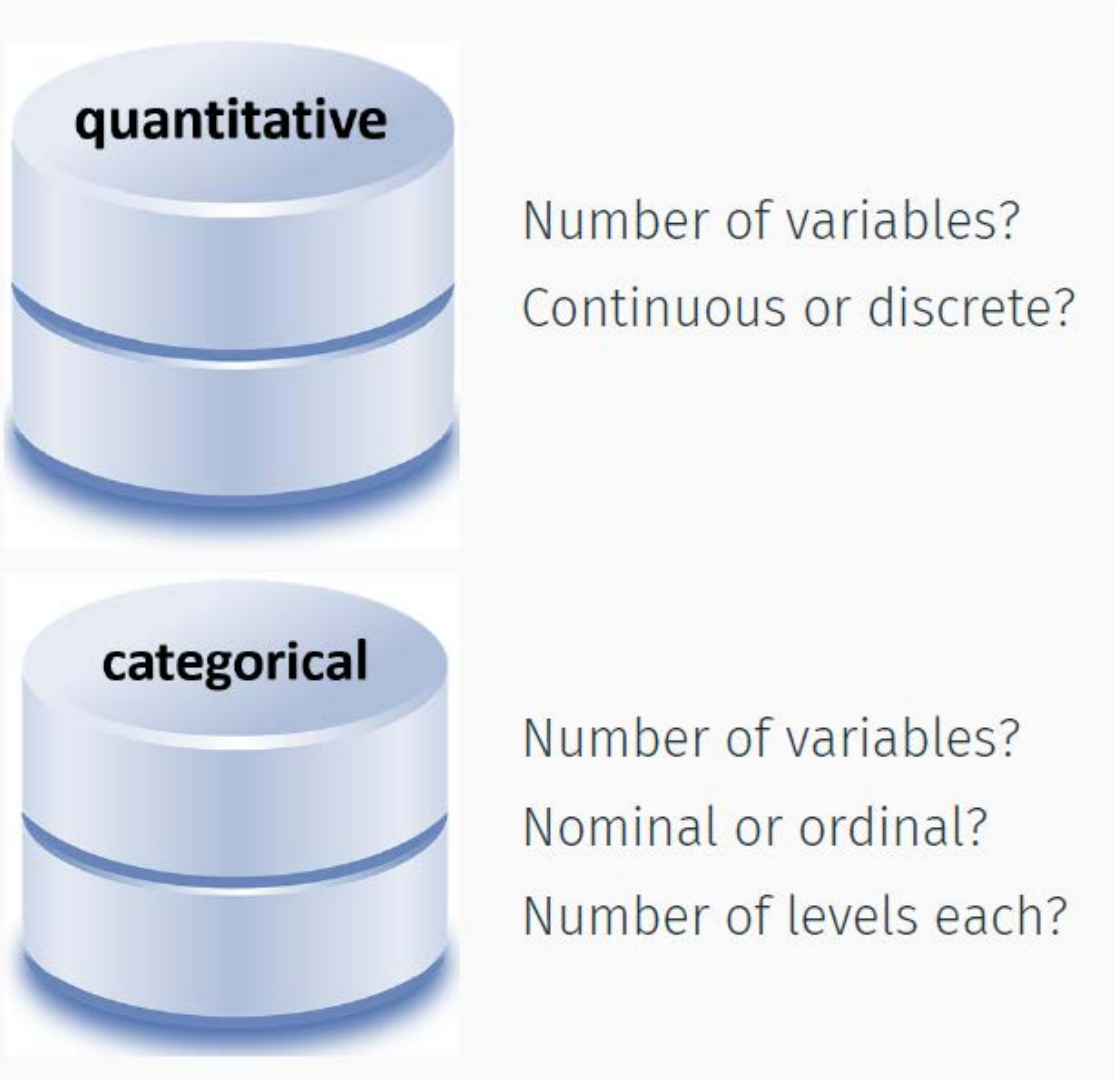
Richard Layton



ROSE-HULMAN INSTITUTE OF TECHNOLOGY

Based on Jean-luc Doumont and Philippe Vandenbroeck (2002 March) Choosing the right graph, *IEEE Transactions on Professional Communication* 45(1)

Jean-Luc Doumont: Optimal graph design depends on the variables to be shown…



J. Doumont. *Trees, Maps and Theorems*. Principiae, 2009

… and the message to be conveyed

displaying distributions

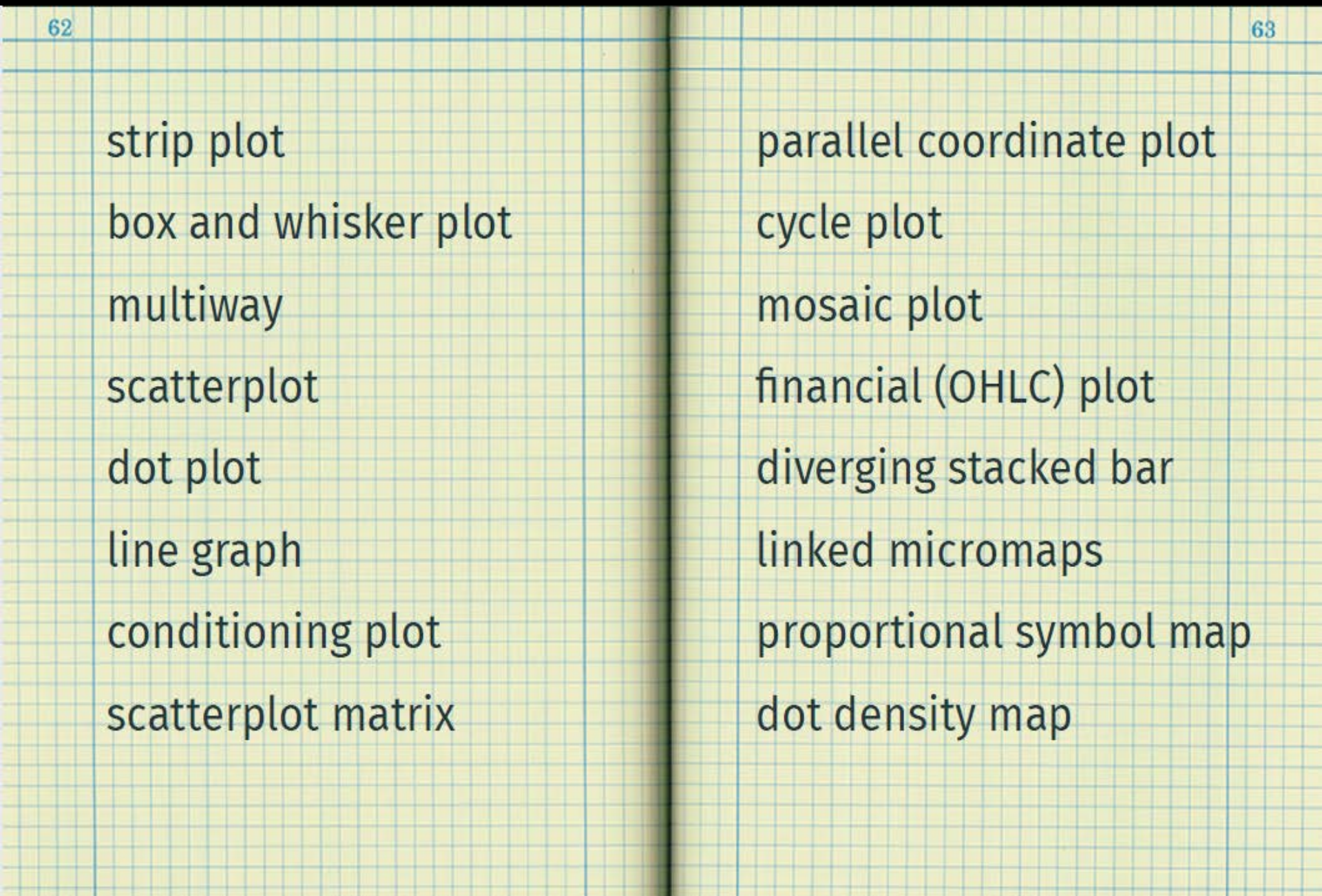
comparing data

revealing correlations

showing evolution

J. Doumont. *Trees, Maps and Theorems*. Principiae, 2009

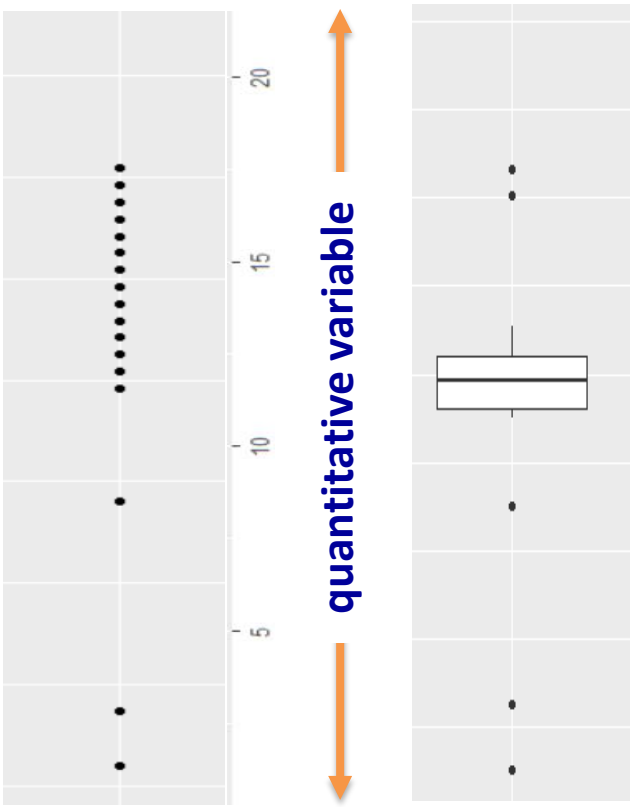
Let's examine match-ups of graph design/data structure

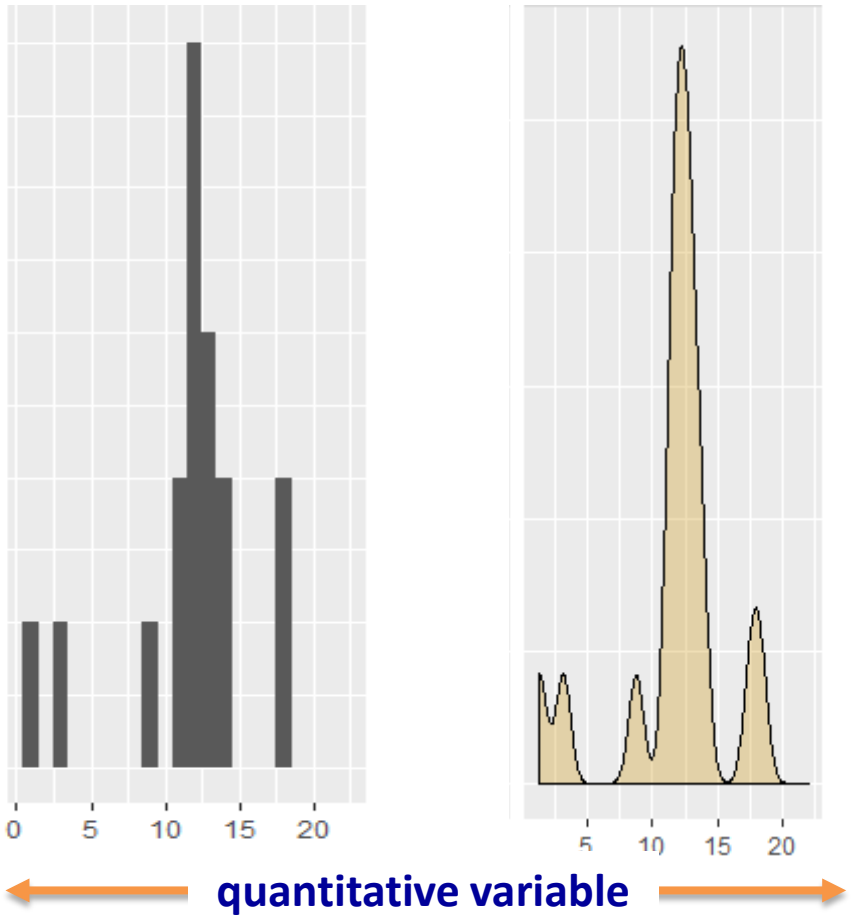


Story: distributions

Data: 1 quantitative variable

strip plot or box plot

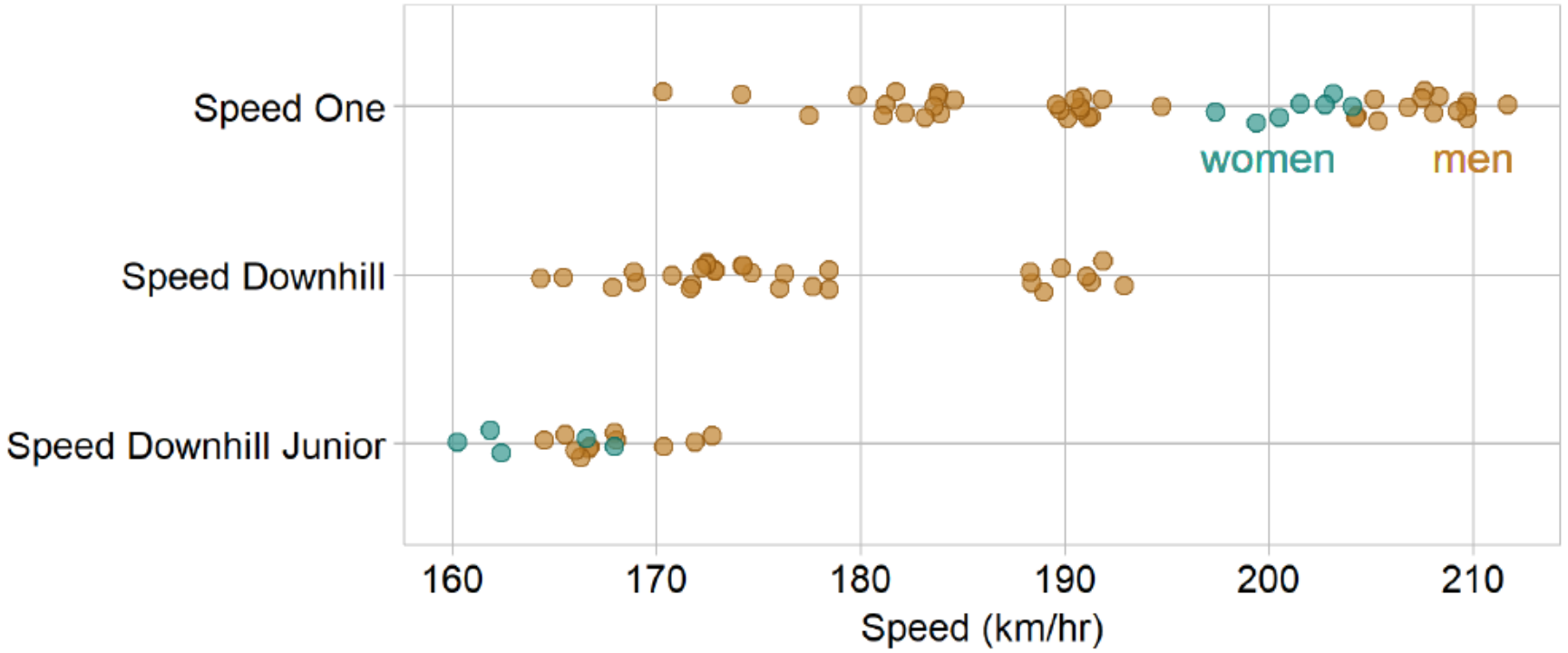




strip plot	box & whisker	histogram	density
preferred	preferred	(prone to rhetorical malpractice)	

1. Strip plot

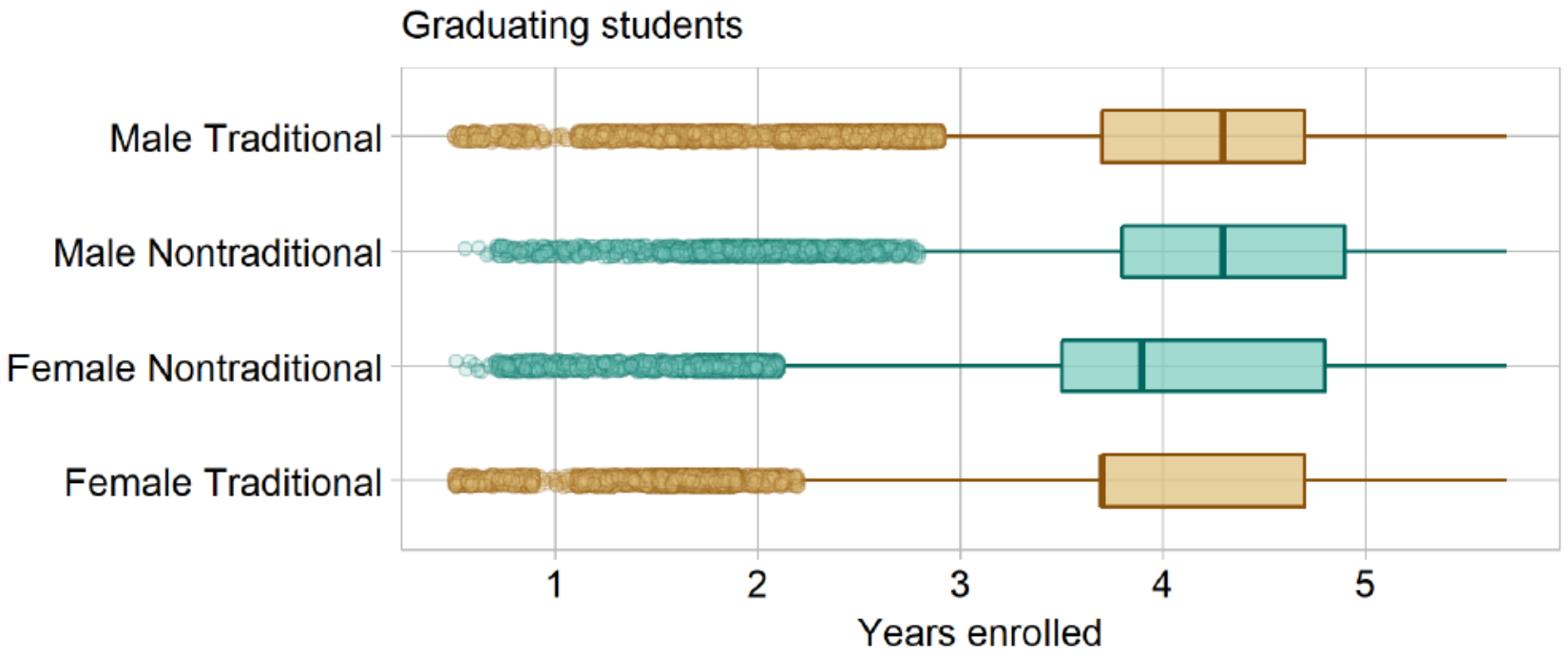
Olympic speed skiing



Data source (Unwin, 2015)

2. Box plot

Years to graduation

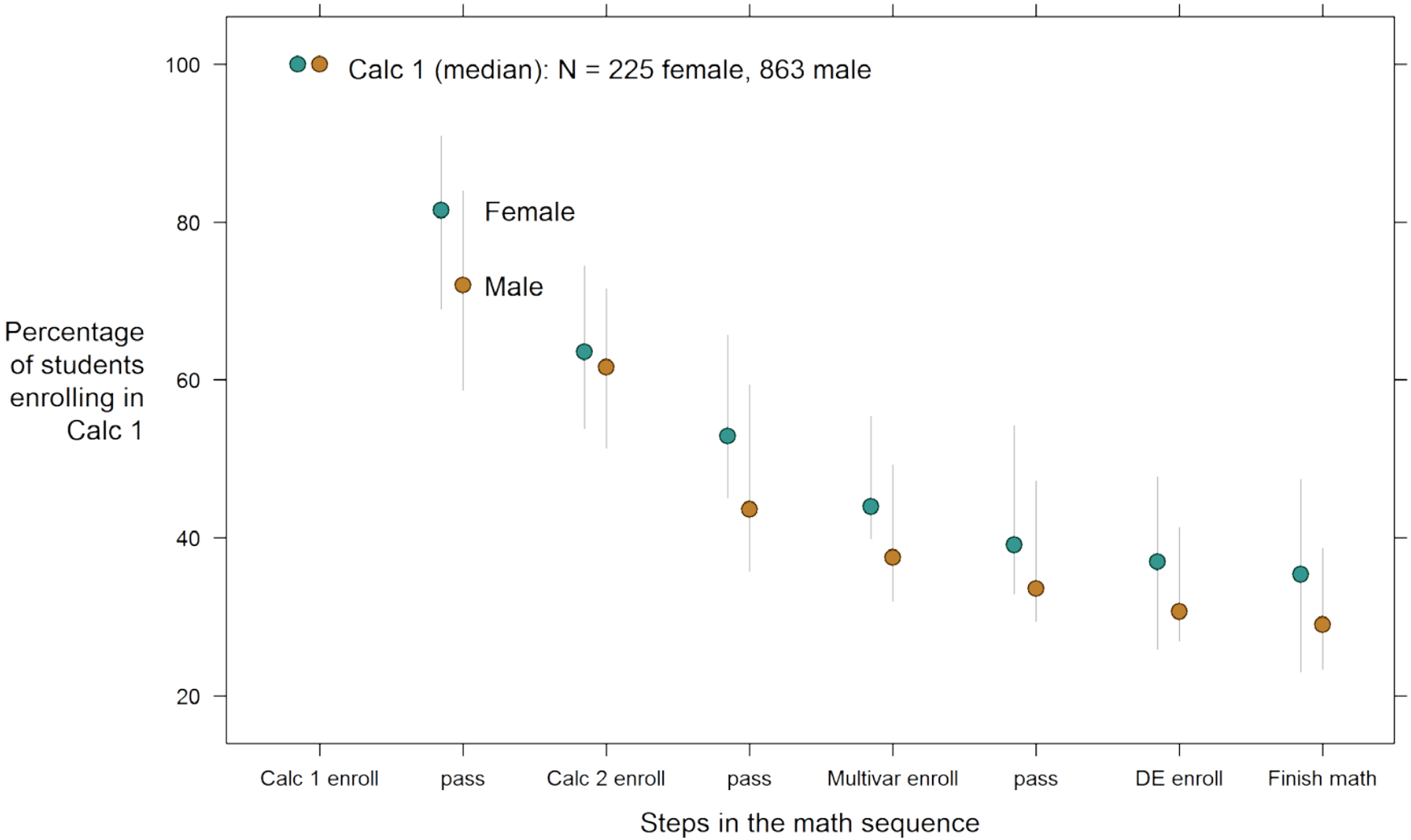


3. Box plot

US employment

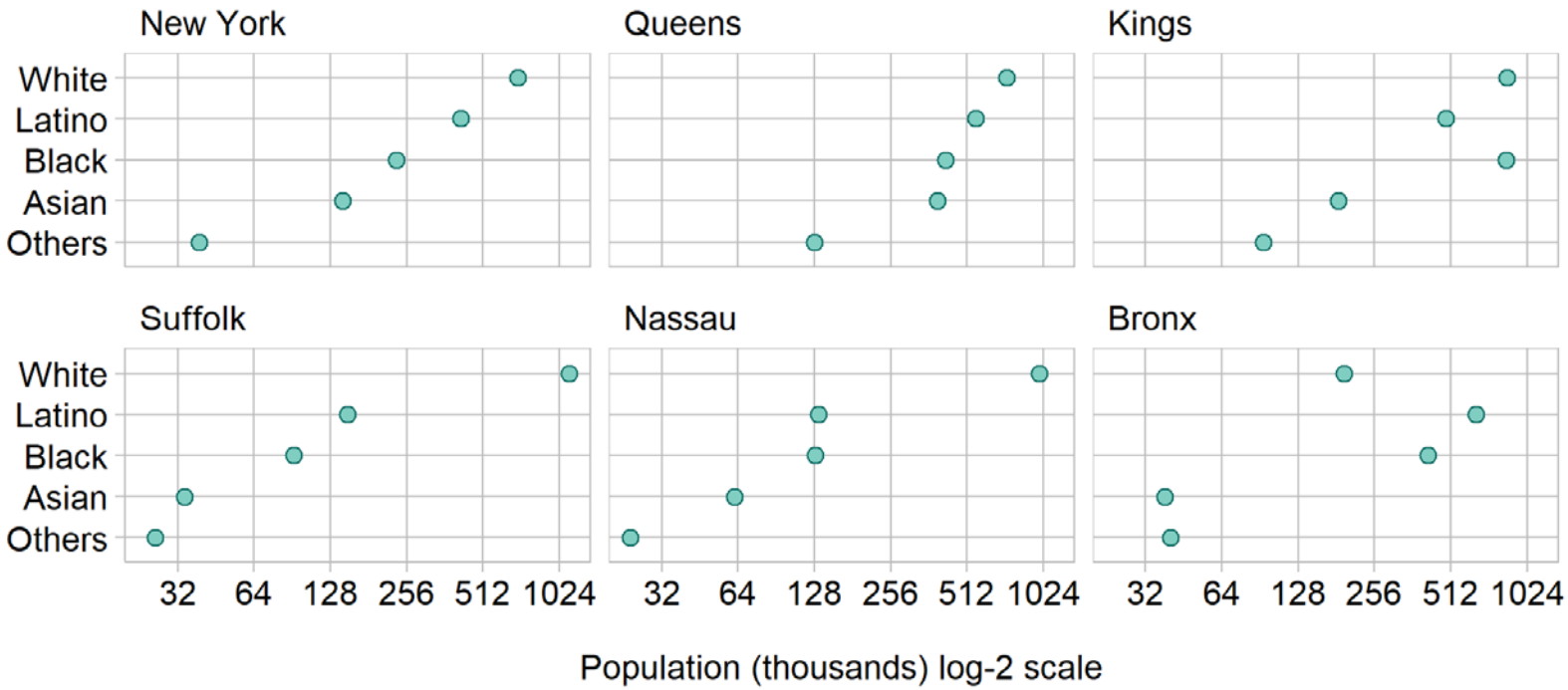
4. Distributions

Math sequence attrition



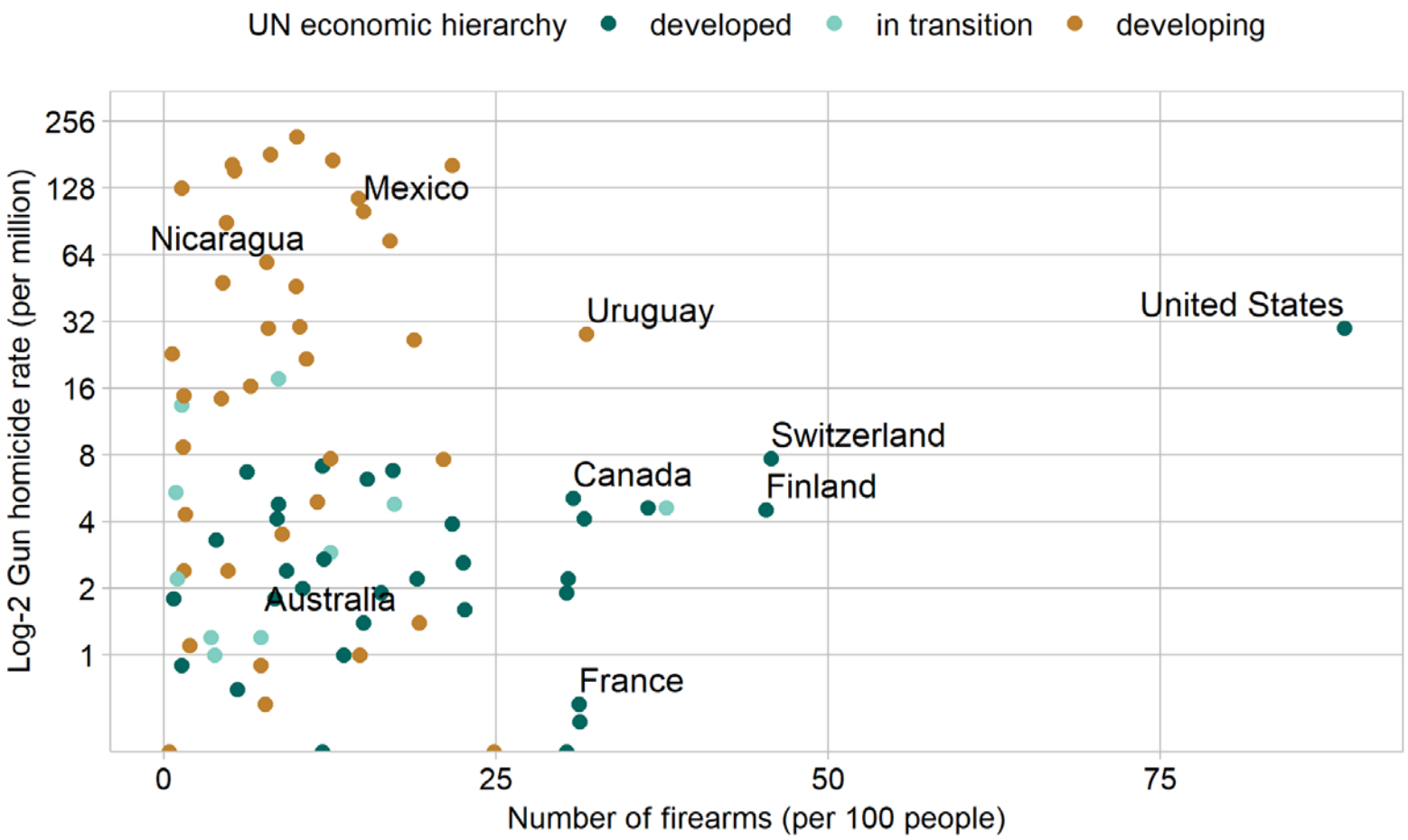
5. Multiway

County population in NY State



6. Scatterplot

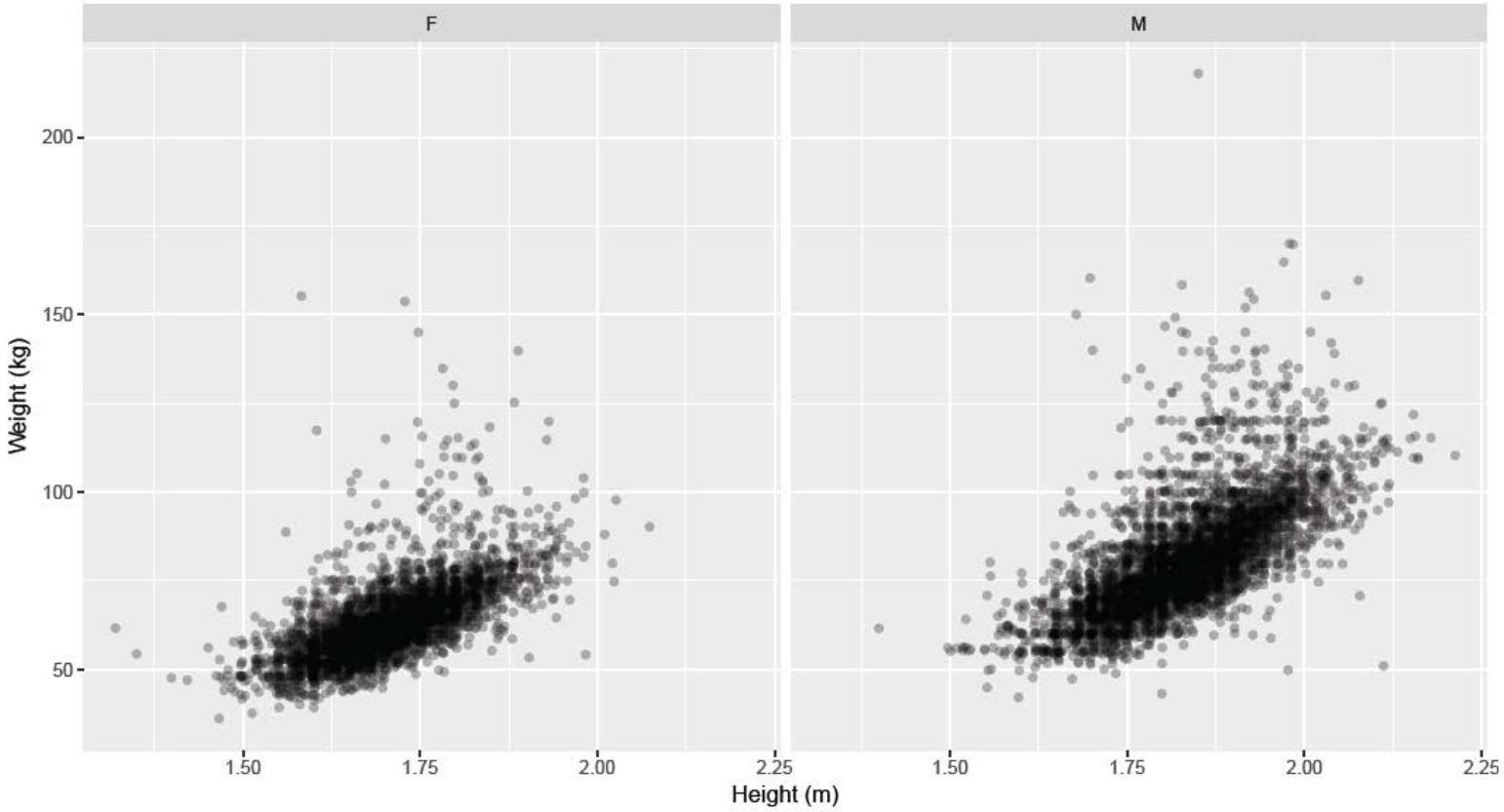
Gun ownership and gun homicides



7. Scatterplot

multi-panel

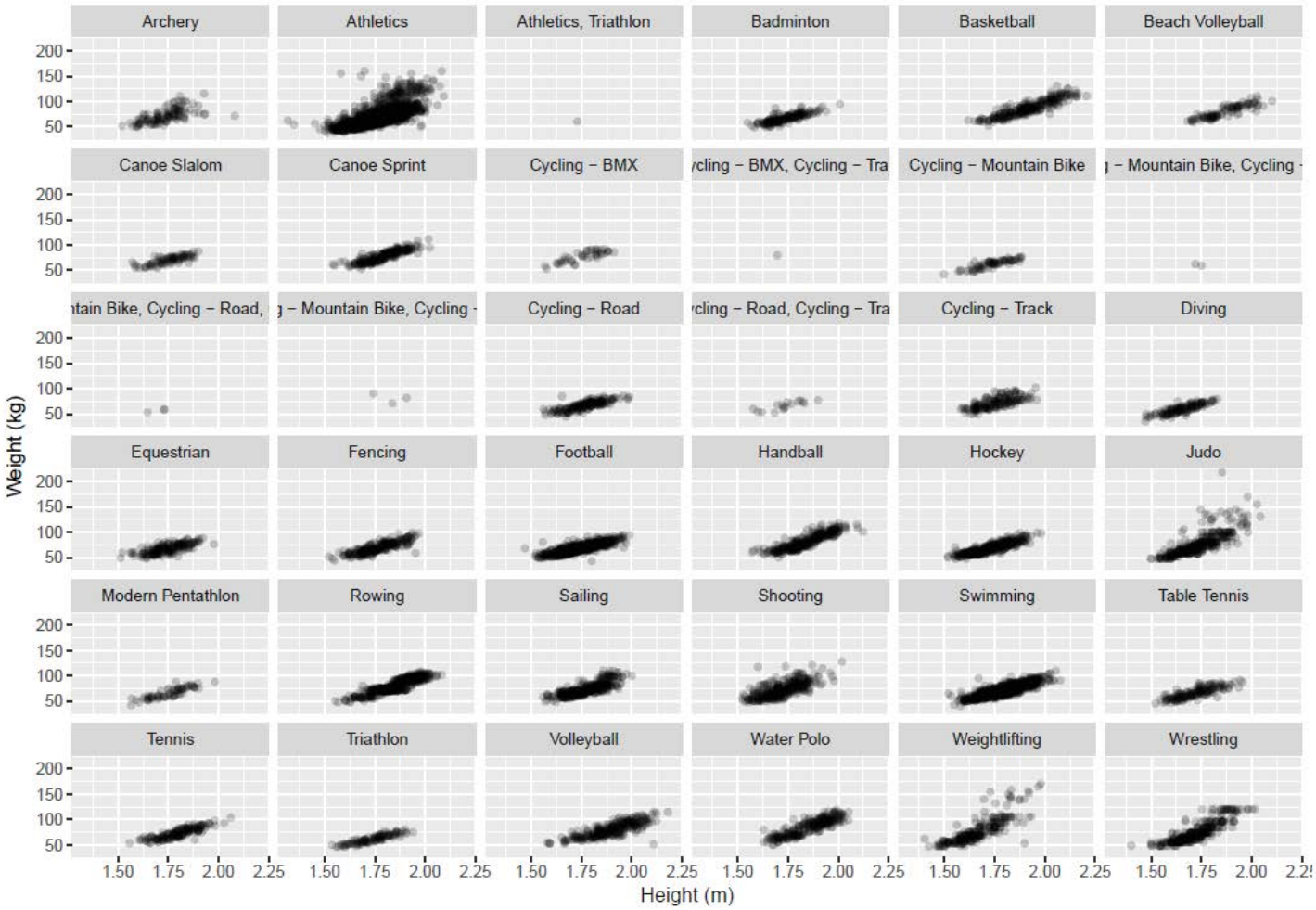
Olympians' height and weight



8. Scatterplot

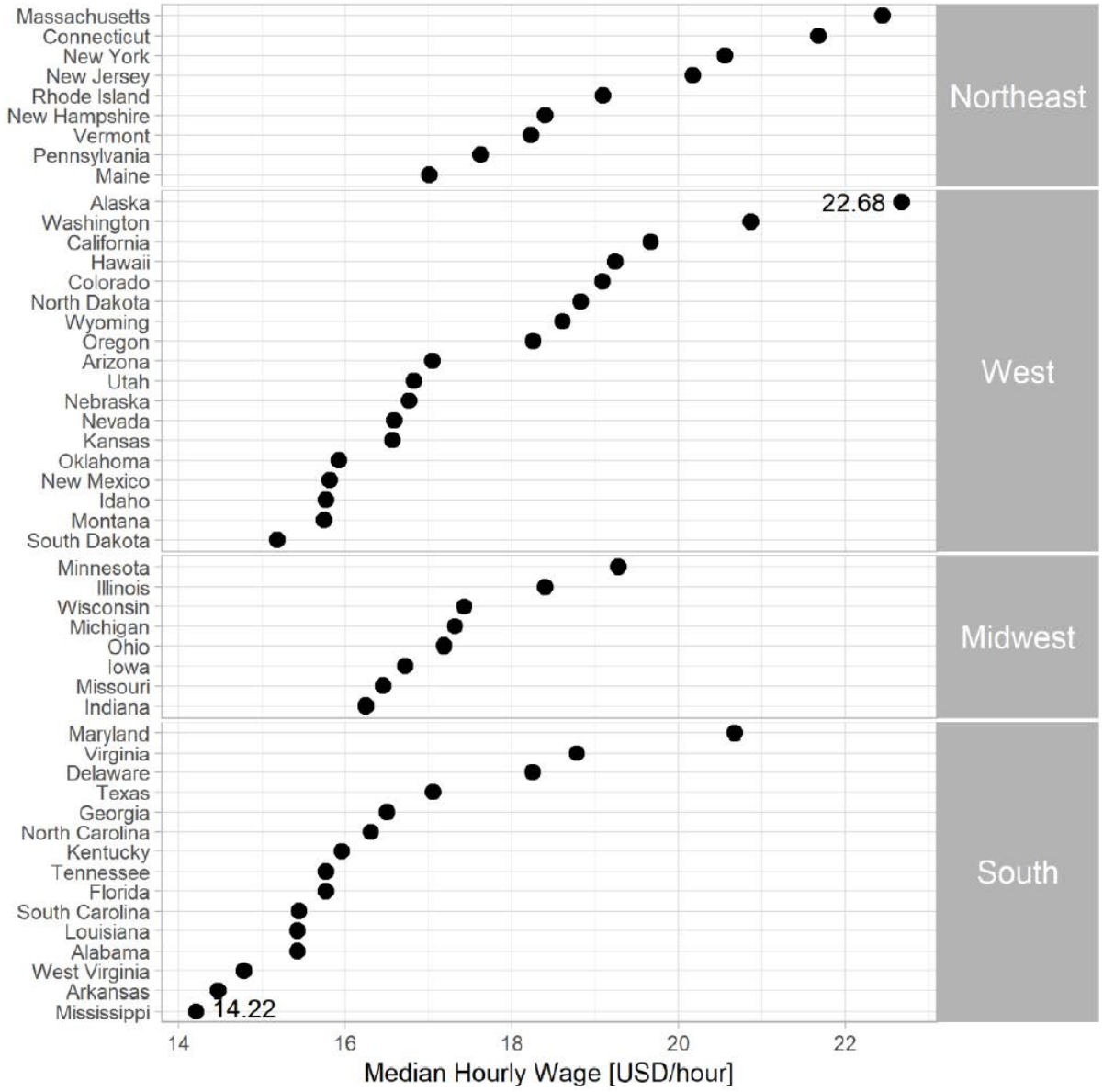
small multiples

Olympians' height and weight, by event



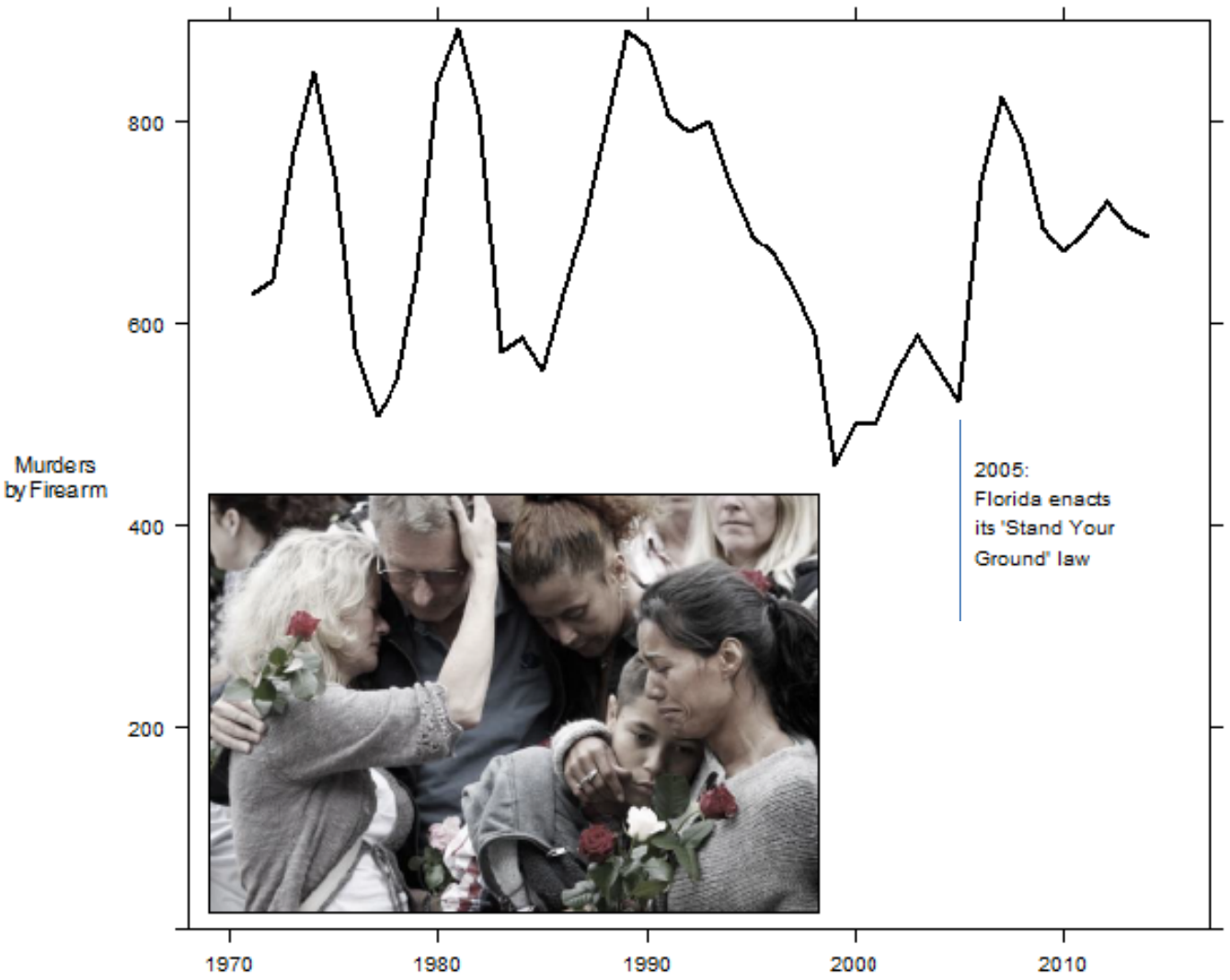
9. Cleveland dot plot

US median hourly wages



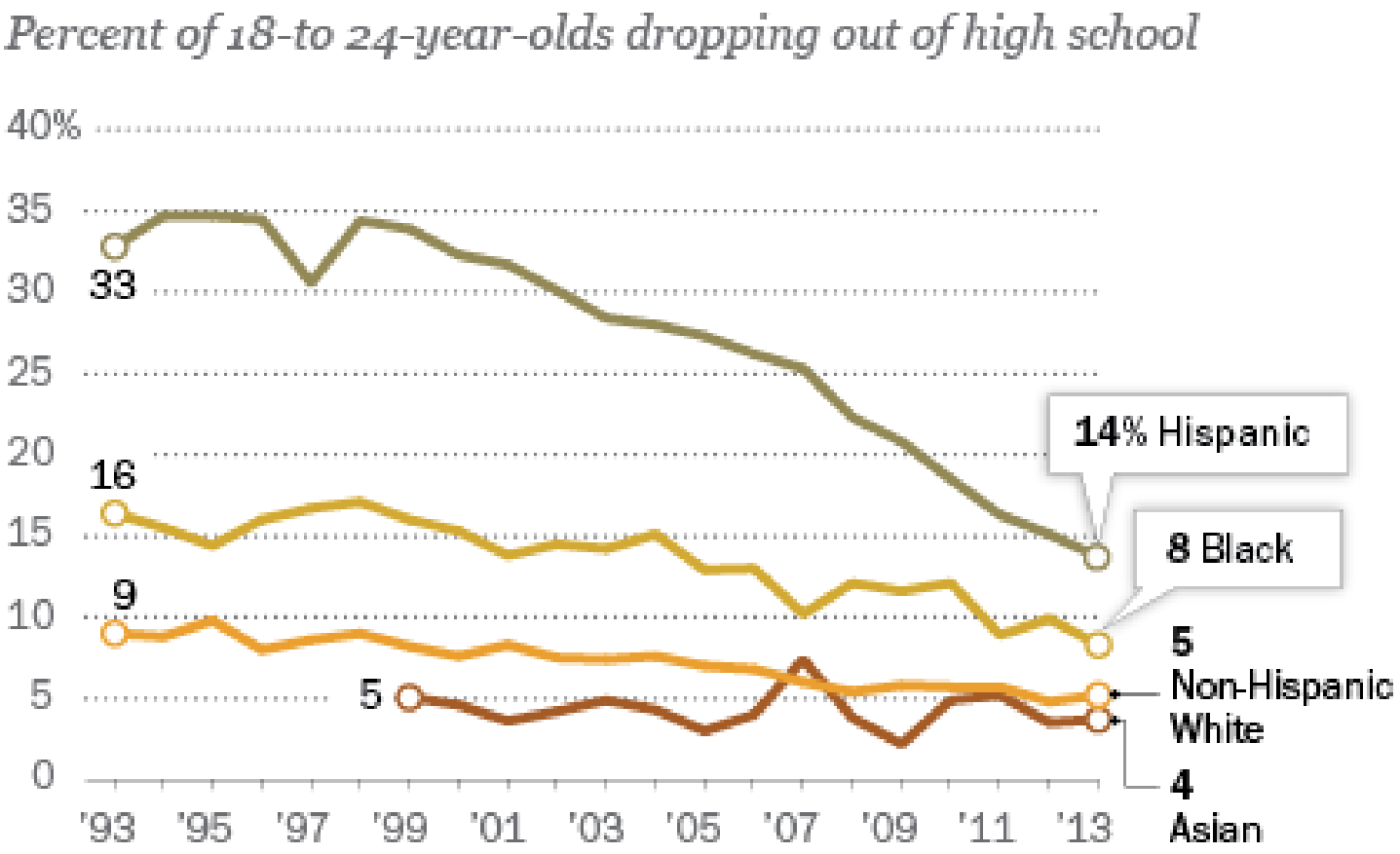
10. Line graph

US firearm deaths



11. Line graph

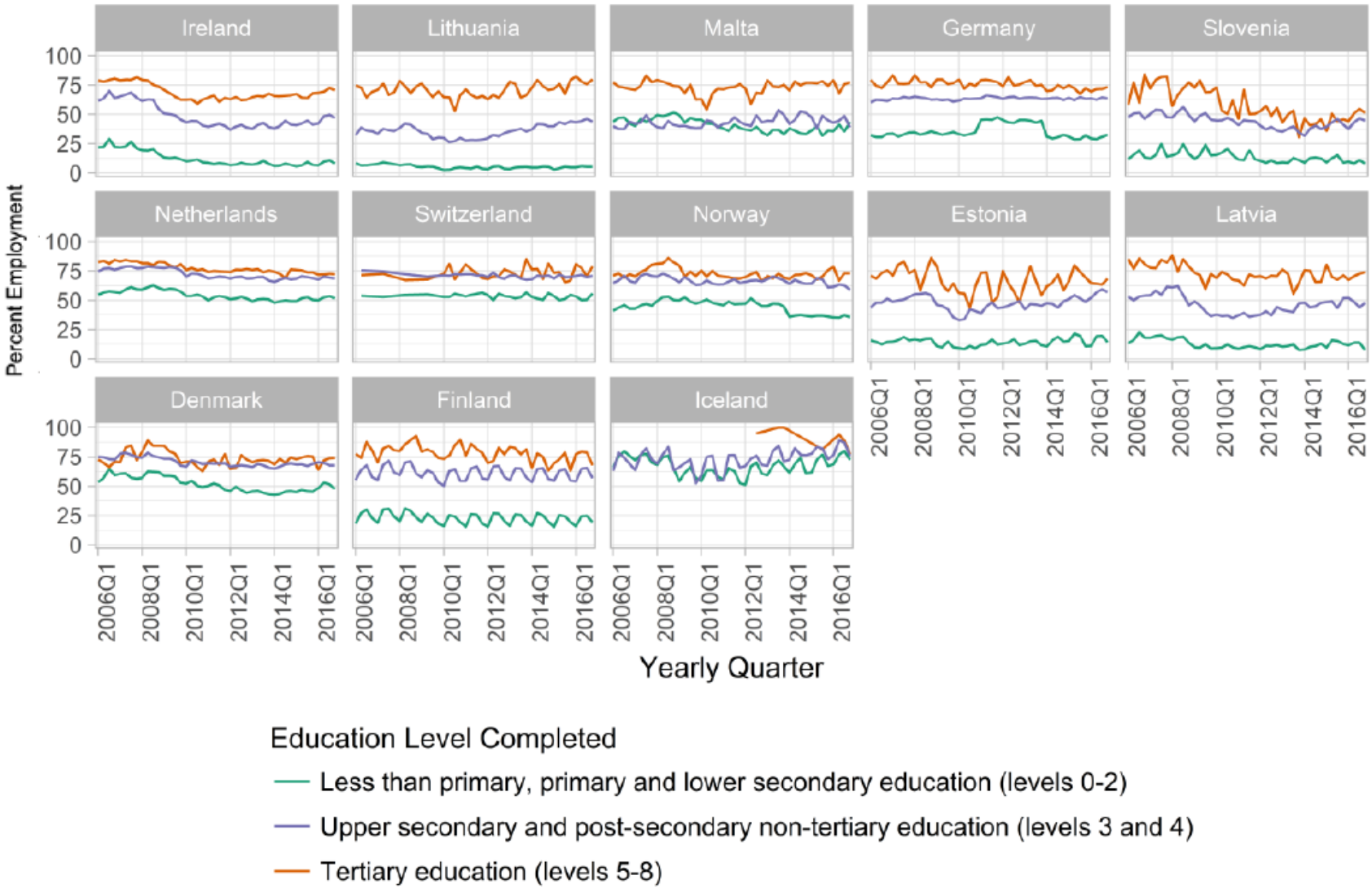
US high school dropout rates



12. Line graph

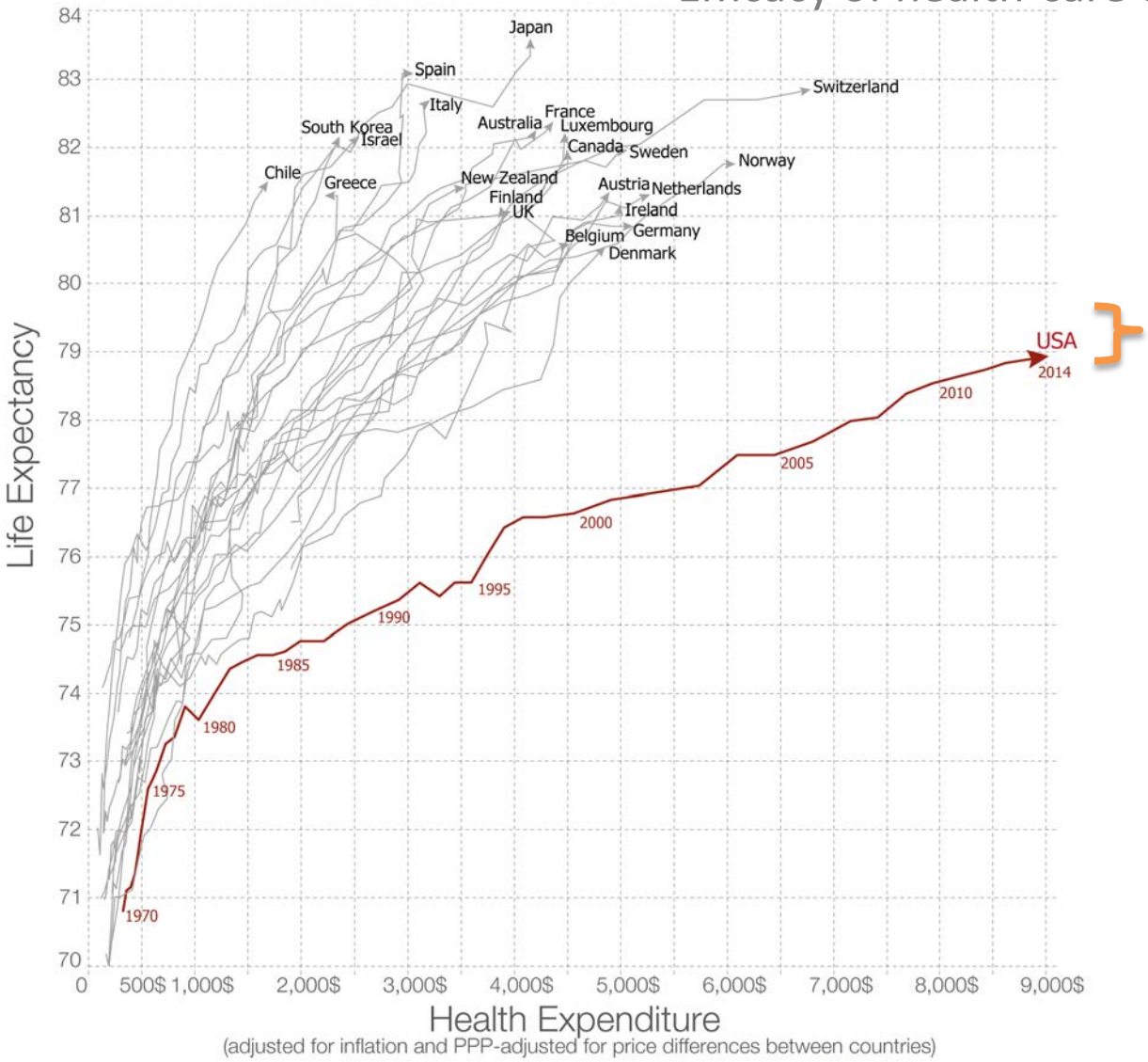
small multiples

EU employment by education level



13. Line graph

Efficacy of health-care expenditures

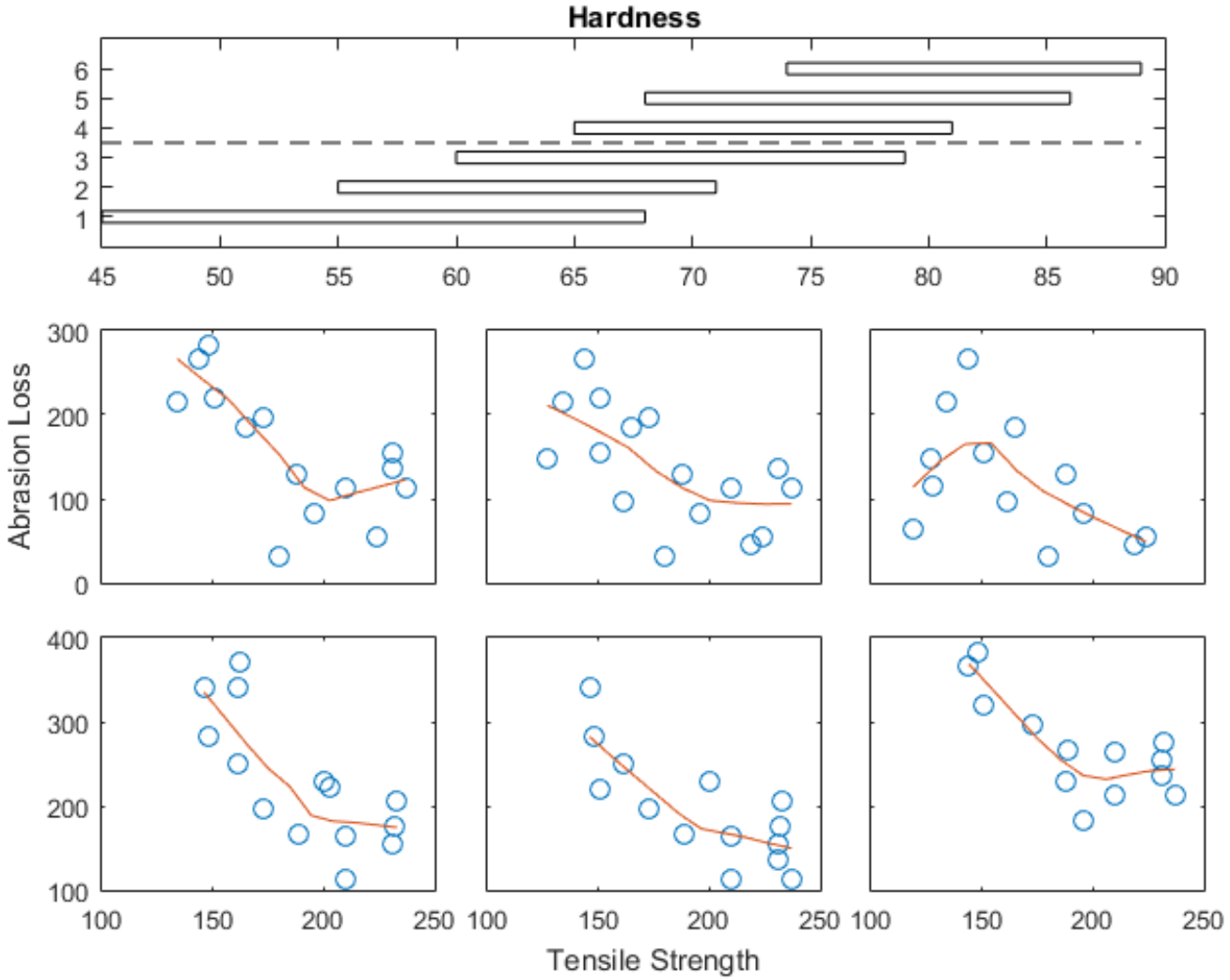


Data source: Health expenditure from the OECD; Life expectancy from the World Bank Licensed under CC-BY-SA by the author Max Roser.
The interactive data visualization is available at OurWorldinData.org. There you find the raw data and more visualizations on this topic.

www.ineteconomics.org/perspectives/blog/the-link-between-health-spending-and-life-expectancy-the-us-is-an-outlier

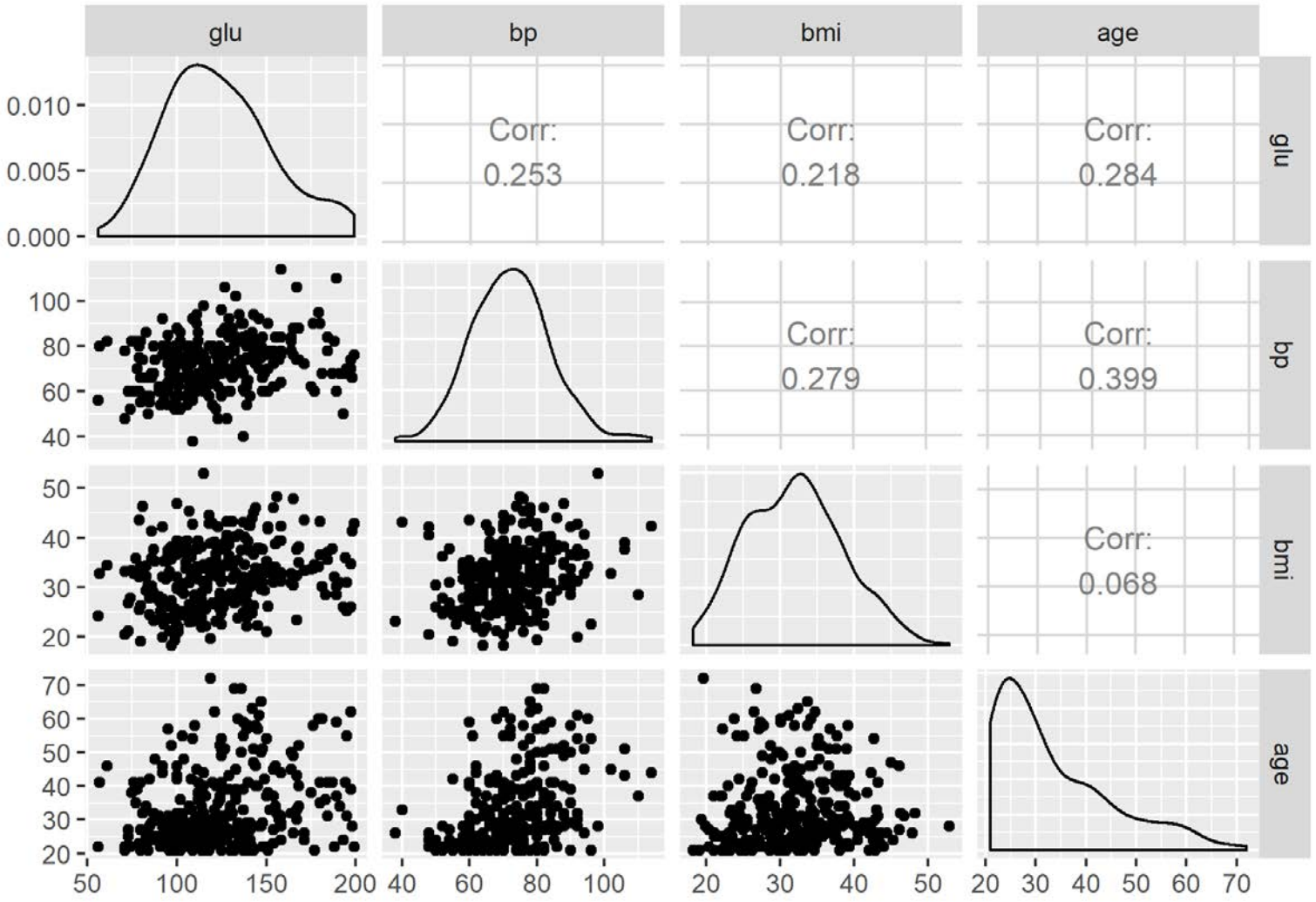
14. Conditioning plot

Properties of rubber



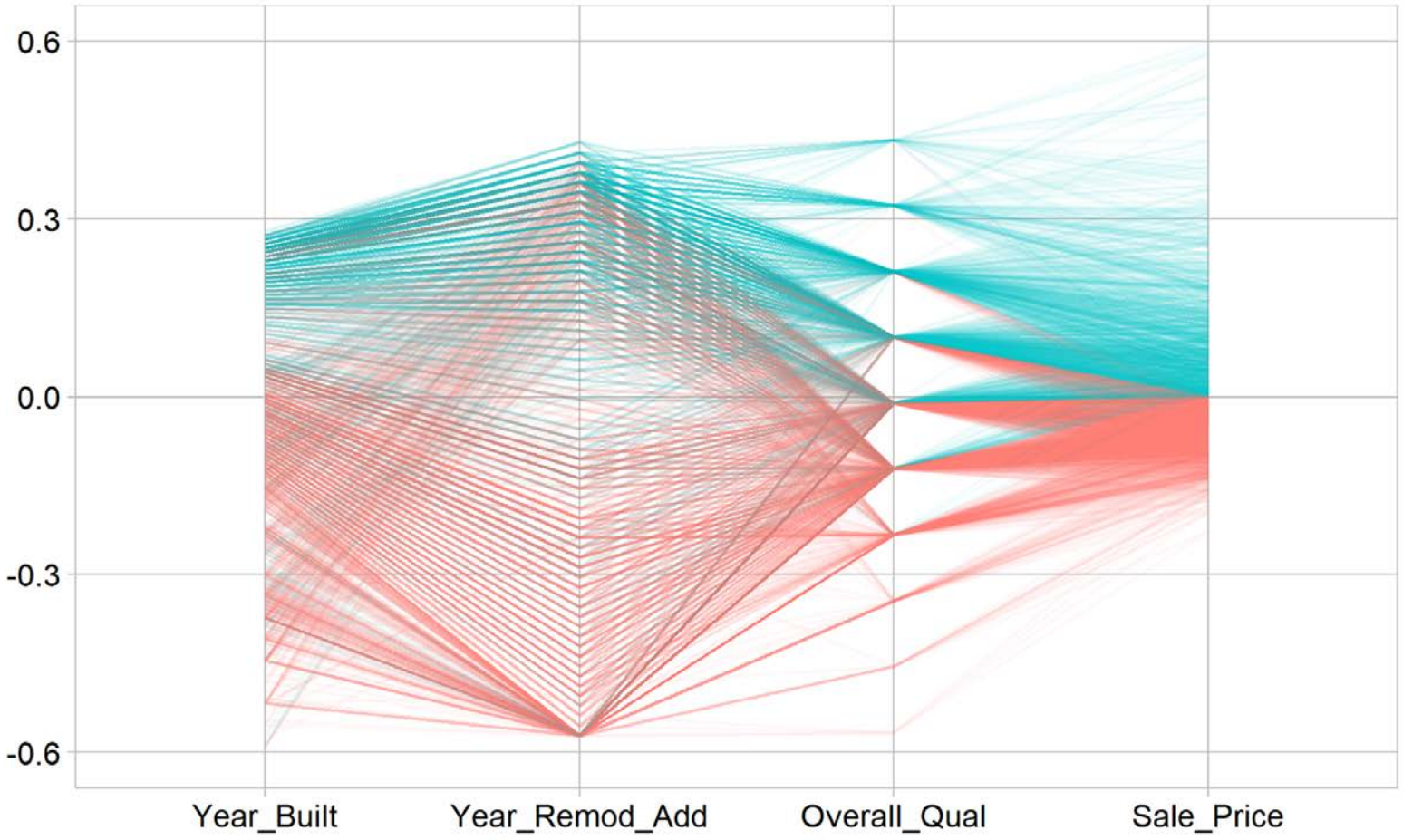
15. Scatterplot matrix

Diabetes in Pima women



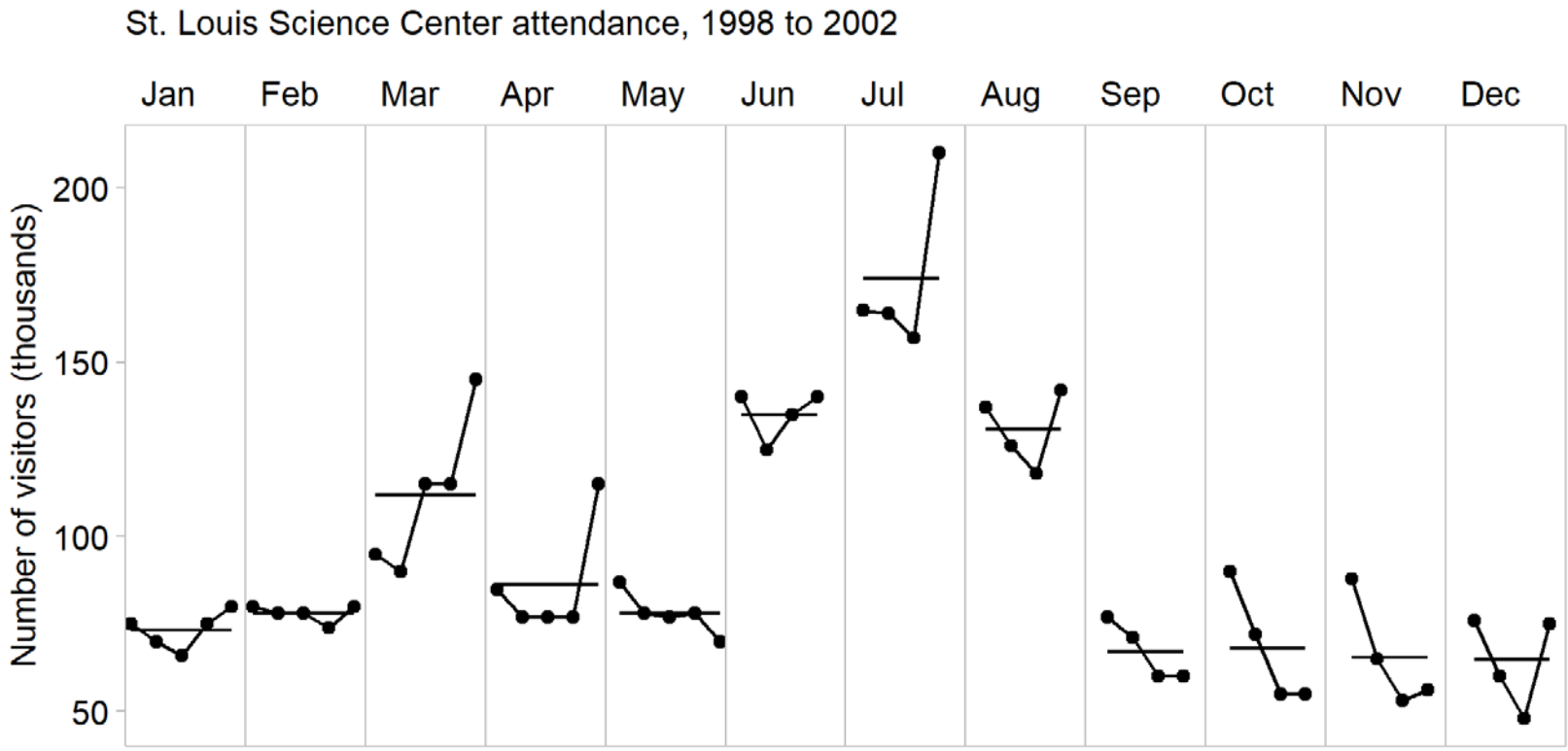
16. Parallel coordinate

House pricing



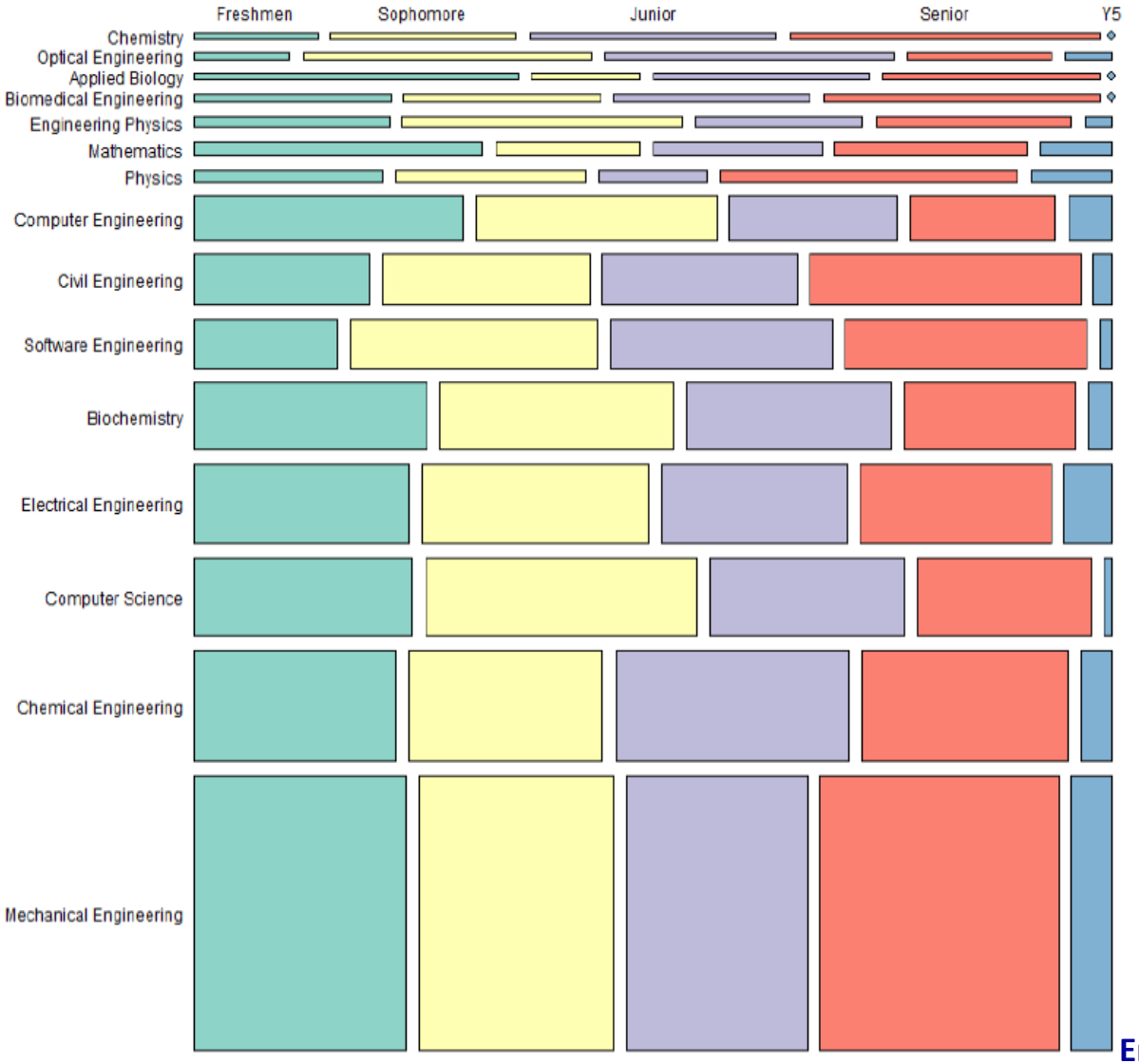
17. Cycle plot

Science center attendance



18. Mosaic

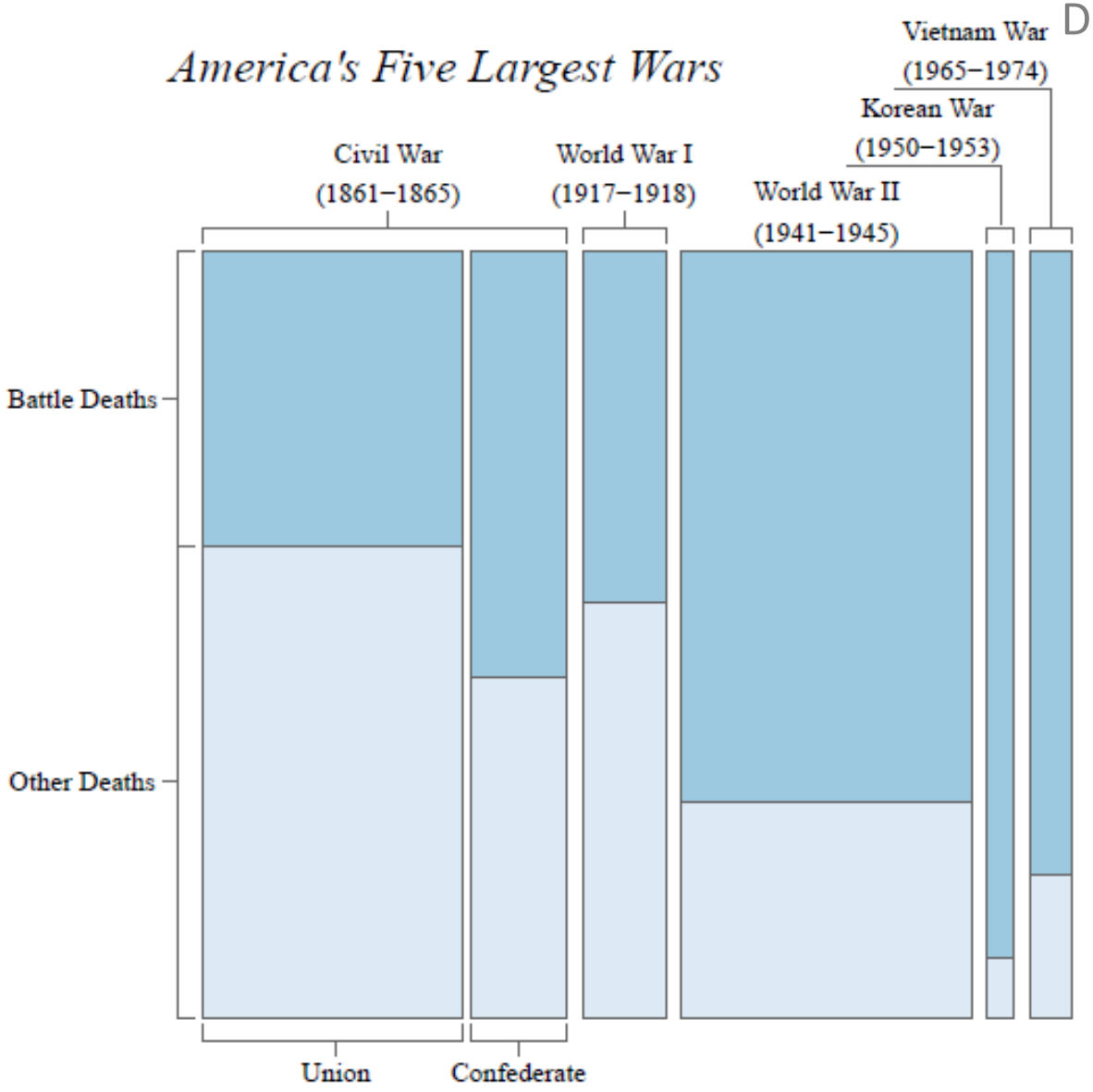
Enrollment at RHIT



Emily Fuhs (2015) Portfolio

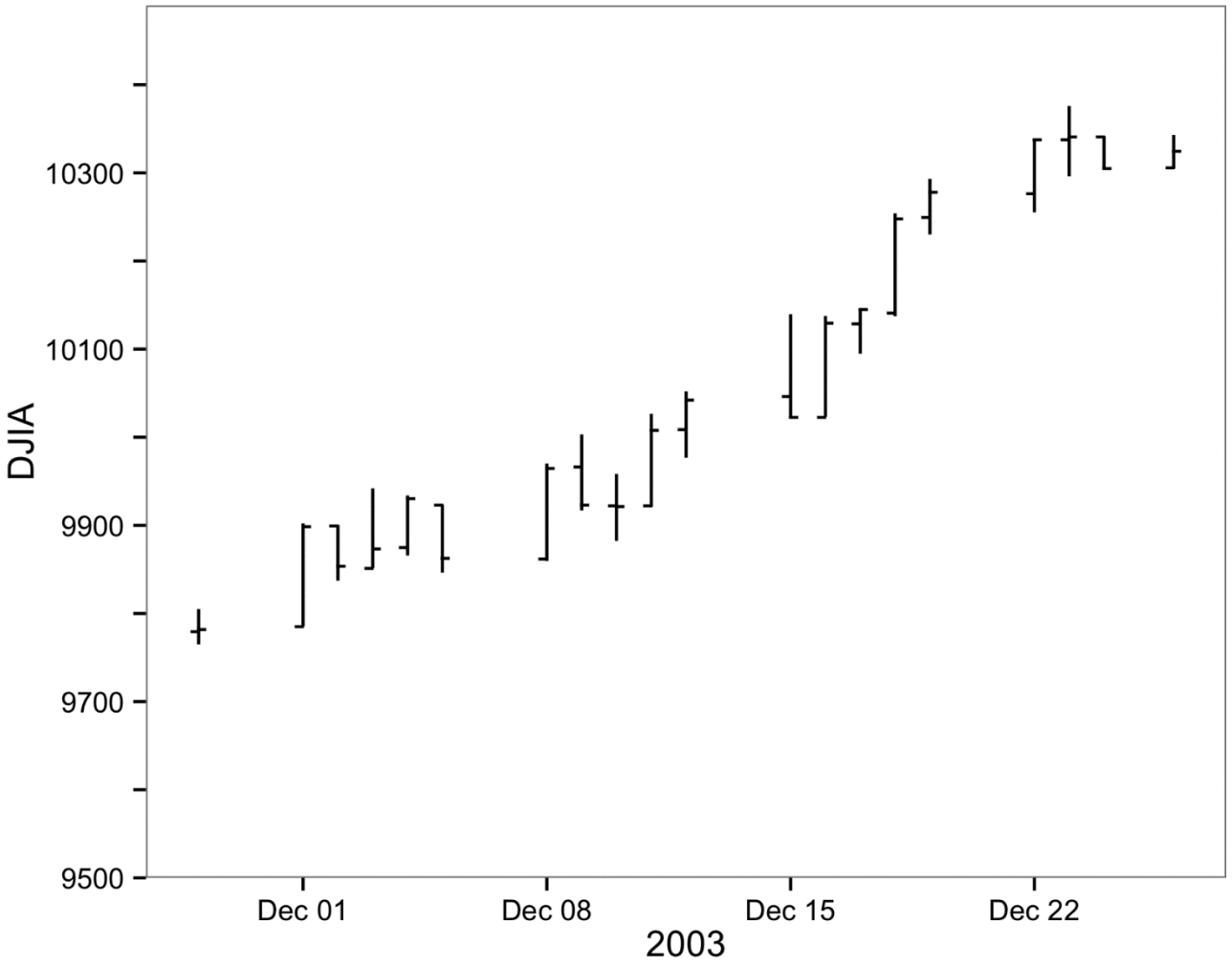
19. Mosaic

Deaths in major US wars



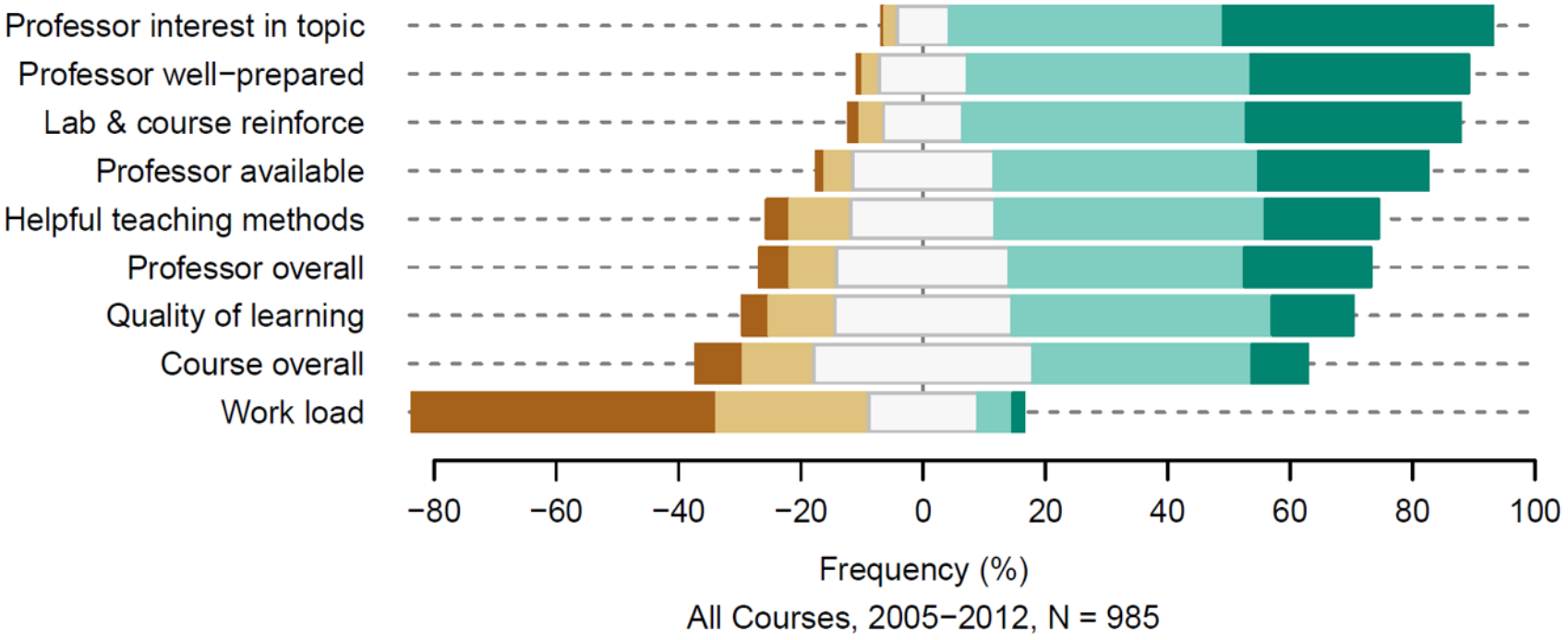
20. Financial plot

Dow Jones Industrial Average



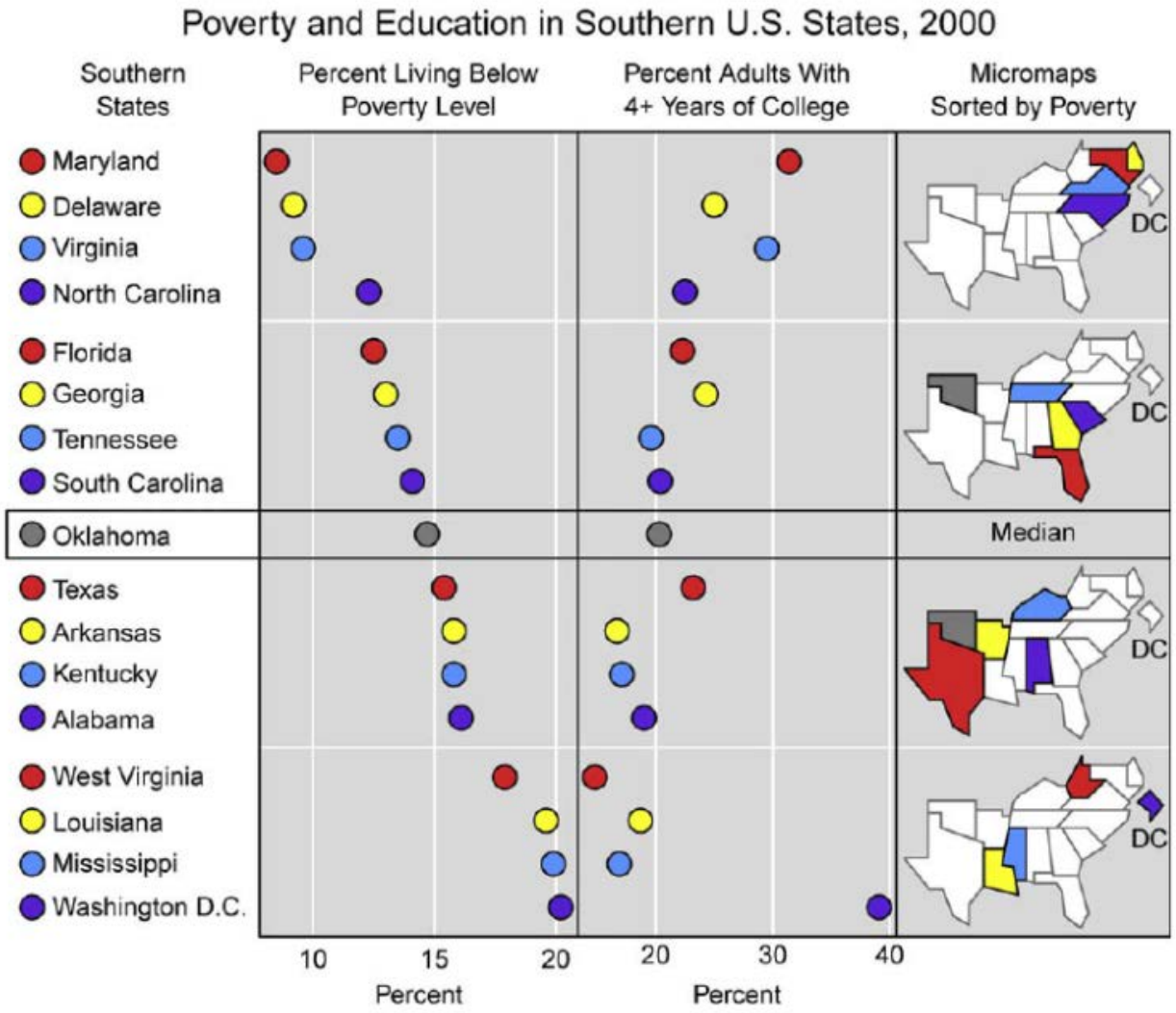
21. Diverging stacked bar

Course evaluation survey results



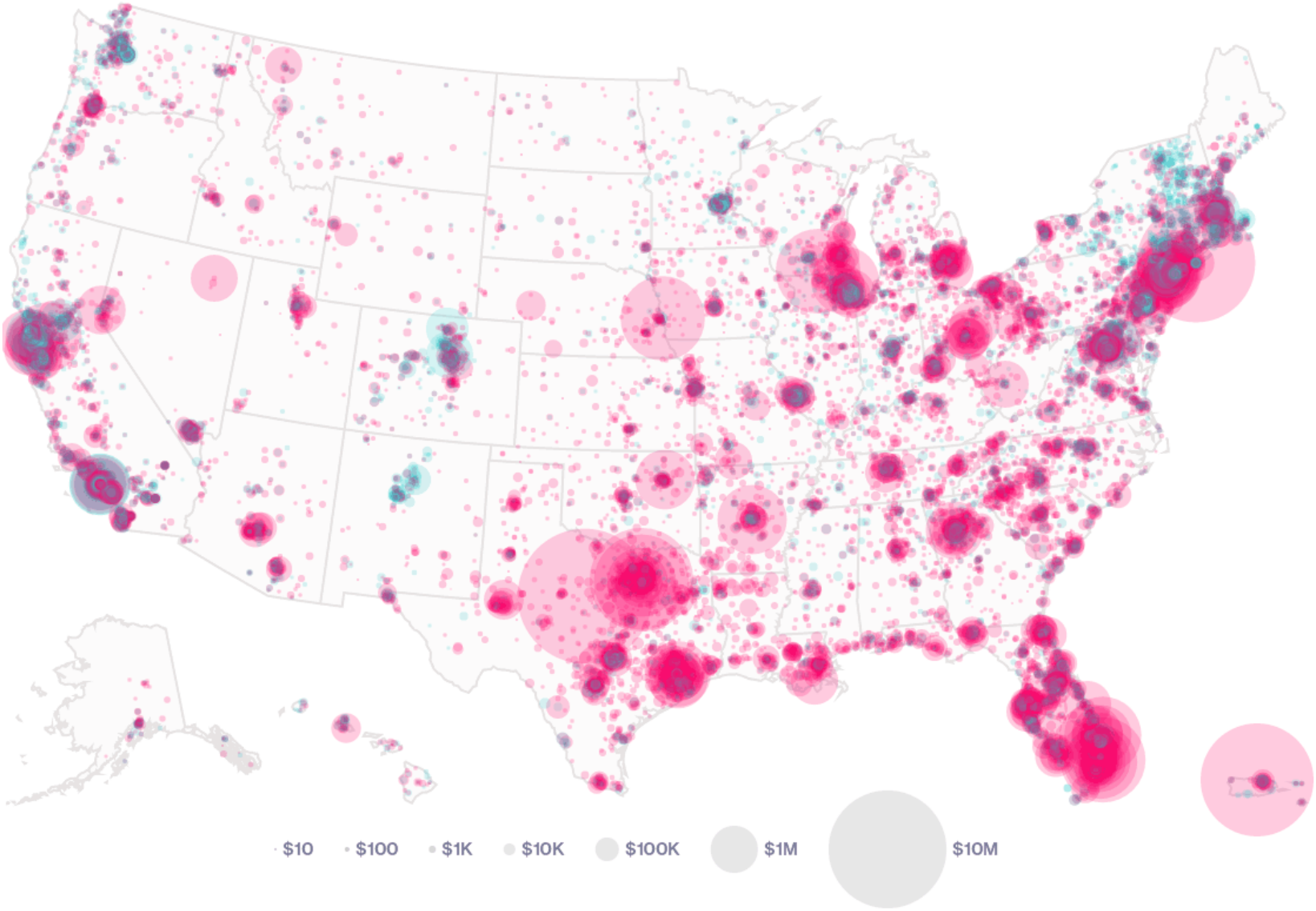
22. Linked micromaps

Poverty and education level



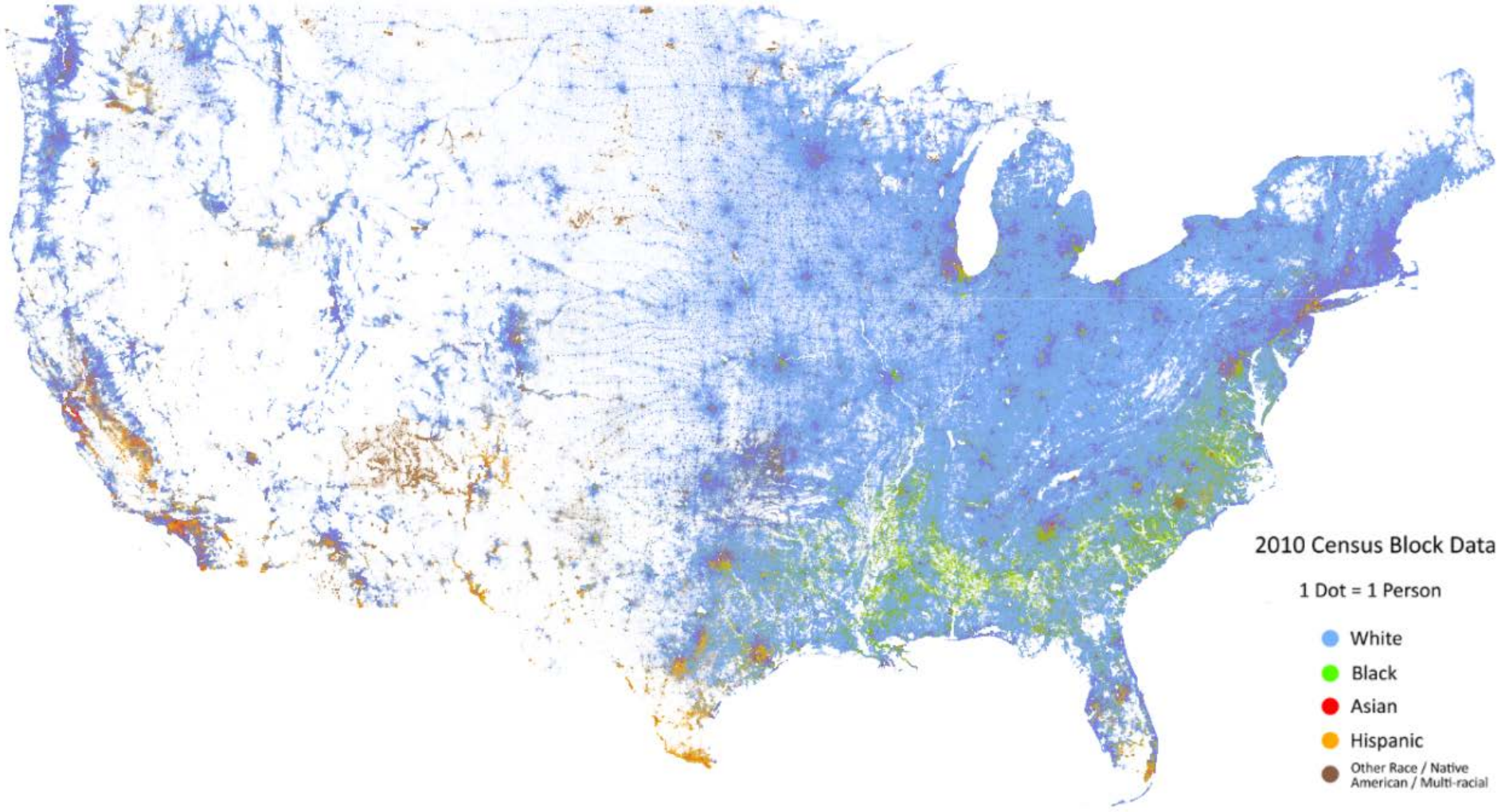
23. *Proportional symbol*

Presidential election fundraising



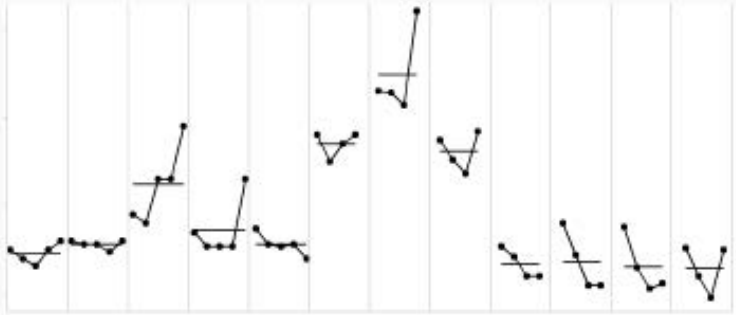
24. Dot density

2010 Census population density



Implications for the designer

Grasp the data structure first



Explore data-suitable designs