

# Data Visualization

## Univariate

### Categorical



### Quantitative



## Code "Univariate"

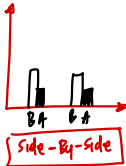
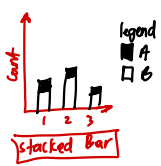
```
ggplot (Data, aes (x= var))
+ geom_bar ()
+ geom_hist ()
+ geom_density ();
```

## Code "Bivariate"

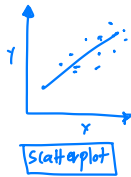
```
ggplot (Data, aes (x=var, y=var)) + geom_bar ()
+ geom_line ()
+ geom_density ()
+ geom_point ();
```

## Bivariate

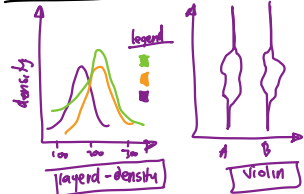
### 2 categorical



### 2 Quantitative



### 1 Categorical / Quantitative



## Additional Quant + Categorical

- o facet
- o ridges
- o Boxplot

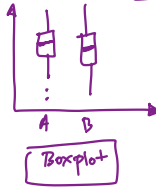
## "Defining fill/color"

geom ... fill ("blue")

named colors defined outside of aes()

geom ... (aes (fill=var))

colors defined by a variable



## Spatial Visualization

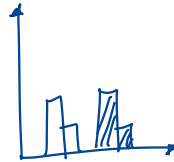
Point maps choropleth maps  
Counter maps

## Effective Visualization

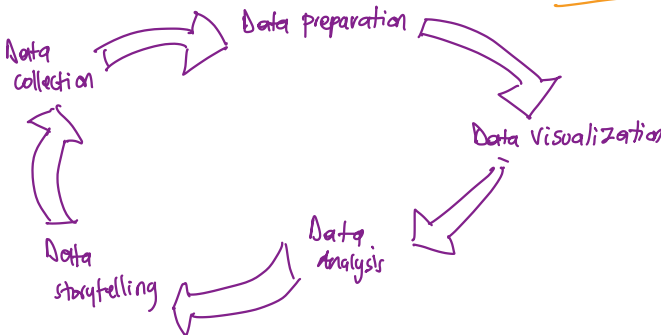
- Professional
- Accessible
- Comparable
- Ethical

code chunk in R  
"fig", fig.at = "side-by-side bar graph", fig.cap = "Bar graph."

Ensure Color-blind friendly



## Data Science workflow



## Mapping Components

- Frame
  - layer
  - Scales
  - faceting
  - theme
- plot components