

Reflection session

Reflection session

Step 1:

In pairs of rows, take turns discussing with your neighbors what you read and what you found interesting about it.

- 10 minutes

Reflection session

Step 2:

Share some of your favorites with the rest of the class. Discuss.

(@ me on Slack w/ links so I can show)

- 15 minutes

tables of data



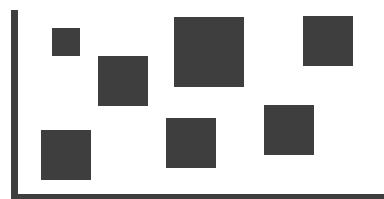
Arrange Tables

→ Express Values

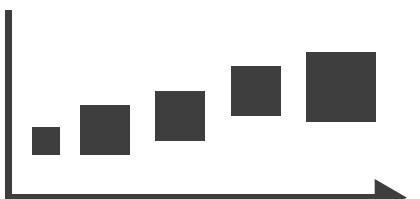


→ Separate, Order, Align Regions

→ Separate



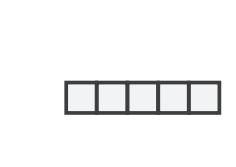
→ Order



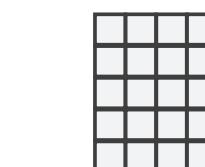
→ Align



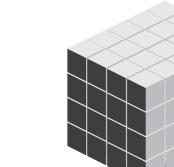
→ 1 Key
List



→ 2 Keys
Matrix



→ 3 Keys
Volume

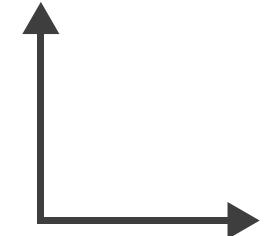


→ Many Keys
Recursive Subdivision

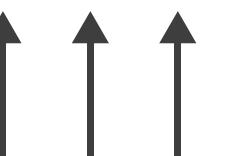


→ Axis Orientation

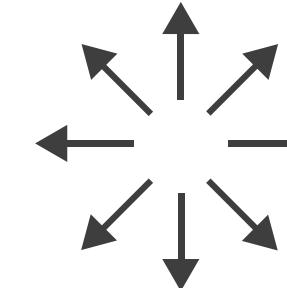
→ Rectilinear



→ Parallel

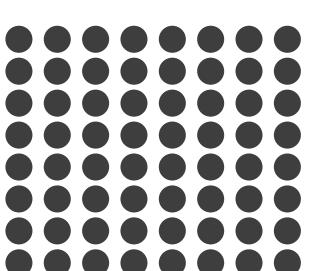


→ Radial



→ Layout Density

→ Dense



→ Space-Filling



*Arrange means
manipulating
space*

Channels: Expressiveness Types and Effectiveness Ranks

→ **Magnitude Channels: Ordered Attributes**

Position on common scale



Position on unaligned scale



Length (1D size)



Tilt/angle



Area (2D size)



Depth (3D position)



Color luminance



Color saturation



Curvature



Volume (3D size)



→ **Identity Channels: Categorical Attributes**

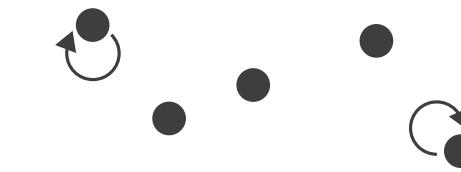
Spatial region



Color hue



Motion



Shape



▲ Most

Effectiveness

▼ Least

[Same]

*Arrange is
constrained by
data "shape"*

→ Tables

Keys

Values

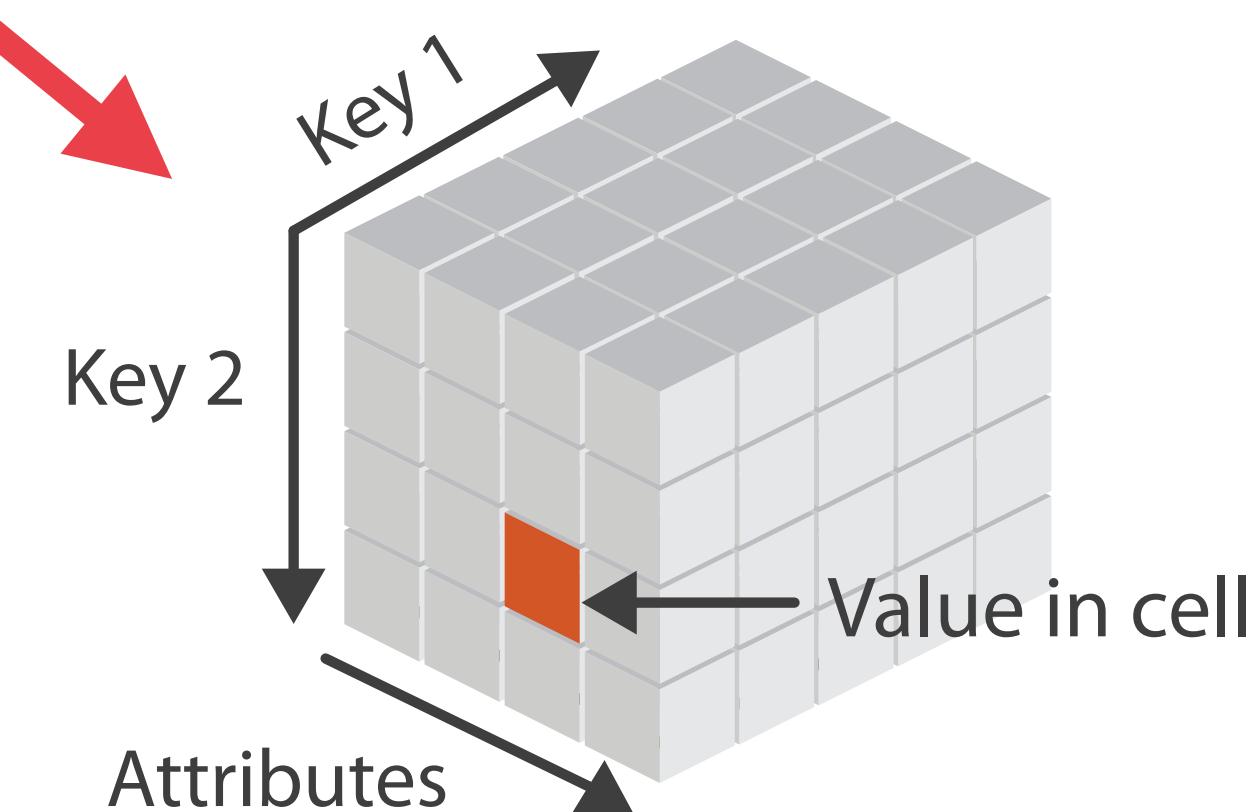
Attributes

Items
(rows)

Attributes (columns)

Cell containing value

→ *Multidimensional Table*

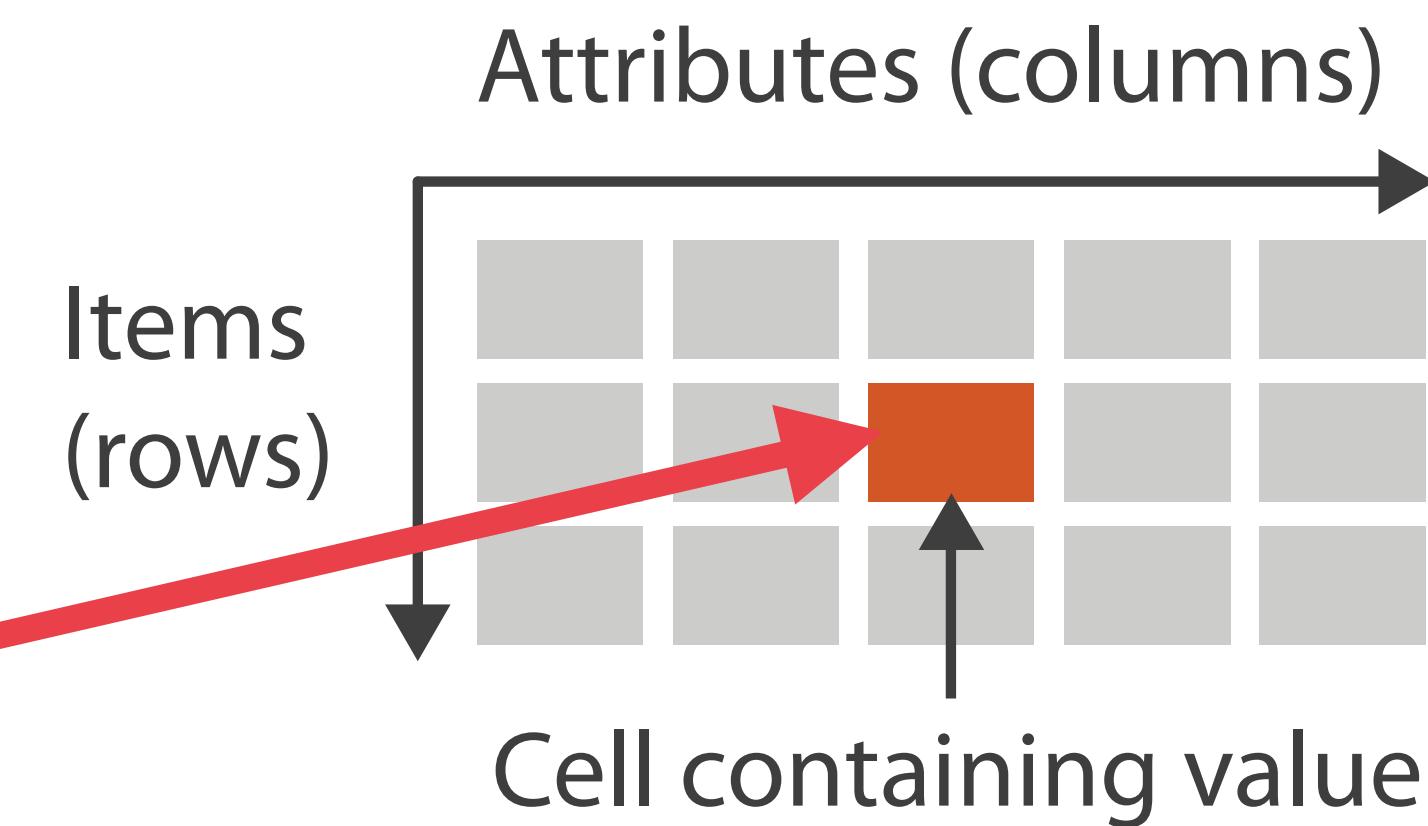


→ Tables

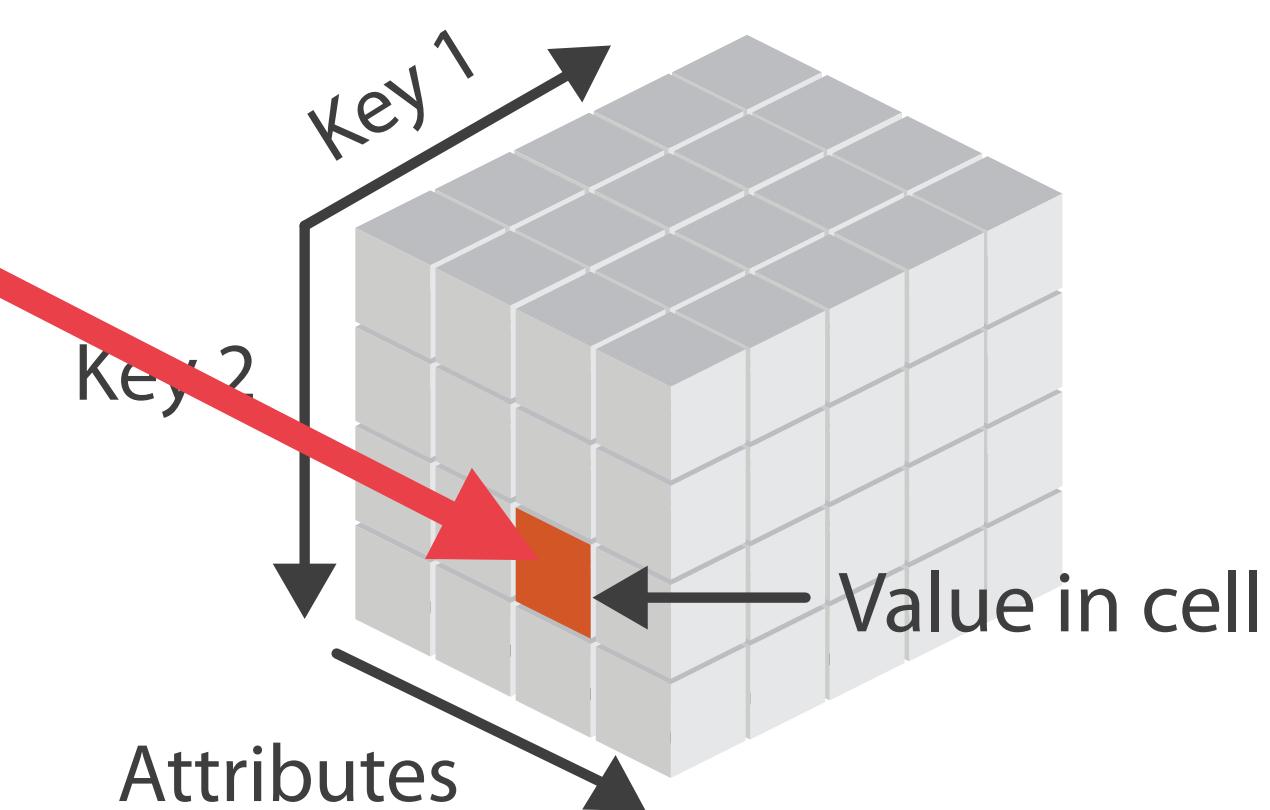
Keys

Values

Attributes



→ *Multidimensional Table*

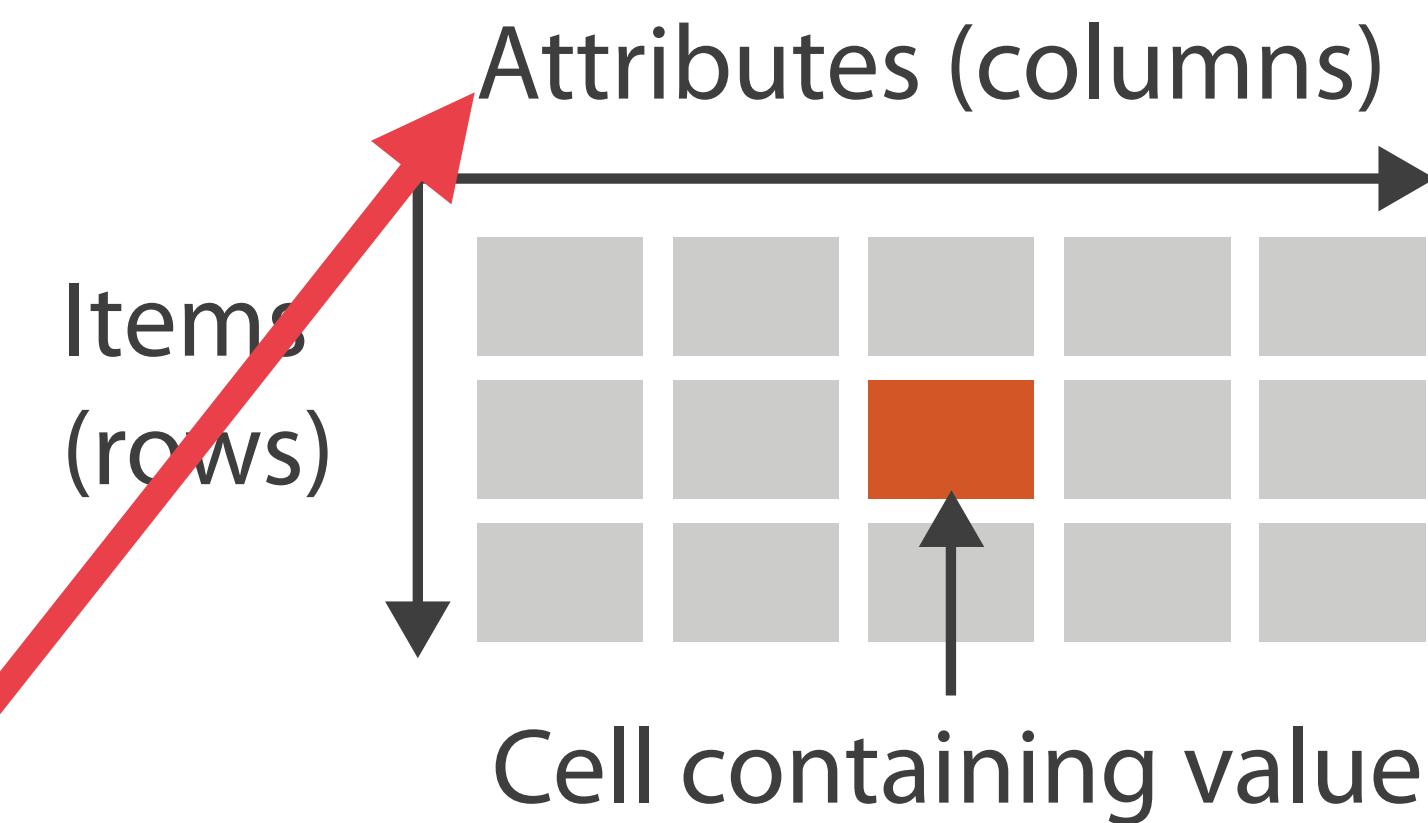


Keys

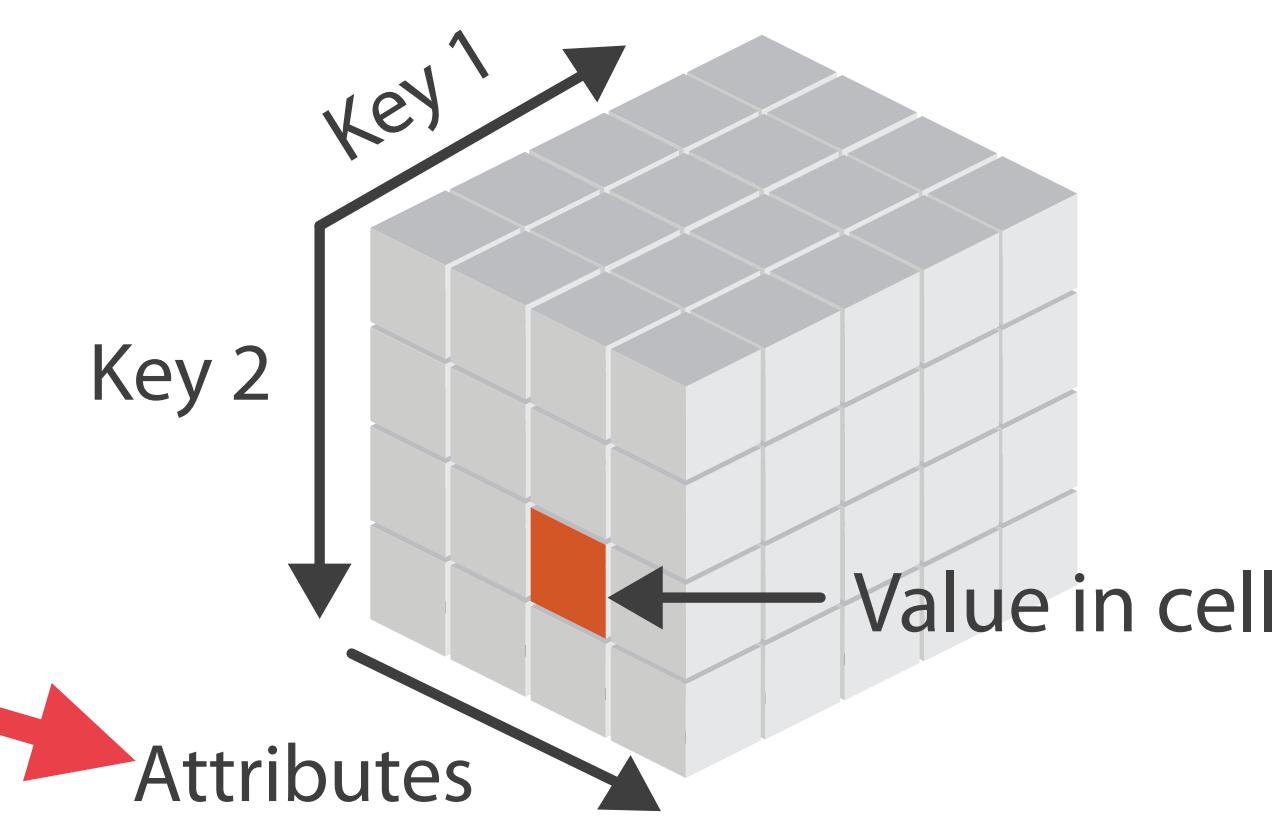
Values

Attributes

→ Tables



→ *Multidimensional Table*



→ Tables

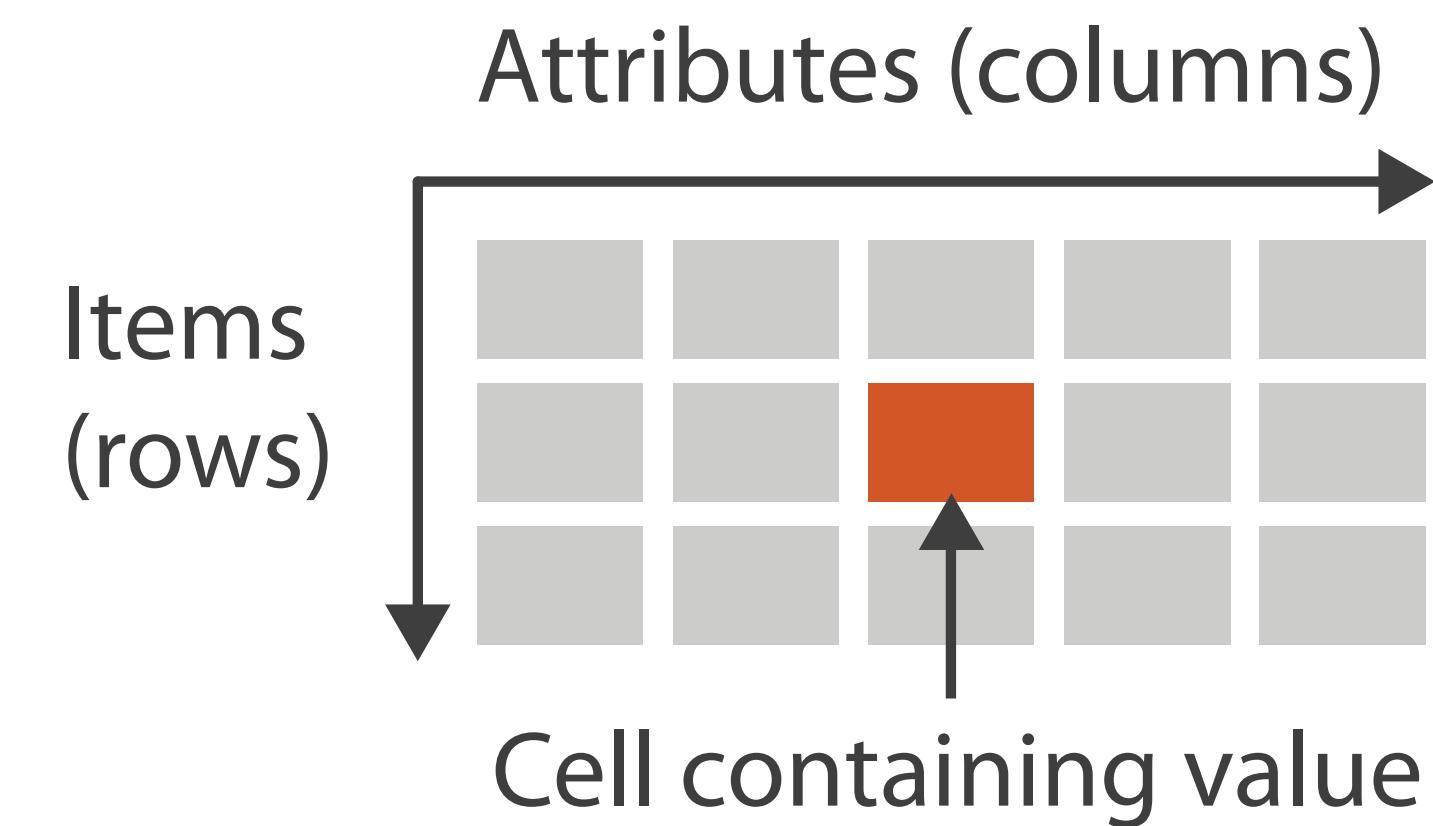
Keys
index

Values

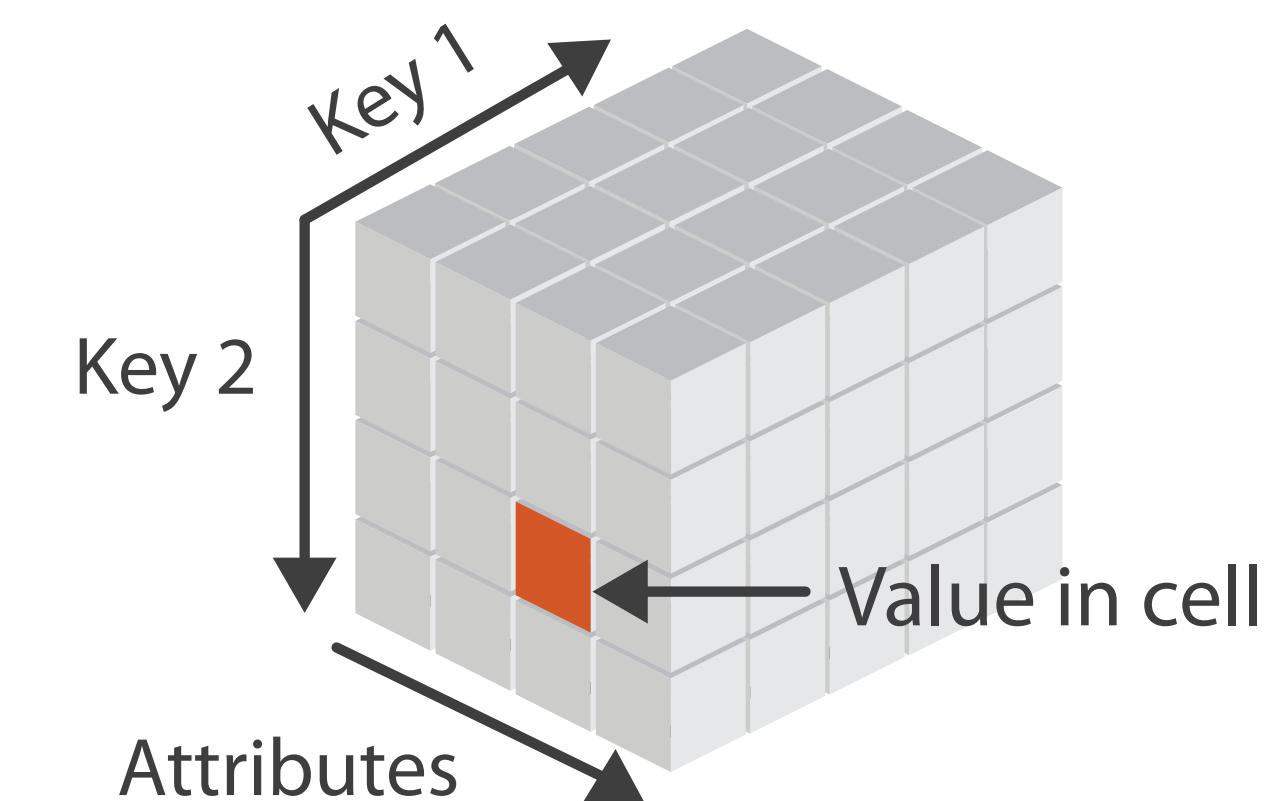
“shape” of attribute

Attributes

type: categorical, ordinal, etc.



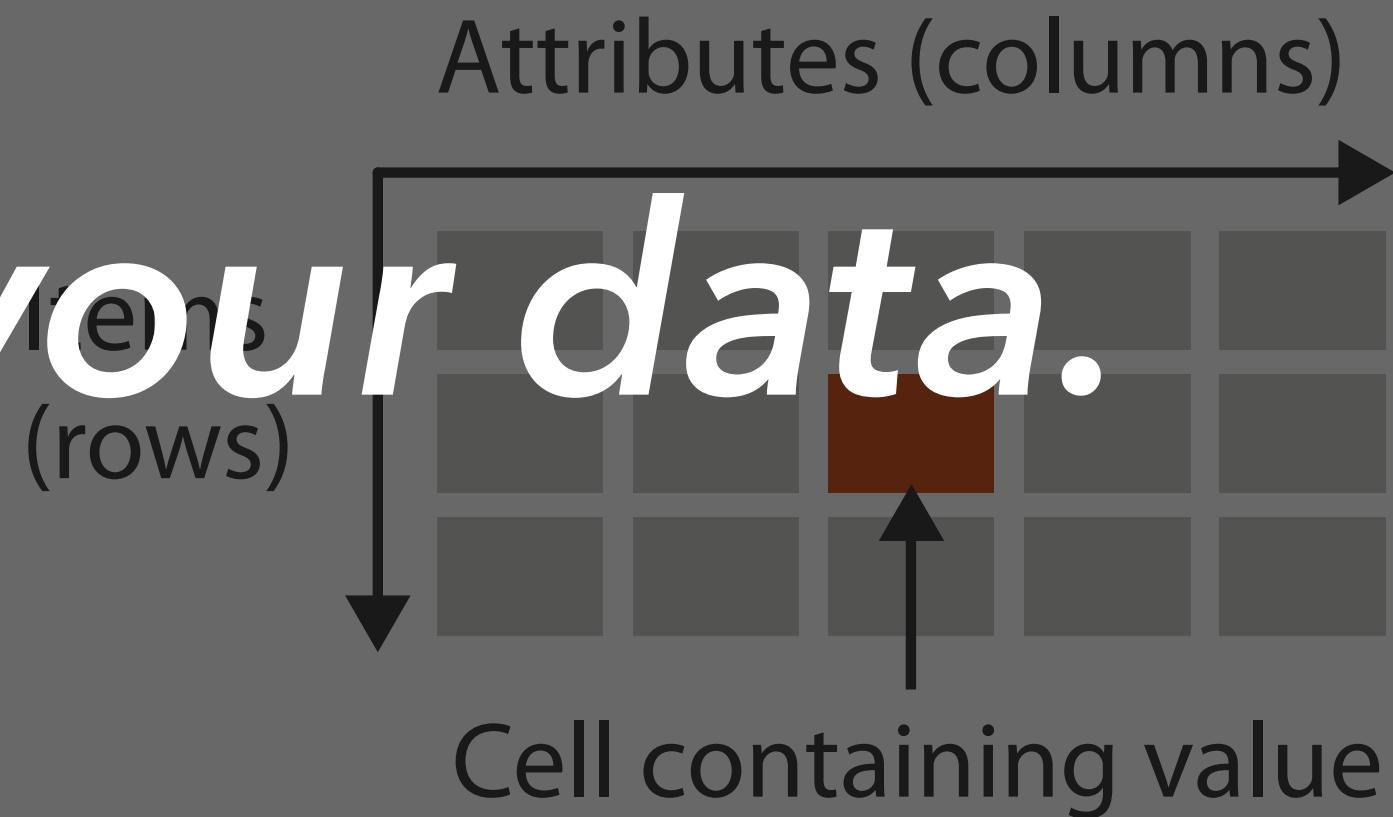
→ *Multidimensional Table*



→ Tables

Keys

Identify the shape of your data.



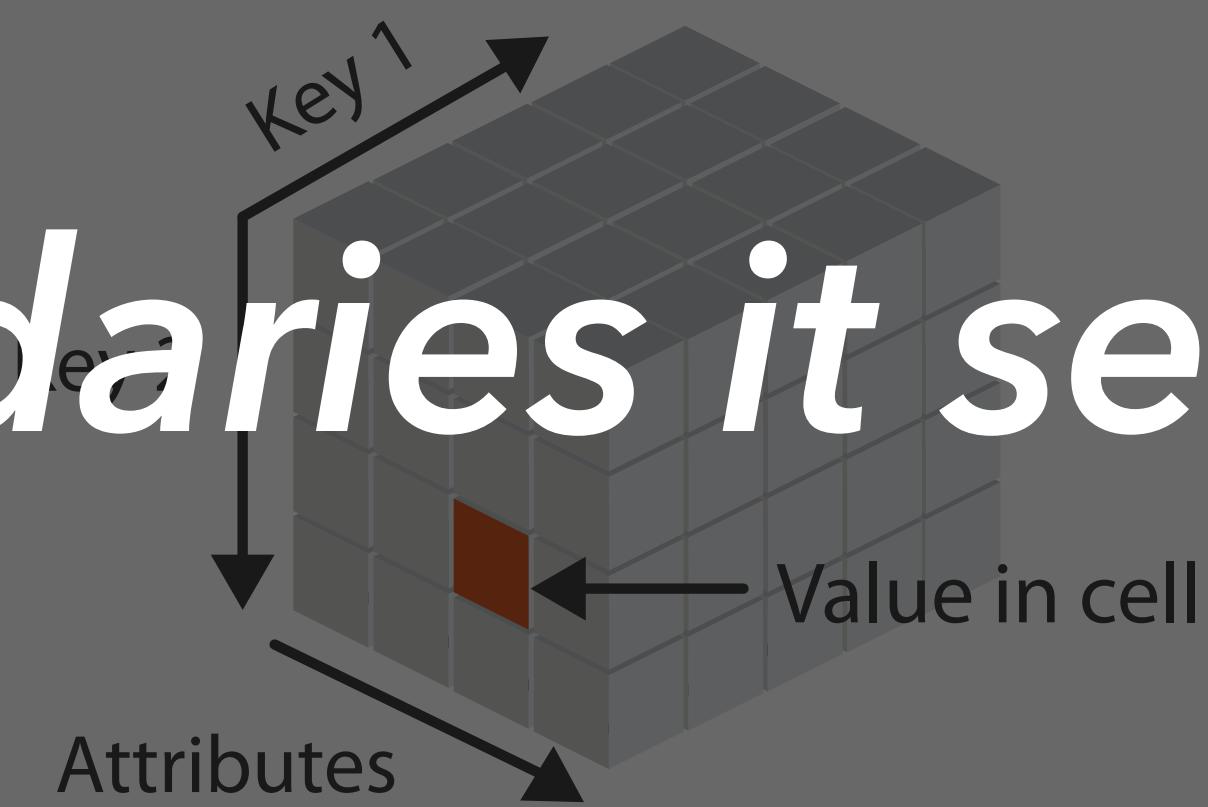
Values
any type

Change it to meet vis/algorithm needs.

→ Multidimensional Table

Design within the boundaries it sets.

categorical or ordinal



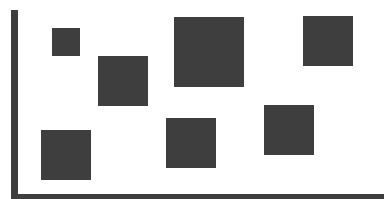
Arrange Tables

→ Express Values

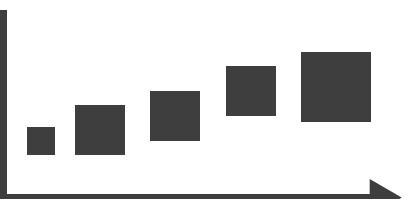


→ Separate, Order, Align Regions

→ Separate



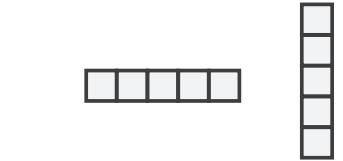
→ Order



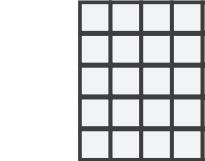
→ Align



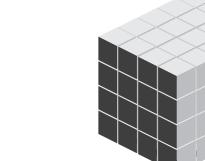
→ 1 Key
List



→ 2 Keys
Matrix



→ 3 Keys
Volume

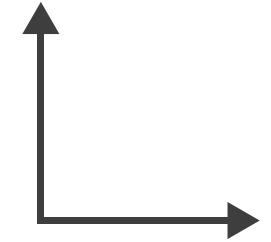


→ Many Keys
Recursive Subdivision

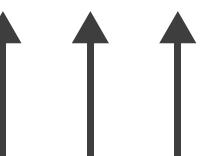


→ Axis Orientation

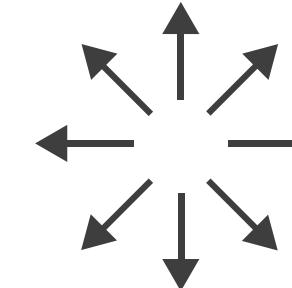
→ Rectilinear



→ Parallel

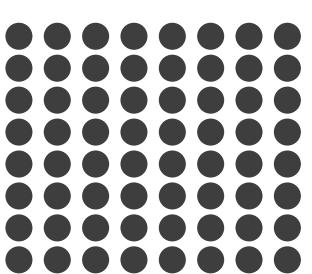


→ Radial



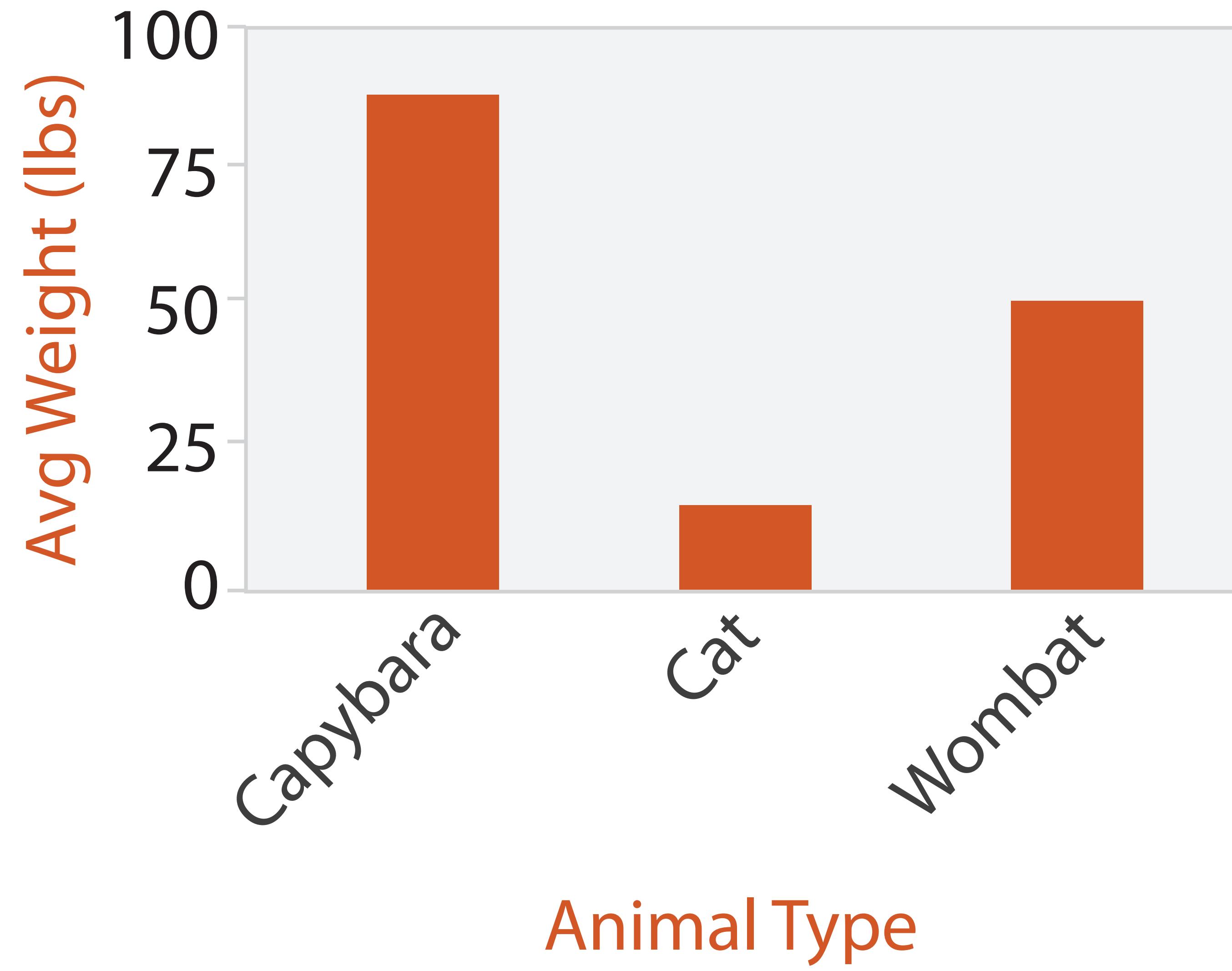
→ Layout Density

→ Dense



→ Space-Filling





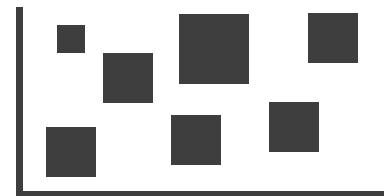
Arrange Tables

→ Express Values

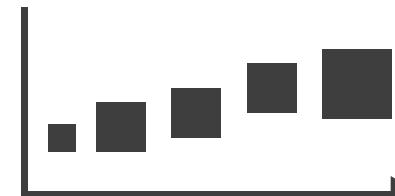


→ Separate, Order, Align Regions

→ Separate



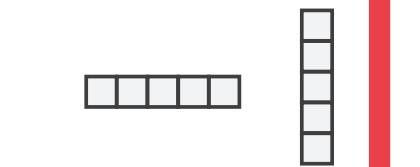
→ Order



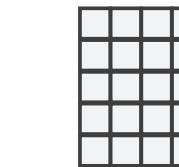
→ Align



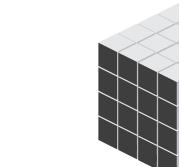
→ 1 Key
List



→ 2 Keys
Matrix



→ 3 Keys
Volume

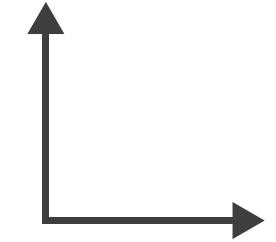


→ Many Keys
Recursive Subdivision

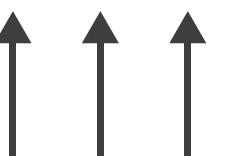


→ Axis Orientation

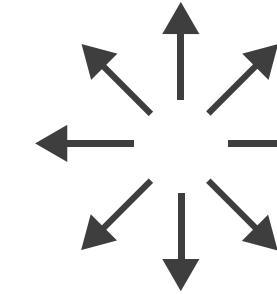
→ Rectilinear



→ Parallel

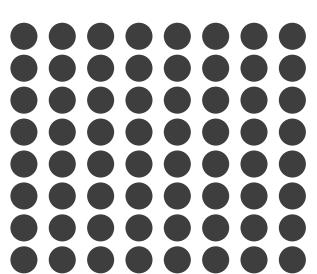


→ Radial



→ Layout Density

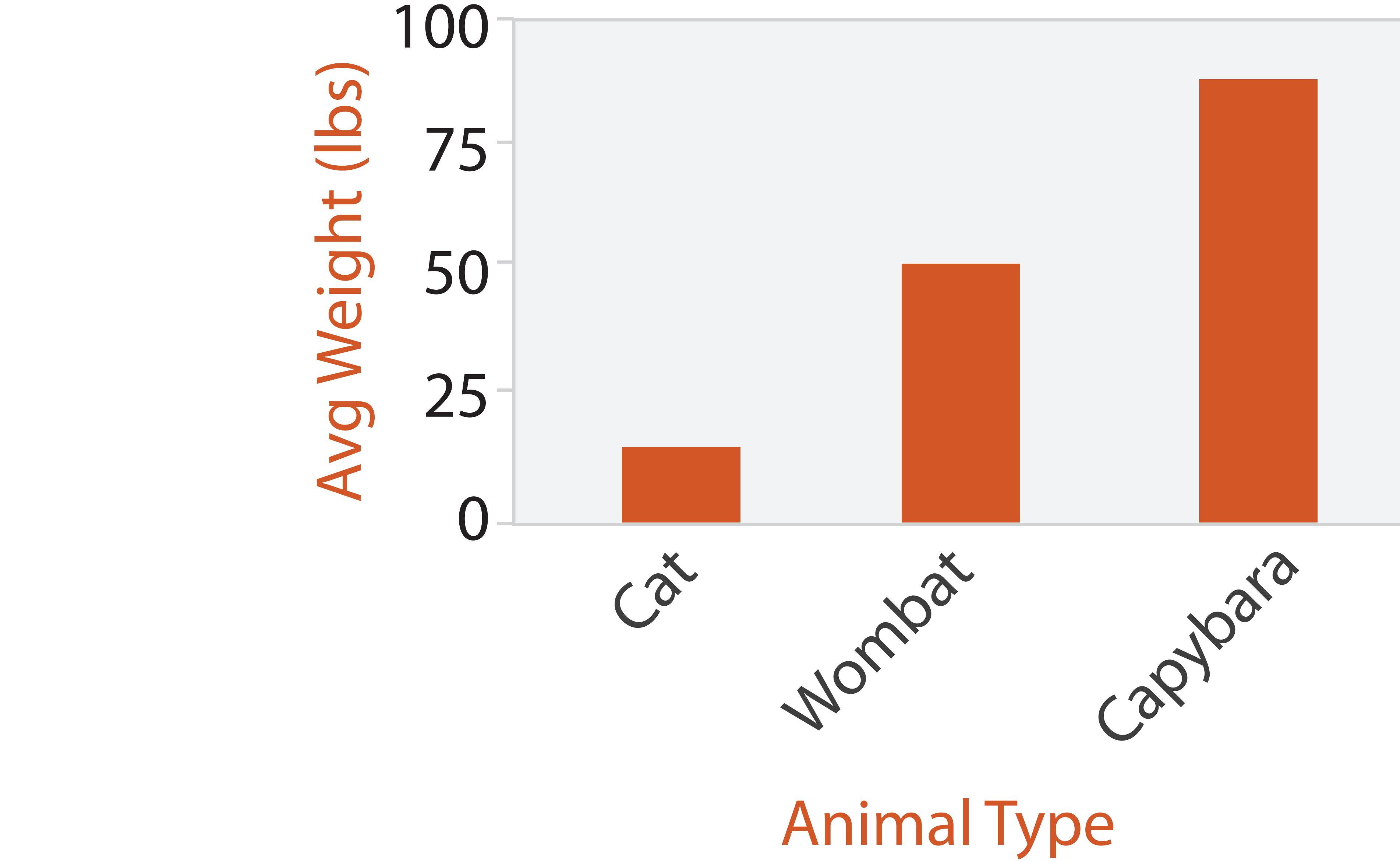
→ Dense



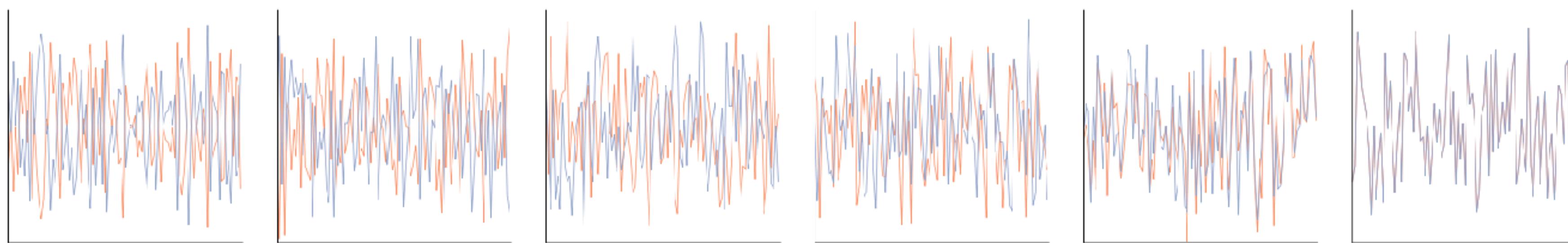
→ Space-Filling



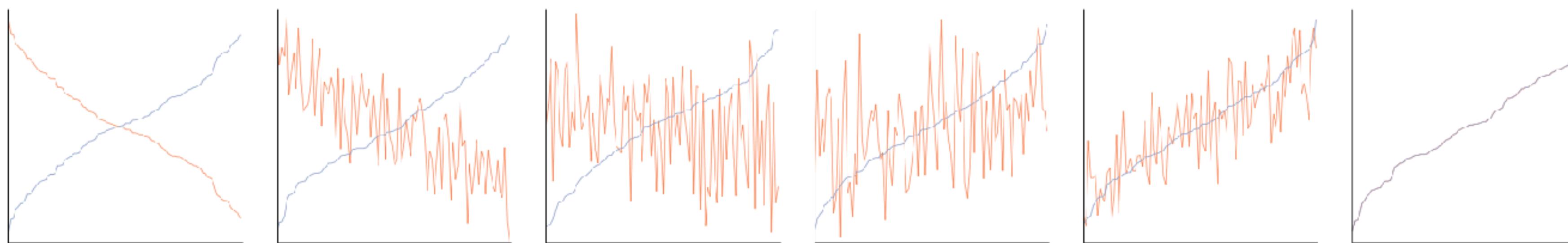
Adding order



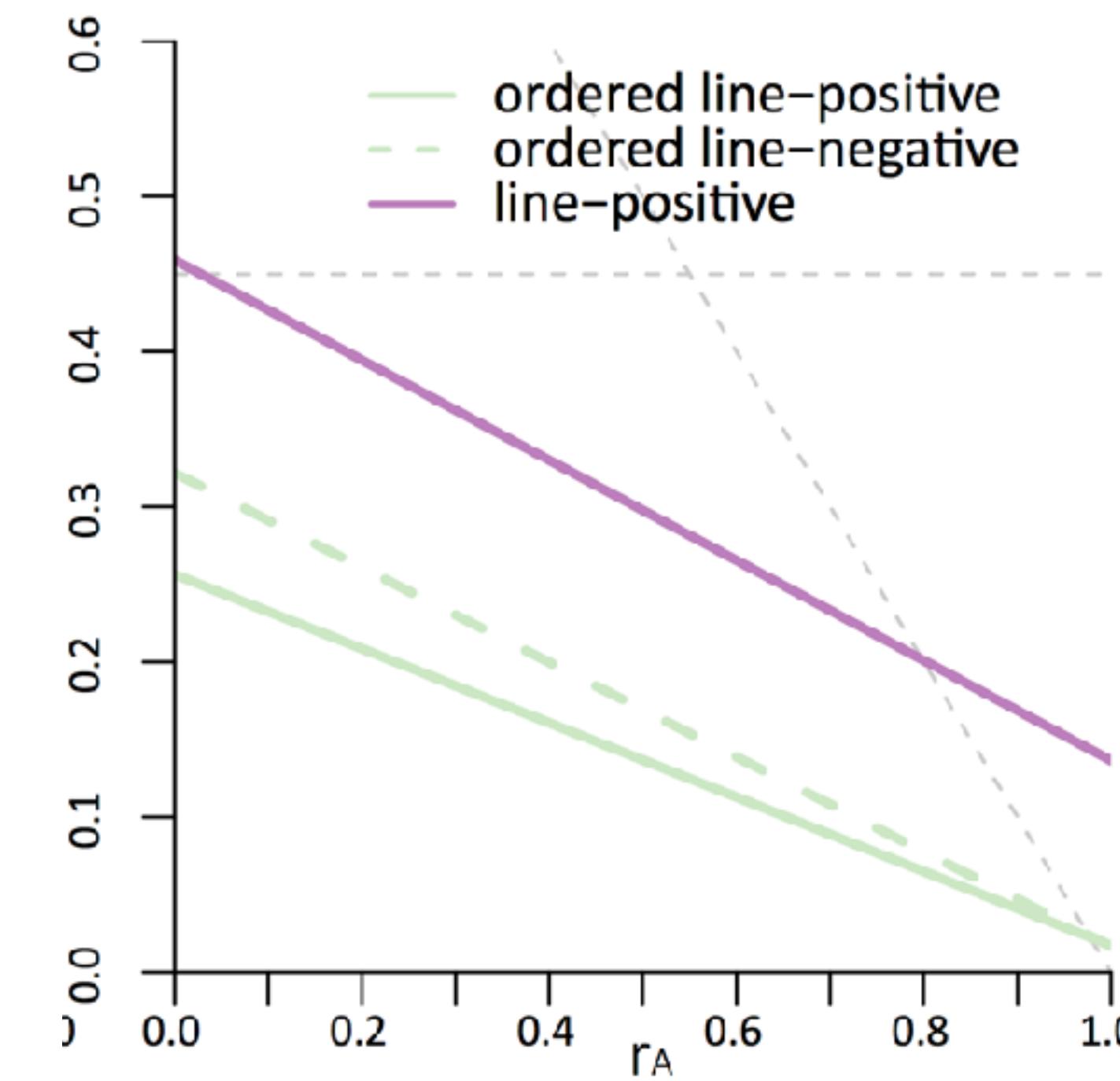
line

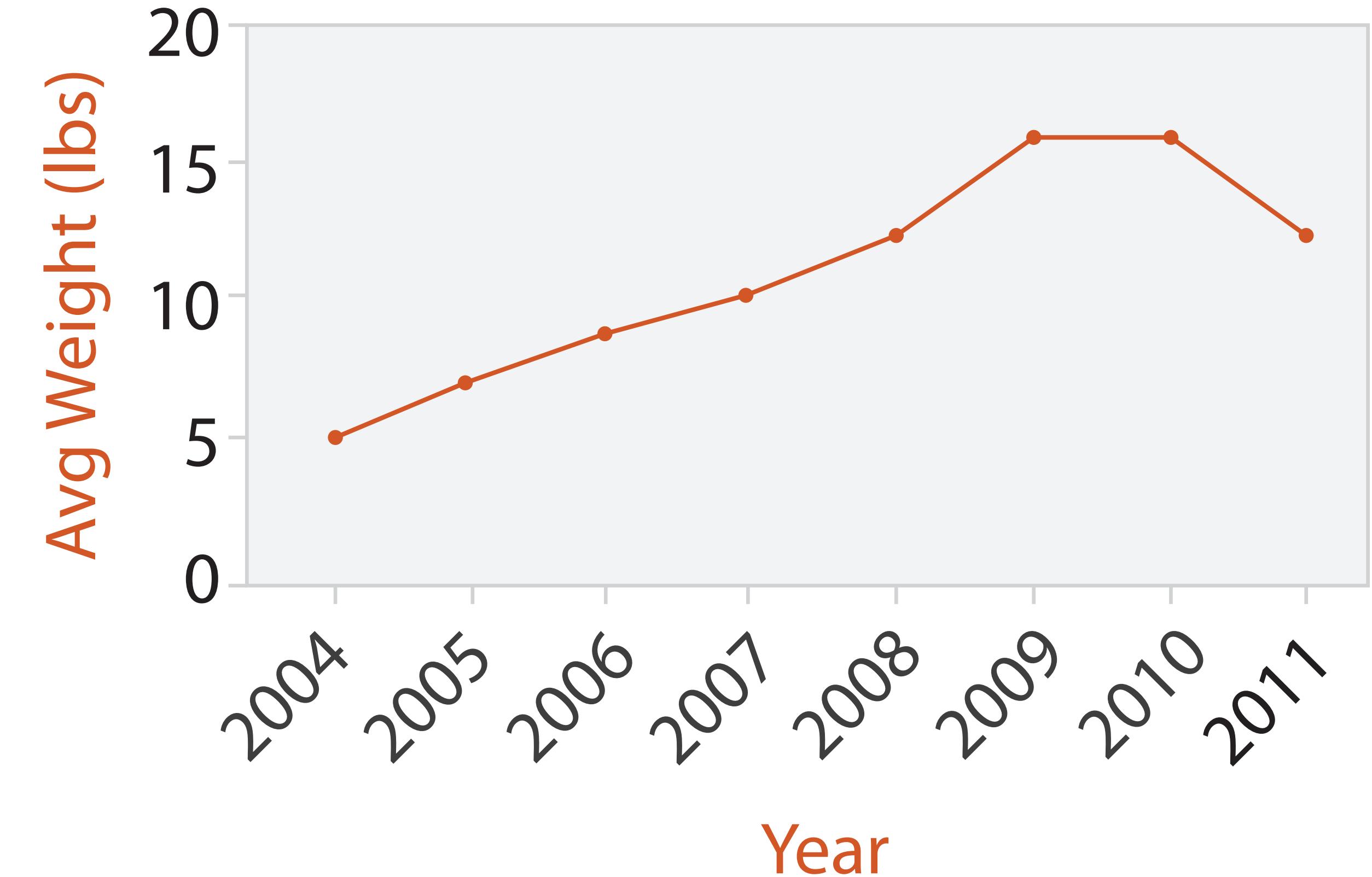
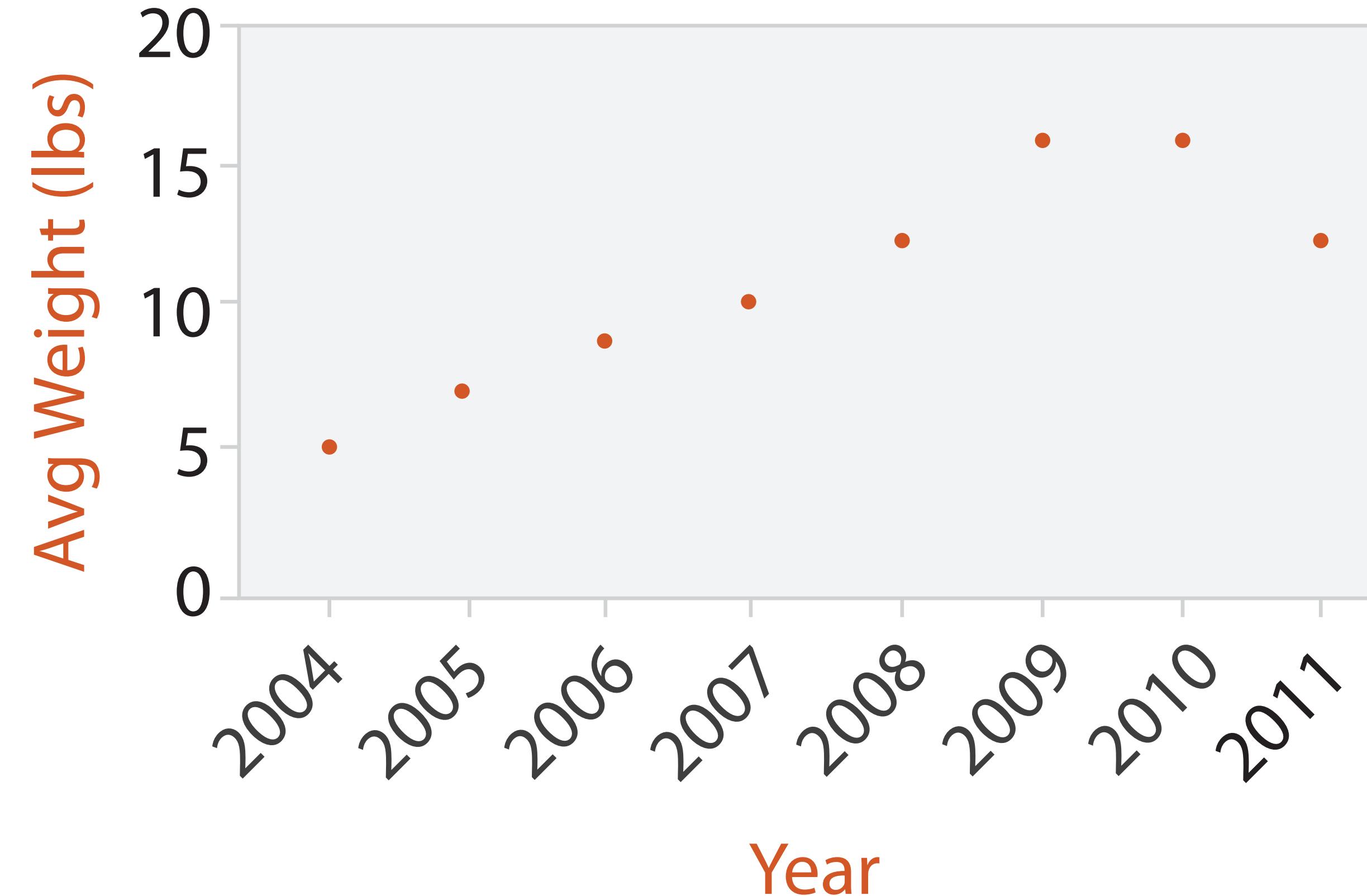


ordered line



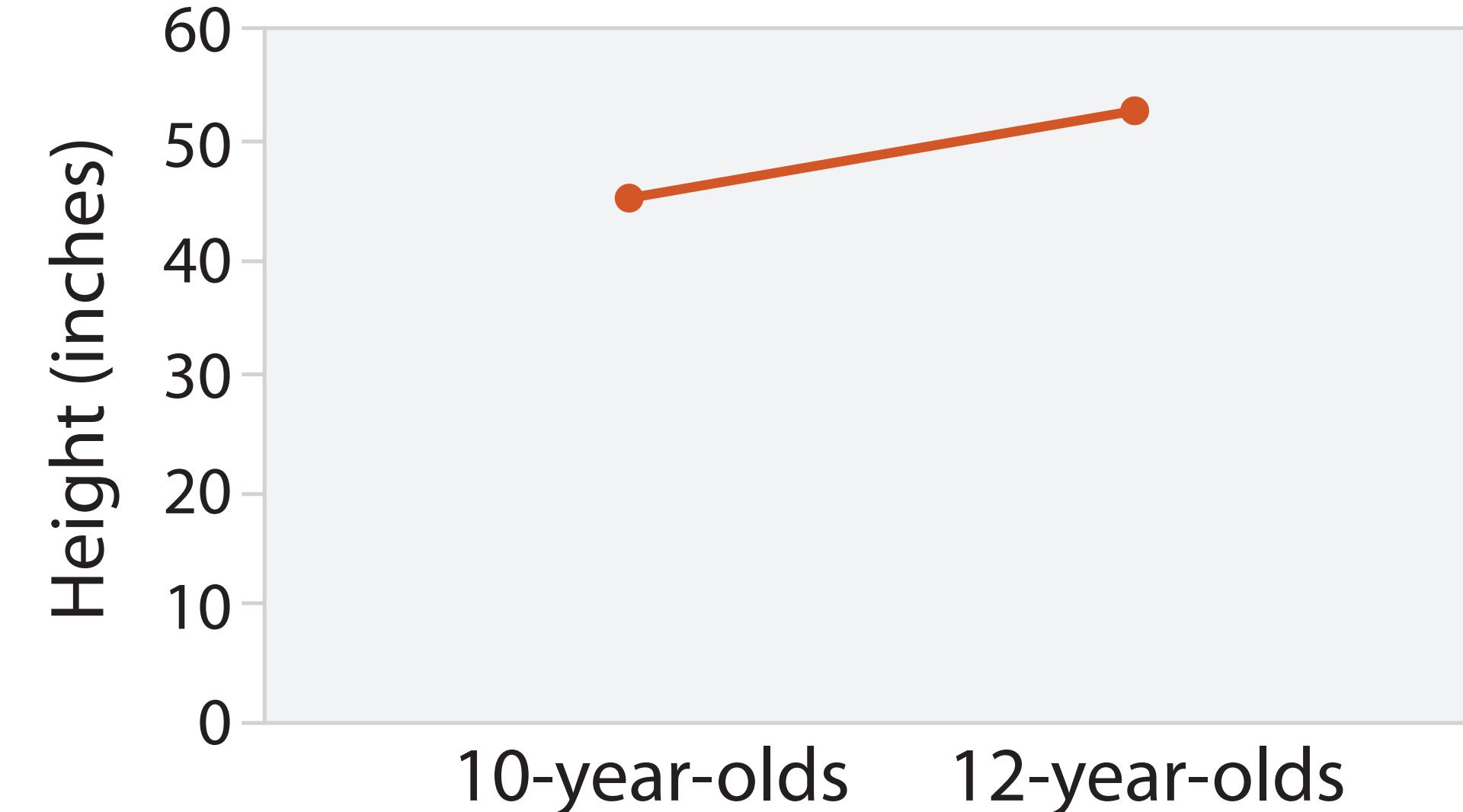
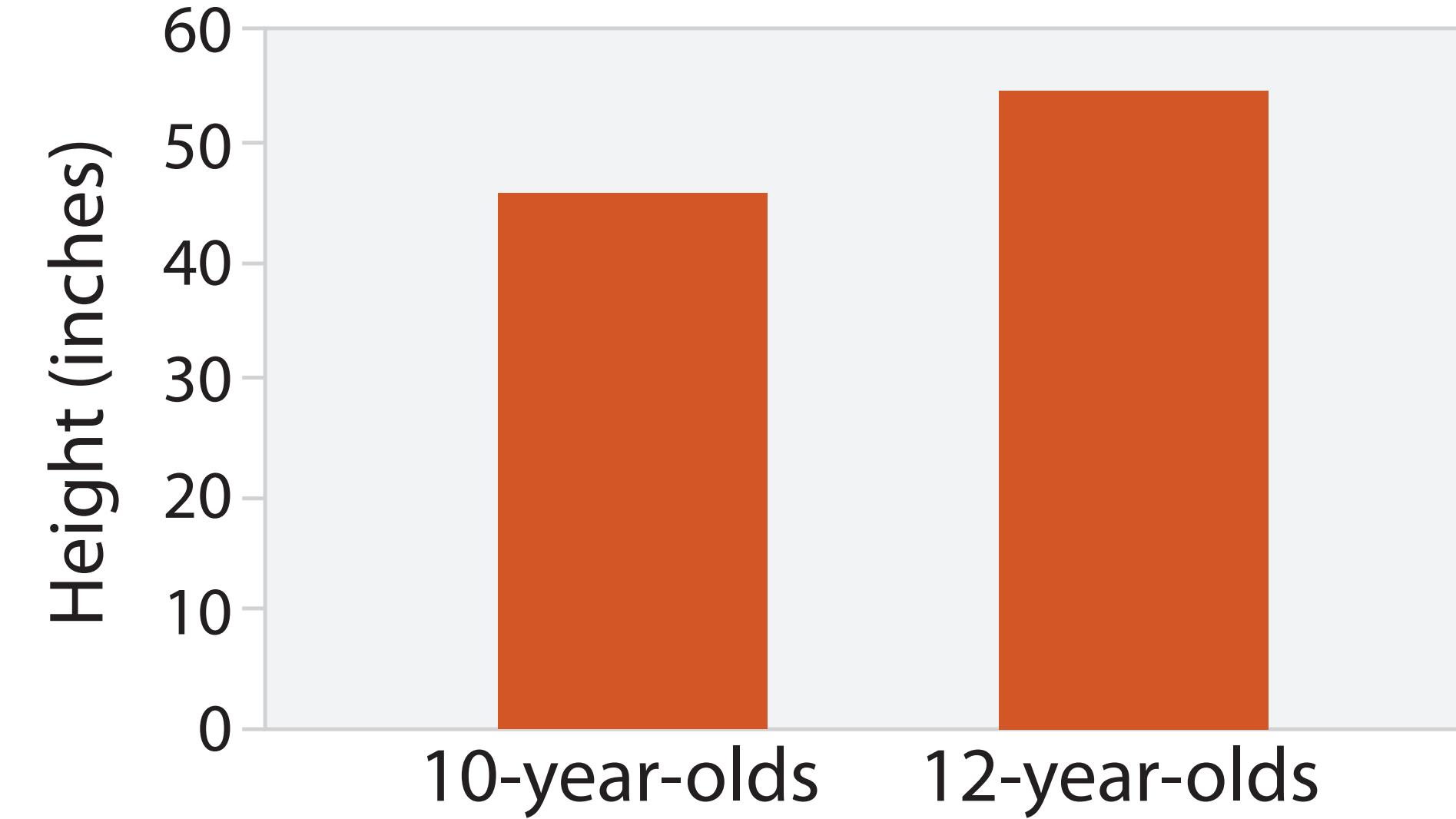
Order aids certain tasks



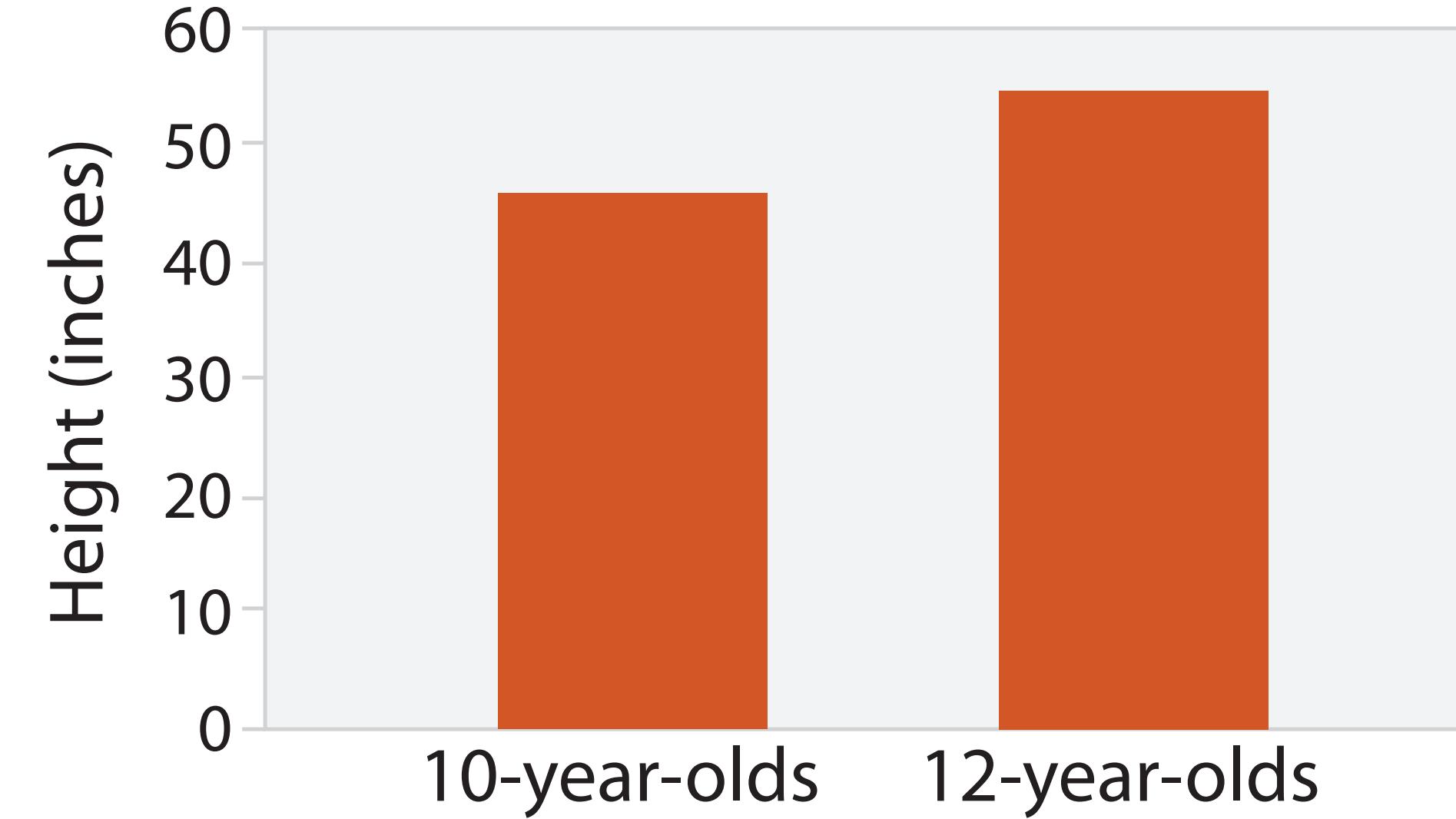


Alternate encodings for “arrange”

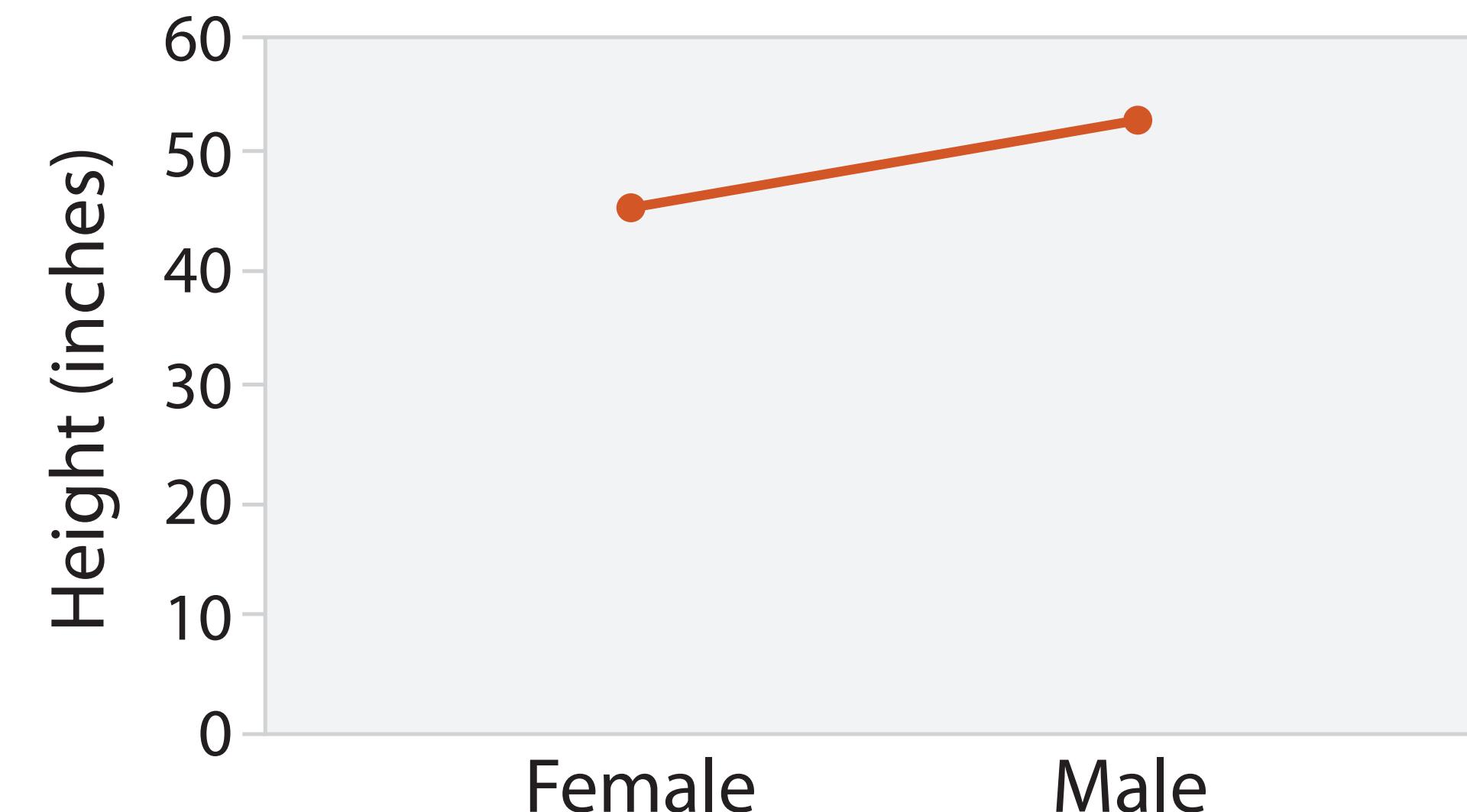
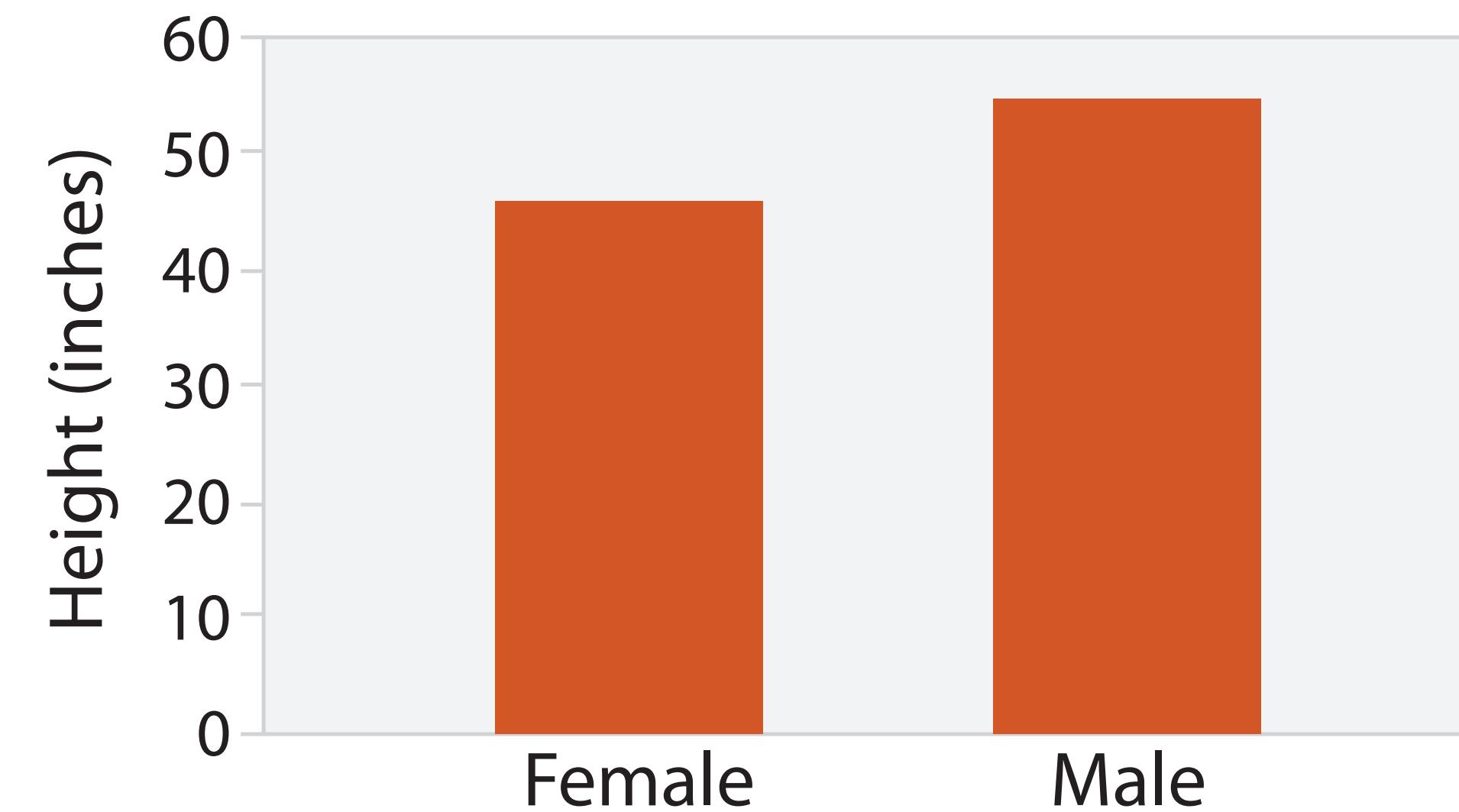
When do encodings matter?



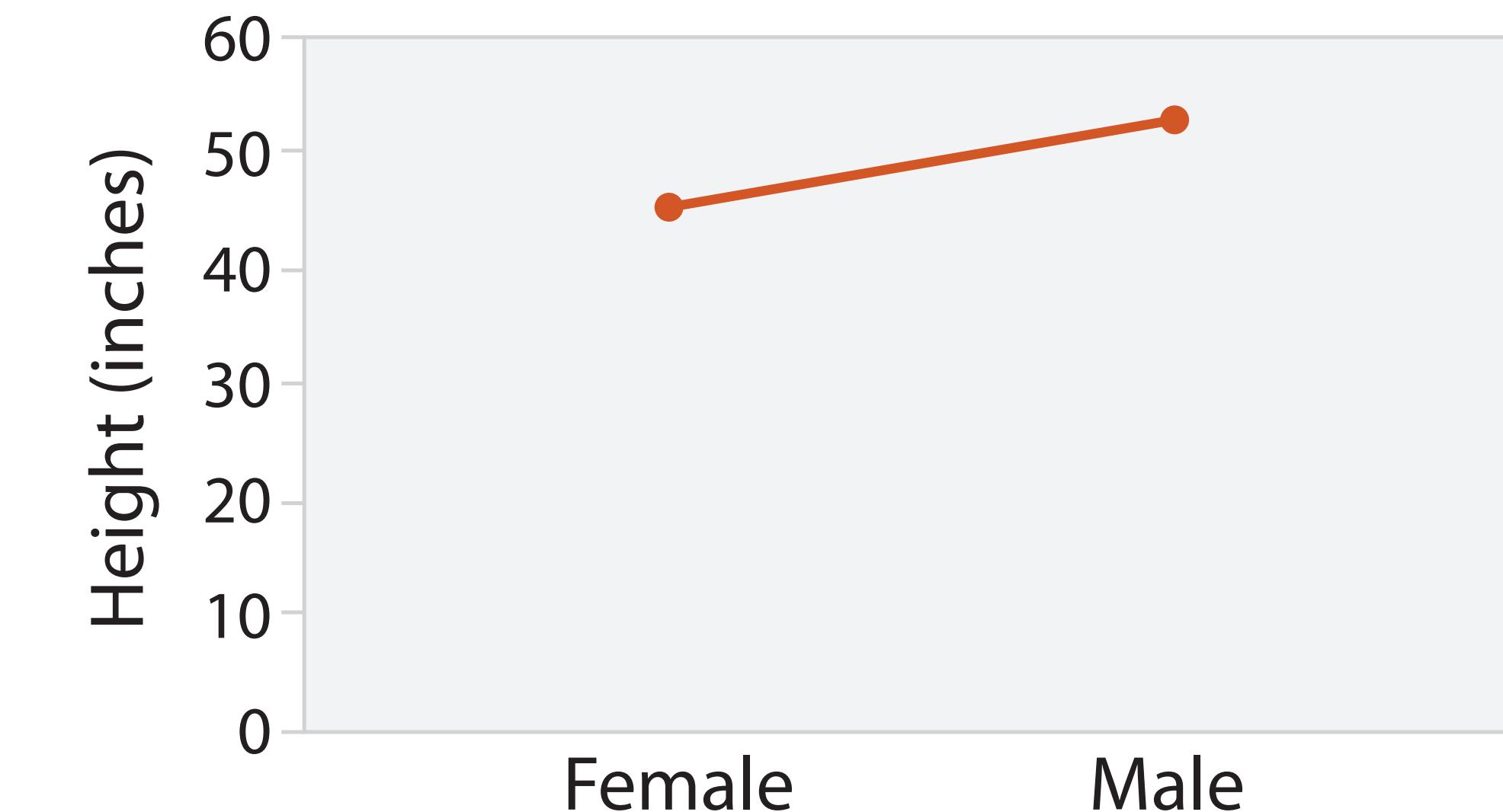
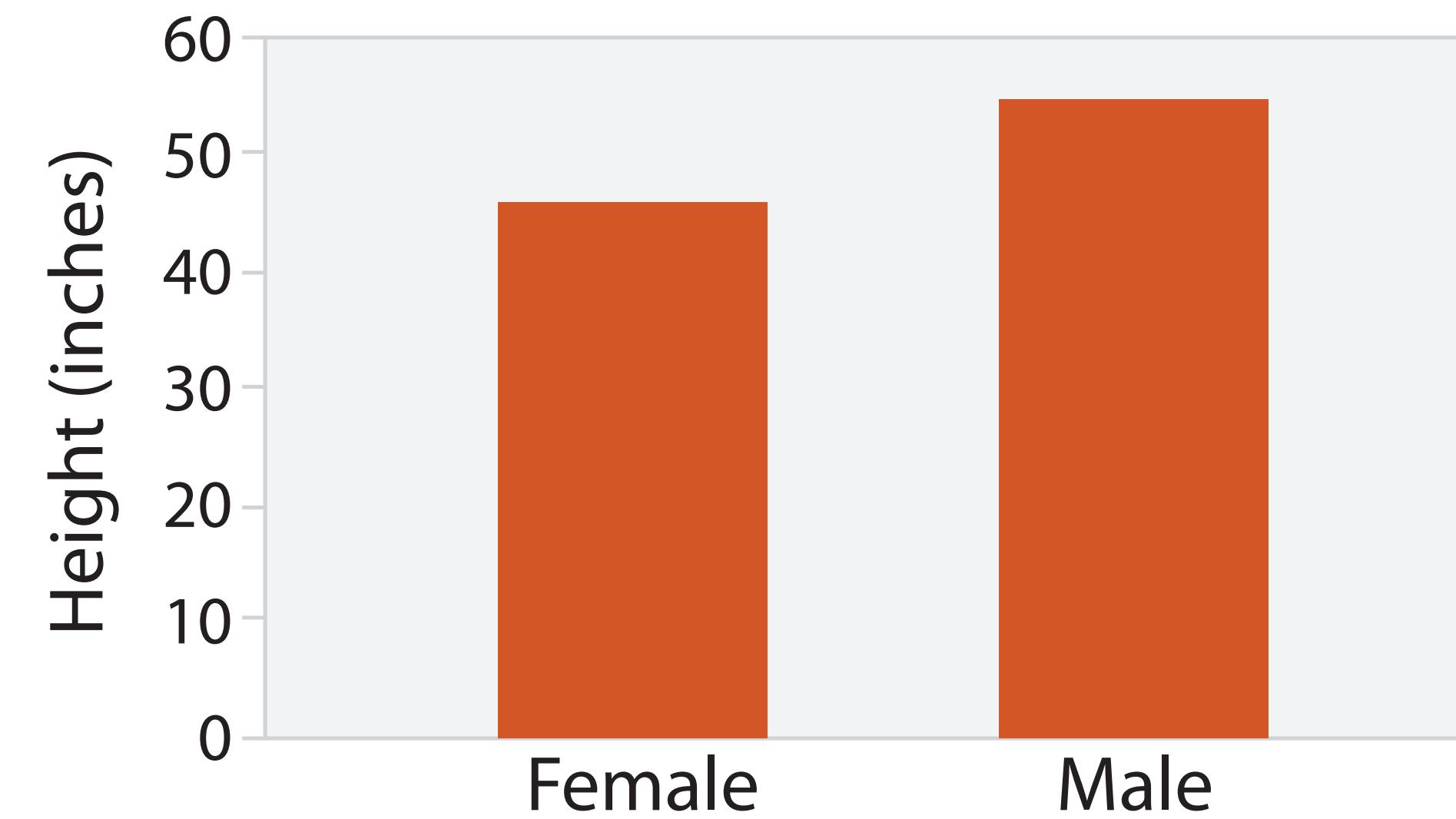
*How would you interpret
this chart?*



*“The older you are, the
taller you are on average”*



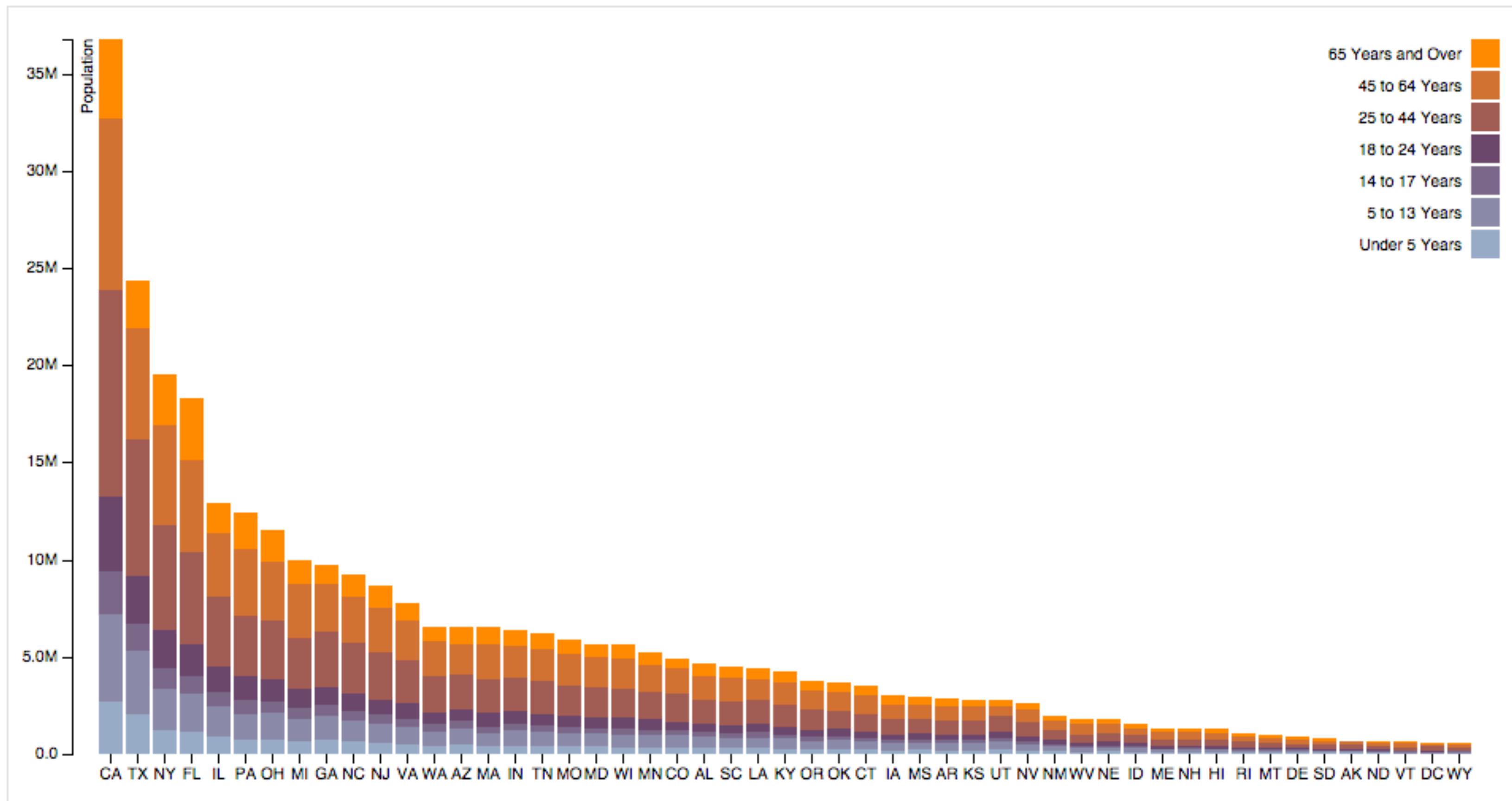
how about this one?



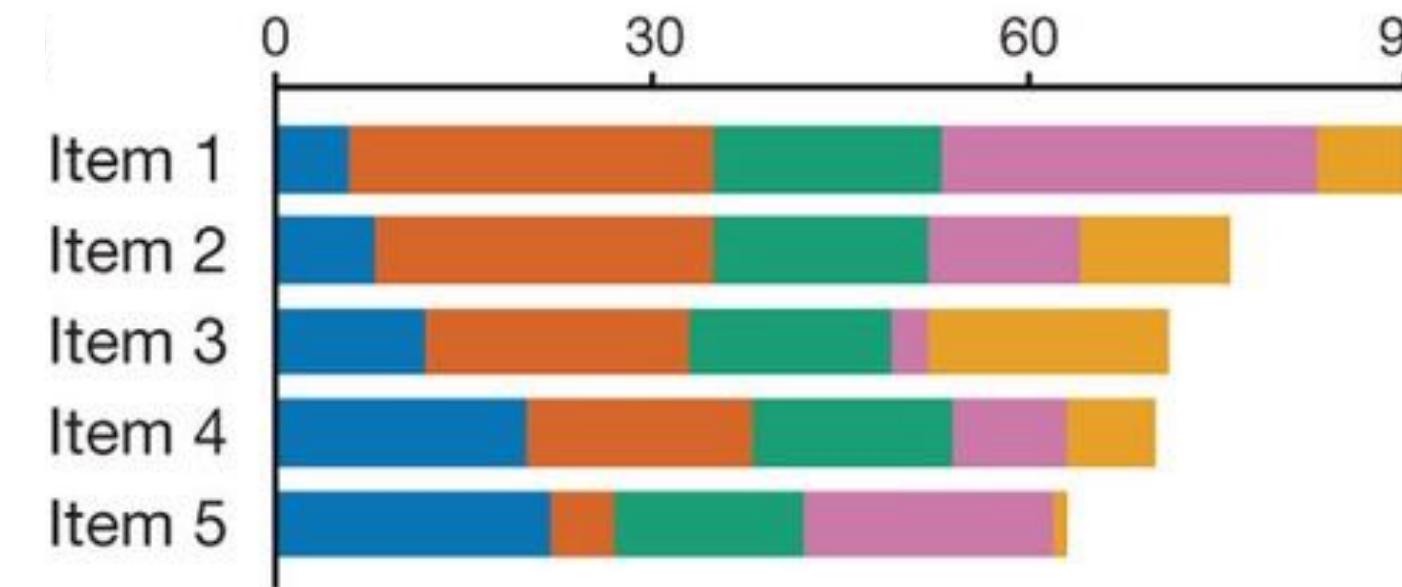
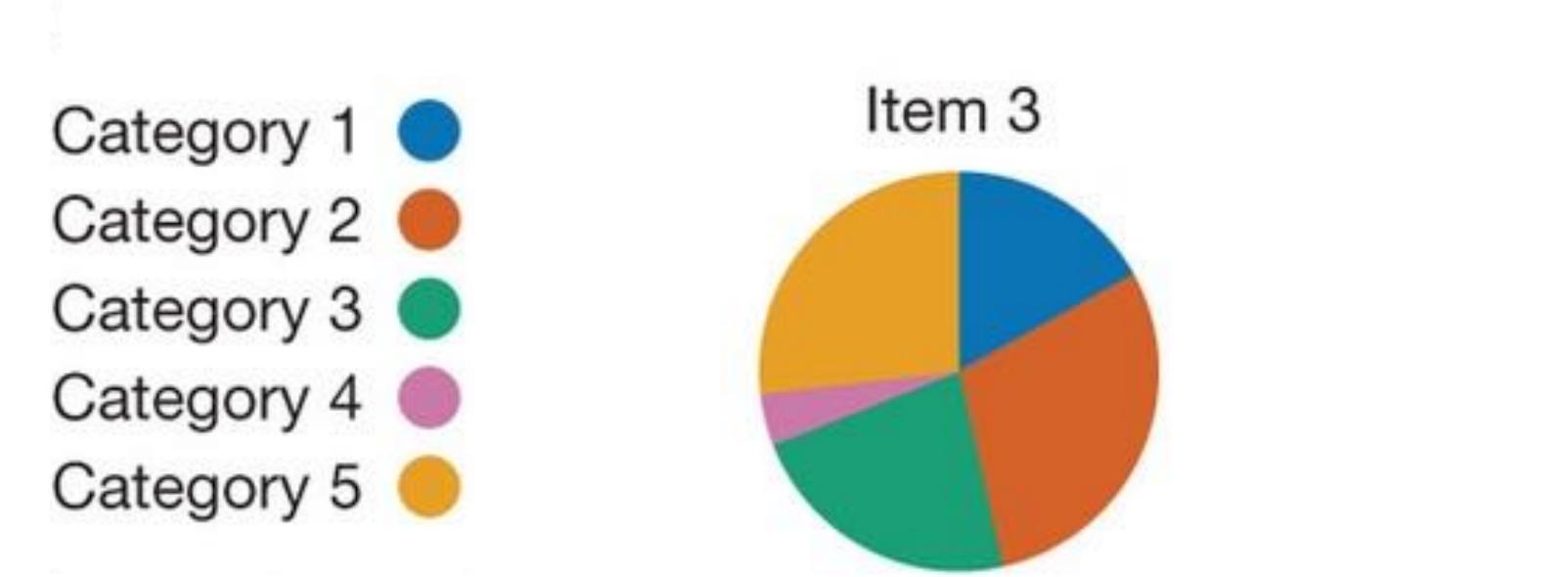
*"The more male you are,
the taller you are on
average"*

Stacked Bar:

<http://bl.ocks.org/mbostock/3886208>

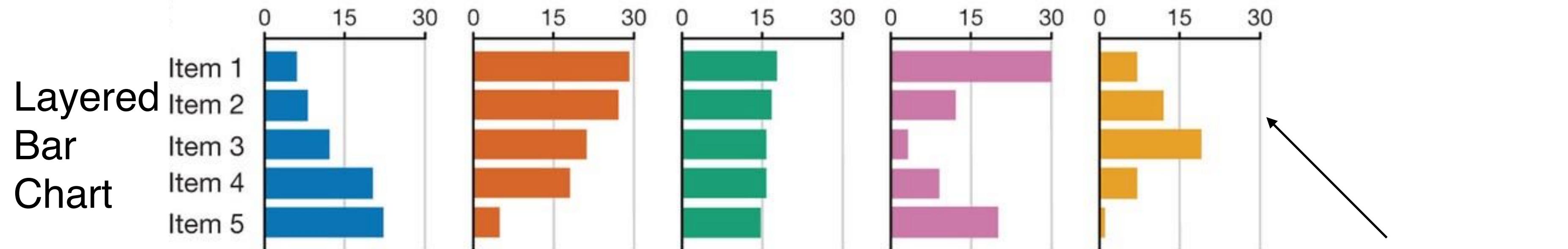


Comparison of bar chart types

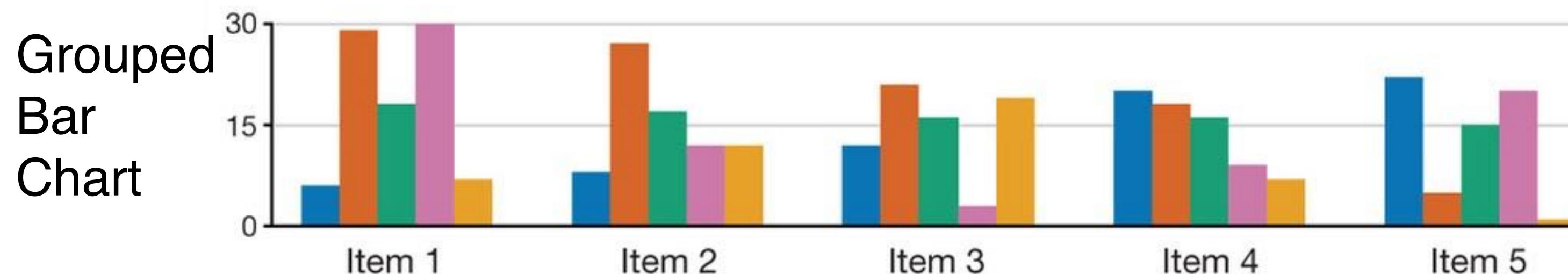


Pie Chart

Stacked bar chart

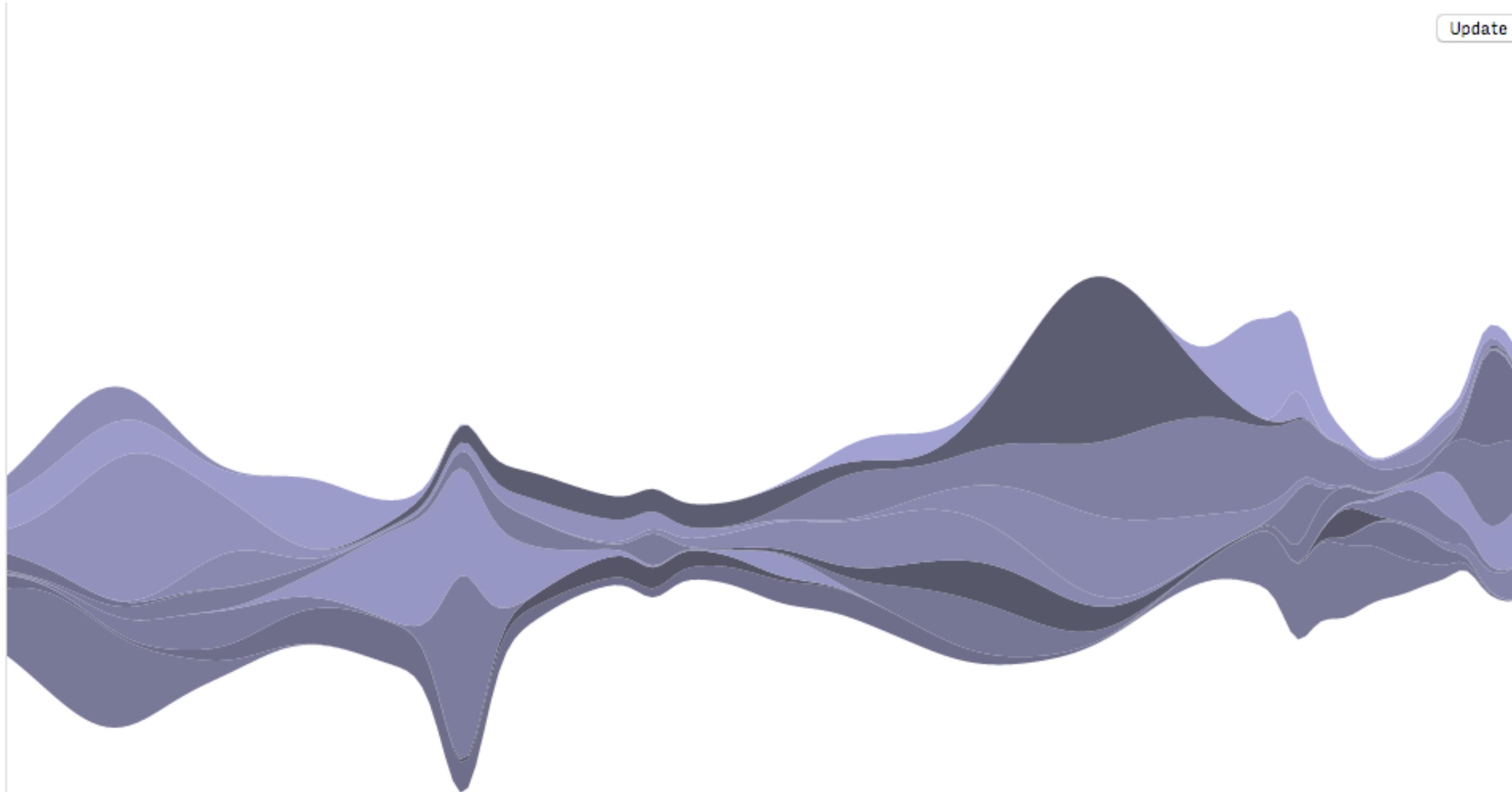


Small Multiples

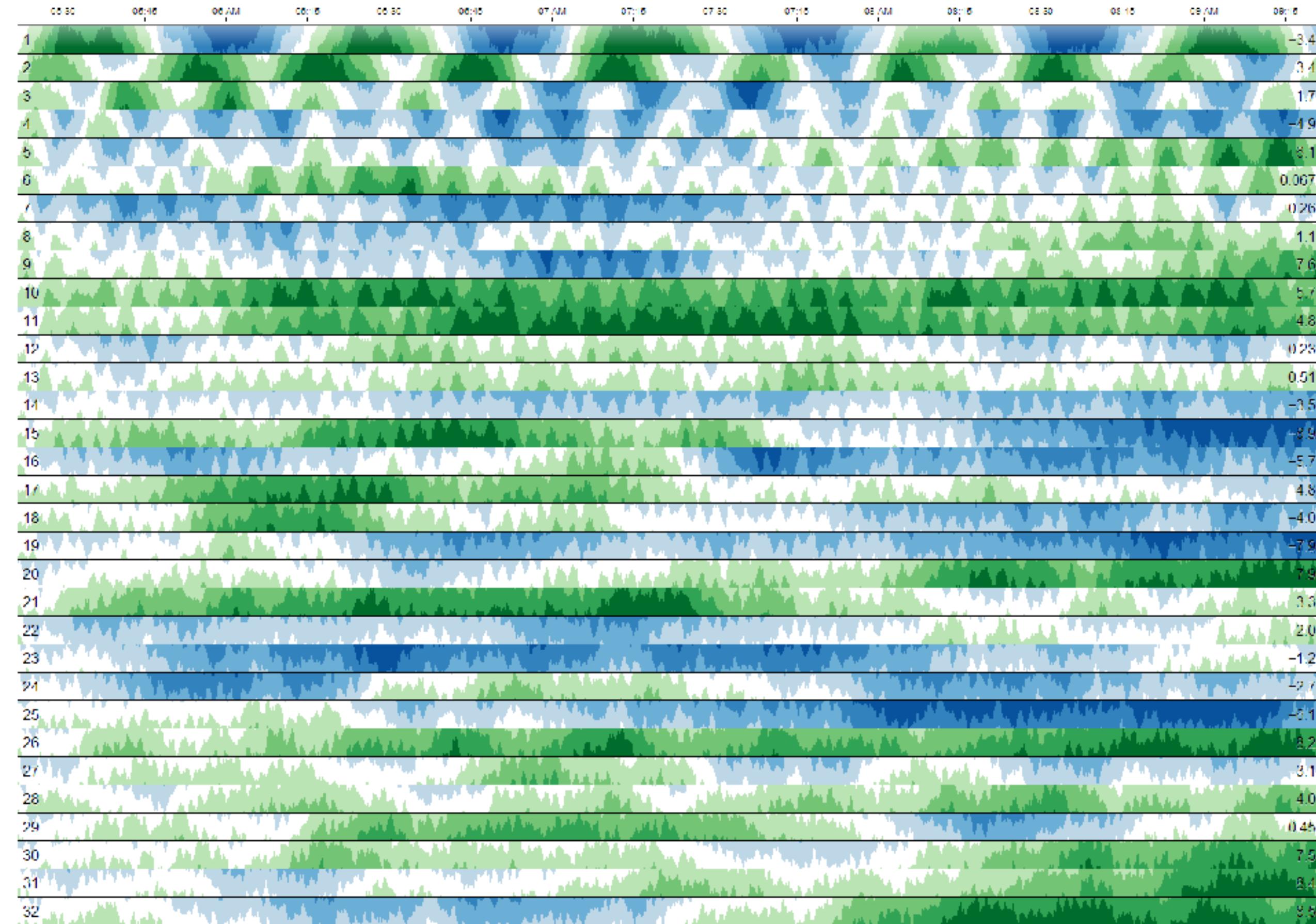


StreamGraph:

<http://bl.ocks.org/mbostock/4060954>



Multiple Line Charts



<http://square.github.io/cubism/>

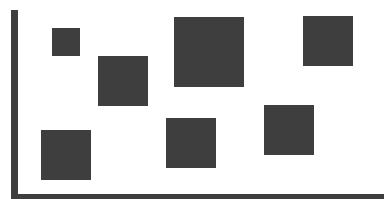
Arrange Tables

→ Express Values

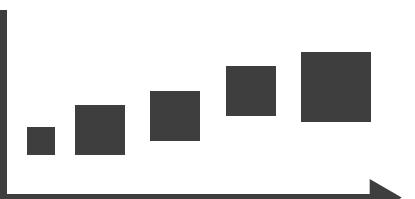


→ Separate, Order, Align Regions

→ Separate



→ Order



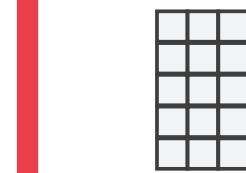
→ Align



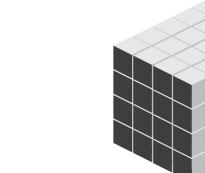
→ 1 Key
List



→ 2 Keys
Matrix



→ 3 Keys
Volume

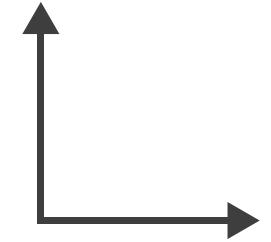


→ Many Keys
Recursive Subdivision

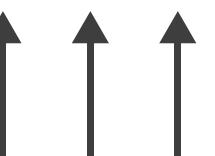


→ Axis Orientation

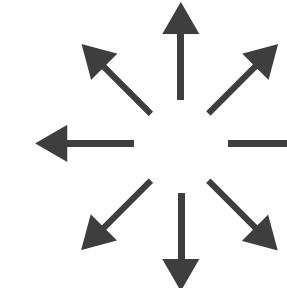
→ Rectilinear



→ Parallel

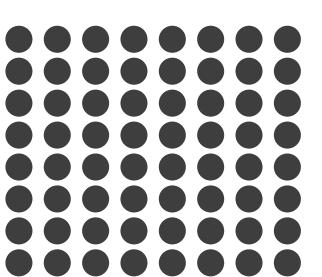


→ Radial



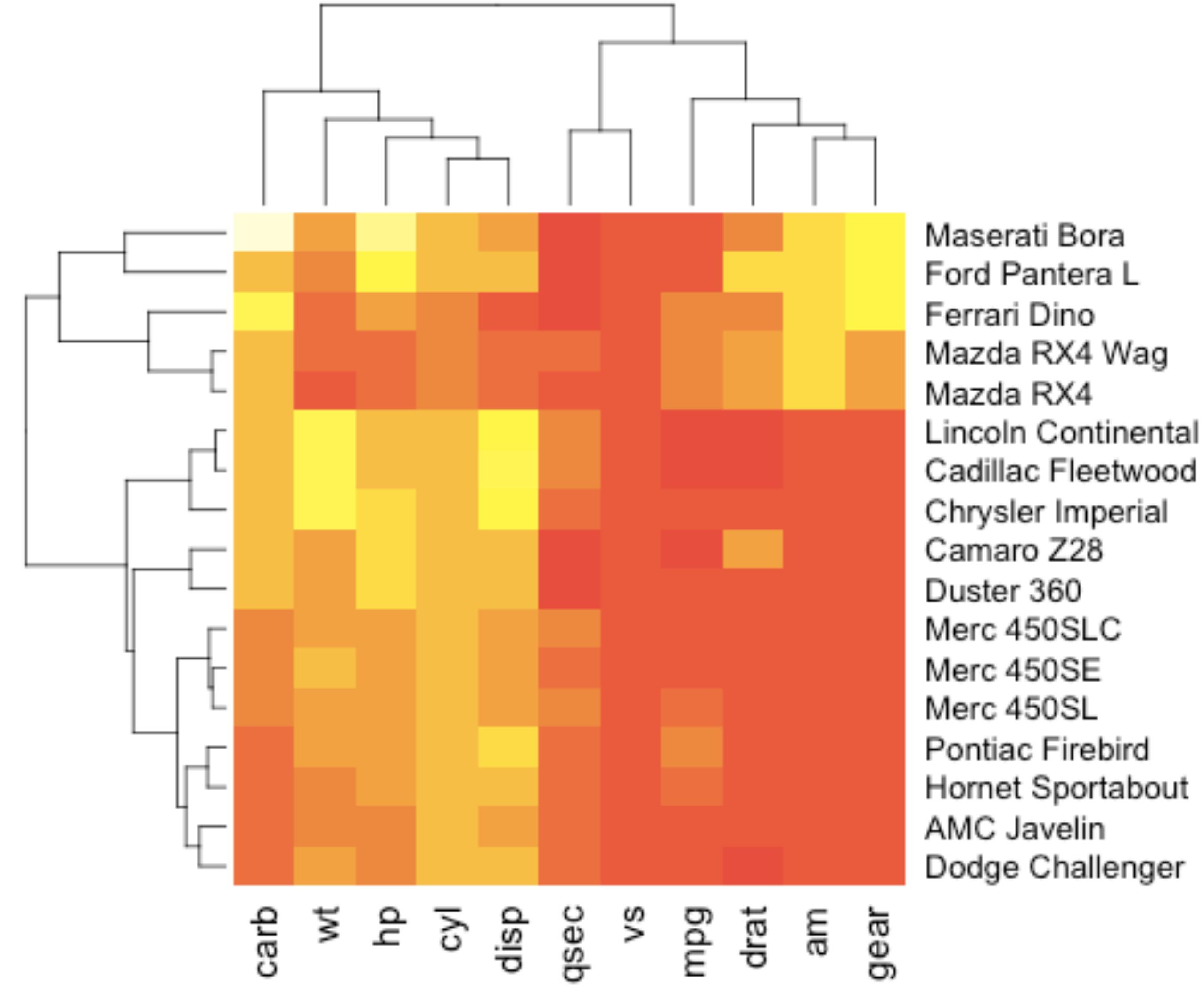
→ Layout Density

→ Dense

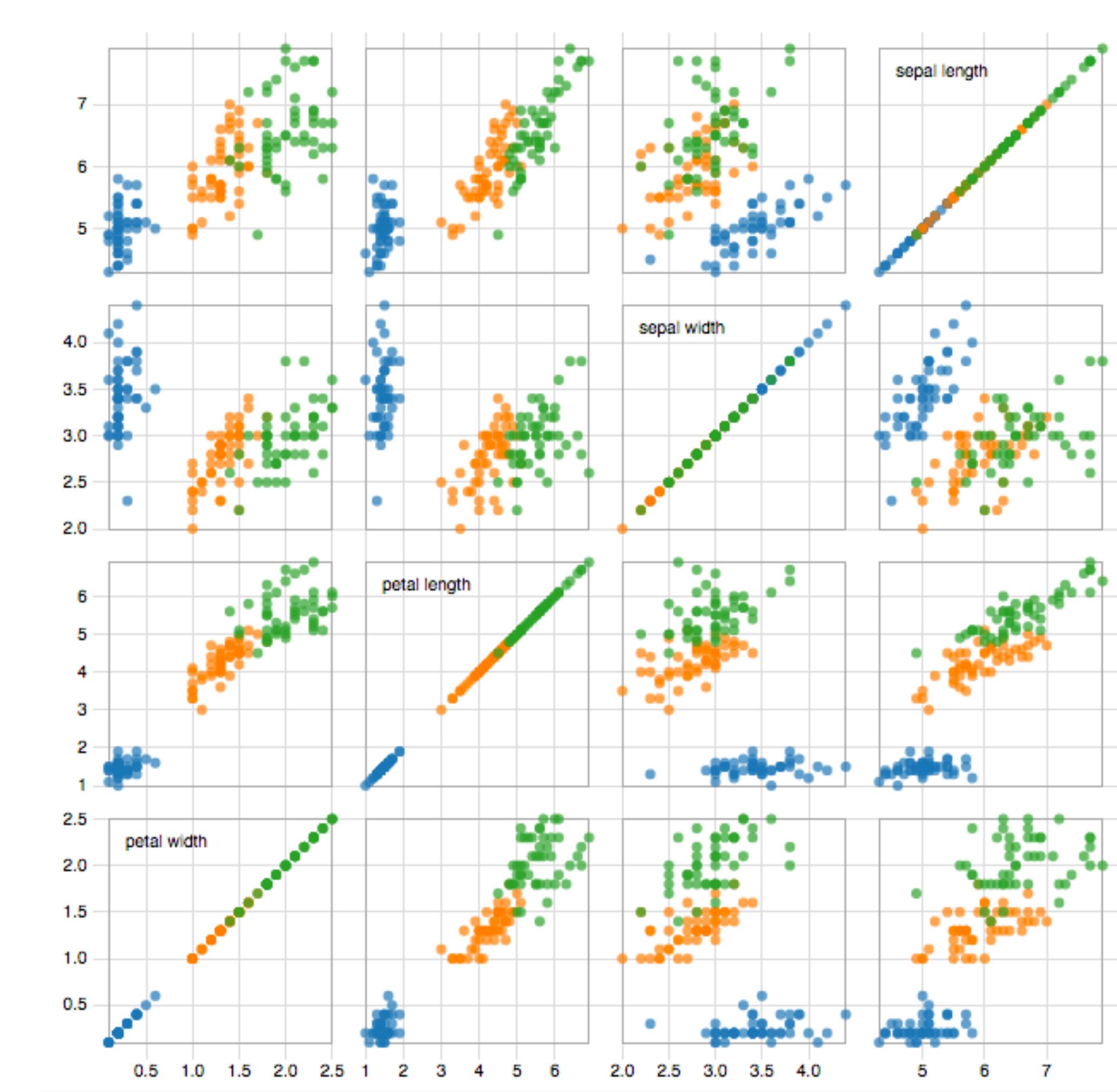


→ Space-Filling





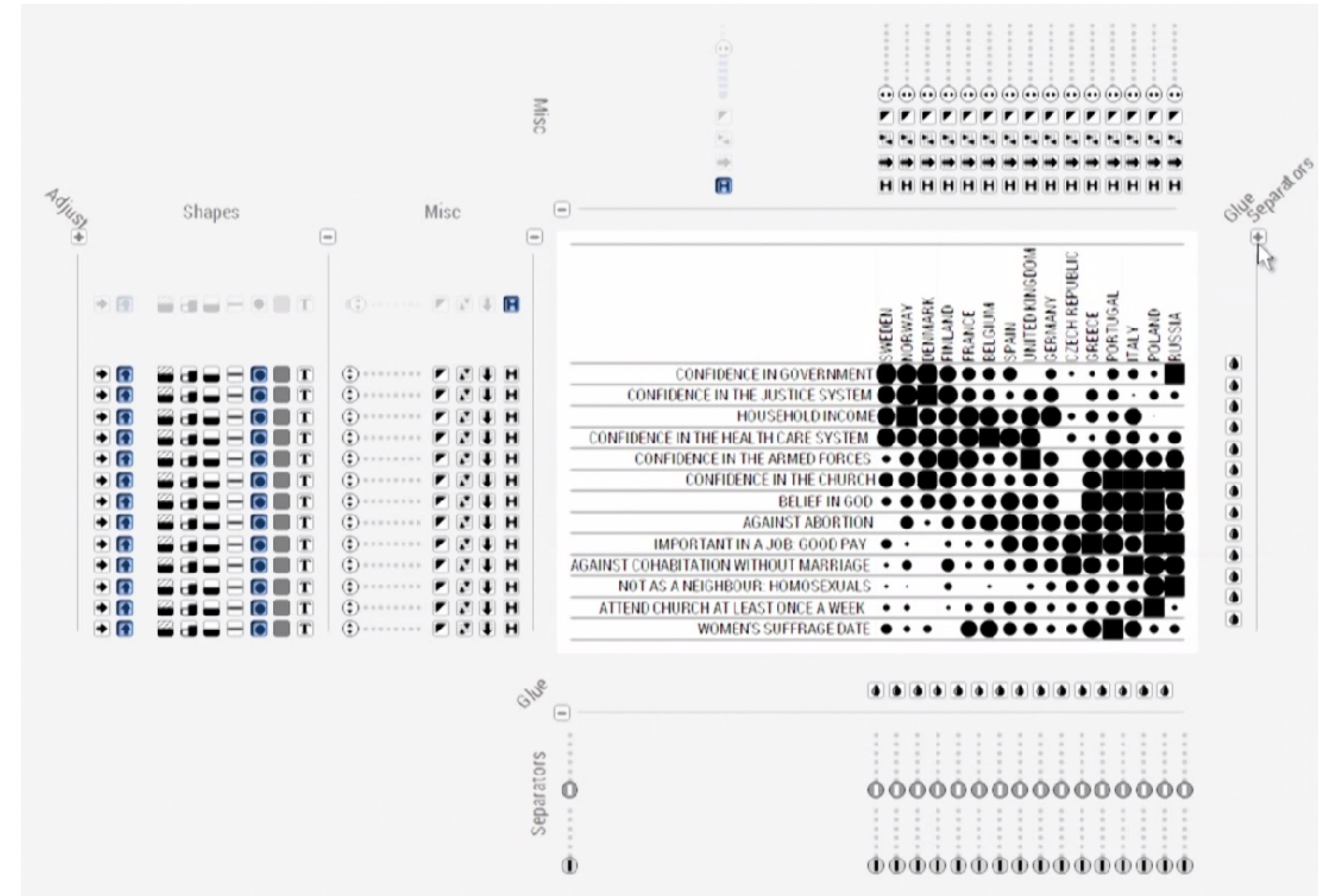
the clustered heatmap



the scatterplot matrix

Bertifier

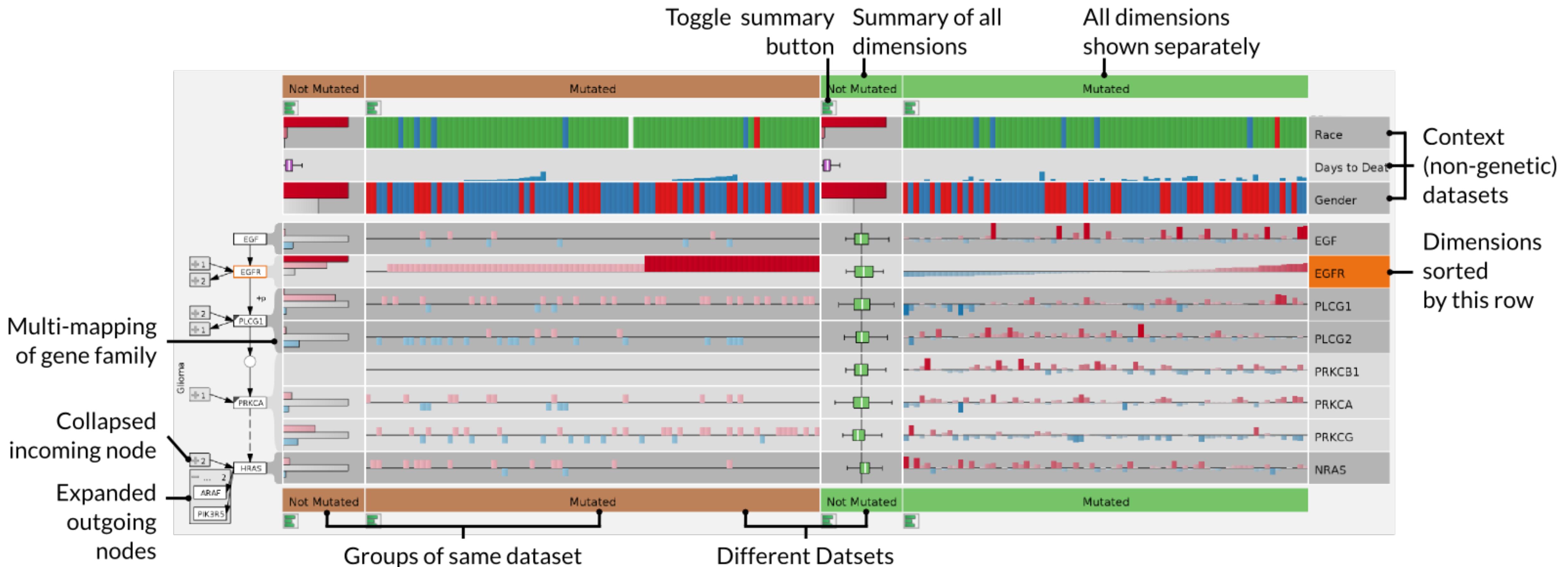
Matrix/Table
representation
Authoring Interface



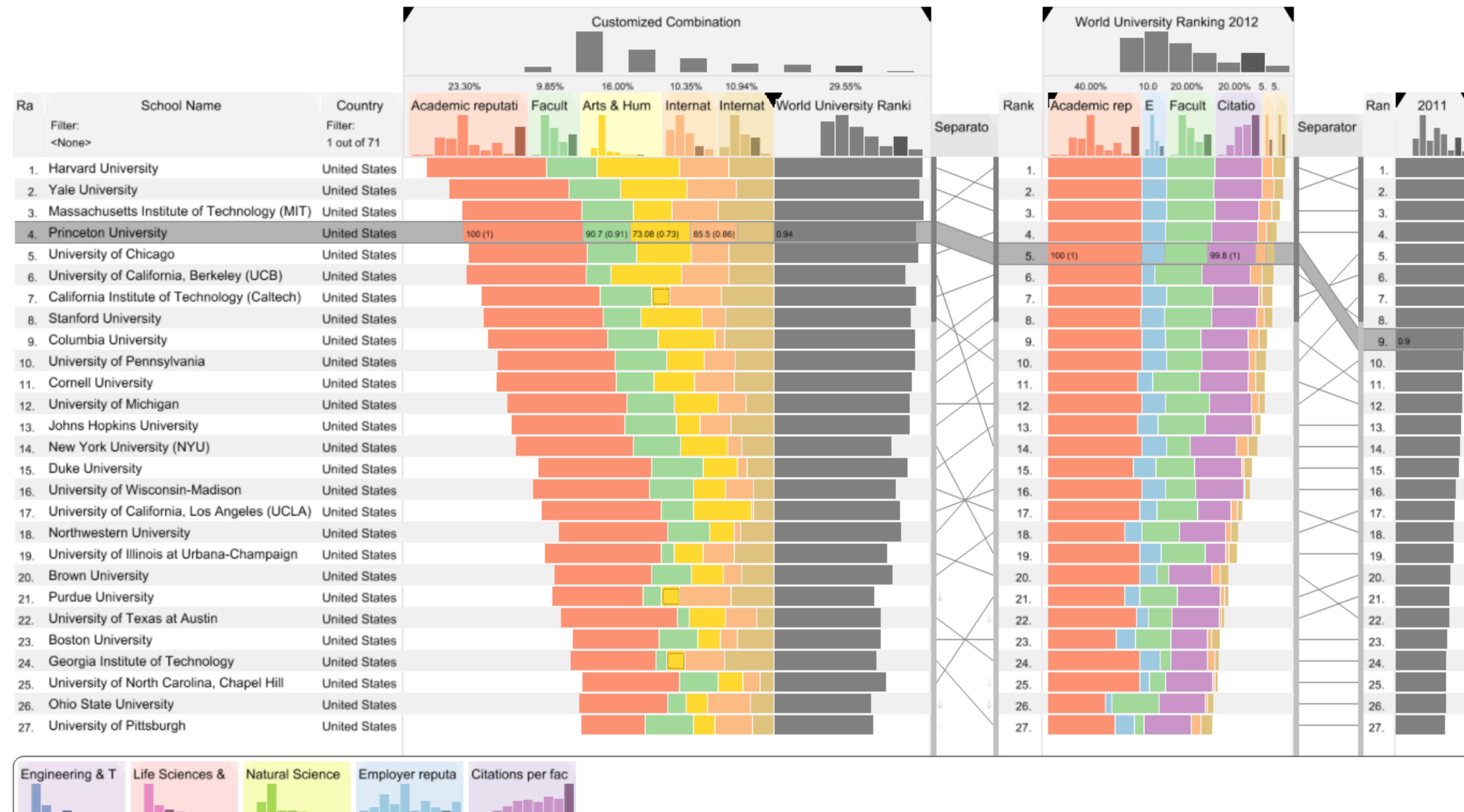
<http://www.aviz.fr/bertifier>

Charles Perin, Pierre Dragicevic and Jean-Daniel Fekete

Combining Various Charts



LineUp



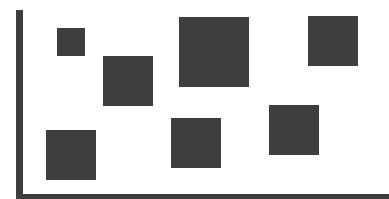
Arrange Tables

→ Express Values

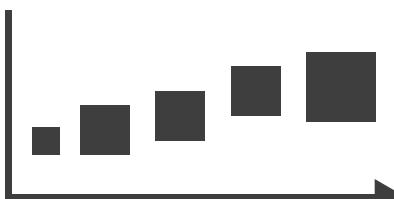


→ Separate, Order, Align Regions

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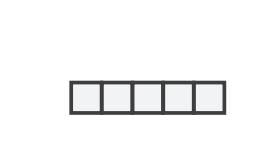
→ Order



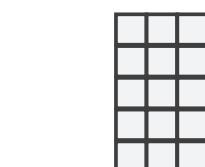
→ Align



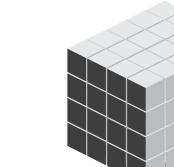
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List



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Matrix



→ 3 Keys
Volume

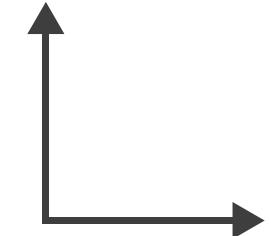


→ Many Keys
Recursive Subdivision

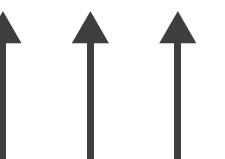


→ Axis Orientation

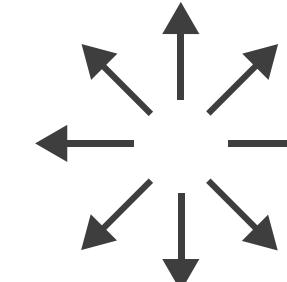
→ Rectilinear



→ Parallel

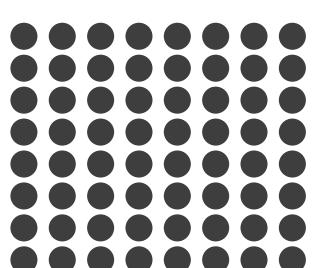


→ Radial



→ Layout Density

→ Dense



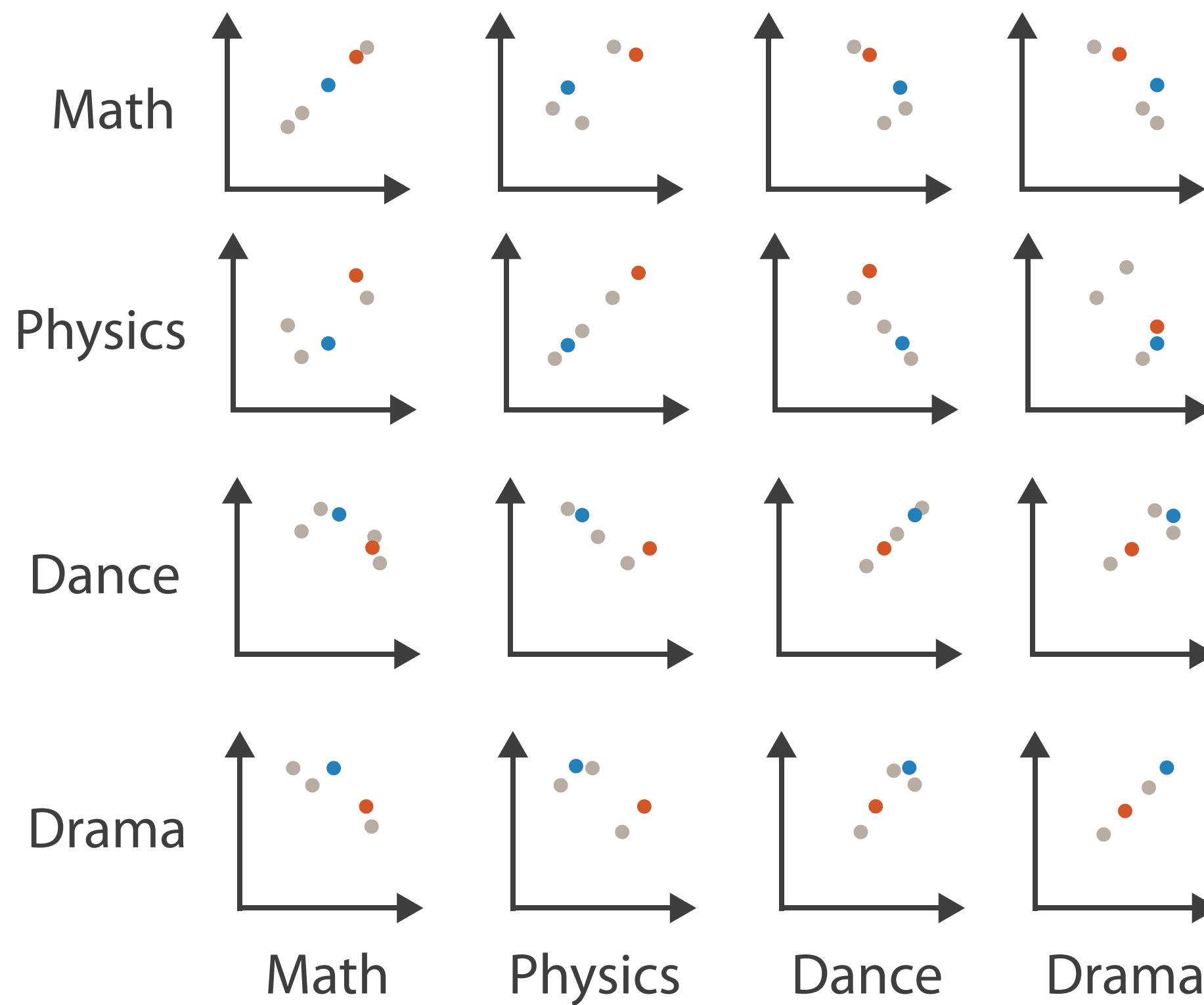
→ Space-Filling



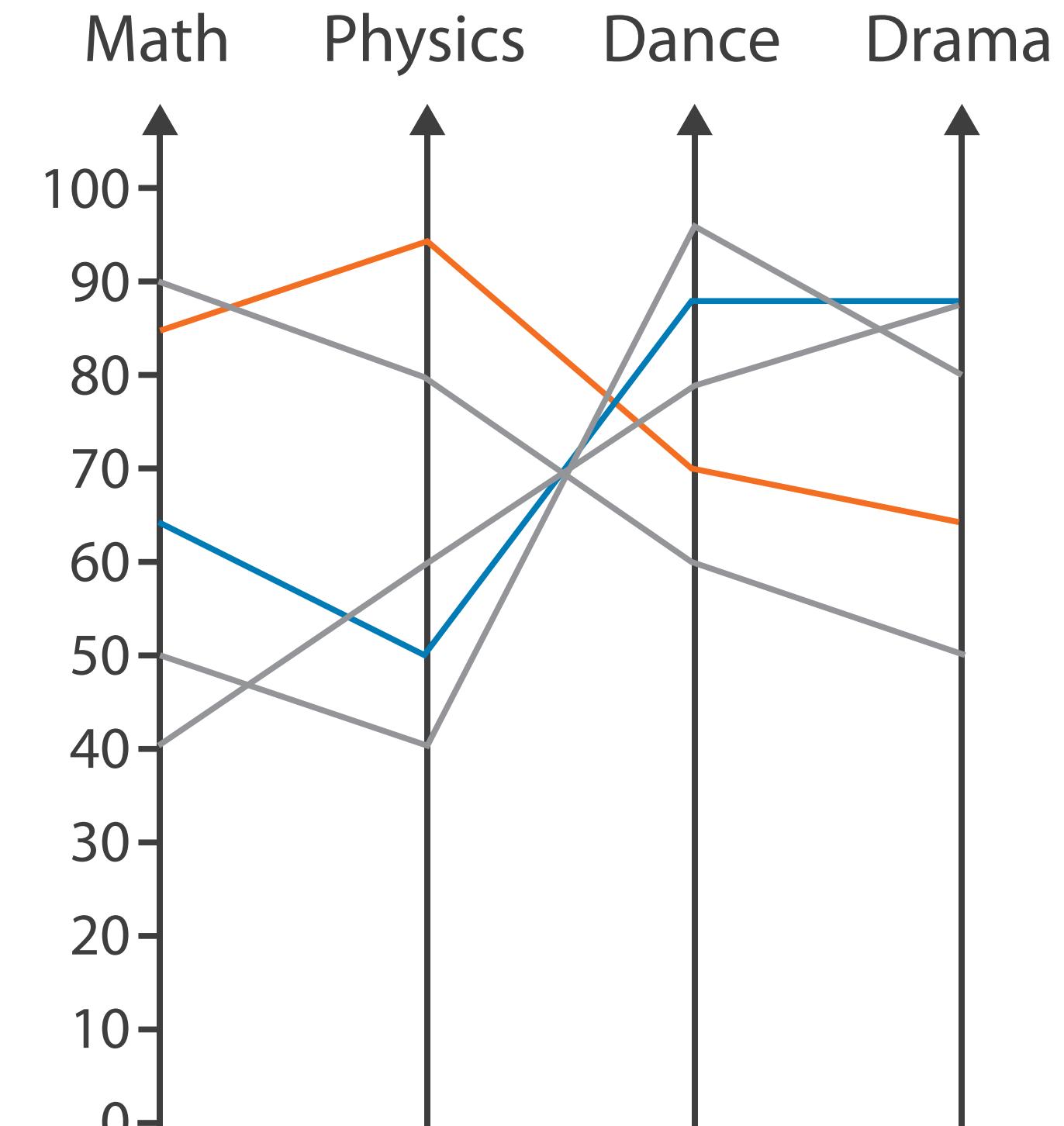
Table

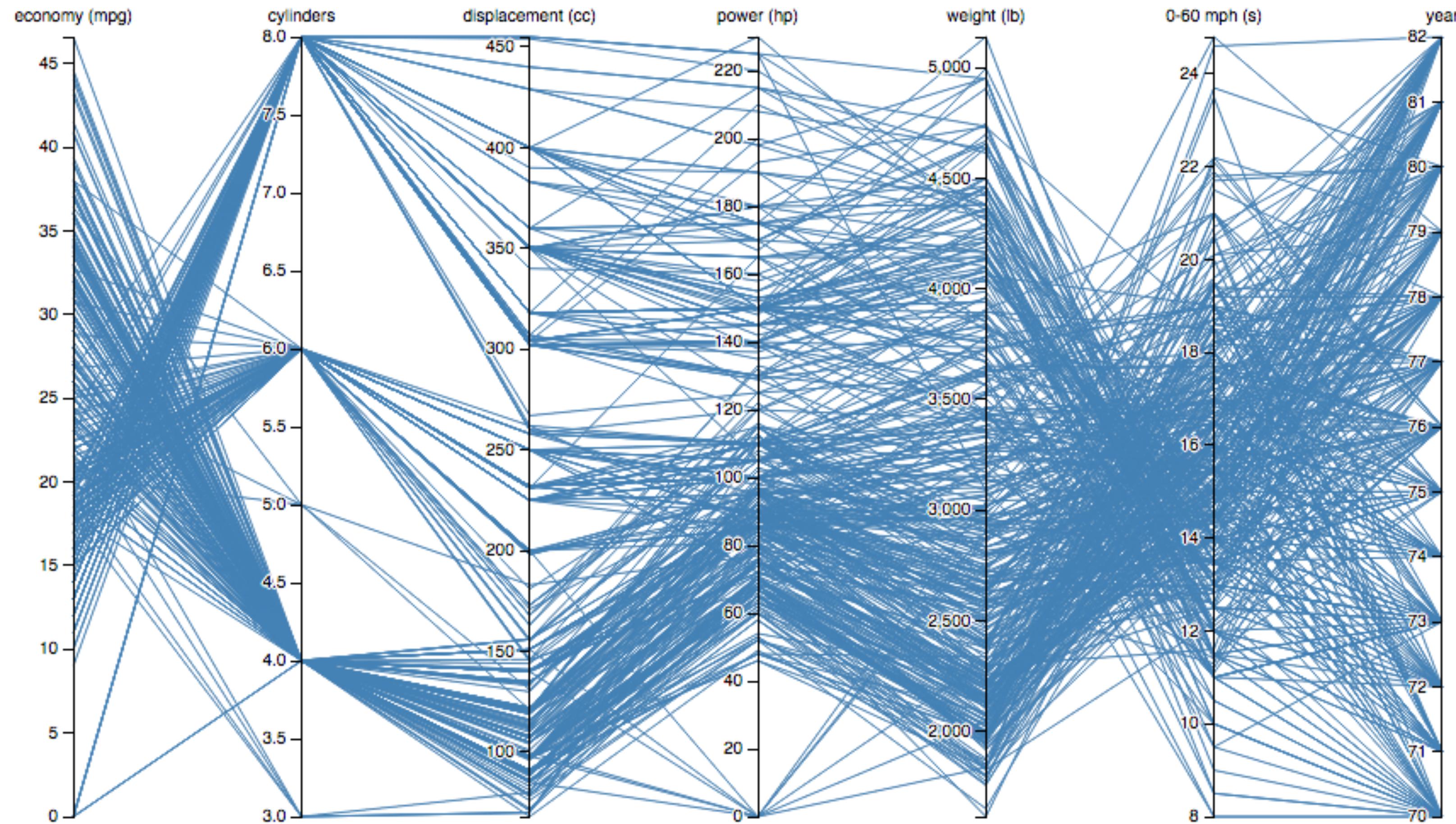
Math	Physics	Dance	Drama
85	95	70	65
90	80	60	50
65	50	90	90
50	40	95	80
40	60	80	60

Scatterplot Matrix

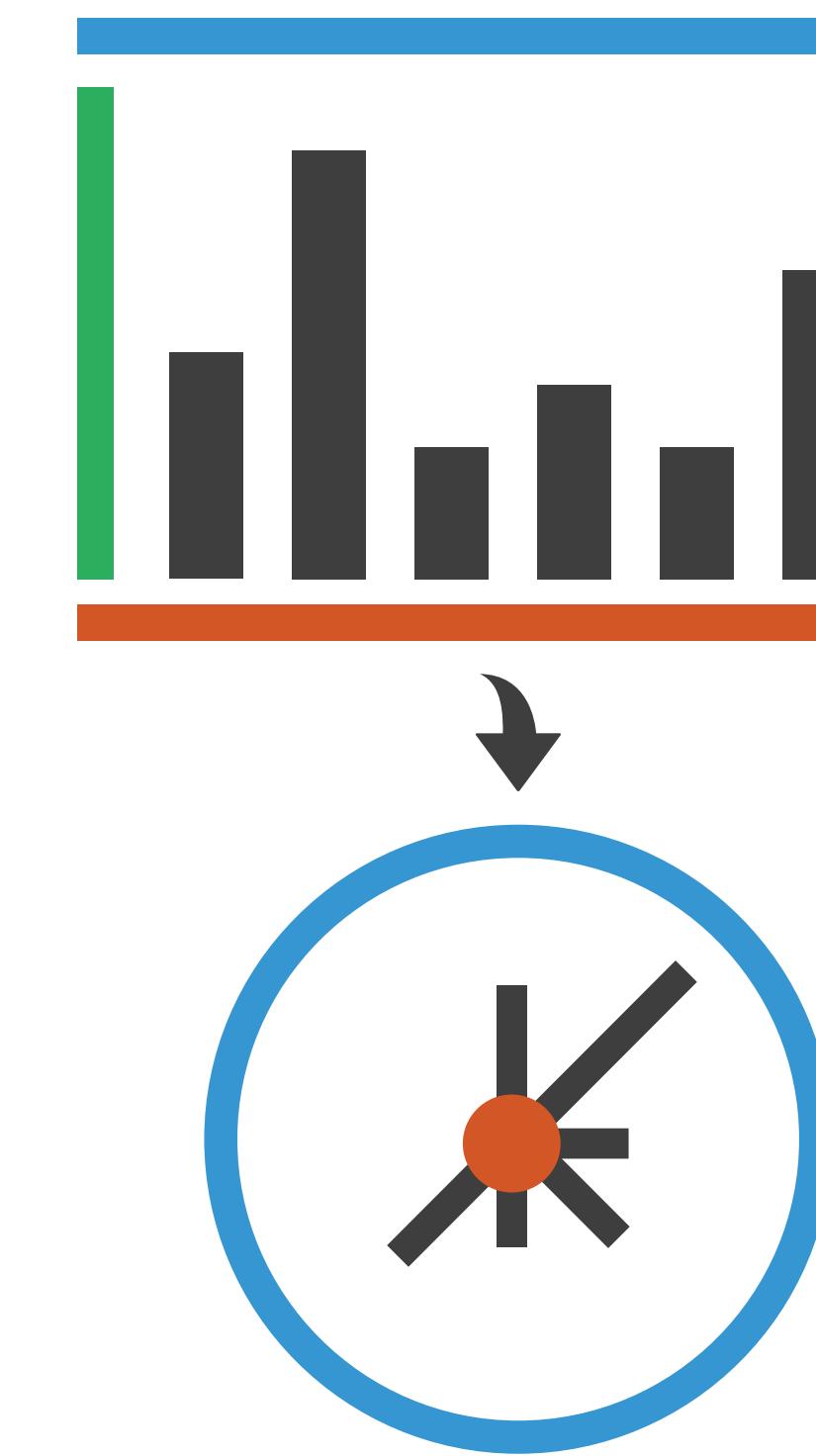
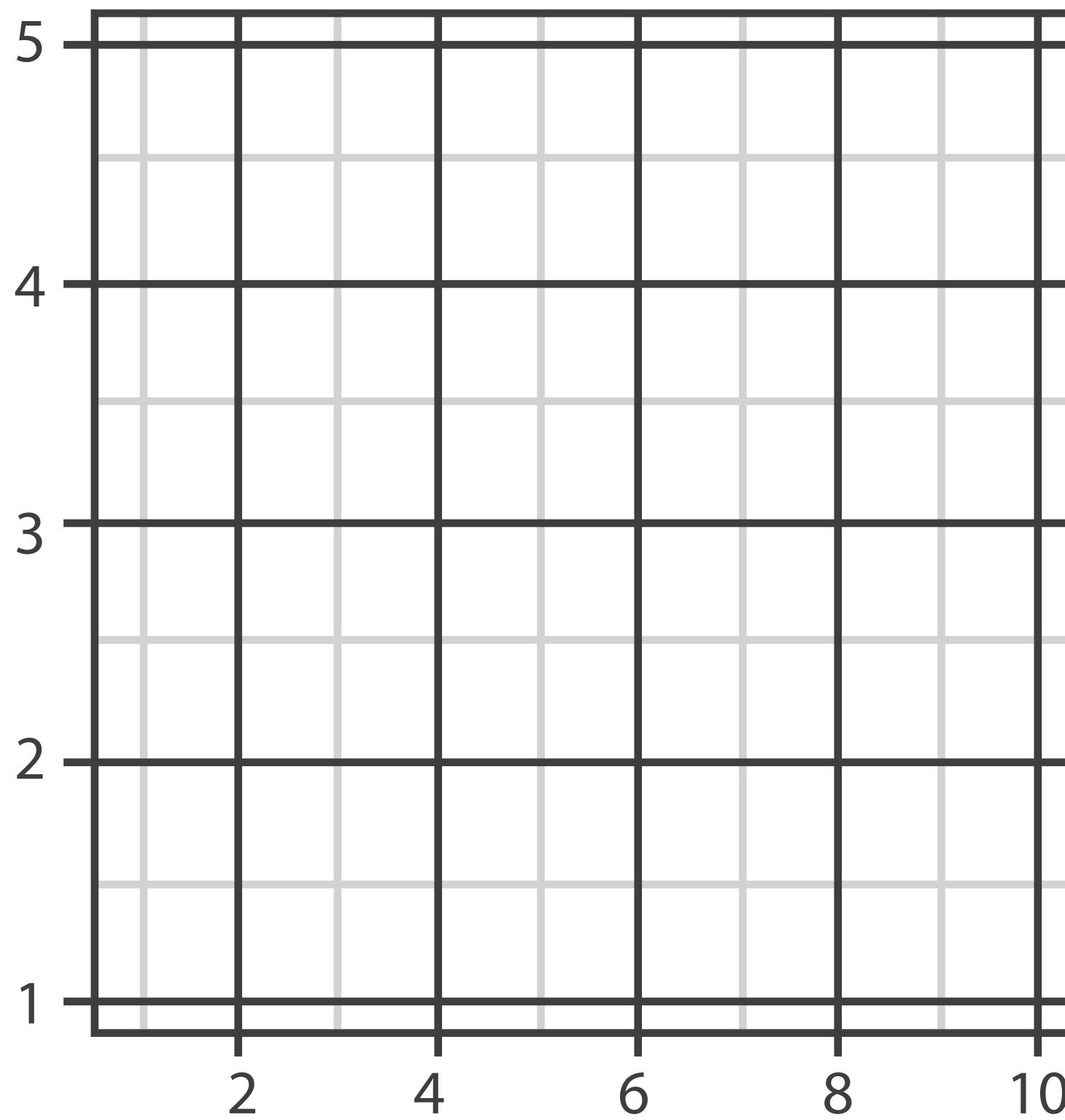
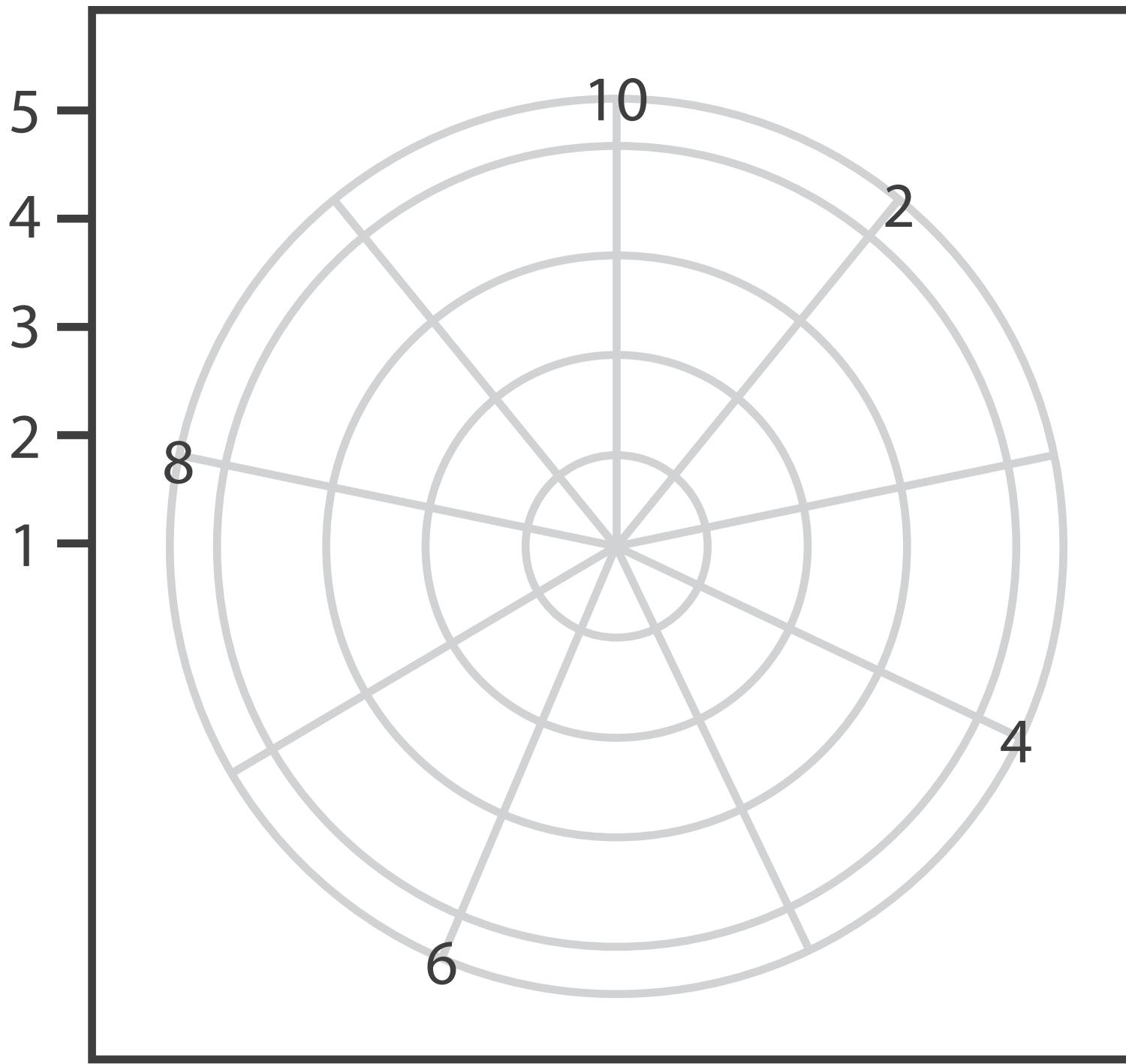


Parallel Coordinates



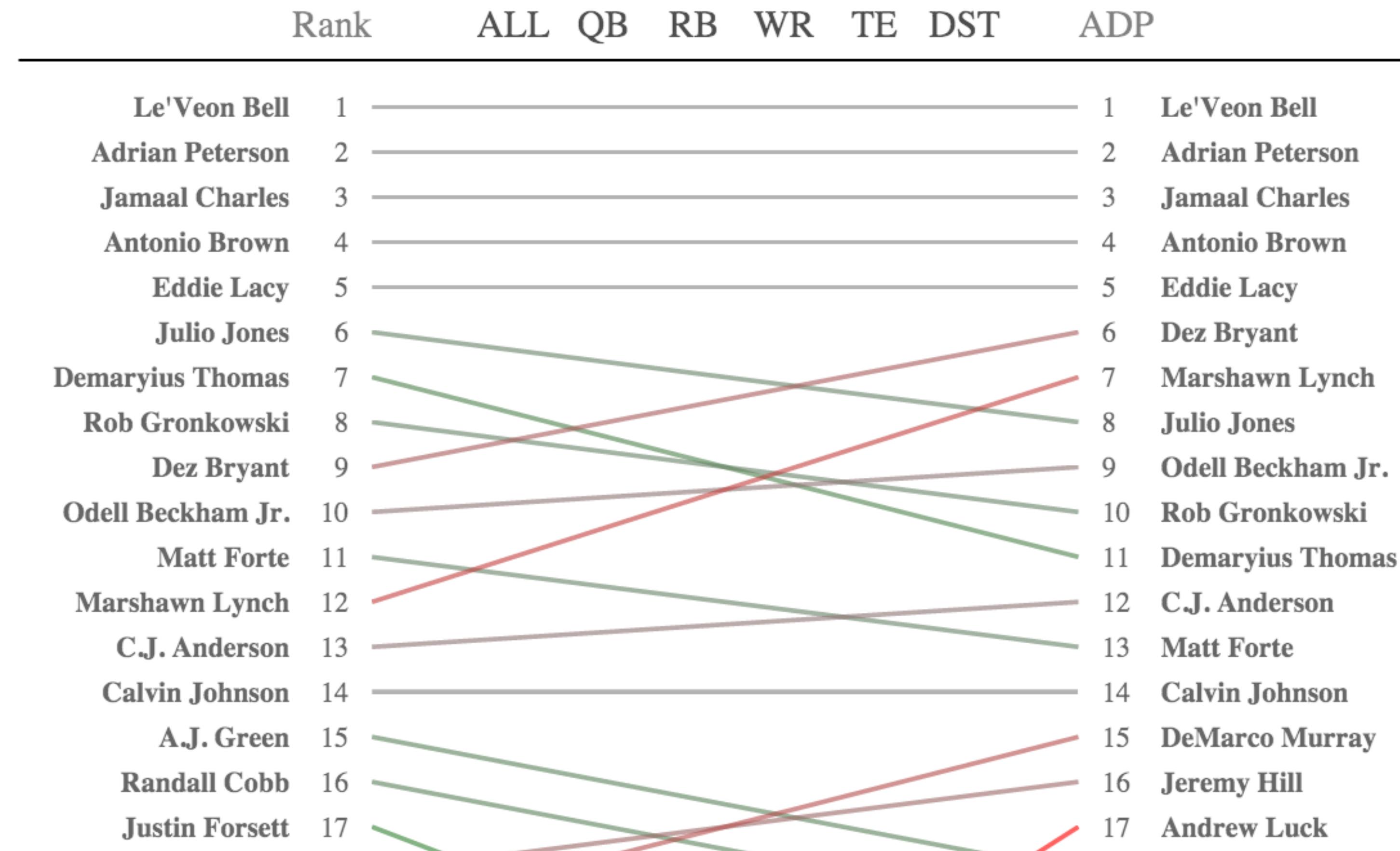


Parallel Coordinates



Regular to Radial Bar Chart

EXPERT CONSENSUS V. DRAFT POSITION

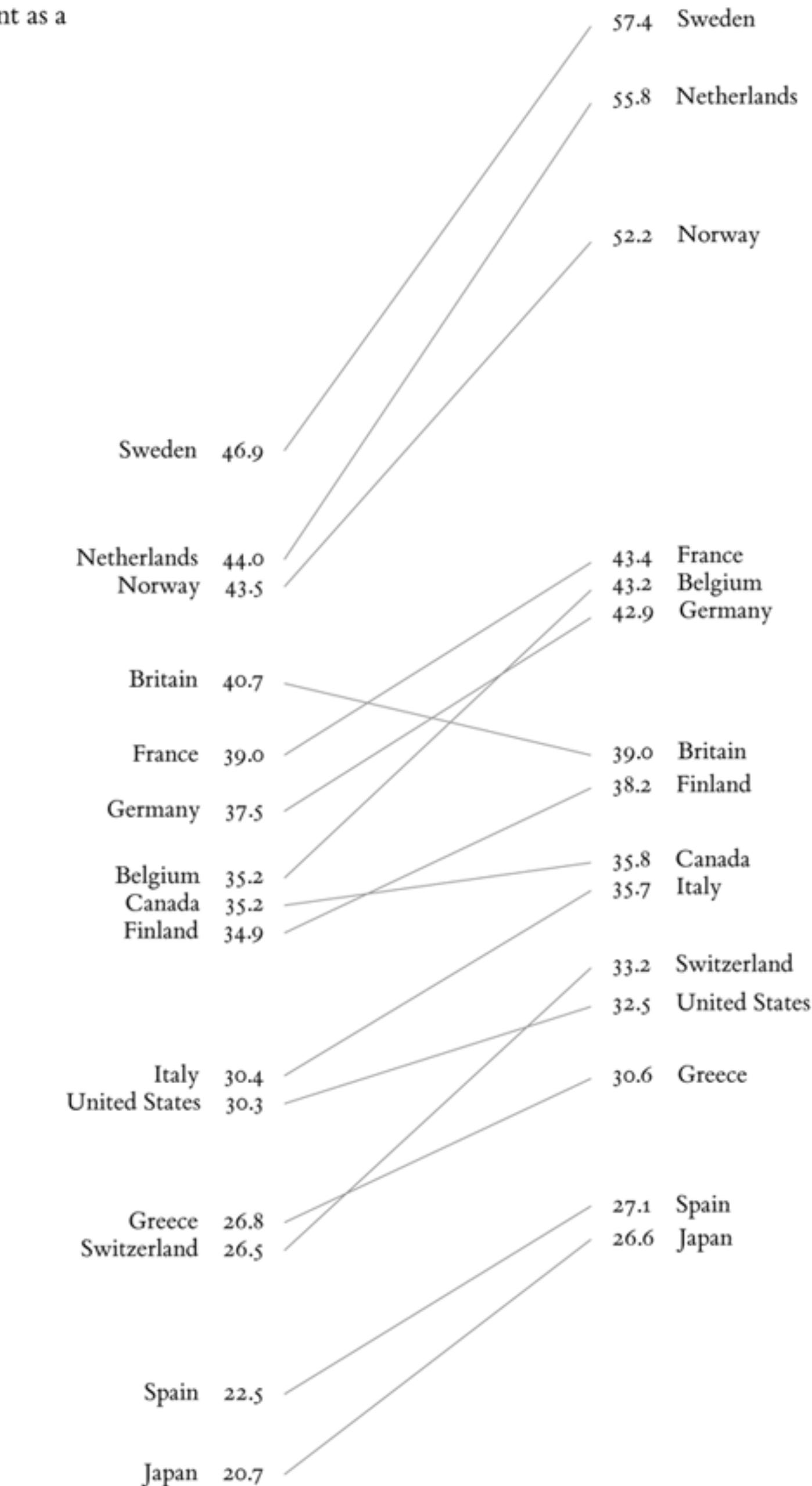


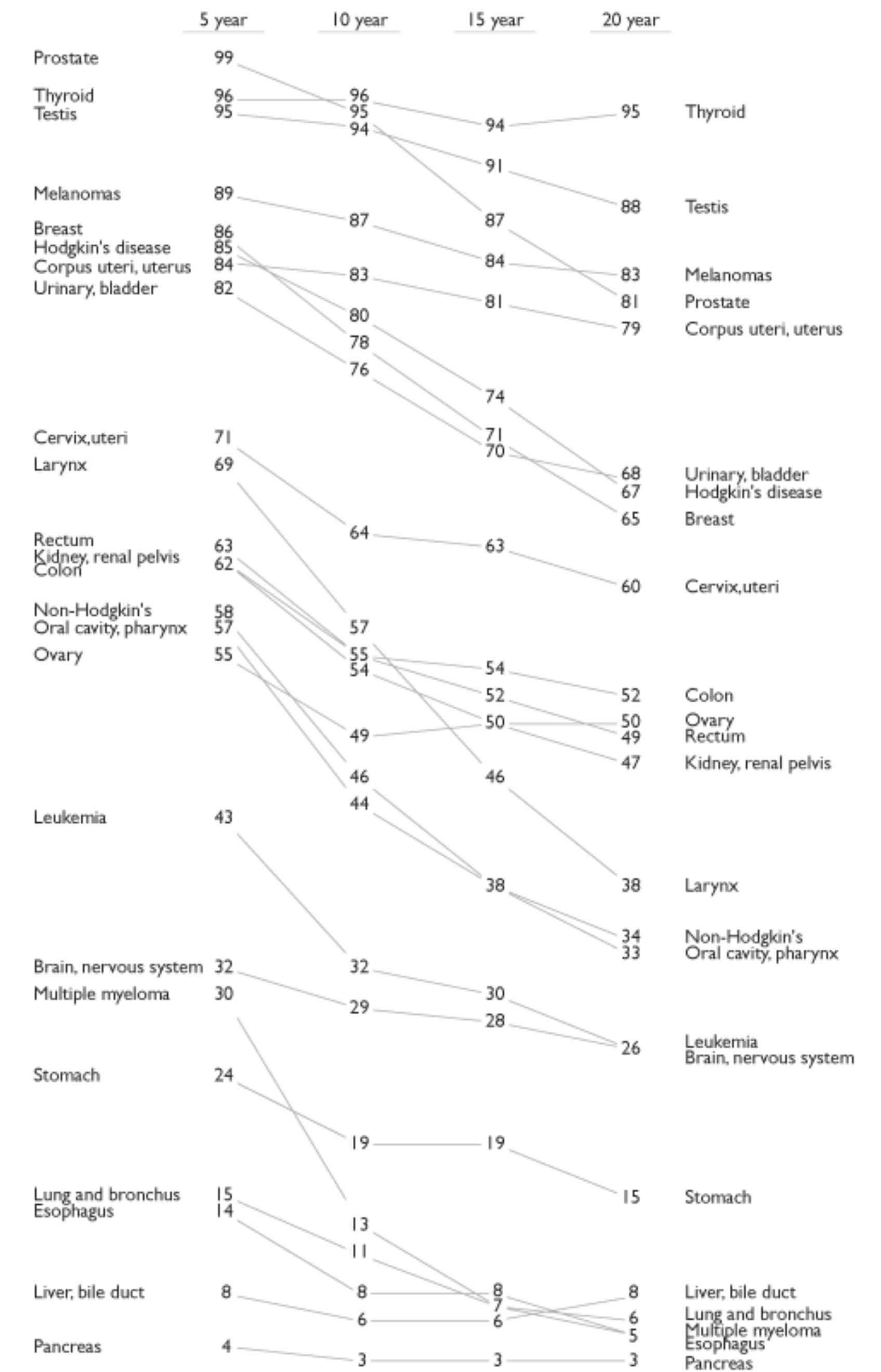
Slopecharts

Current Receipts of Government as a
Percentage of Gross Domestic
Product, 1970 and 1979

1970

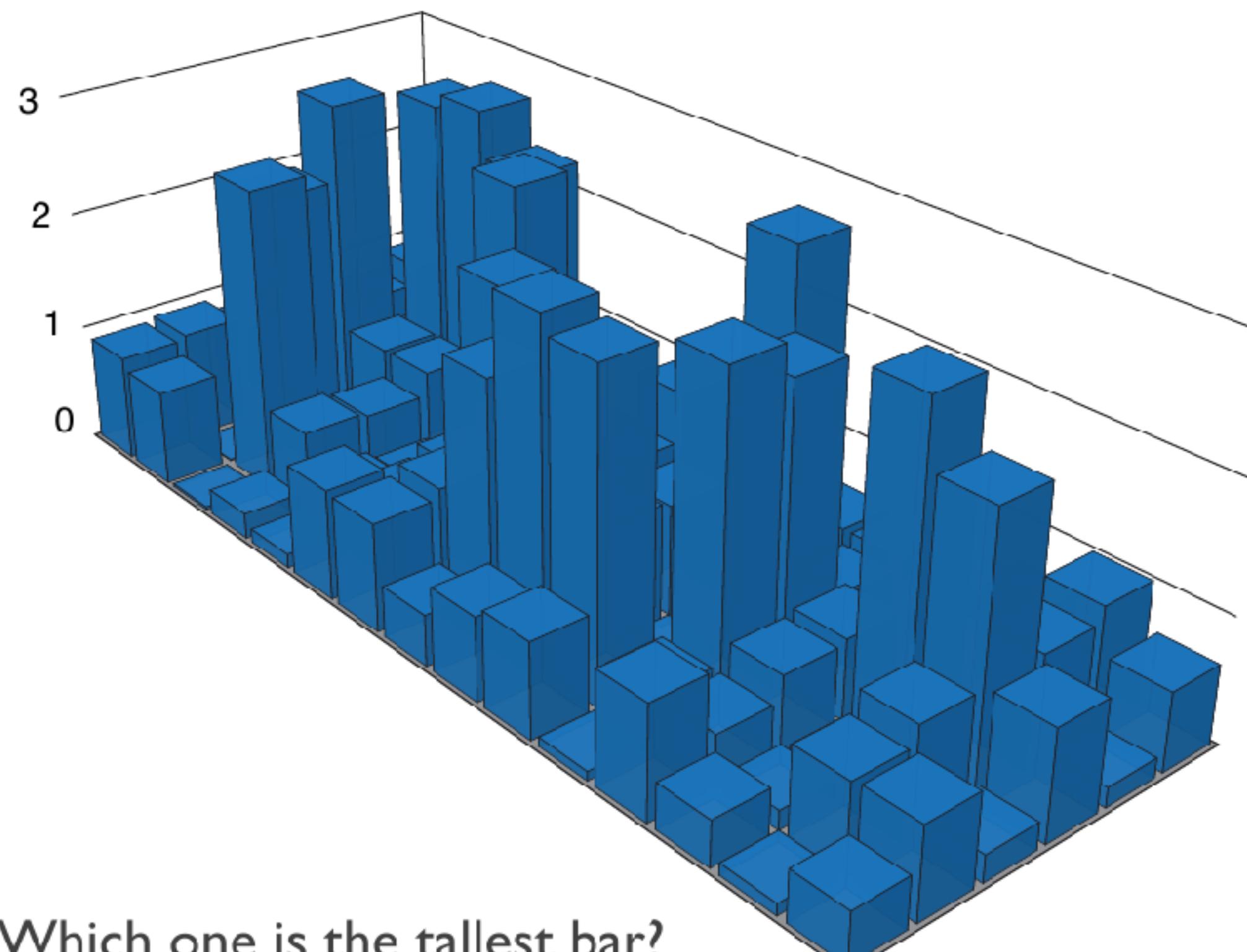
1979



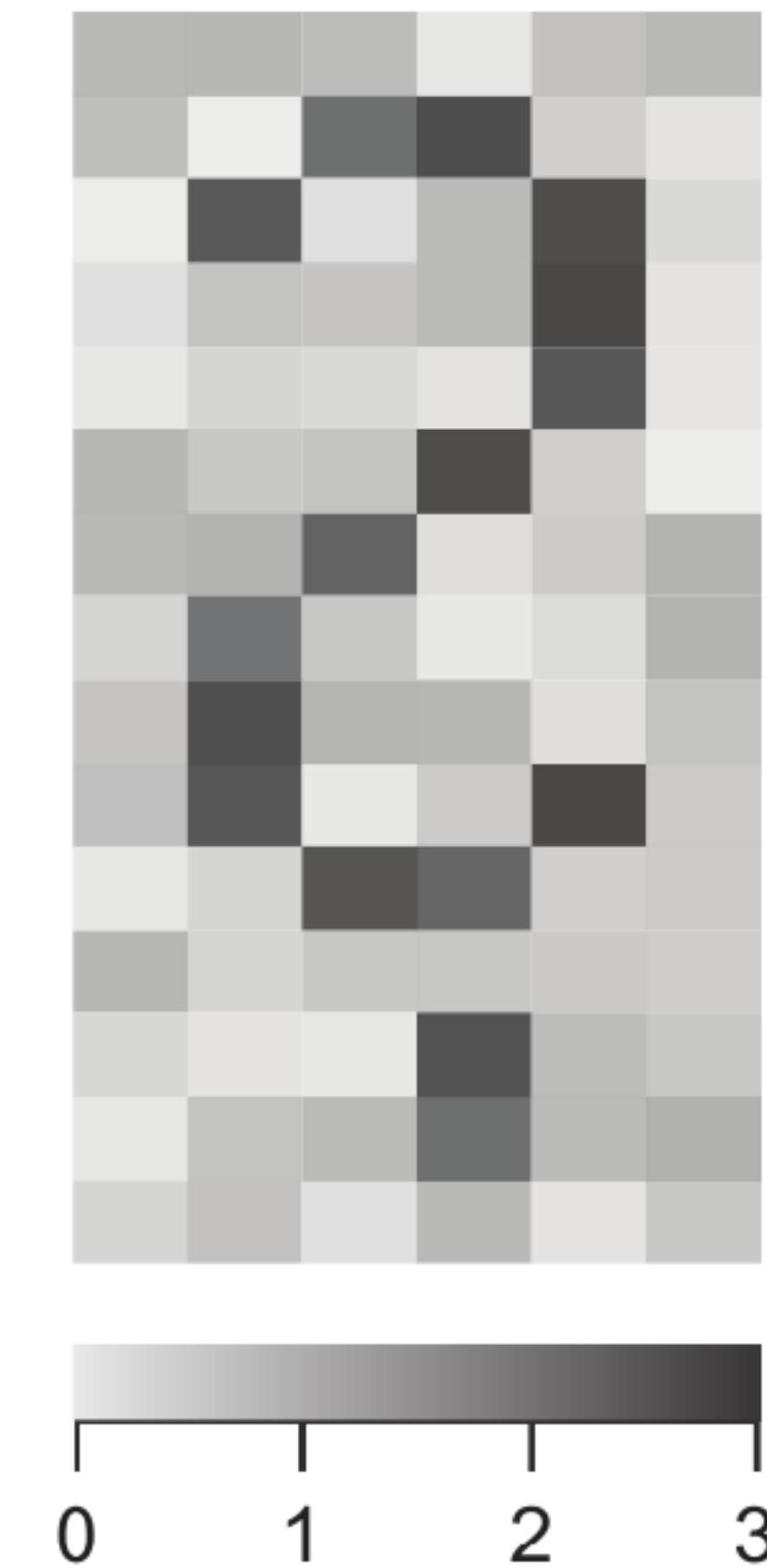


*dealing with
dimensions*

3D Pitfall: Occlusion & Perspective



Which one is the tallest bar?
What is the pattern in the data?



HPC: ENCODING DERIVED DATA

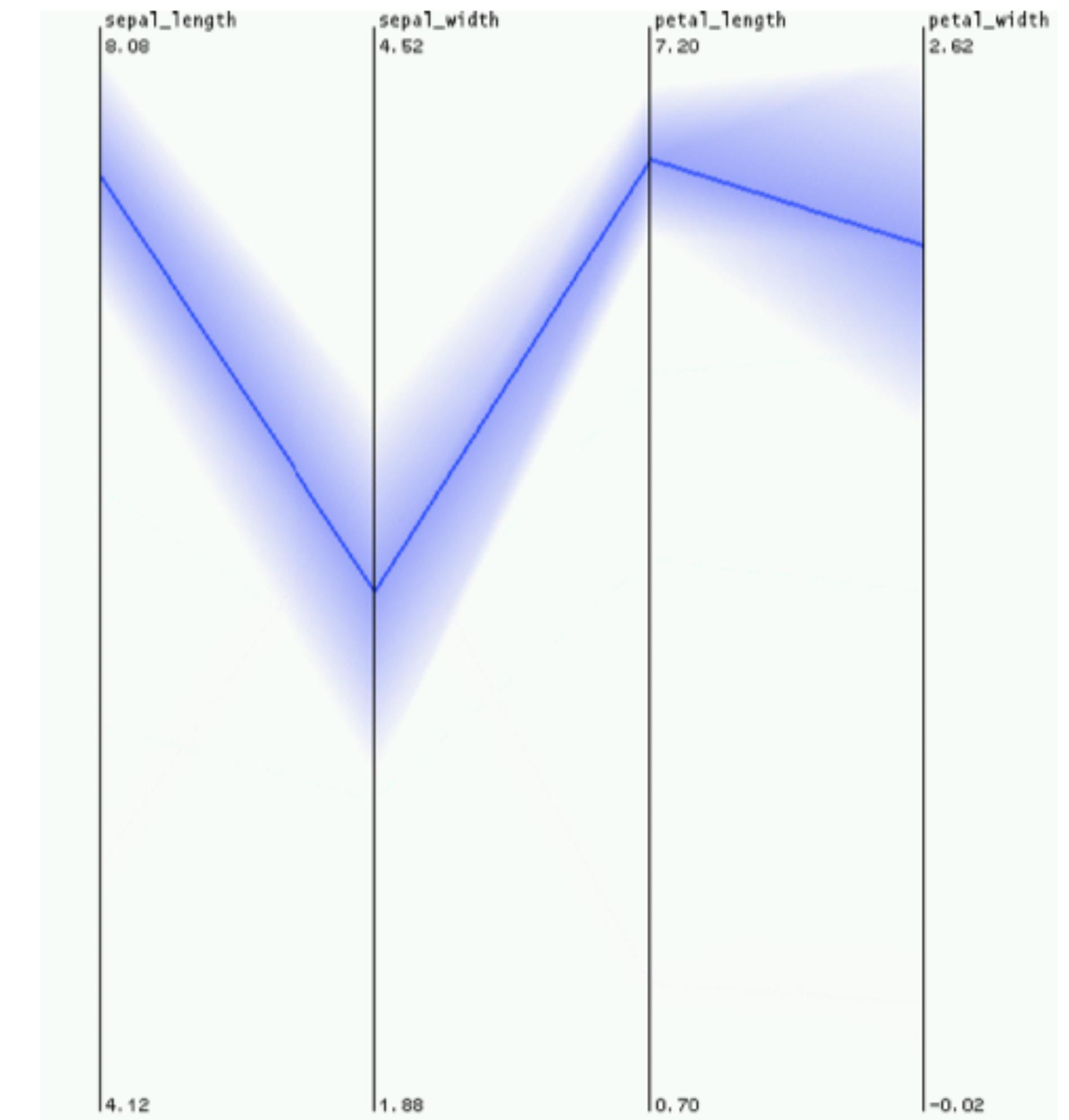
visual representation: variable-width opacity bands

show whole cluster, not just single item

min / max: spatial position

cluster density: transparency

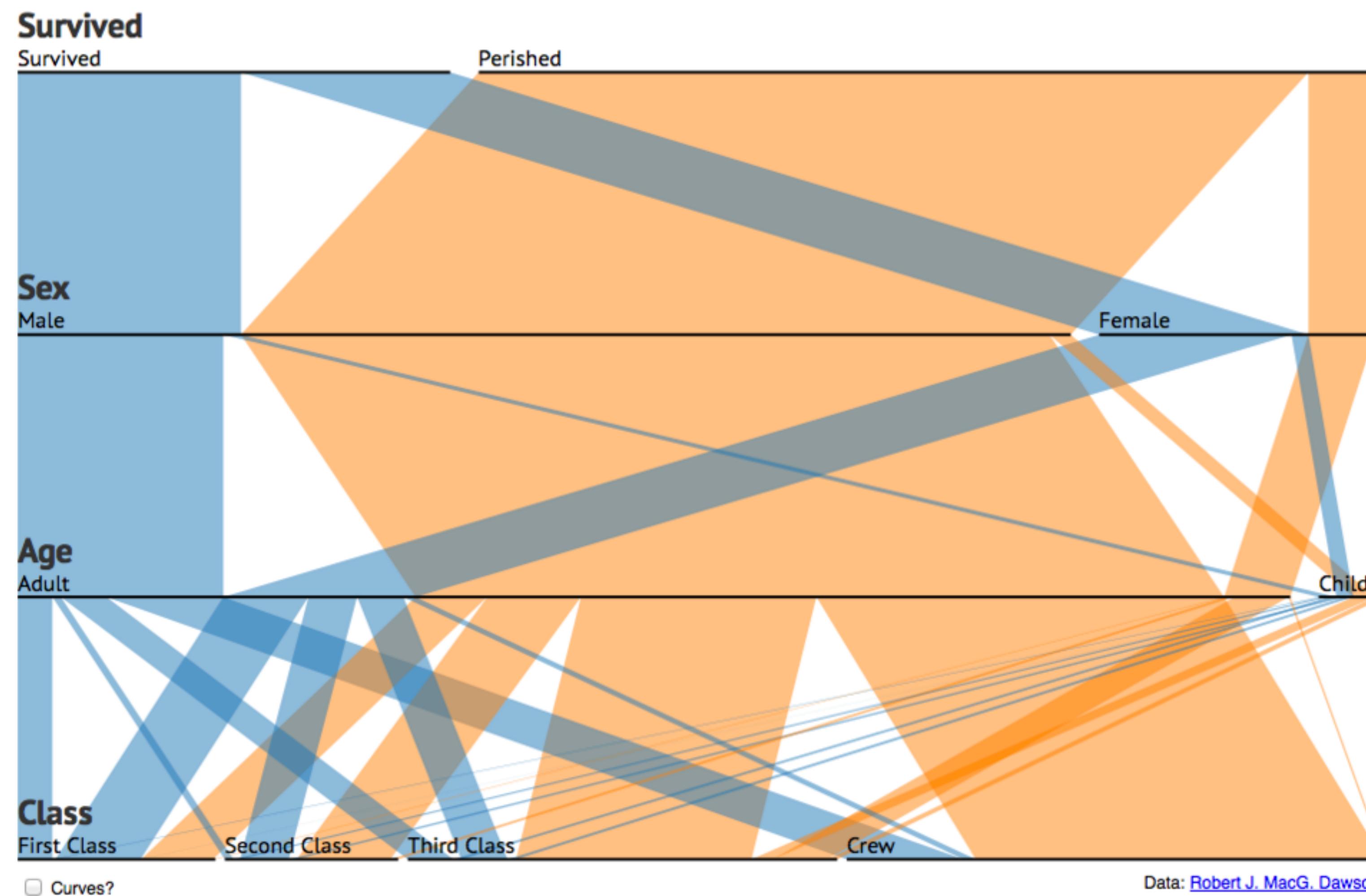
mean: opaque



Parallel Sets

A visualisation technique for multidimensional categorical data.

Titanic Survivors



reduction:

mds

reduction:

pca

sorting:

automatic

*sorting:
user-driven*

machine learning

data mining

*techniques &
systems*

TableLens

small multiples

large singles

pixel mapping