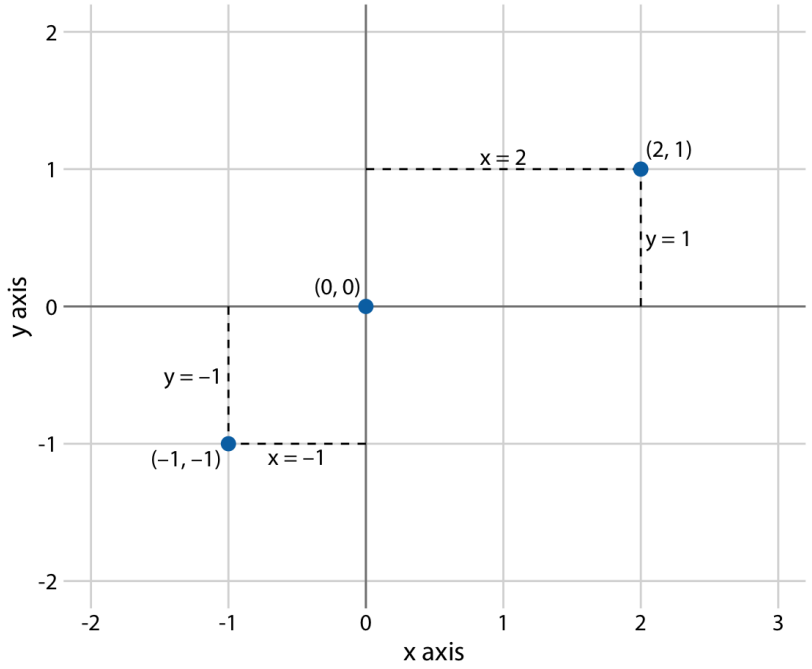
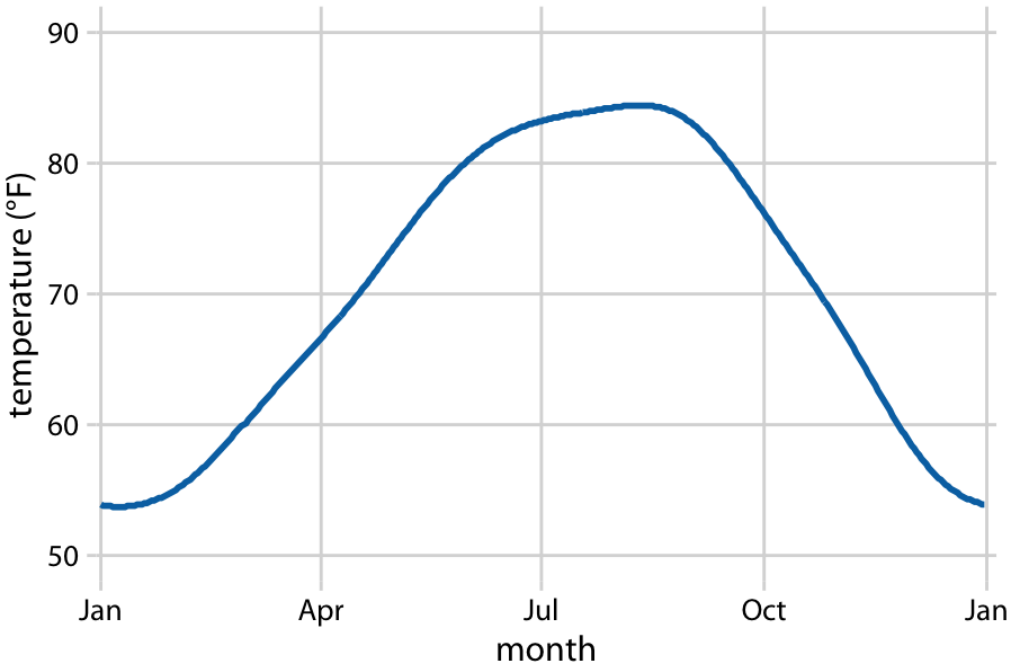
Unit -1
Introduction to Visualization

Cartesian coordinates

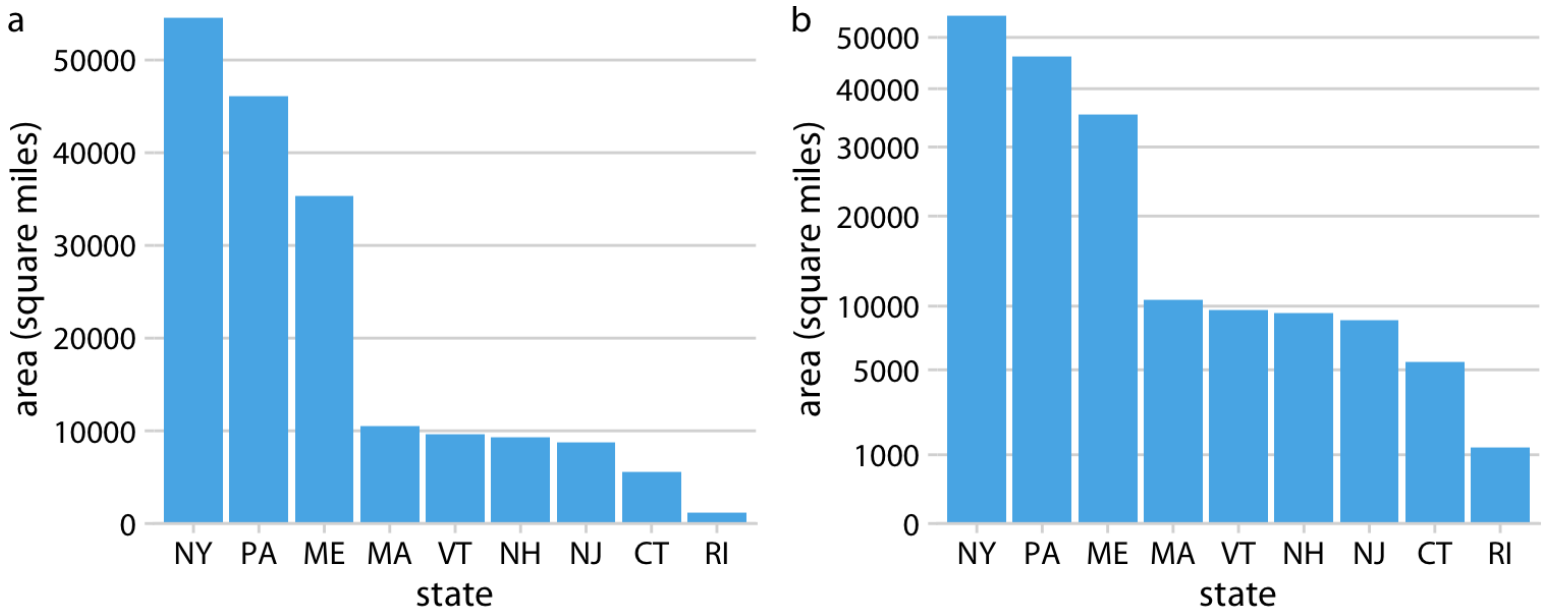
- The *x* and *y* axes run orthogonally to each other, and data values are placed in an even spacing along both axes.
- The two axes are continuous position scales, and they can represent both positive and negative real numbers.





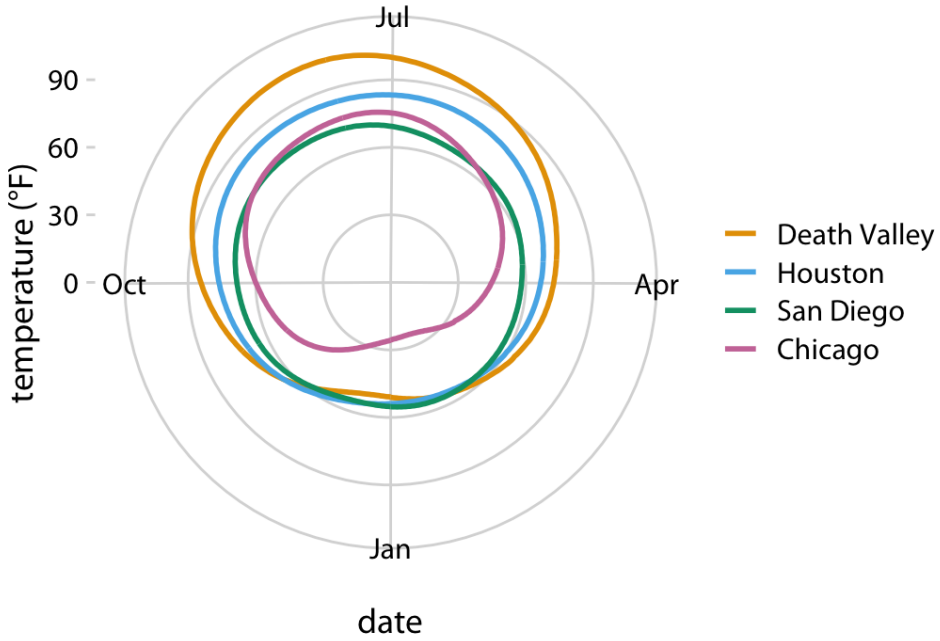
Nonlinear axes

- In a nonlinear scale, even spacing in data units corresponds to uneven spacing in the visualization, or conversely even spacing in the visualization corresponds to uneven spacing in data units.
- The most commonly used nonlinear scale is the *logarithmic scale* or *log scale* for short.



Coordinate systems with curved axes

- There are other coordinate systems, however, where the axes themselves are curved.
- The *polar* coordinate system, we specify positions via an angle and a radial distance from the origin, and therefore the angle axis is circular.
- Polar coordinates can be useful for data of a periodic nature.

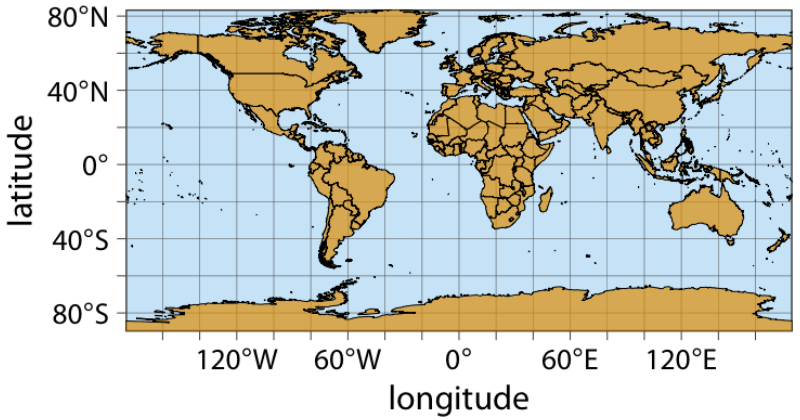


curved axes: Geospatial data

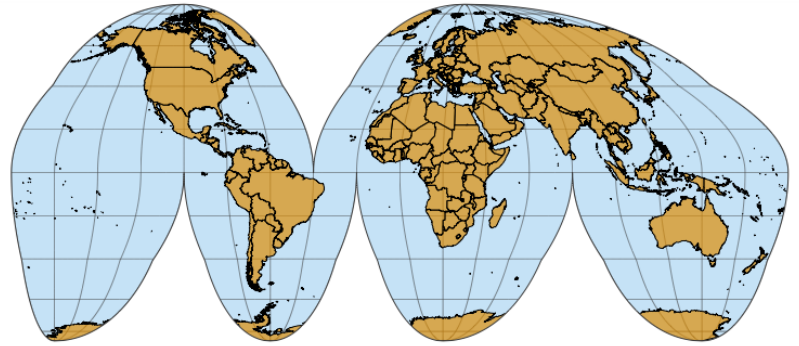
- Maps, locations on the globe are specified by their longitude and latitude.
- Earth is a sphere, drawing latitude and longitude as Cartesian axes is misleading and not recommended.
- There are various types of non-linear projections that attempt to minimize artifacts and that strike different balances between conserving areas or angles relative to the true shape lines on the globe.

curved axes: Geospatial data

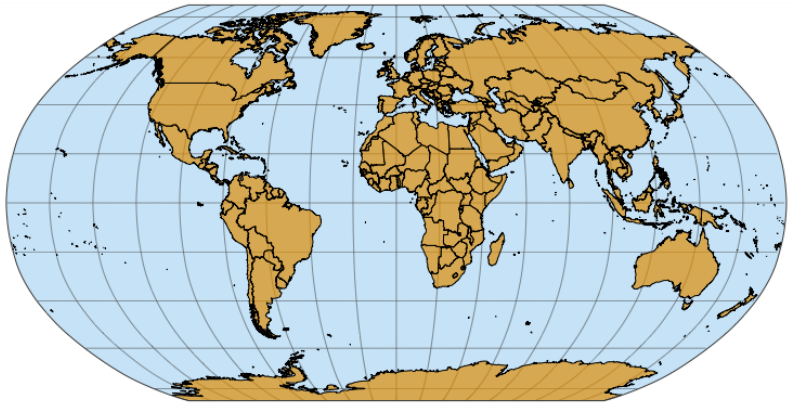
Cartesian longitude and latitude



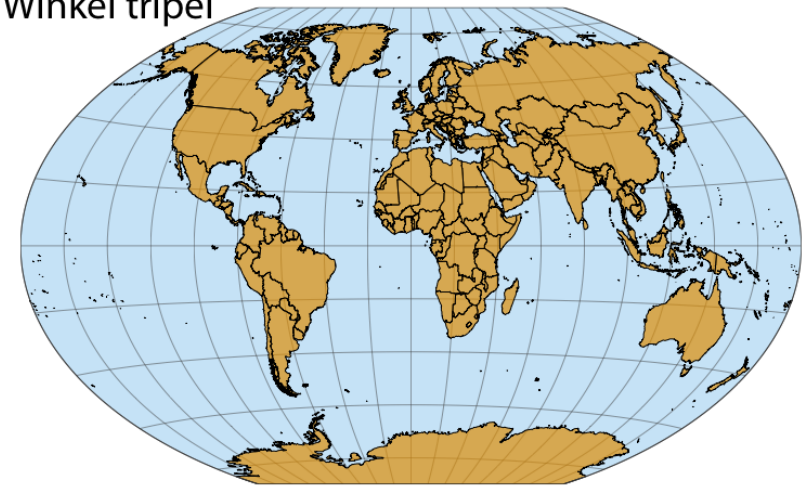
Interrupted Goode homolosine



Robinson

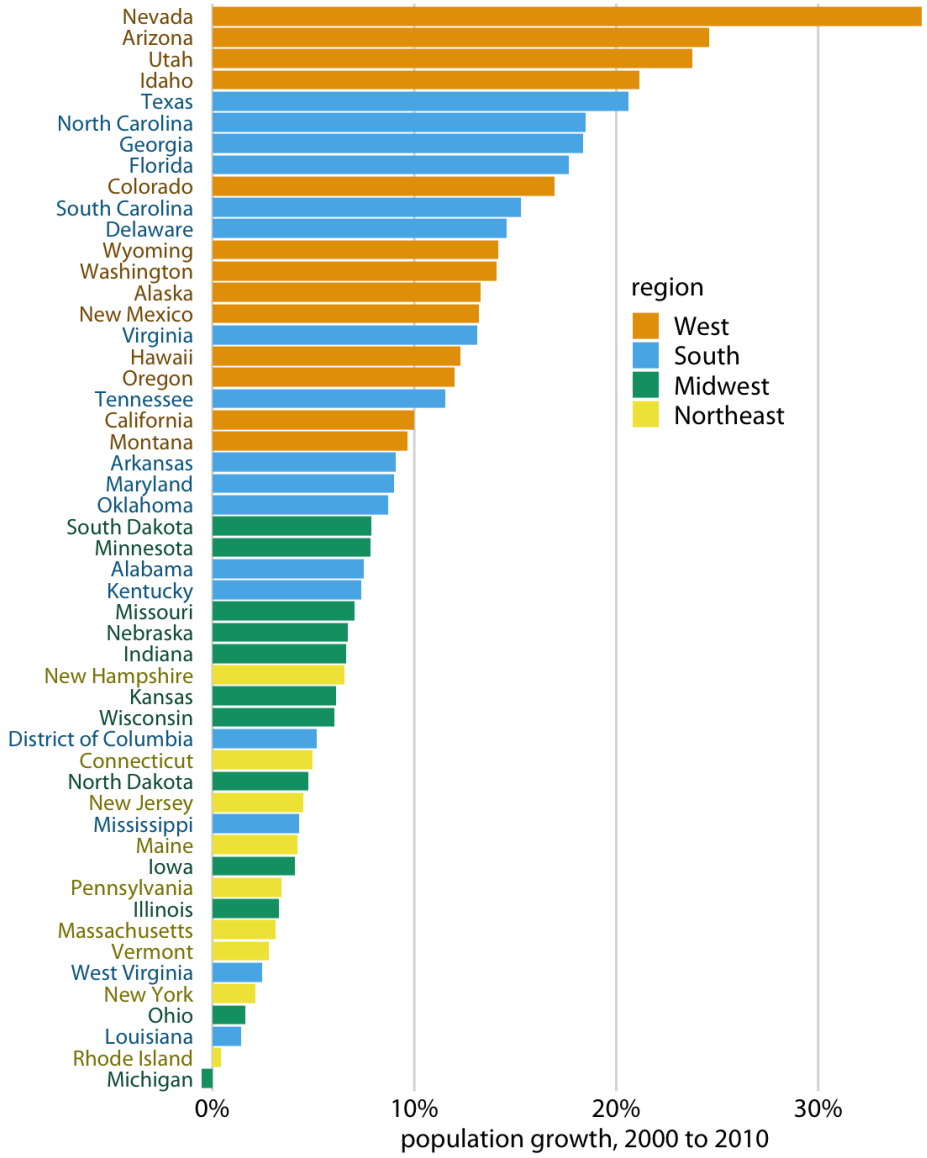


Winkel tripel



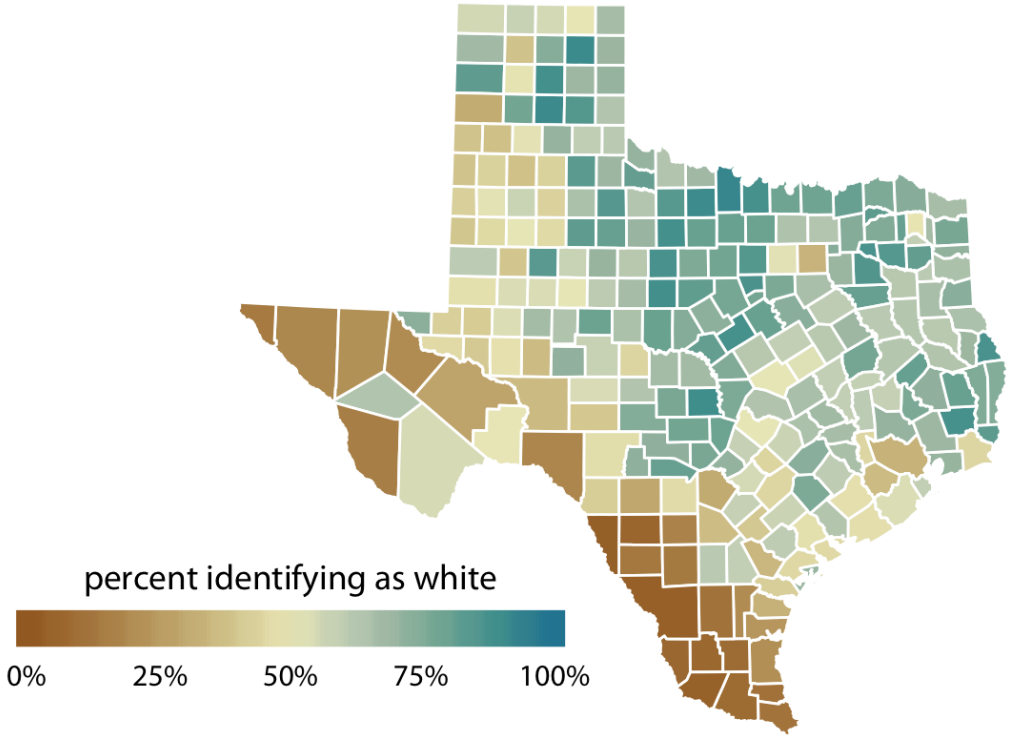
Use of colors in data visualization

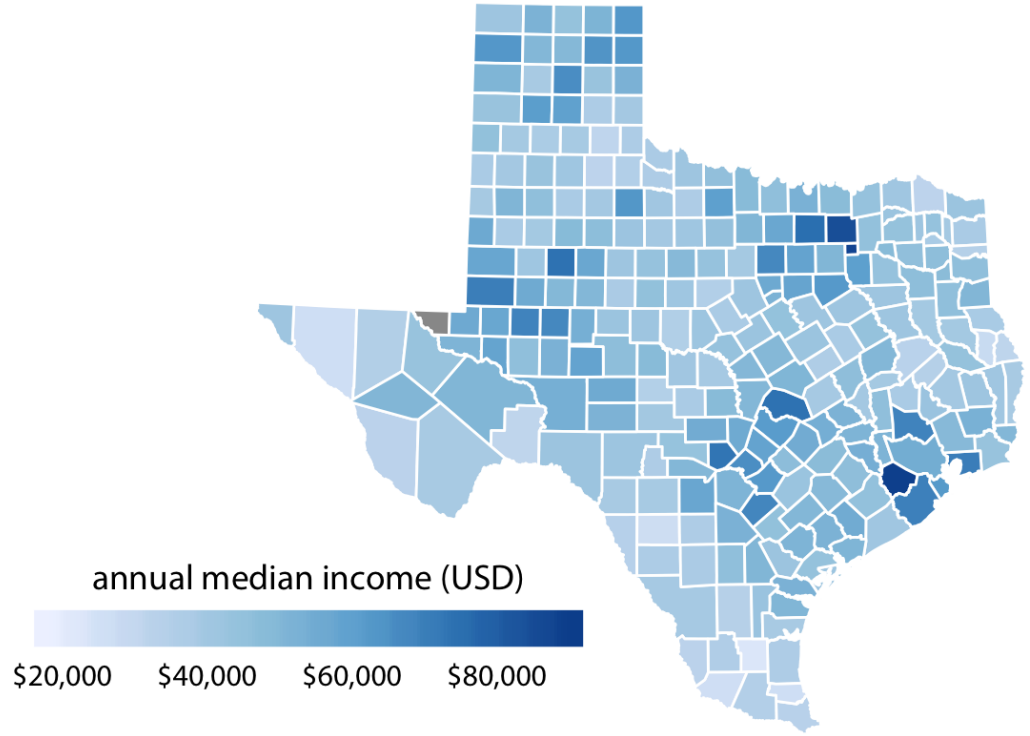
- **Color as a tool to distinguish**



Color to represent data values

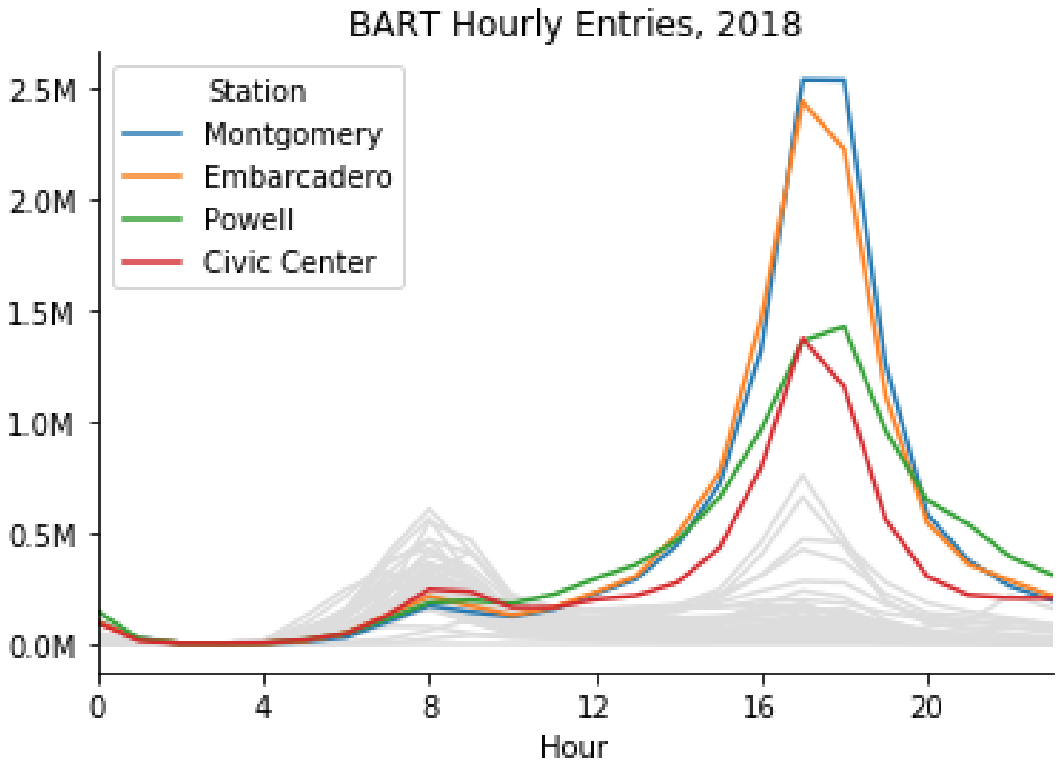
- Provide a color with a quantitative value.
- Give specific color a specific data range.





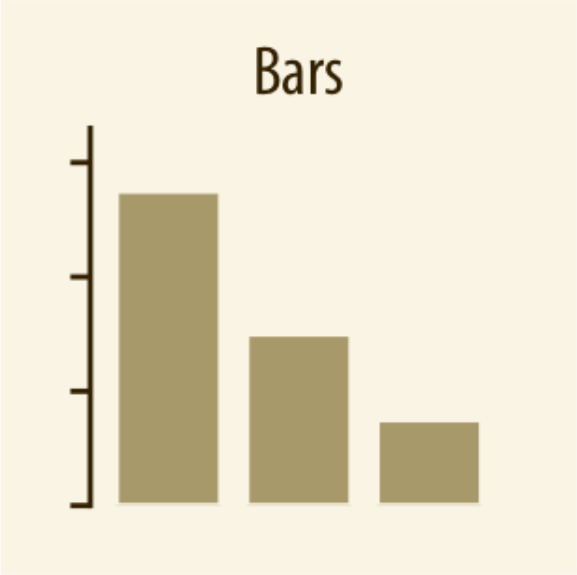
Color as a tool to highlight

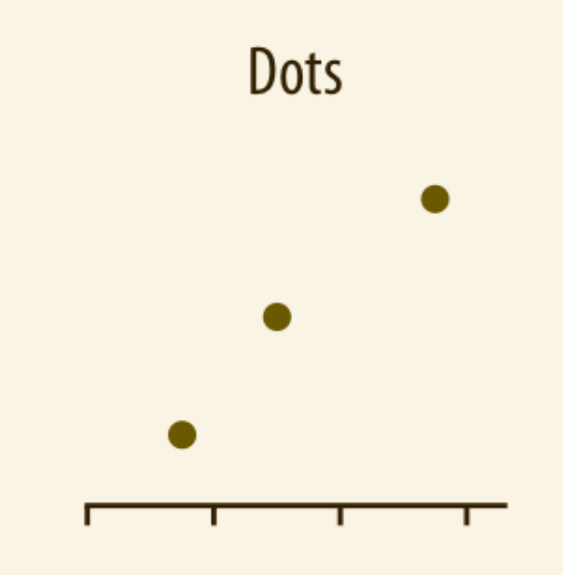
- When you need specific data to highlight among large data set.



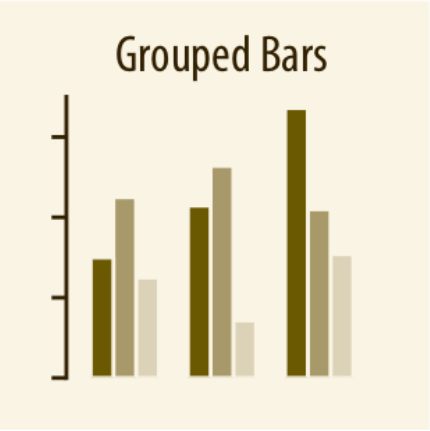
Directory of visualizations:

- **Amounts**

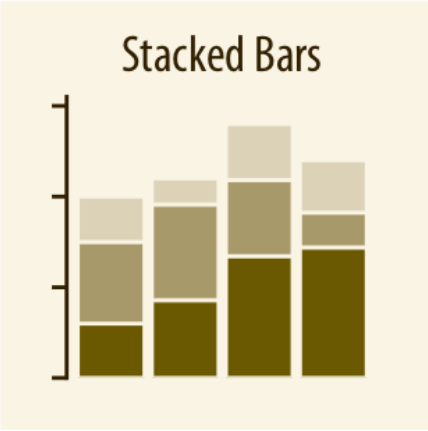


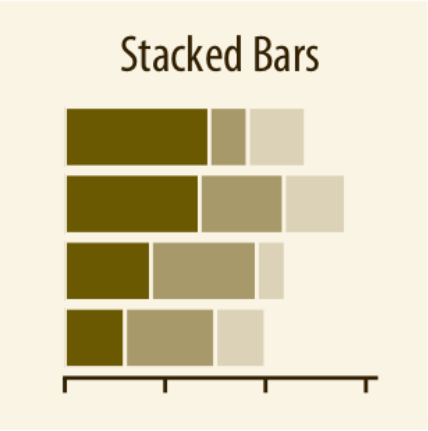


Amounts


Grouped Bars

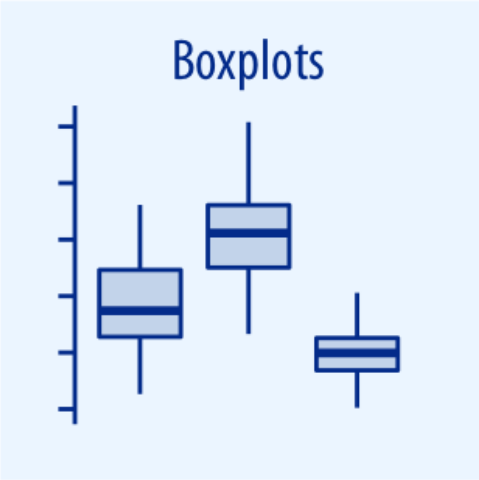

Grouped Bars

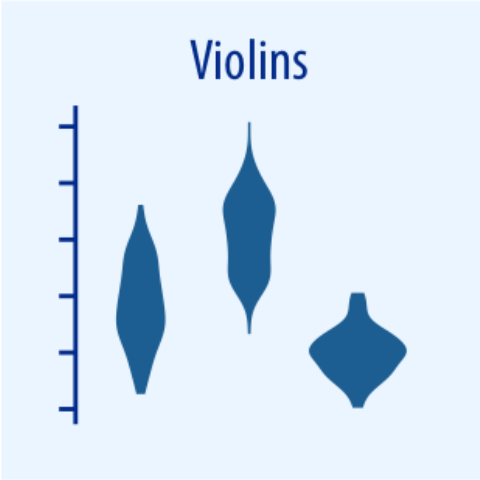

Stacked Bars

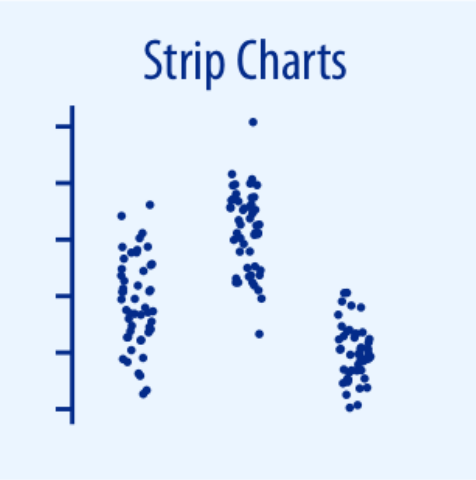

Stacked Bars

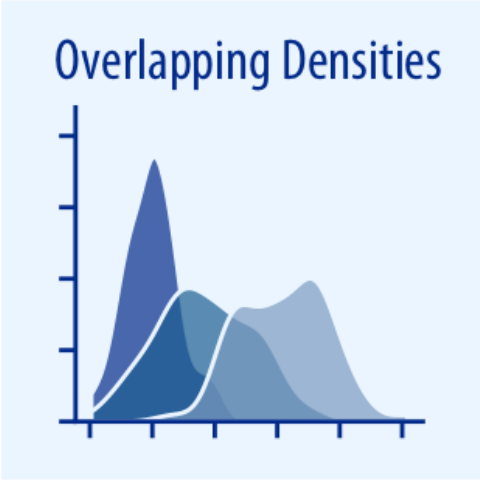

Heatmap

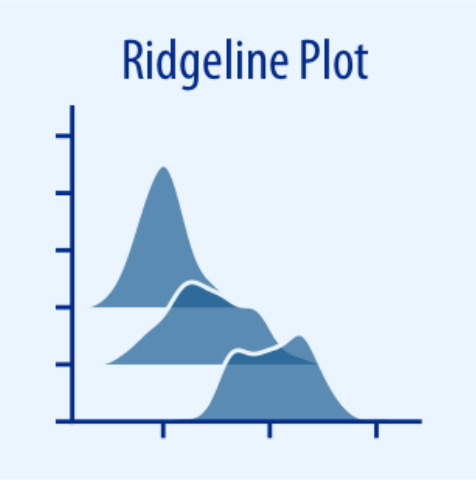
Distributions





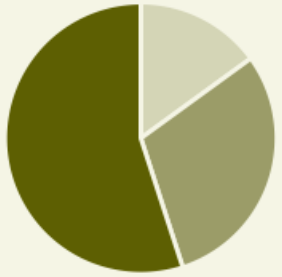




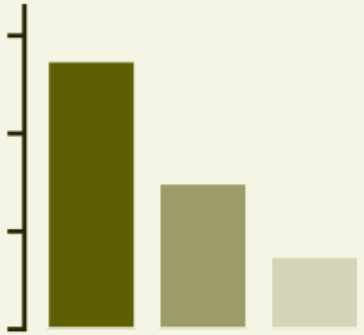


Proportions

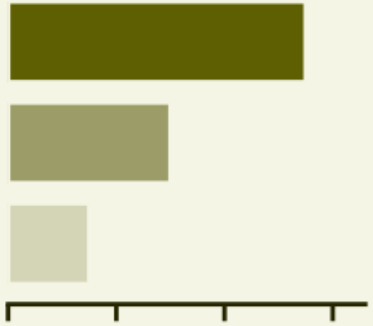
Pie Chart



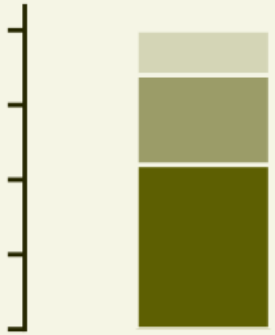
Bars



Bars

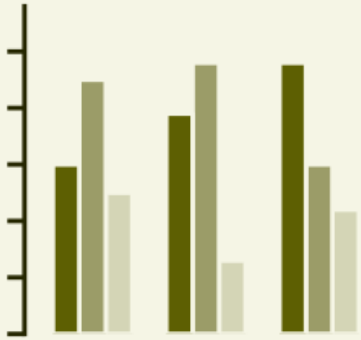


Stacked Bars

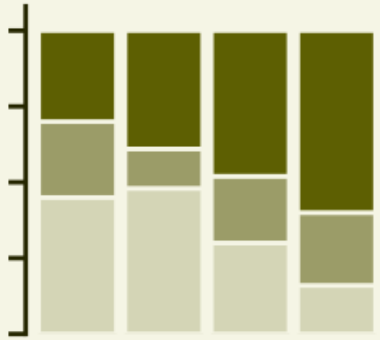


Multiple Pie Charts

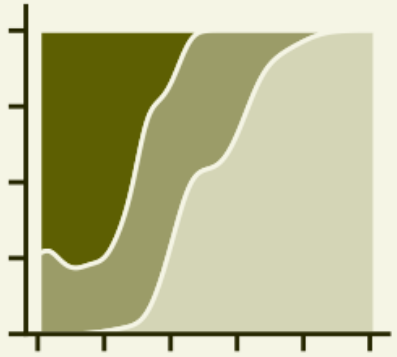
Grouped Bars



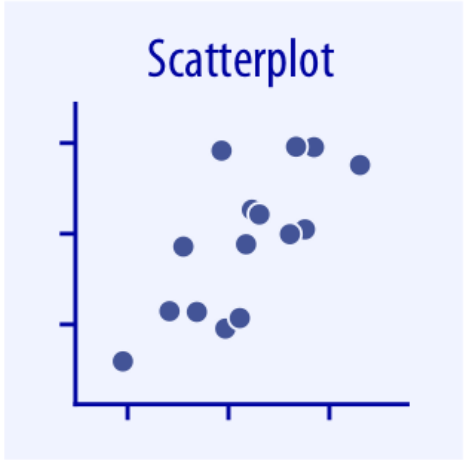
Stacked Bars

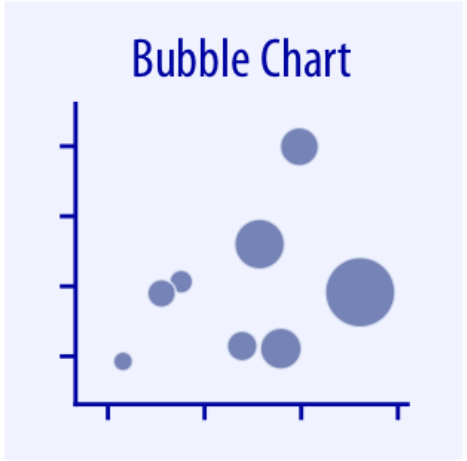


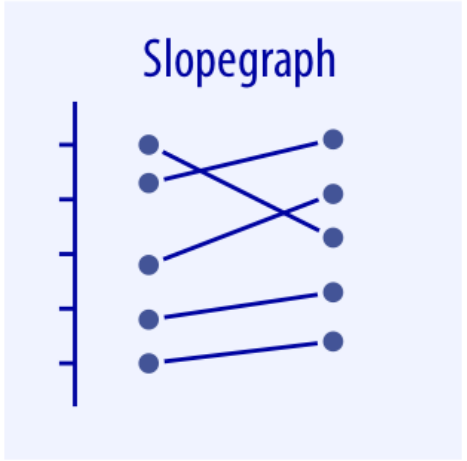
Stacked Densities

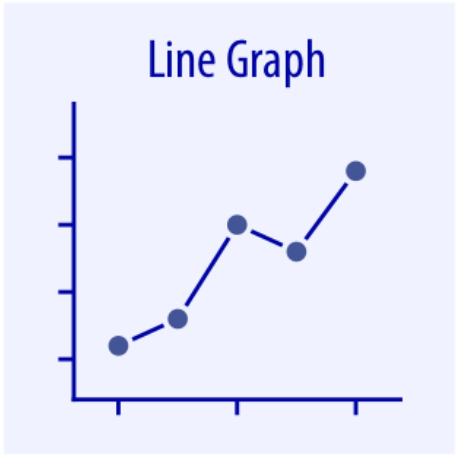


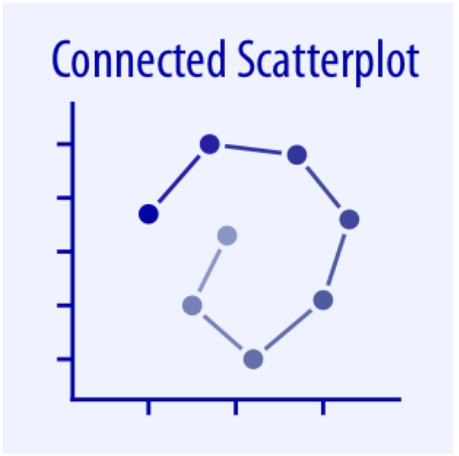
x–y relationships

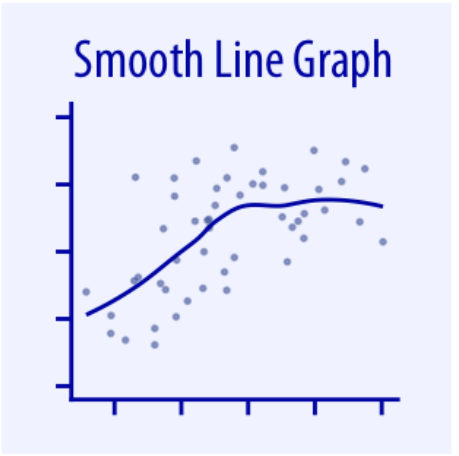












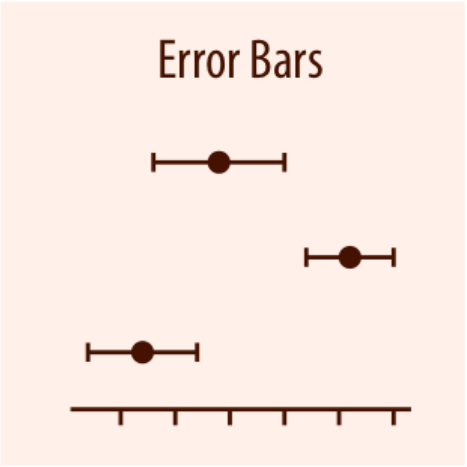
Geospatial data

Map

Choropleth

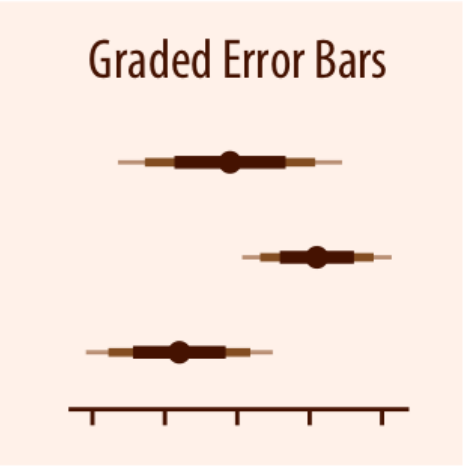
Cartogram

Error Bars

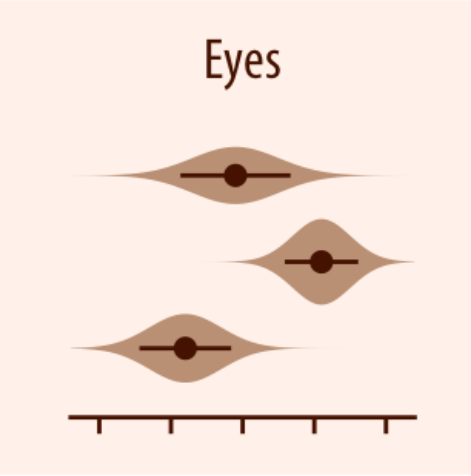

Error Bars

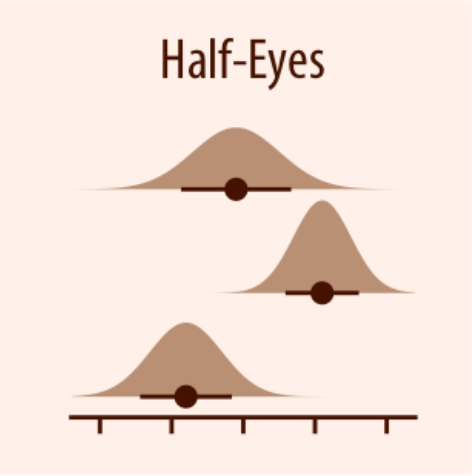

Error Bars

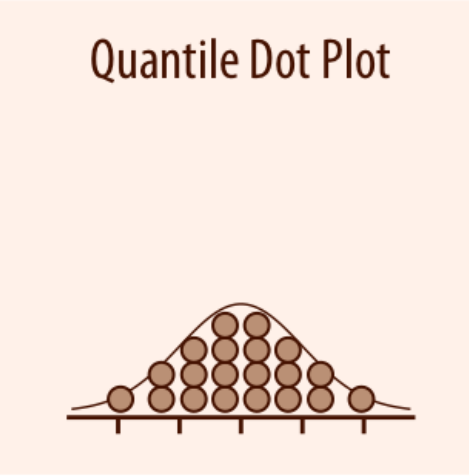

2D Error Bars


Graded Error Bars


Confidence Strips


Eyes


Half-Eyes


Quantile Dot Plot