"Tidy data" ← 1 row per observation, 1 column per data piece
1 value per cell

Graphics Components:

- Frame: Variables that define axes and gridlines
- Layer: Geometric elements that represent pieces of data, or trends, each different shape ⇒ diff. layer
- Scale: Aesthetics (color, shape, size, etc.) of geoms to represent categories.
- Facet: Splitting data into subplots to represent groups of data individually
- Theme: Other aesthetics, font, bg color, etc.

Data Graphics

Visualizations

Univariate Viz:

- Categorical: Bar chart
- Quantitative: Boxplot, Histogram, Density Plot

Bivariate Viz

- Quant. x Quant.: Scatterplot (geom_smooth → trendline, method="lm")
- Cat. x Quant.: Side-by-side boxplots, hists., density plots (or facet-wrapped), violin plots (one per cat.; colors)
- Cat x Cat.: Mosaic plots (proportion and count) Stacked bar (Proportion and count), Stacked relative frequency (Proportion), Faceted Bar plot, side-by-side bars

fill = x

position = "fill"

position = "dodge"

Multivariate (3+ variables) Viz:

- Regardless of combination, find some way to combine different scales (color, size, etc.) and facet-wrapping to represent any number of variables

Spatial + Effective Viz: (map = bg)

- Choropleth Maps: geom_map, color → spread of data, can have points
- Contour map: geom_density_2d (map)
- leaflet map: leaflet(data) + addTiles + addMarkers (datapoint)

geom_sf(mapping) + geom_point or geom_density_2d