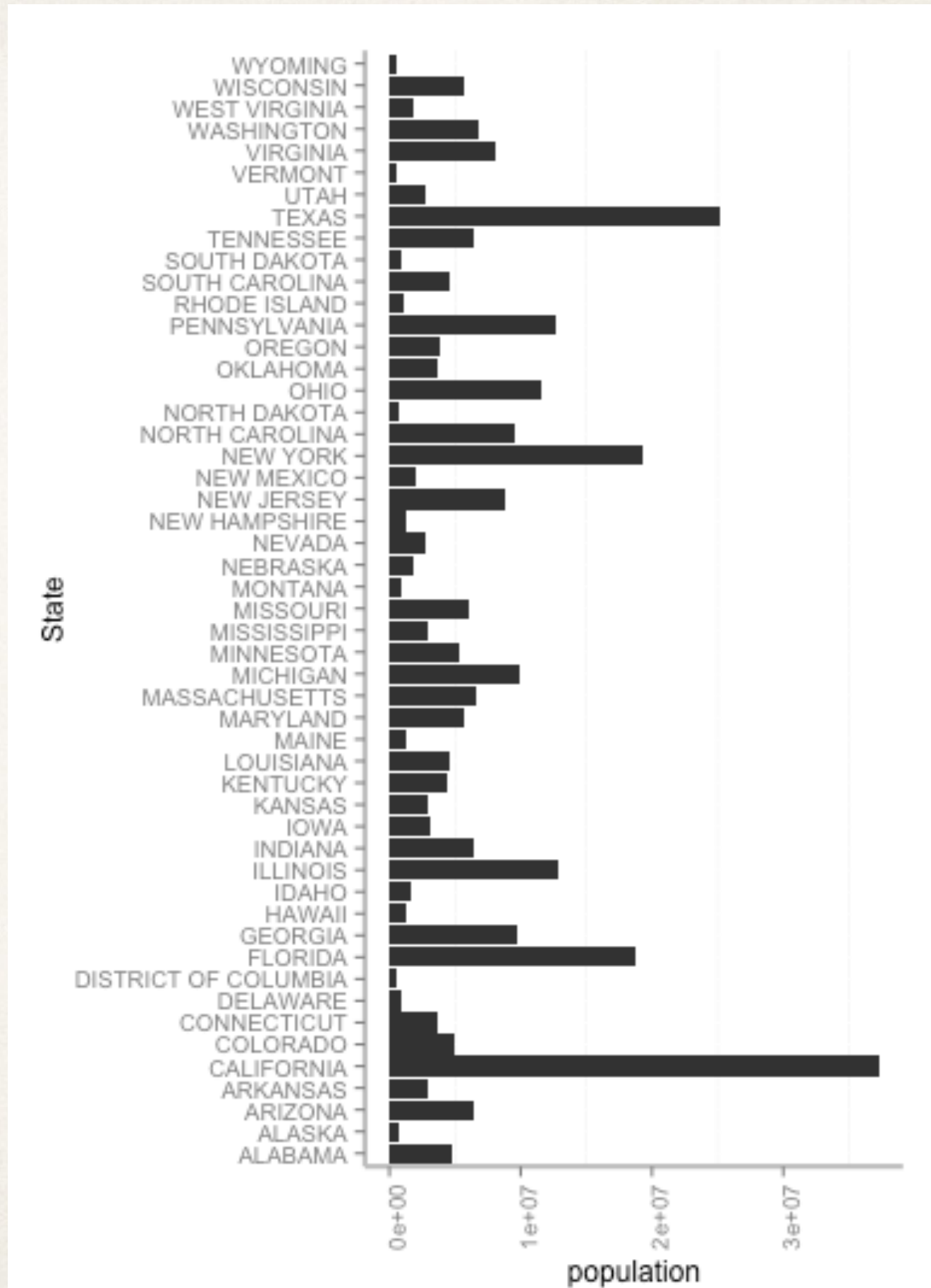


Multivariate visualization

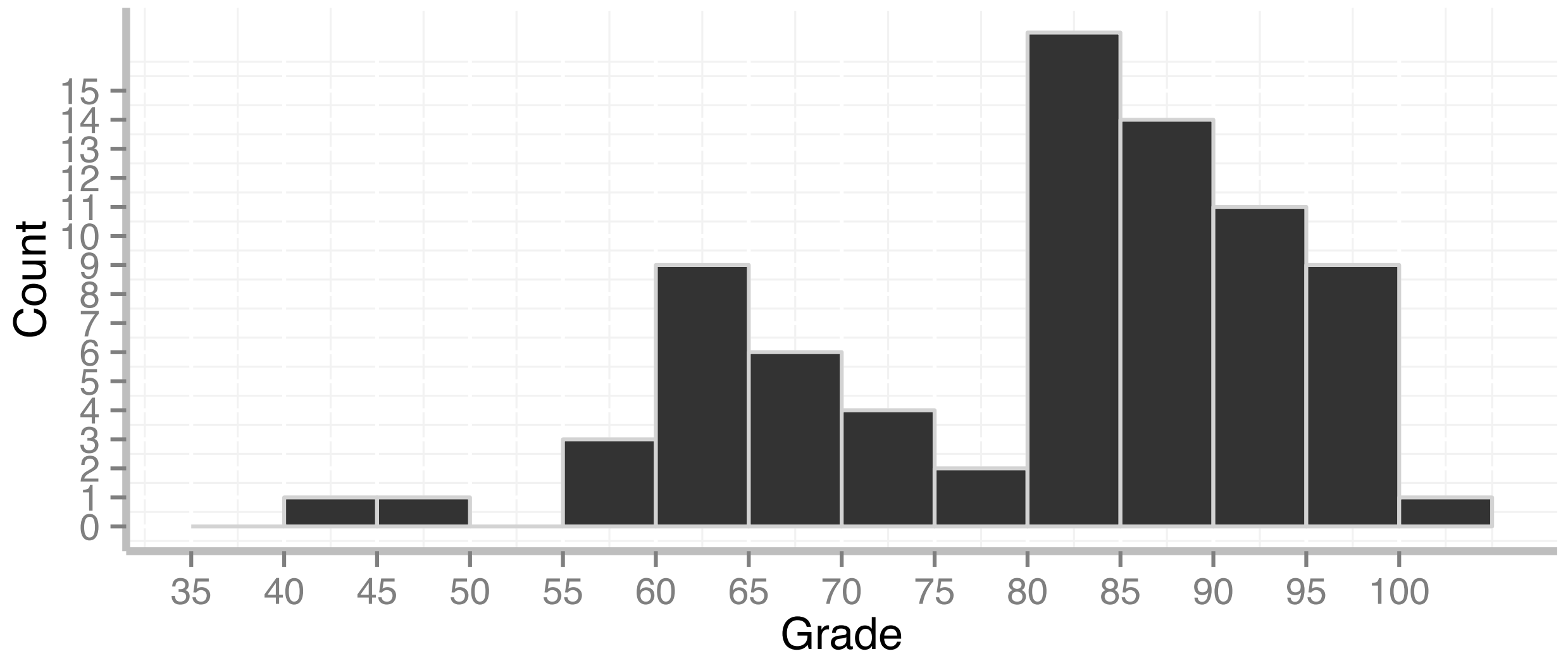
C. Andrews

2016-03-25

Univariate



Univariate: Histogram



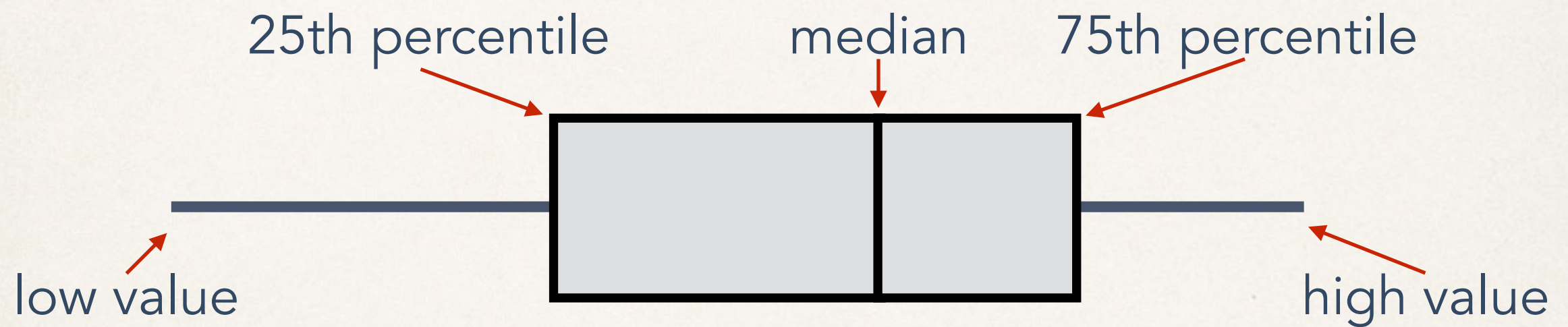
Univariate: Stem and Leaf

Stem

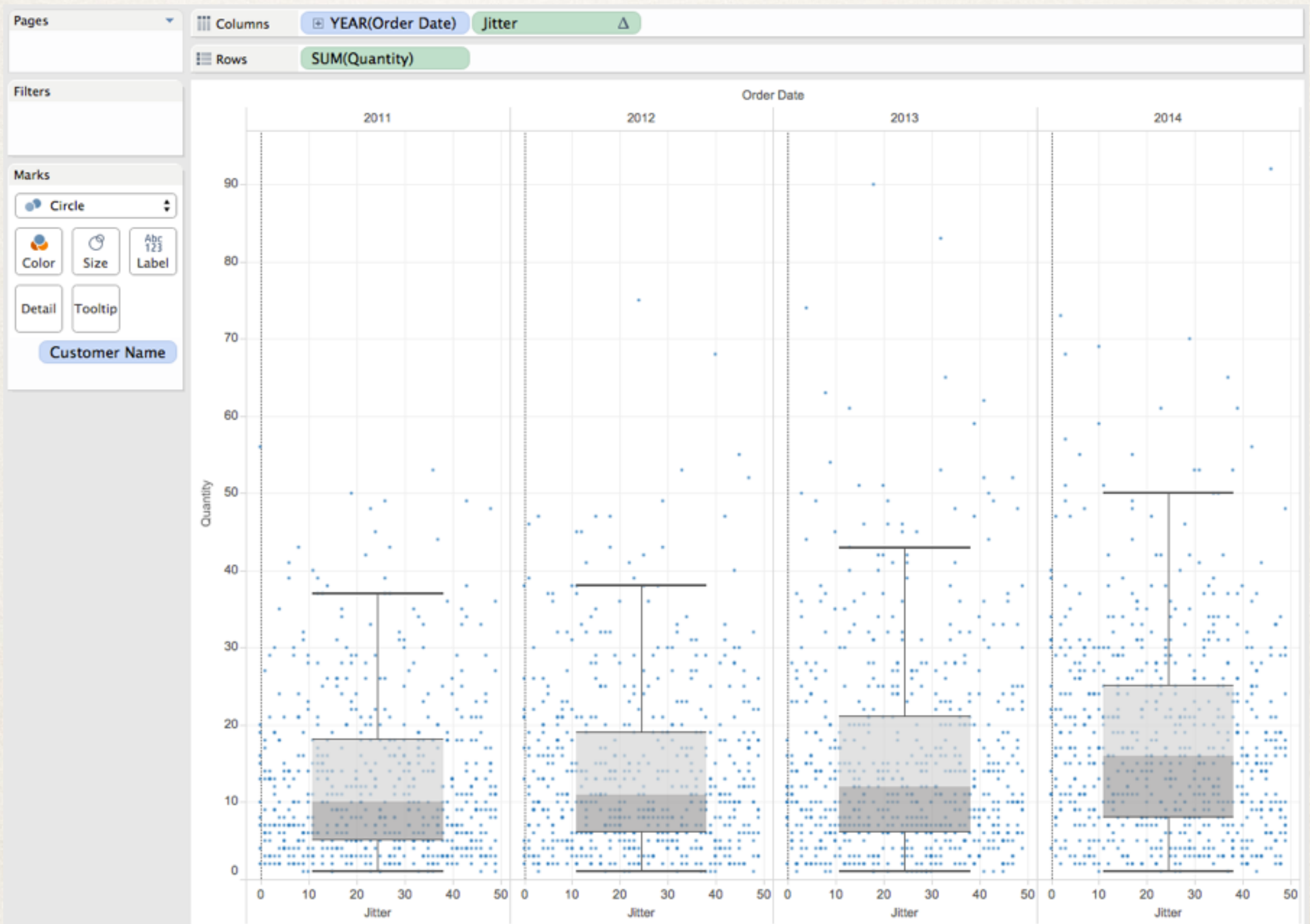
Leaf

| | |
|----|---------------------------------|
| 4 | 1 2 |
| 5 | 7 |
| 6 | 3 4 4 5 8 |
| 7 | 1 2 2 2 5 6 6 6 6 6 7 7 8 9 9 9 |
| 8 | 0 1 1 1 1 2 2 3 3 9 |
| 9 | 1 2 3 5 5 5 5 6 7 8 8 9 9 |
| 10 | 0 0 |

Univariate: Box and Whiskers



Adding a variable...



Univariate questions

Which is the biggest?

Which is the smallest?

What is the "center"?

What is the "shape" of the data?

What are the outliers?

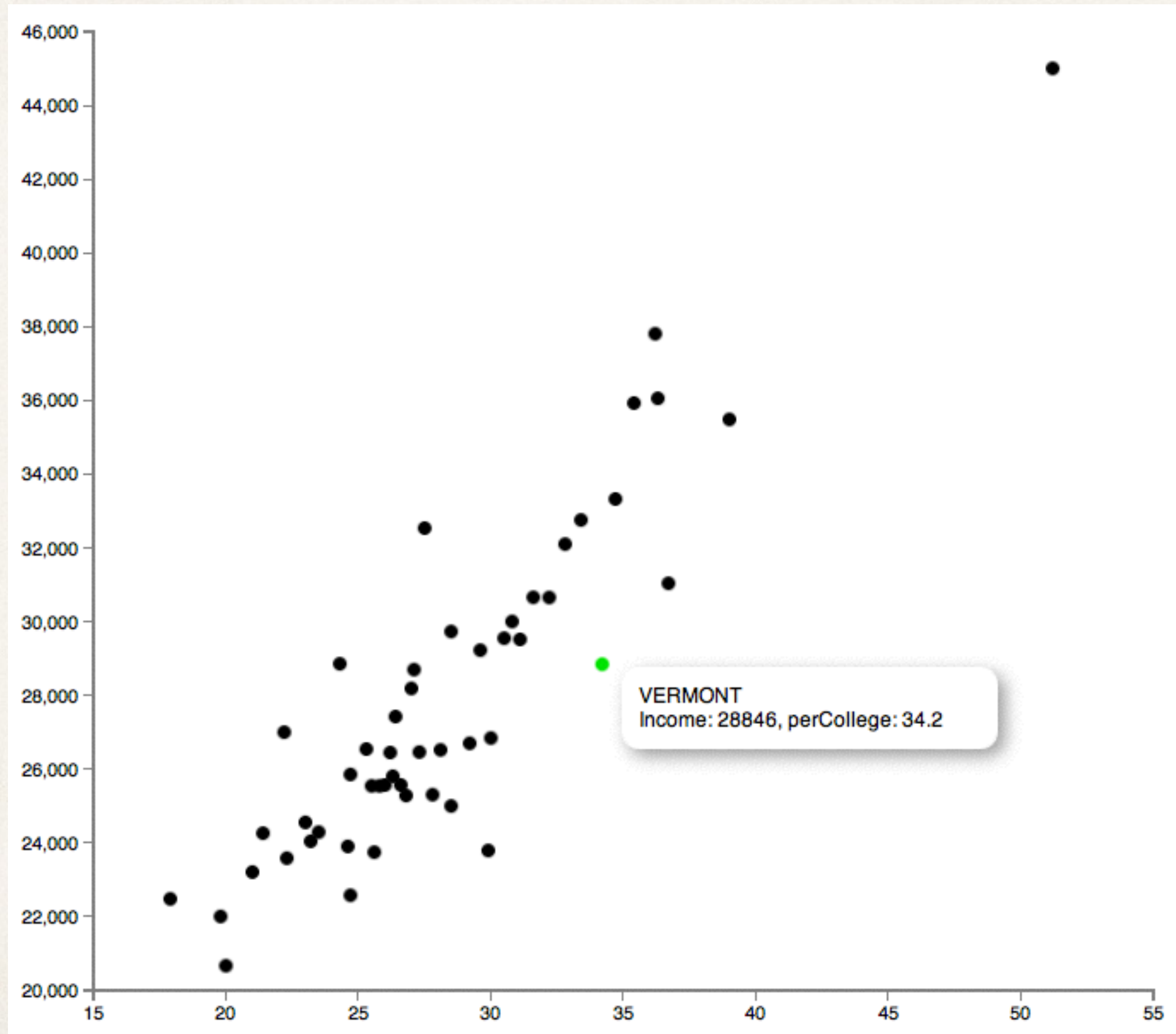
Multivariate questions

Which items are most alike?

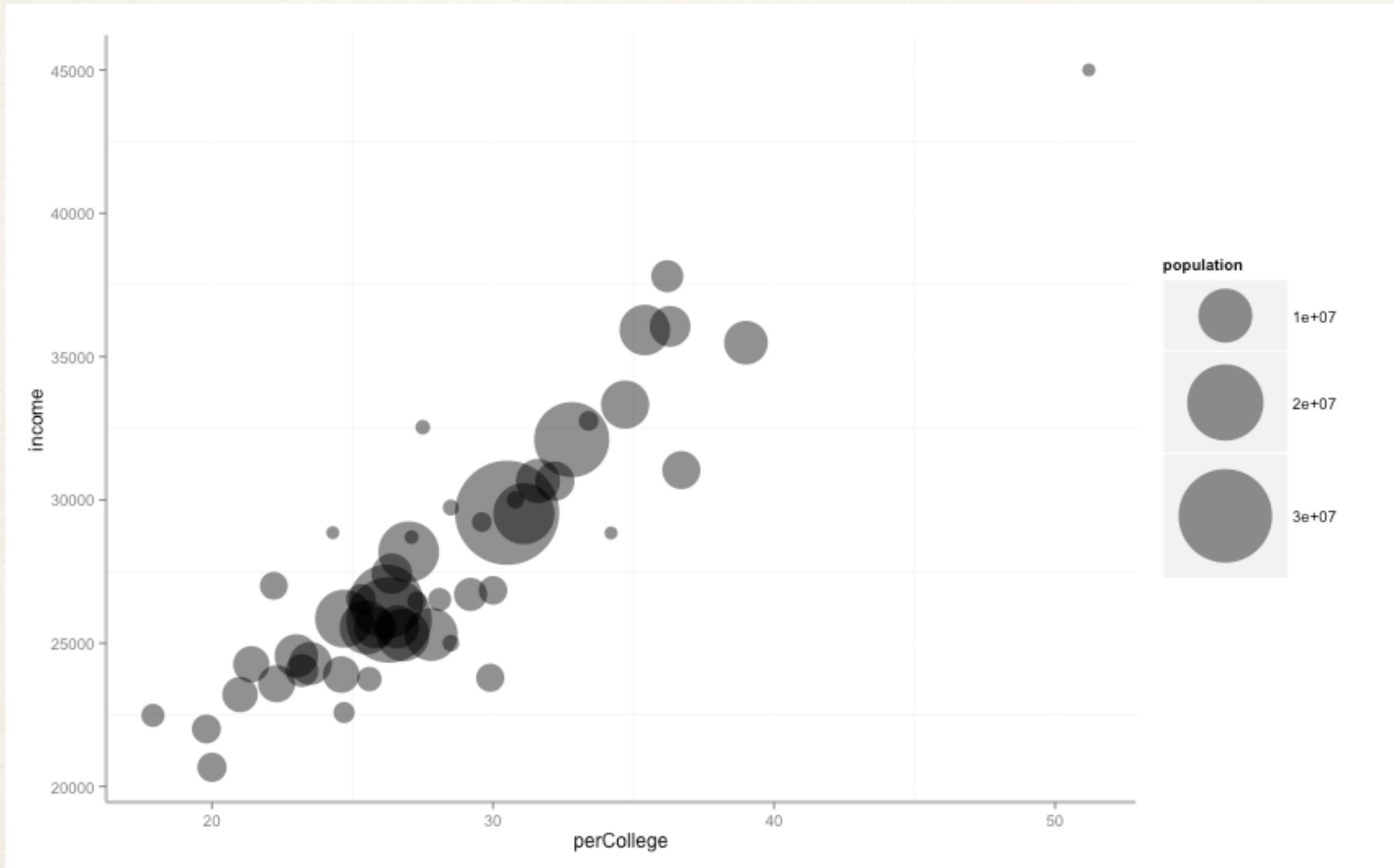
Which items are most exceptional?

How can these items be combined into logical groups based on similarity?

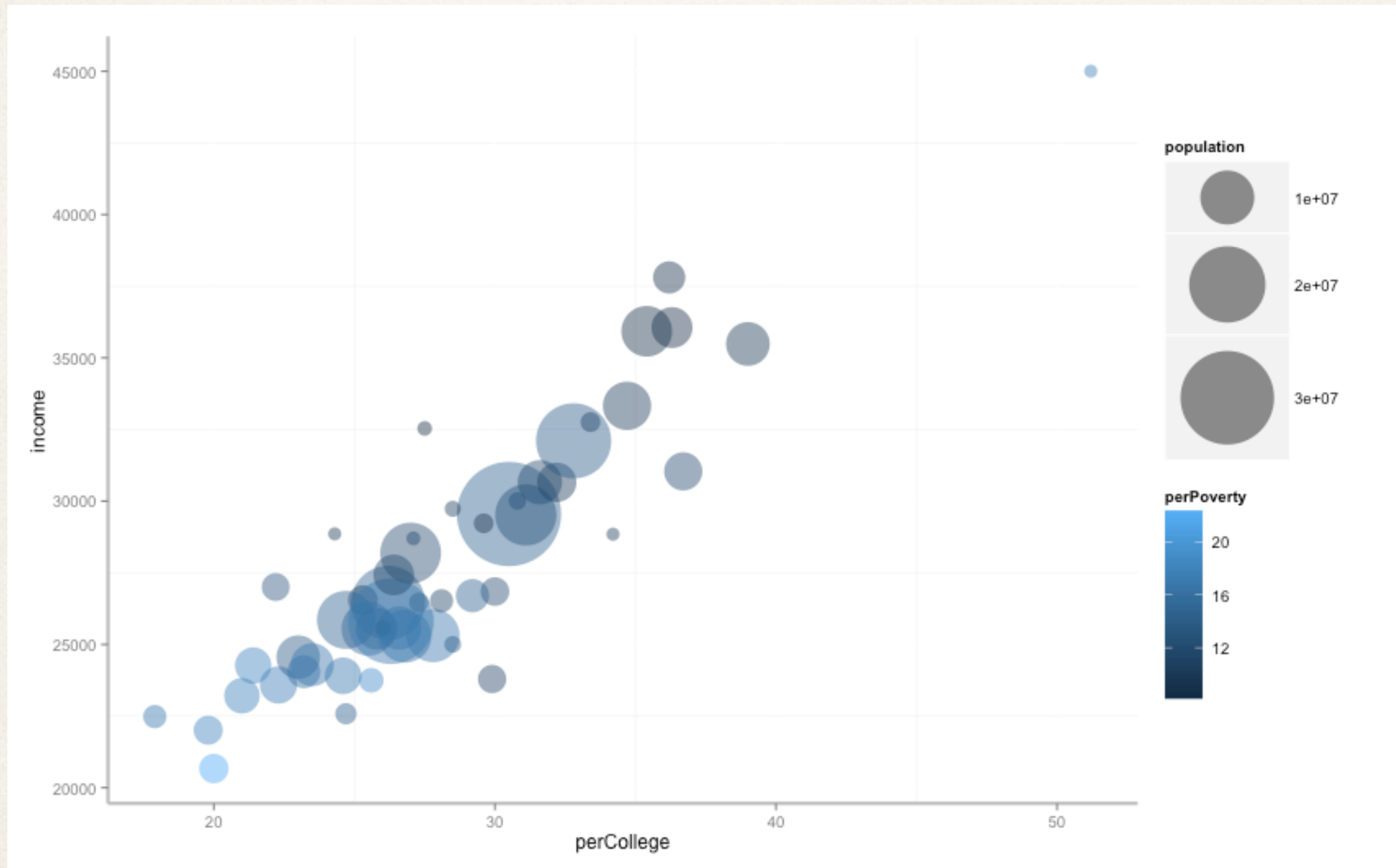
Bivariate



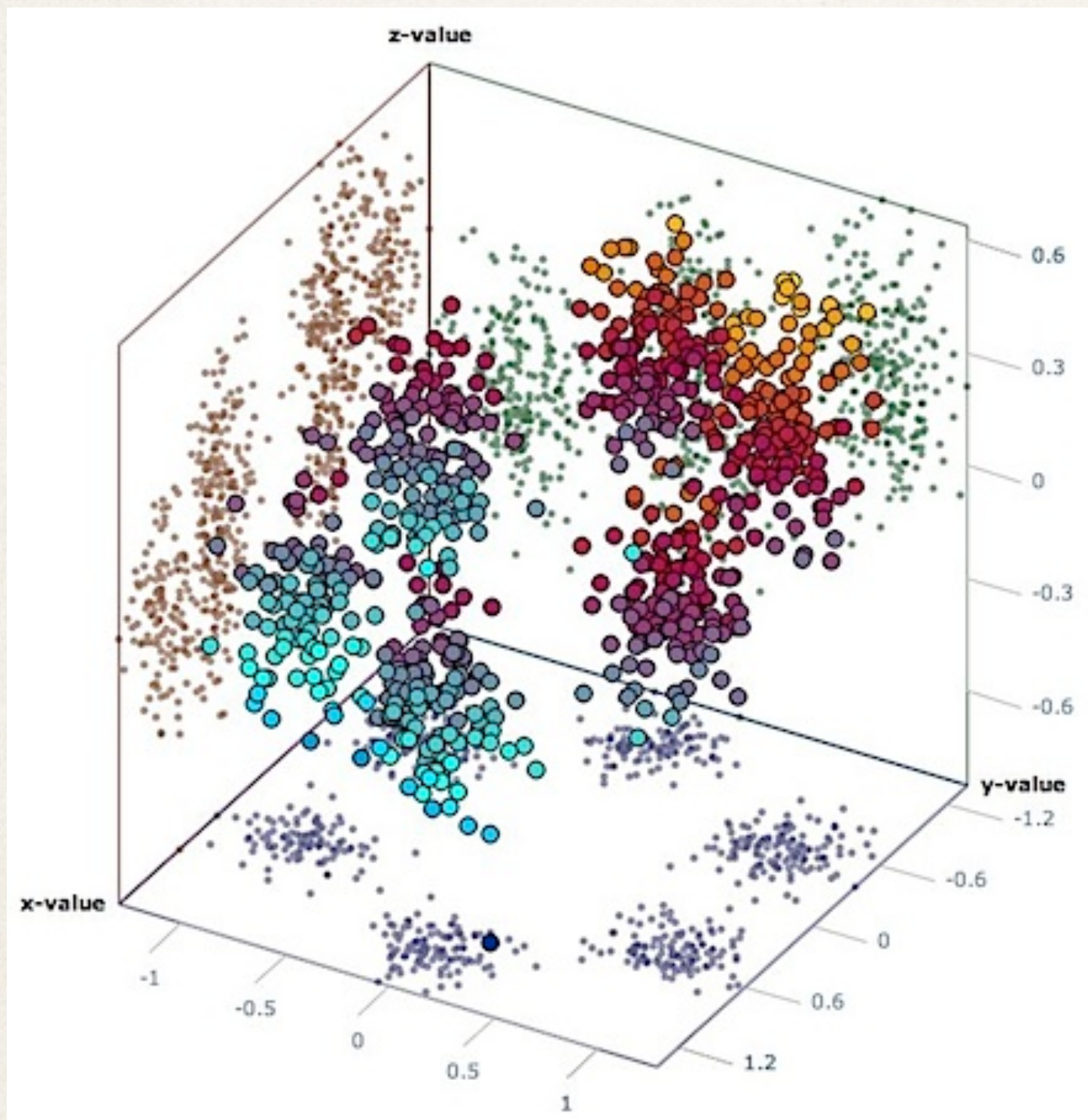
Trivariate



Hypervariate

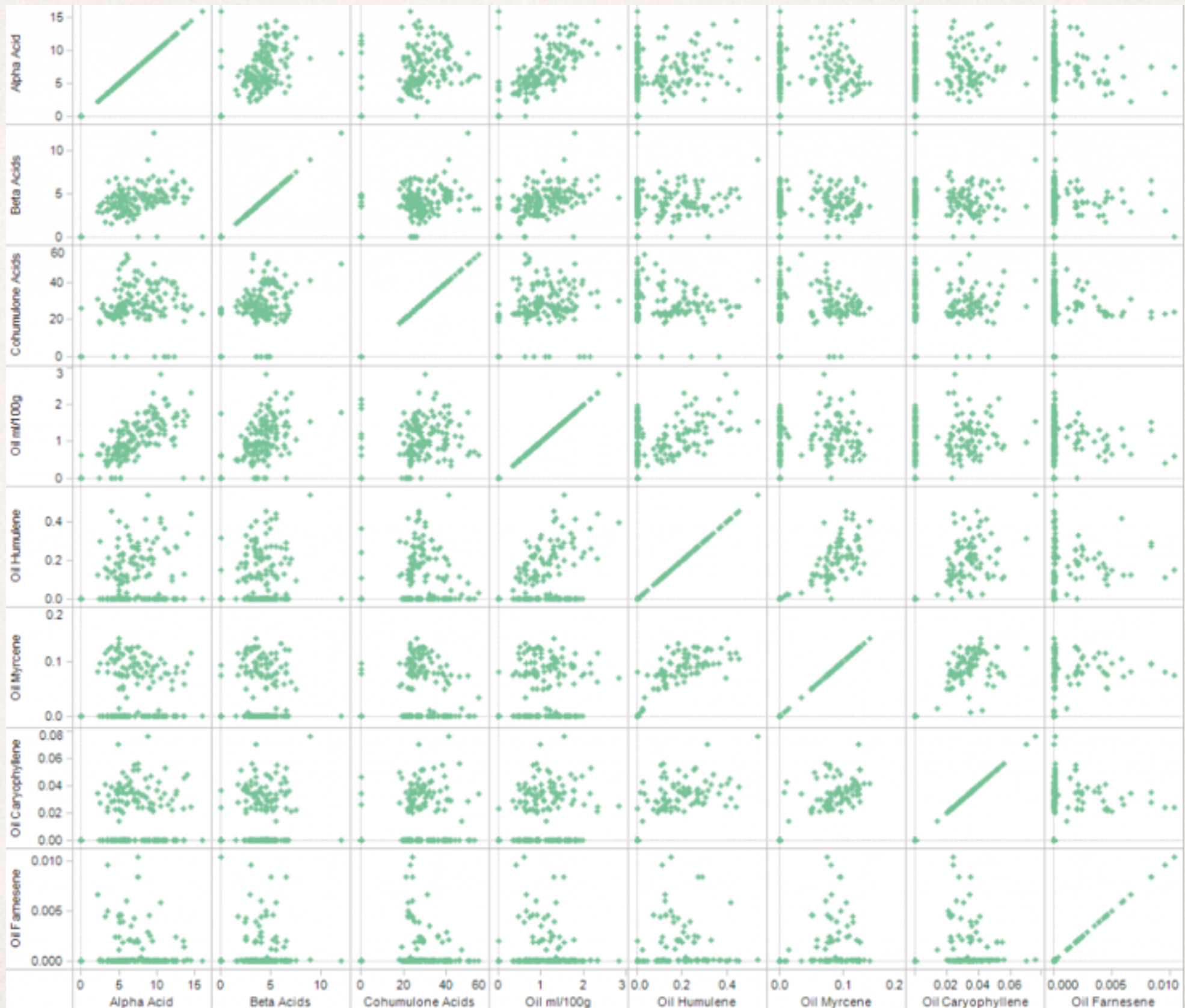


MultiD Scatterplots

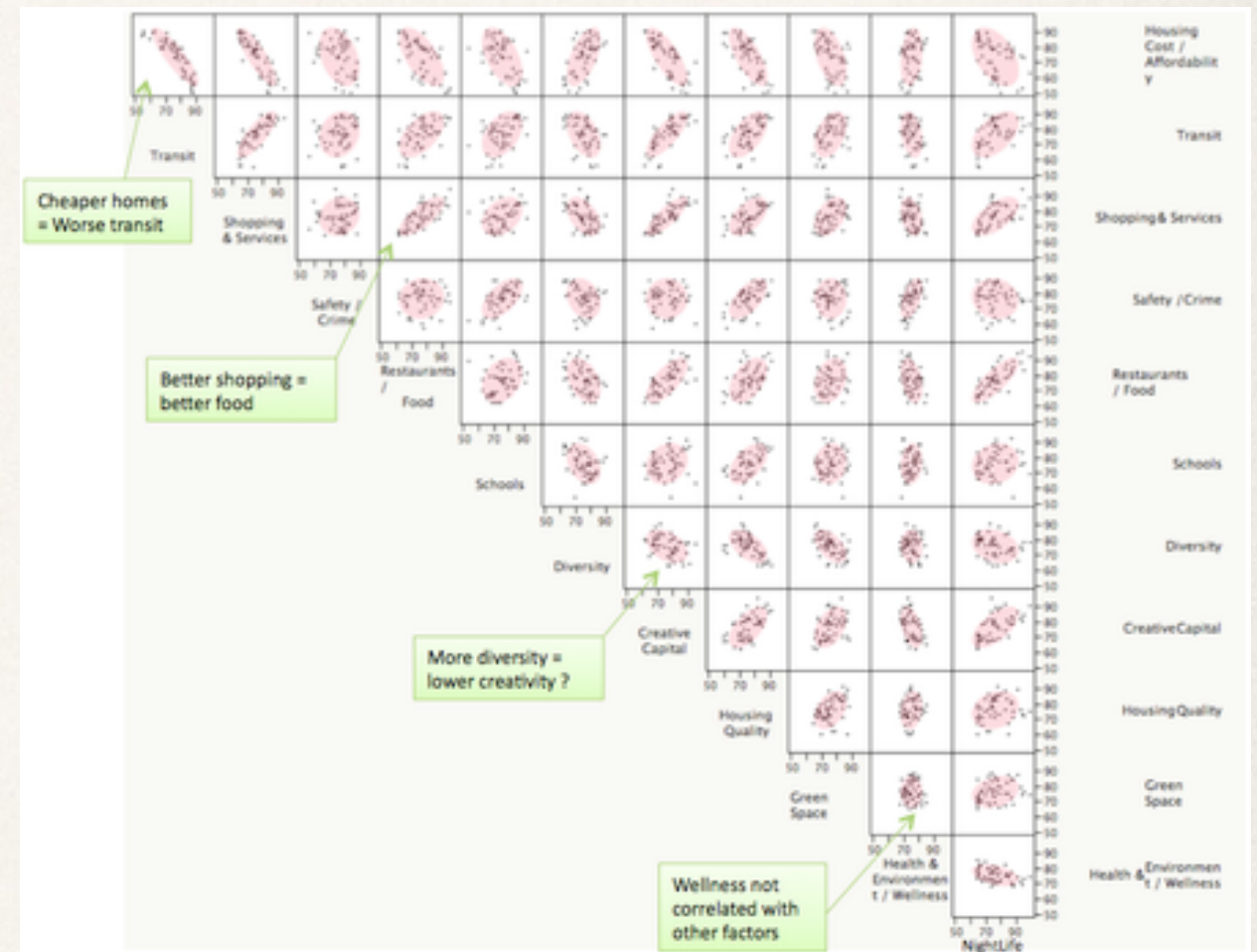
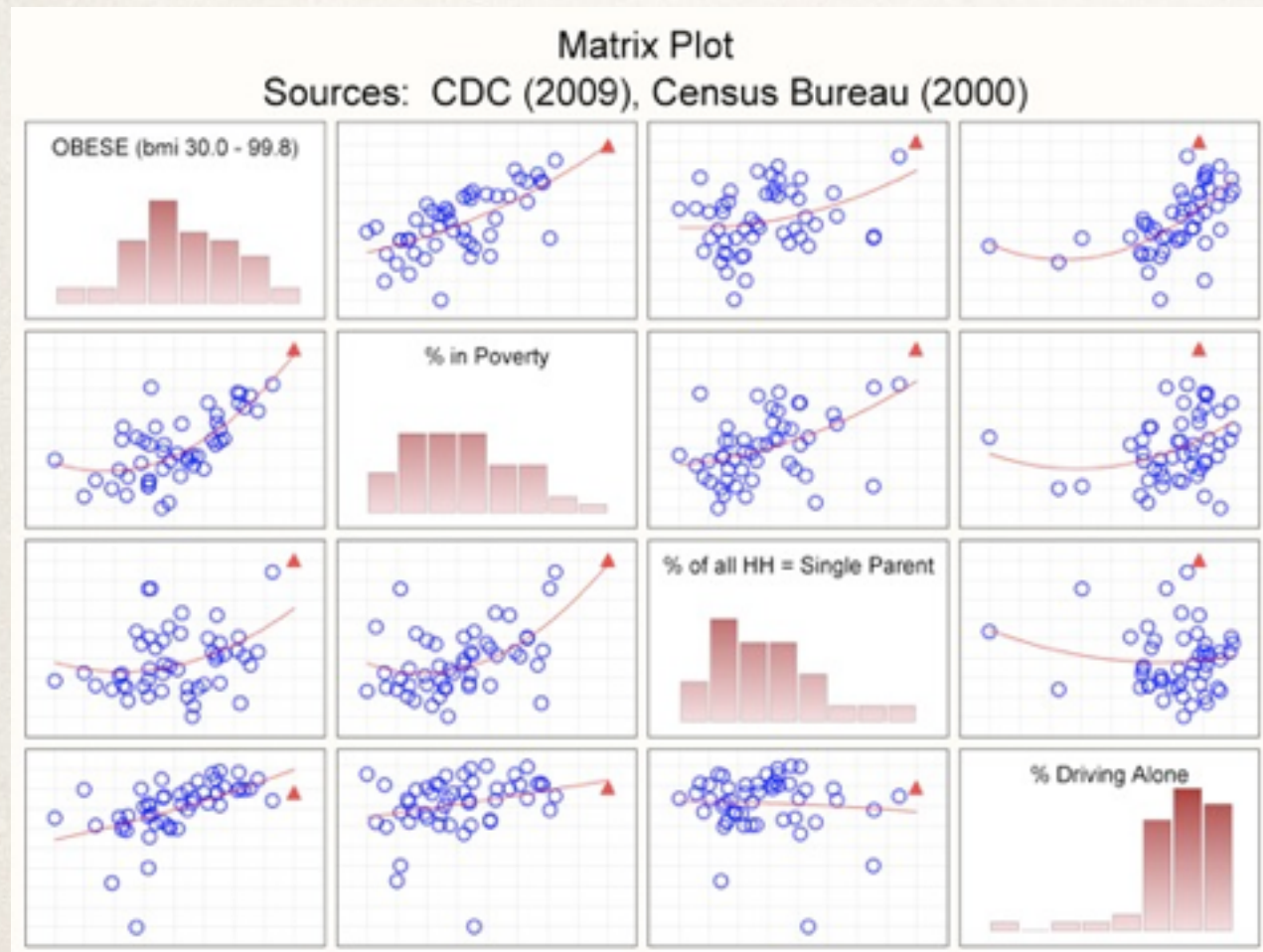


or just add another axis

Scatterplot matrix



Scatterplot matrix



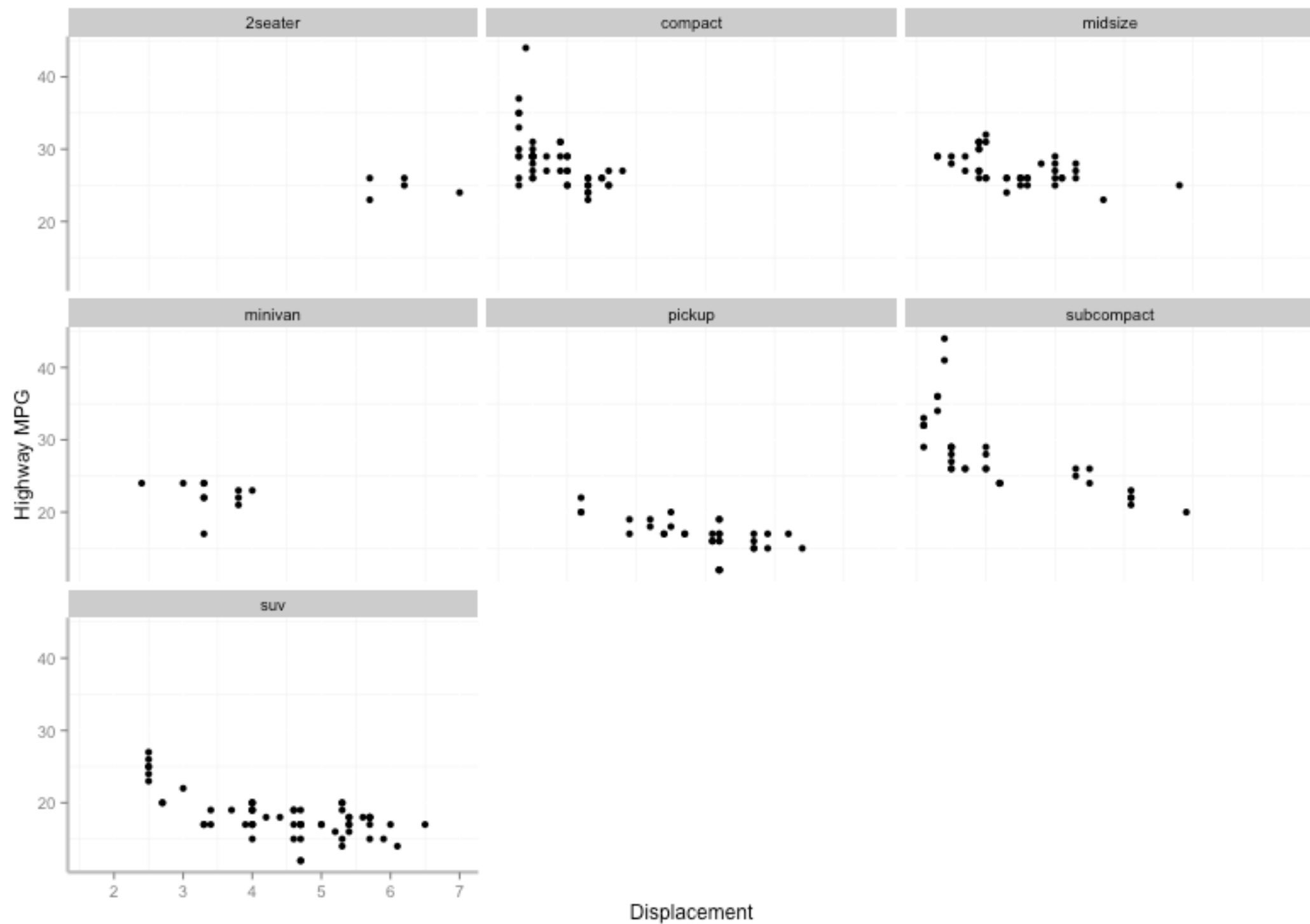
<http://www.statsoft.com/support/blog/entryid/212/finding-the-right-pieces-to-the-puzzle>

http://junkcharts.typepad.com/junk_charts/2010/06/the-scatterplot-matrix-a-great-tool.html

Trellis plot



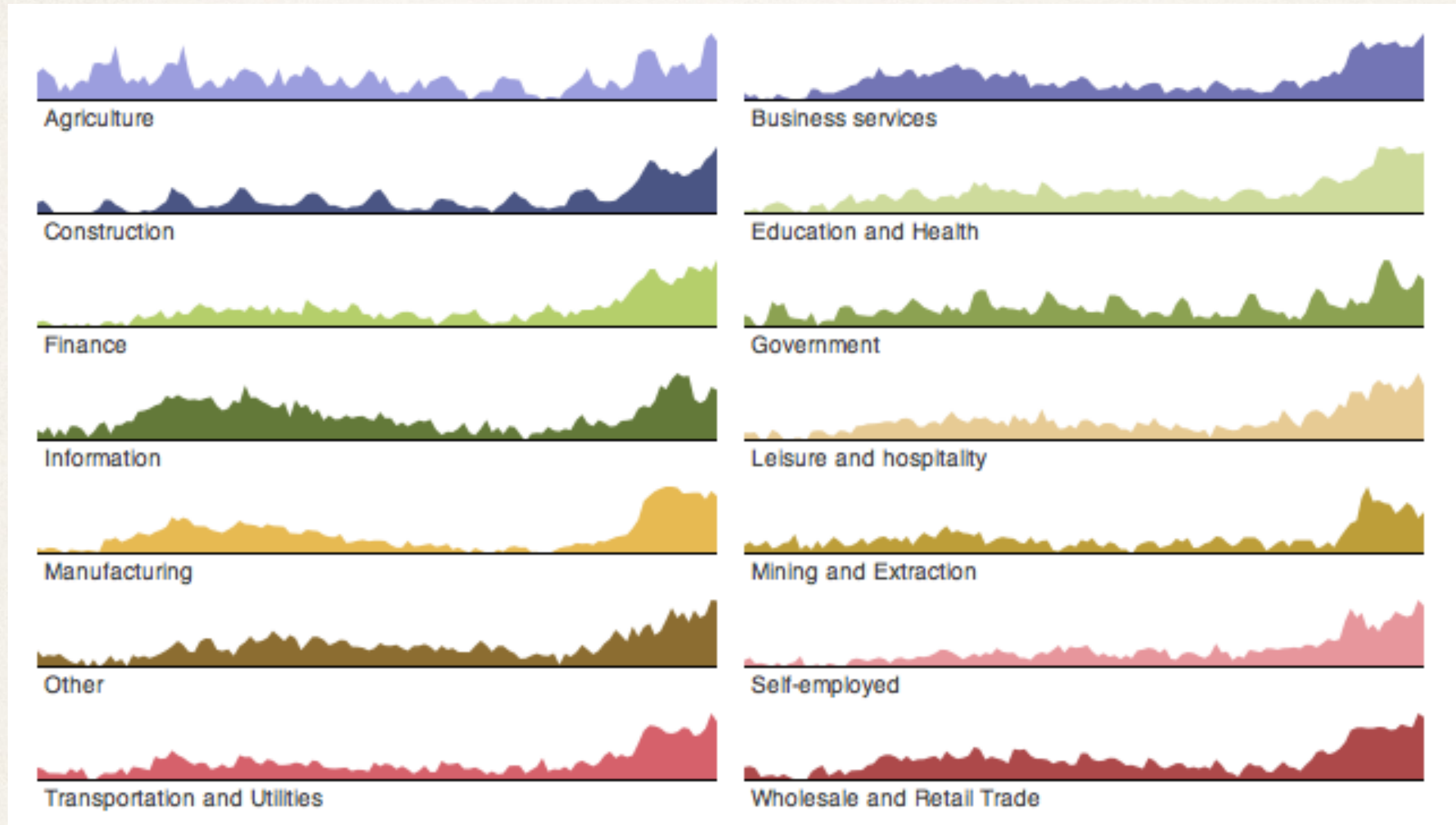
Trellis plot



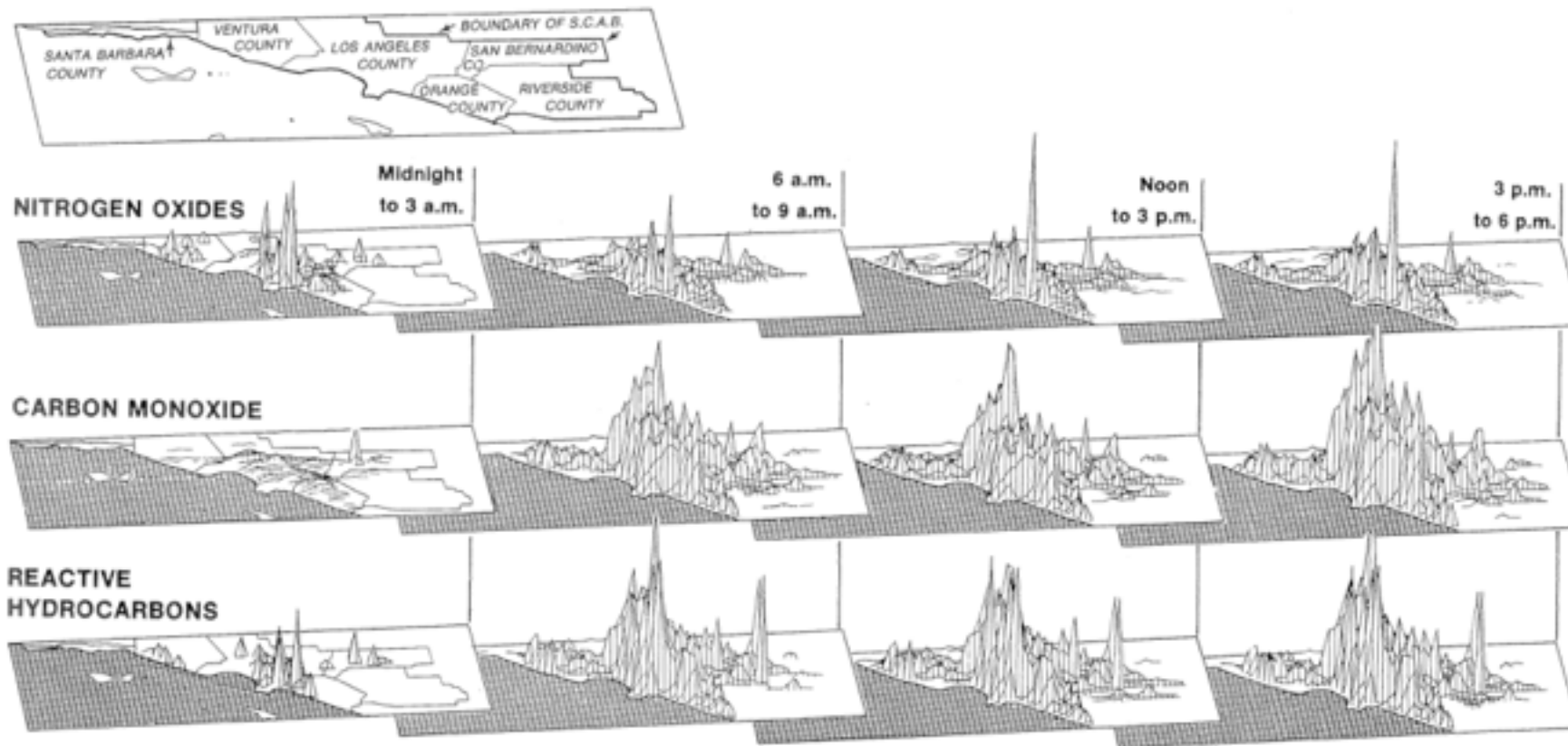
Trellis graph - not just scatterplots



Small multiples



Small multiples

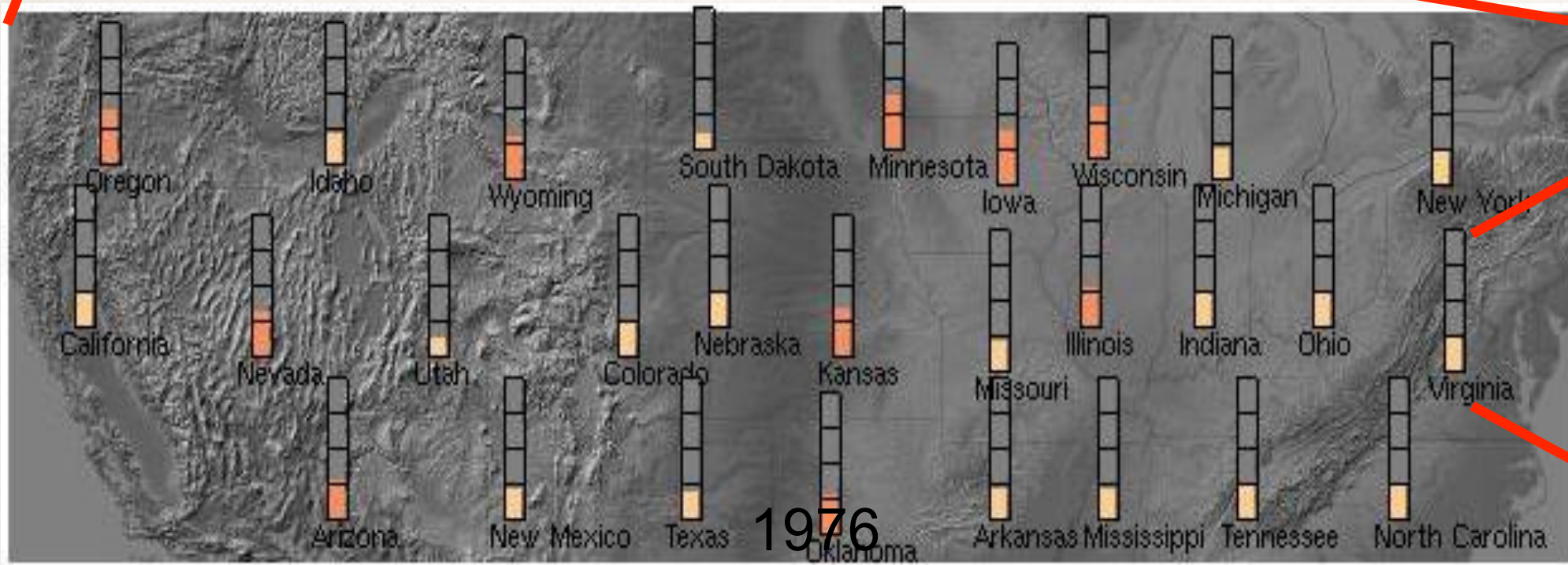
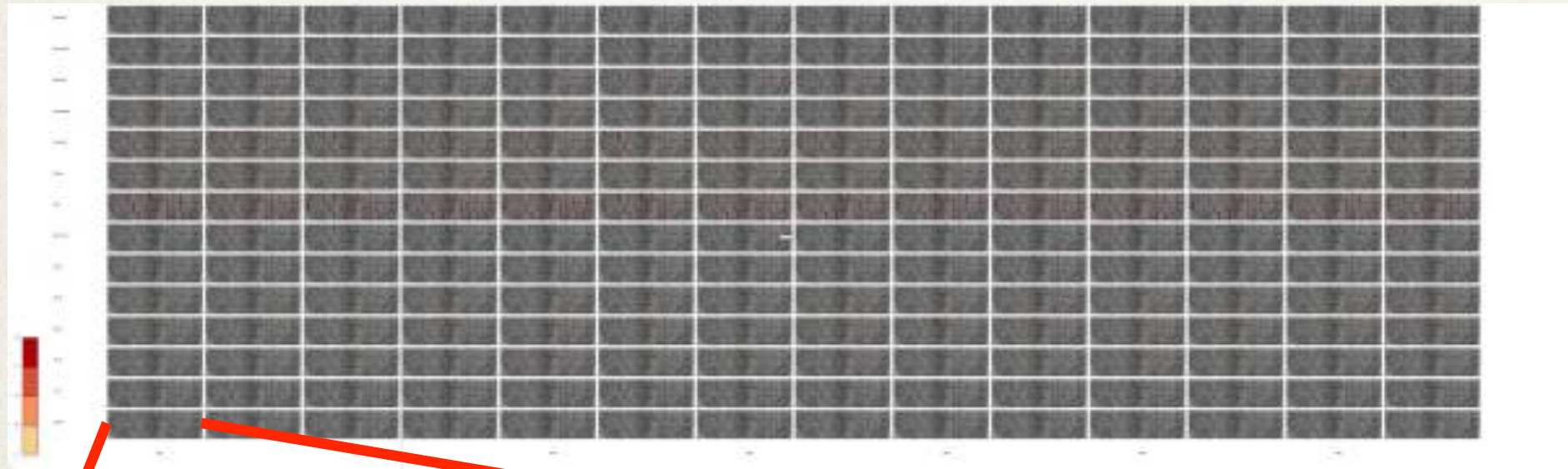


Tufte. The Visual Display of Quantitative Information

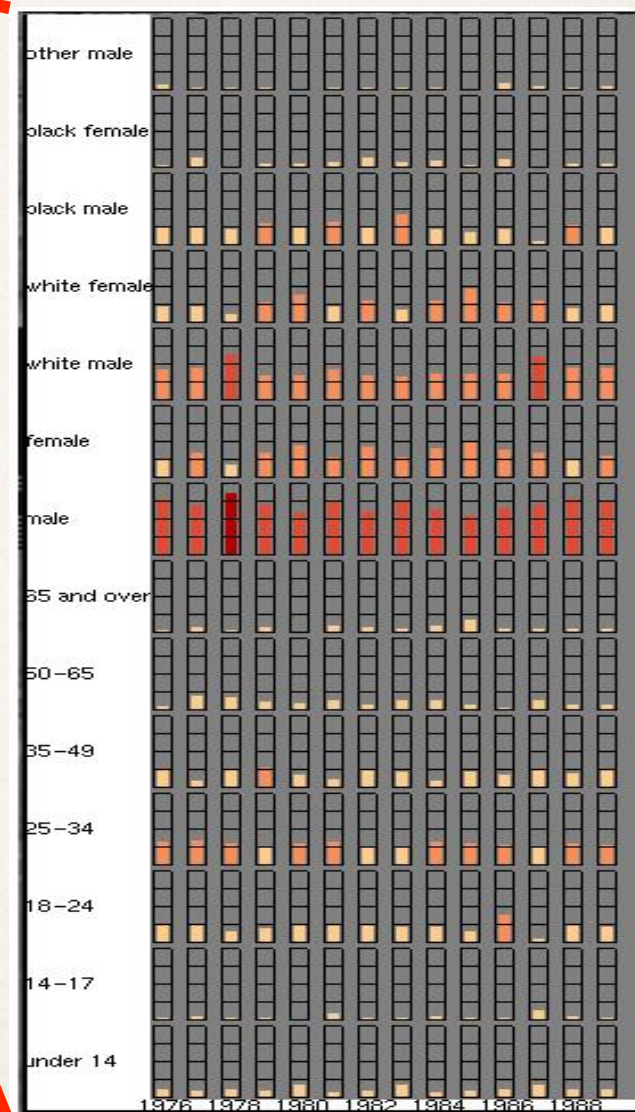
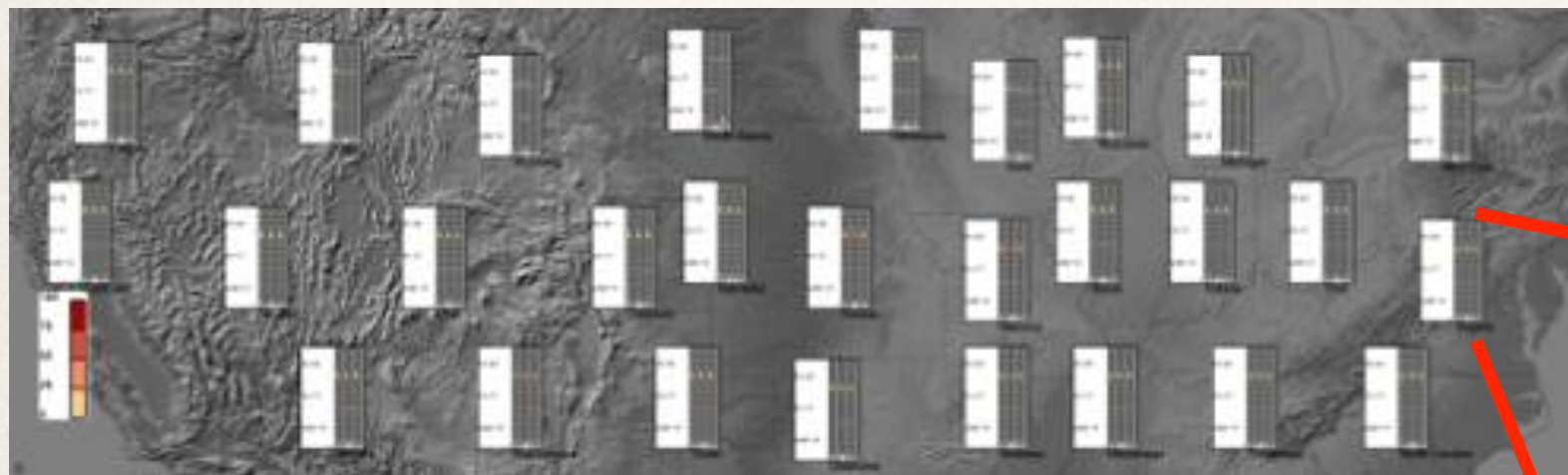
Chaiyya Chaiyya Dance Moves



Small multiples



Embedded visualization



Multidimensional scaling

Calculate the similarity of all pairs of records using some distance function

Create a map that maps each record into our 2 (or 3) dimensional space

Calculate the similarity of all pairs of points

Compute the stress on the system as function of the difference between the similarity of the points and the similarity of the original records

If the stress is above some threshold, move points to reduce stress and repeat

Multidimensional scaling

