Fundamentals of Data Visualization

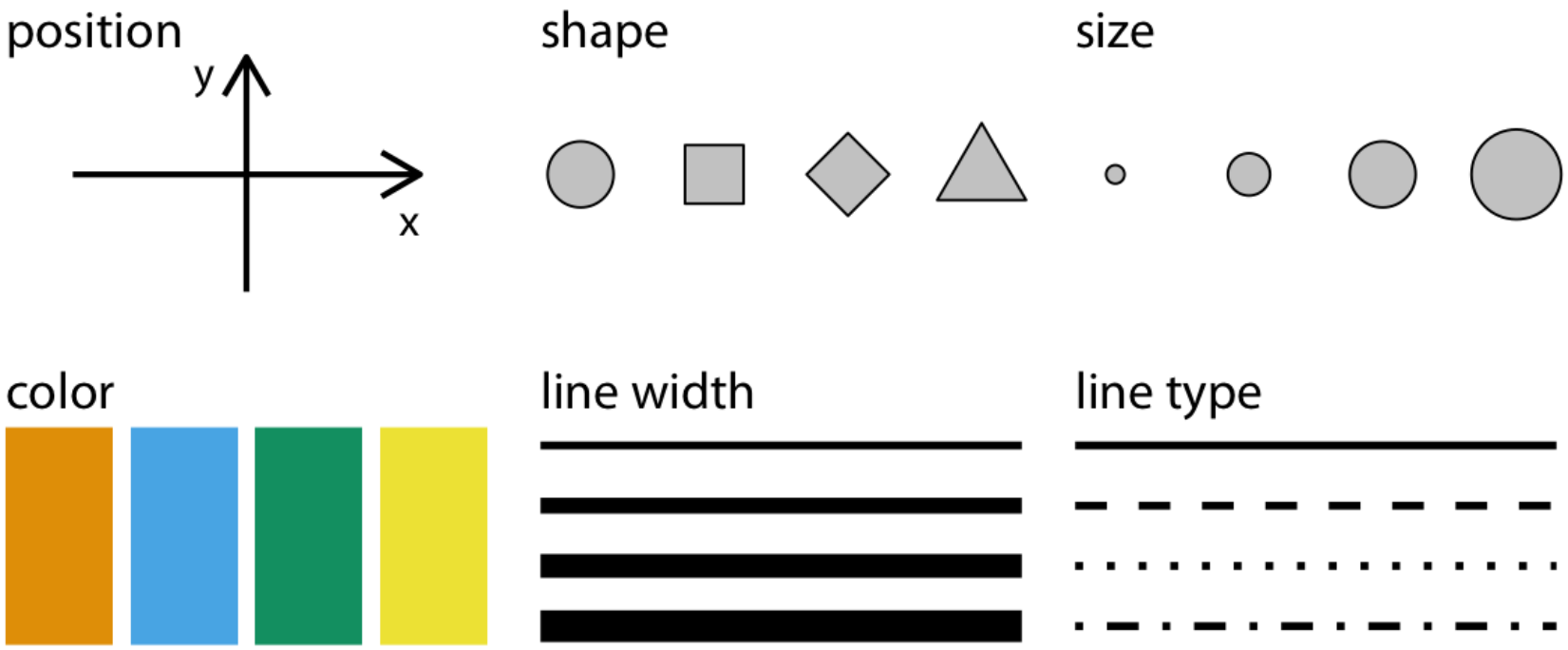
Chapter 2

April 23, 2023

Mapping data onto aesthetics

- On first glance a scatter plot, a pie chart, and a heatmap don't seem to have much in common.
- All data visualizations map data values into quantifiable features of the resulting graphic.
- We refer to these features as aesthetics.

Common aesthetics



Other aesthetics

- Font family, size.
- Transparency of overlapping aesthetics.

Two fundamental types

- Continuous data
  - e.g. time duration
  - position, size, color, line width
- Everything else
  - e.g. gender
  - shape, line type

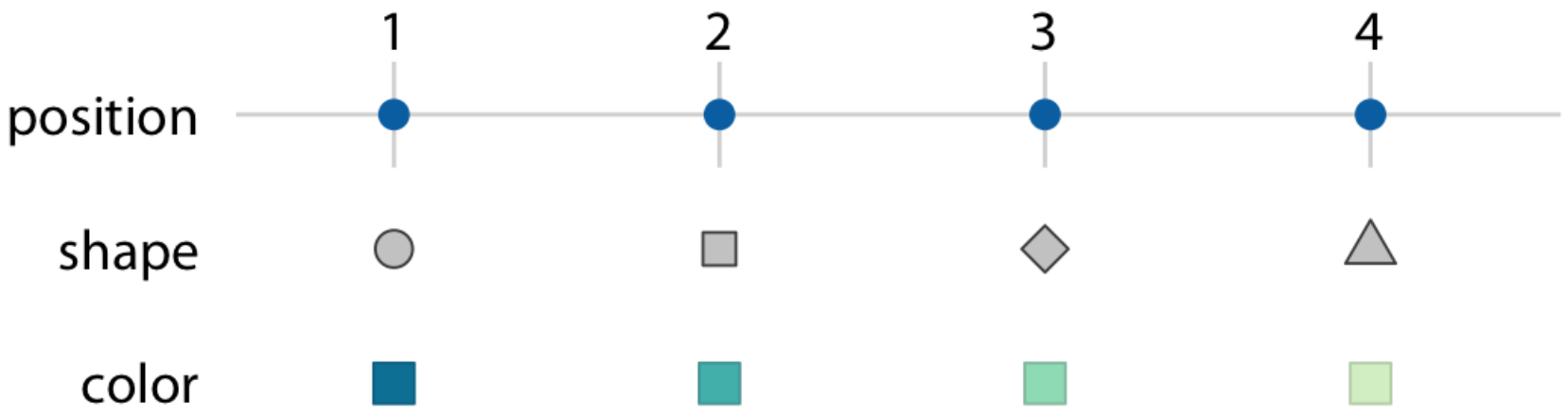
Types of data

Type of variable	Examples	Appropriate scale
quantitative/numerical continuous	1.3, 5.7, 83, 1.5x10-2	continuous
quantitative/numerical discrete	1, 2, 3, 4	discrete
qualitative/categorical unordered	dog, cat, fish	discrete
qualitative/categorical ordered	good, fair, poor	discrete
date or time	Jan. 5 2018, 8:03am	continuous or discrete
text	"No comment."	none, or discrete

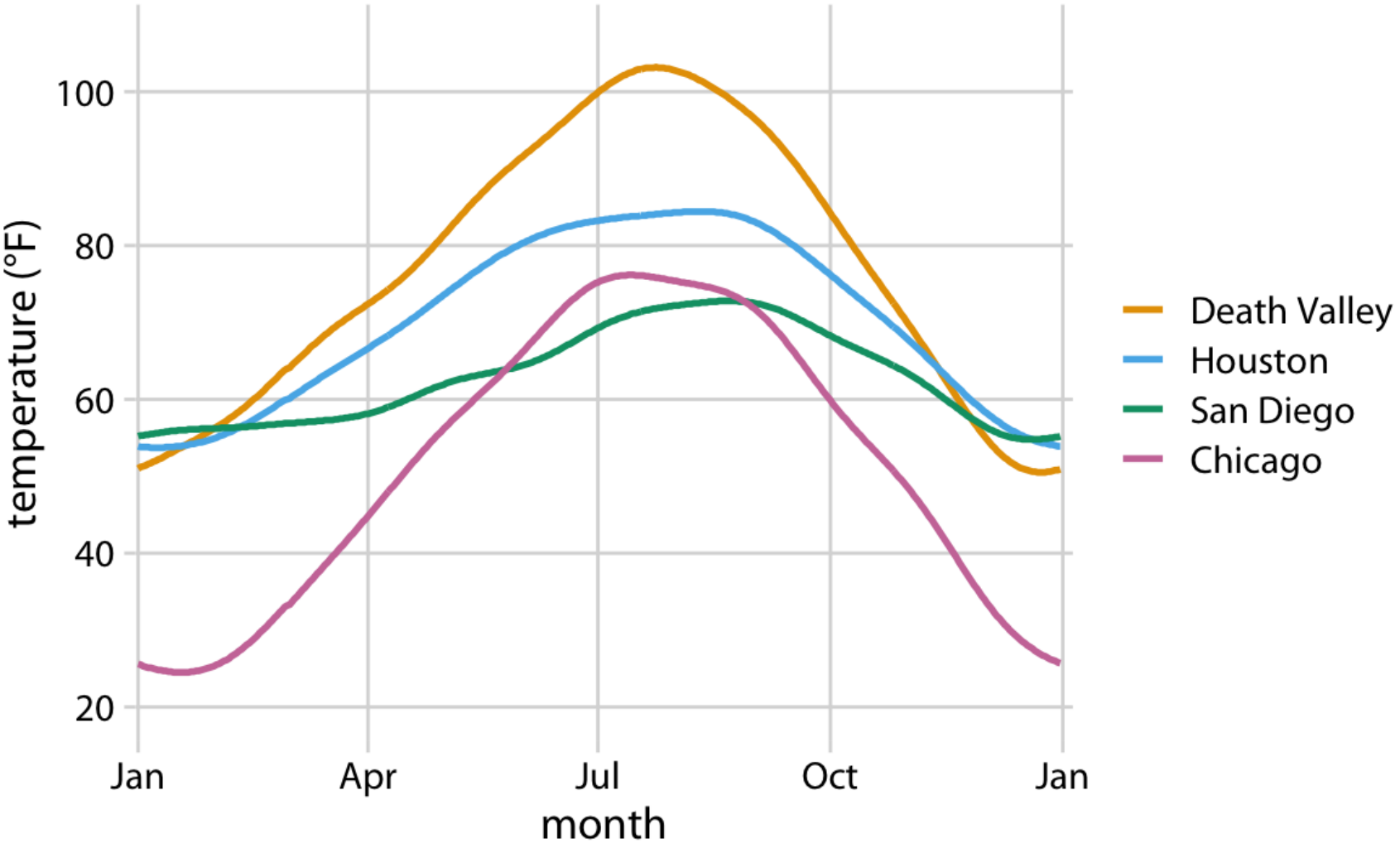
Example Data Frame

Month	Day	Location	Station ID	Temperature
Jan	1	Chicago	USW00014819	25.6
Jan	1	San Diego	USW00093107	55.2
Jan	1	Houston	USW00012918	53.9
Jan	1	Death Valley	USC00042319	51.0
Jan	2	Chicago	USW00014819	25.5
Jan	2	San Diego	USW00093107	55.3
Jan	2	Houston	USW00012918	53.8
Jan	2	Death Valley	USC00042319	51.2
Jan	3	Chicago	USW00014819	25.3

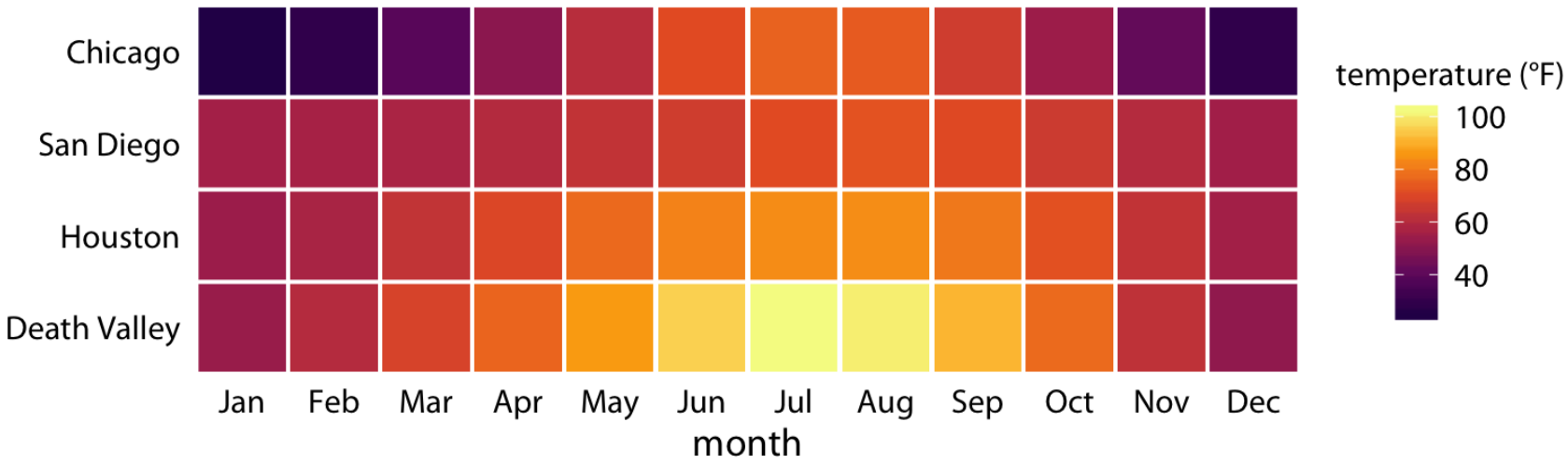
Scales map data values onto aesthetics



Daily temperature normals



Daily temperature normals



- Vertical scale is unordered discrete
  - order chosen by eye
- Horizontal scale is ordered discrete

Five scales on one graph