# Data Science for Everyone – Introduction to Visualization

Dr. Ab Mosca (they/them)

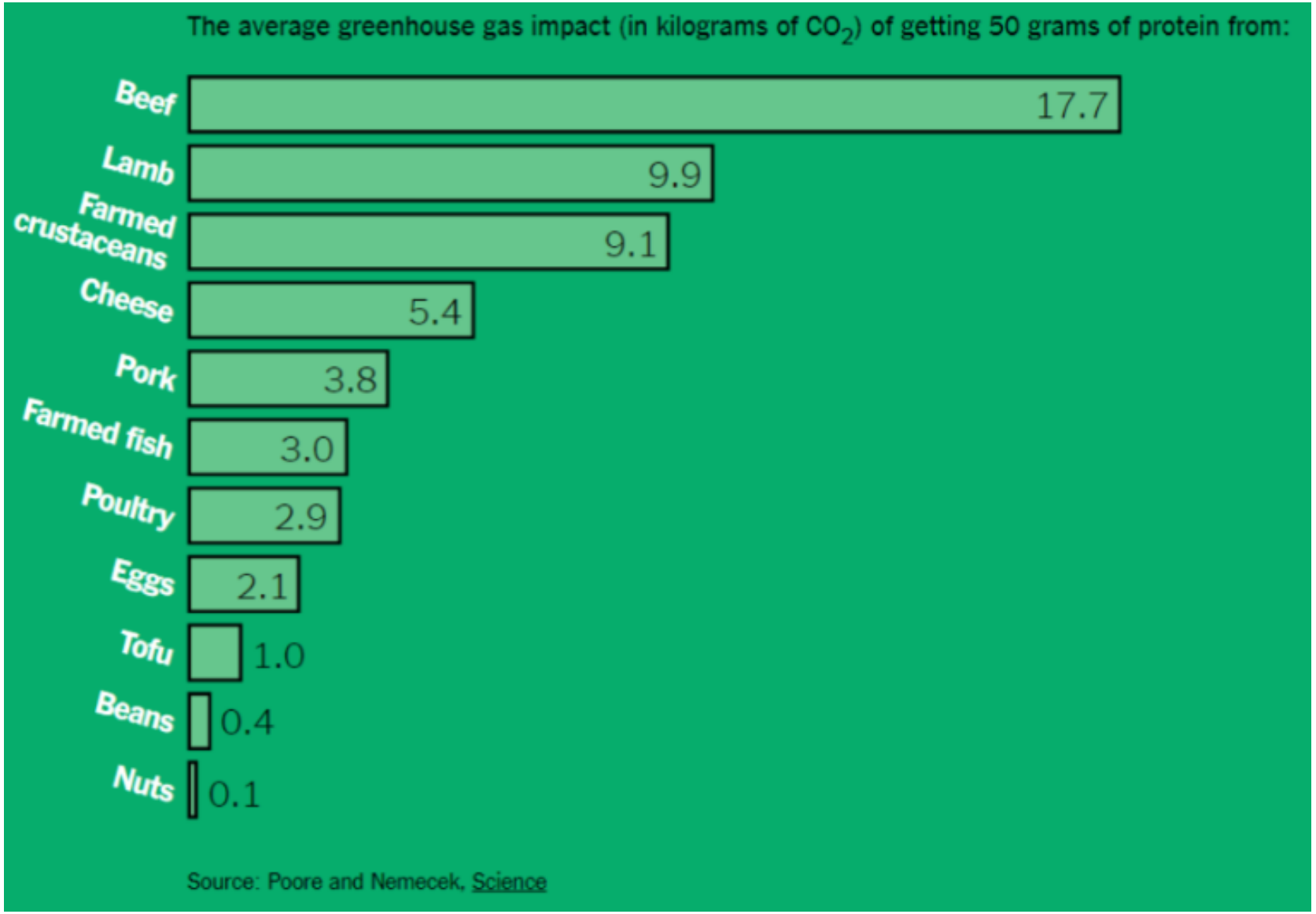
Slides based off slides courtesy of Jordan Crouser (https://jcrouser.github.io/)

# Plan for Today

- What is Visualization?
- Basic Principle of Visualization

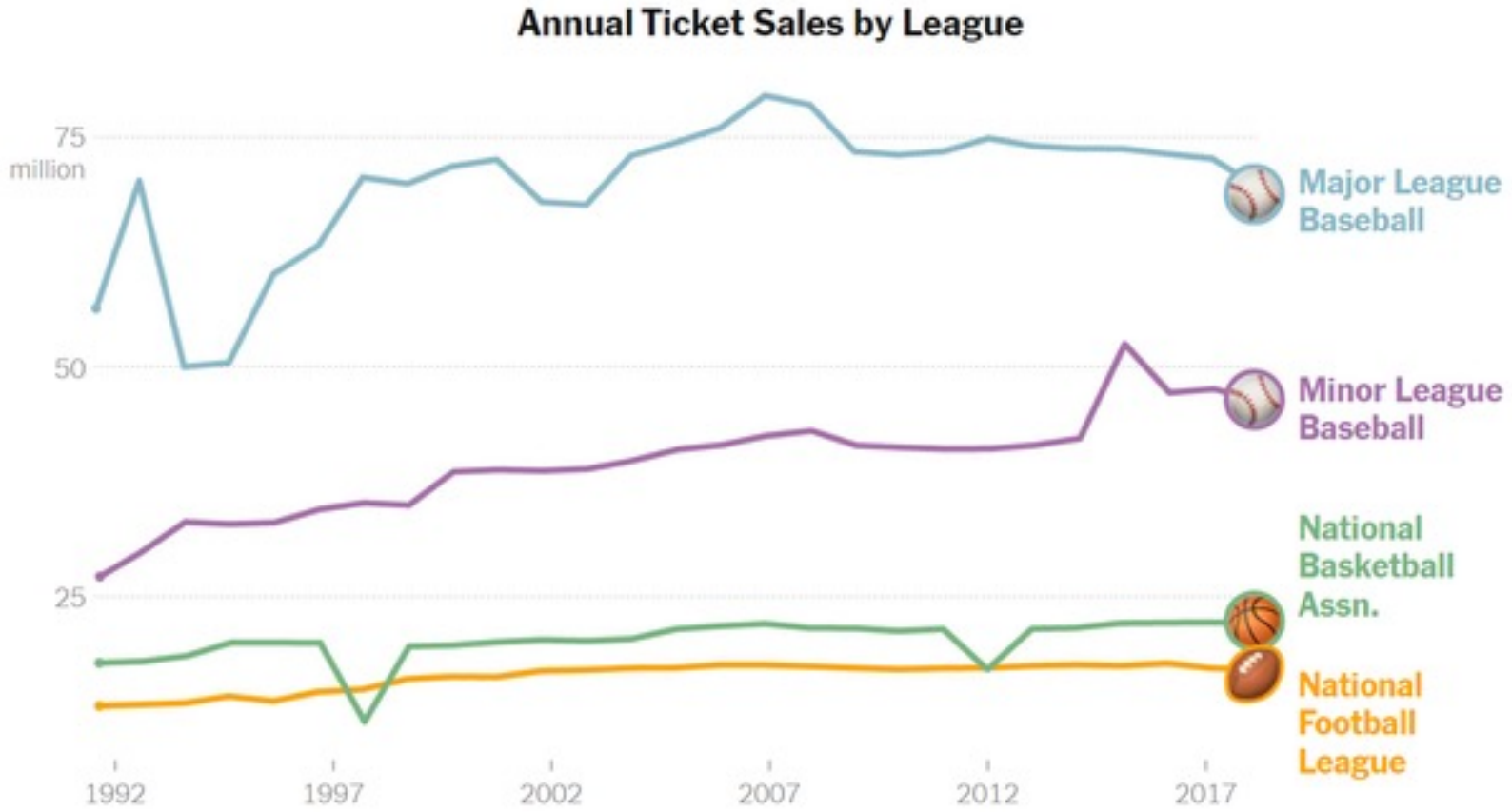
# Visualization

# Example




https://www.nytimes.com/2019/12/05/learning/whats-going-on-in-this-graph-dec-11-2019.html

# Example




https://www.nytimes.com/2019/10/24/learning/whats-going-on-in-this-graph-oct-30-2019.html

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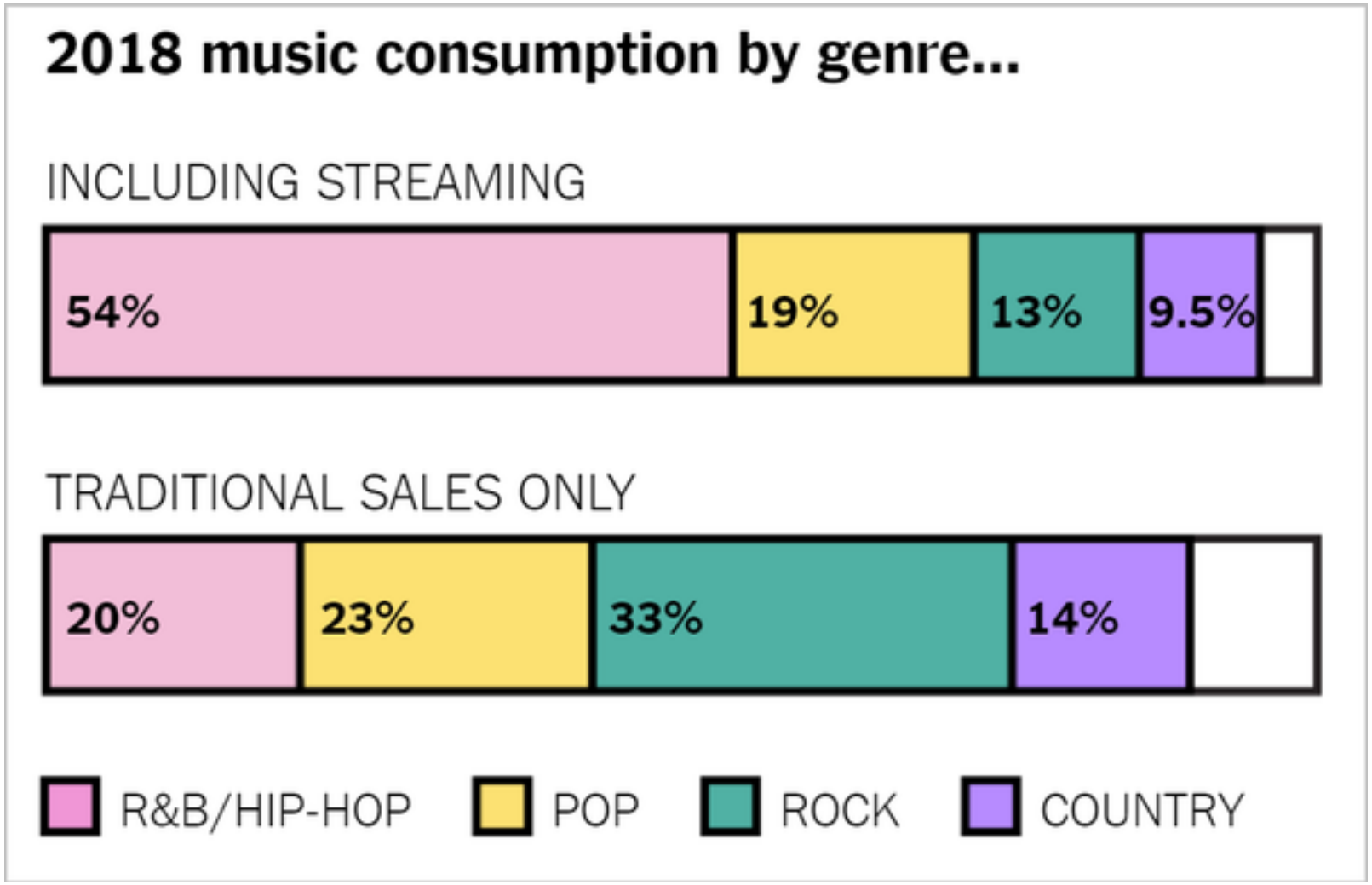


https://www.nytimes.com/2019/01/31/learning/whats-going-on-in-this-graph-feb-6-2019.html

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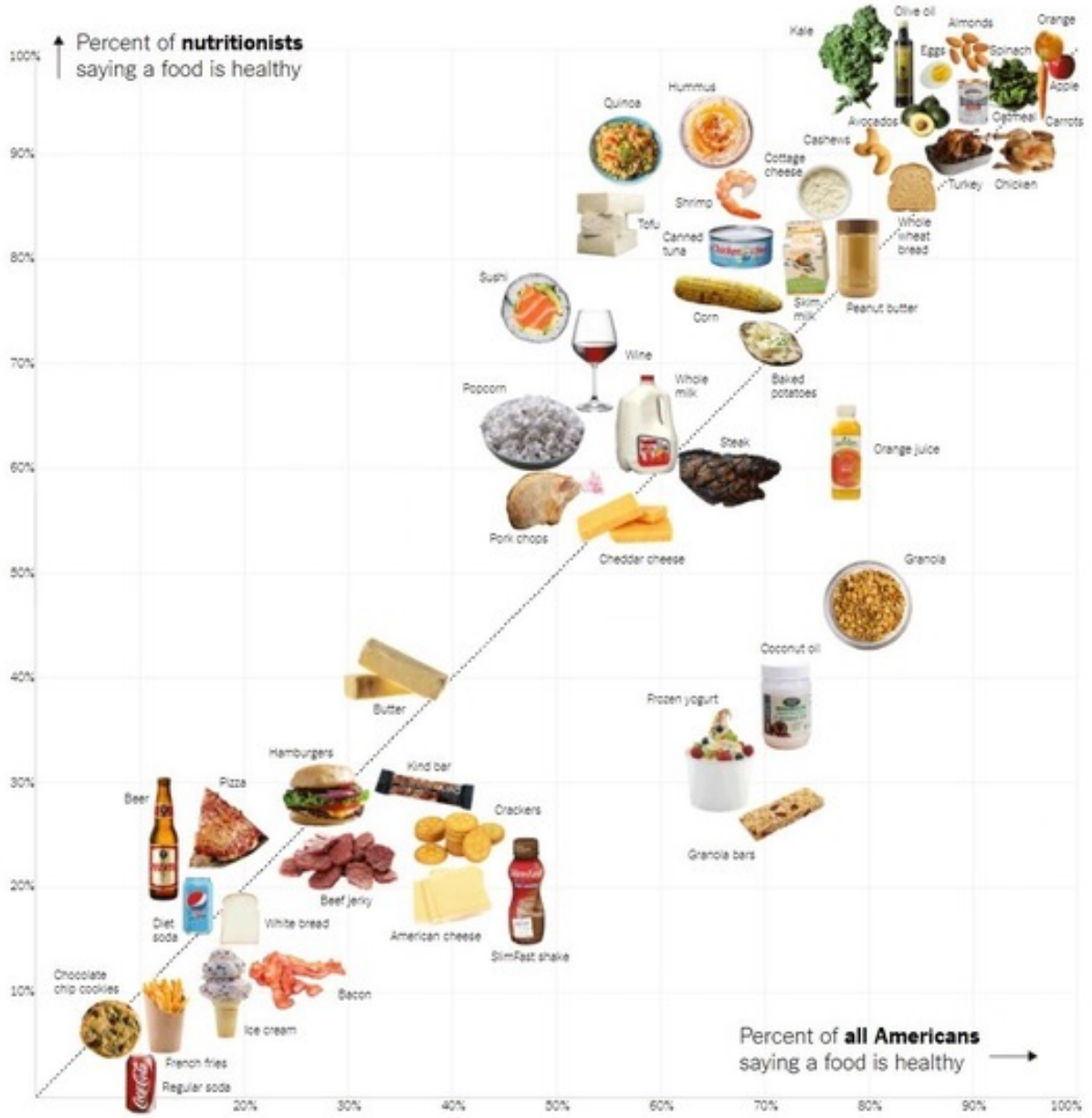



https://www.nytimes.com/2017/10/09/learning/whats-going-on-in-this-graph-oct-10-2017.html

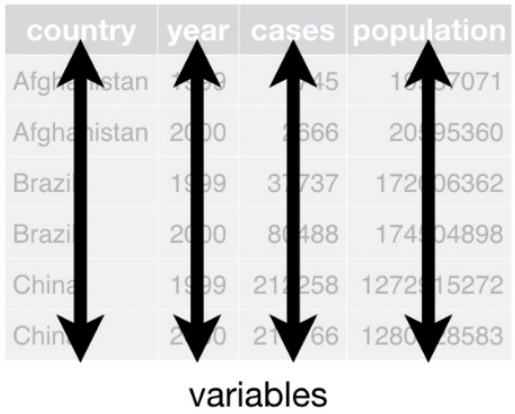
# Definition: Visualization

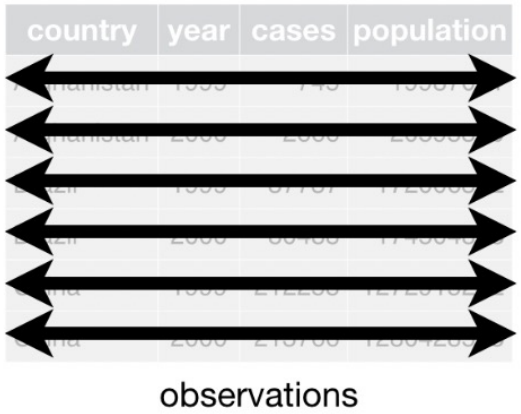
- The graphical representation of information and data.

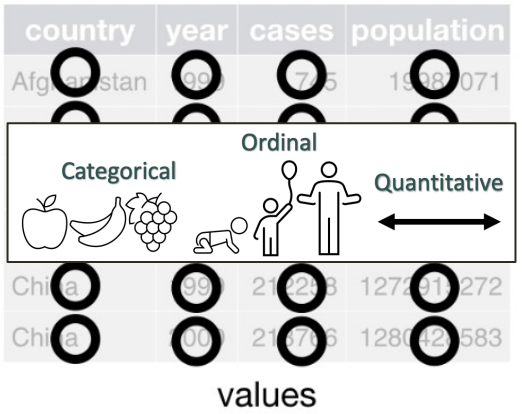
# Formalizing Data Visualizations

# Data

- Remember…

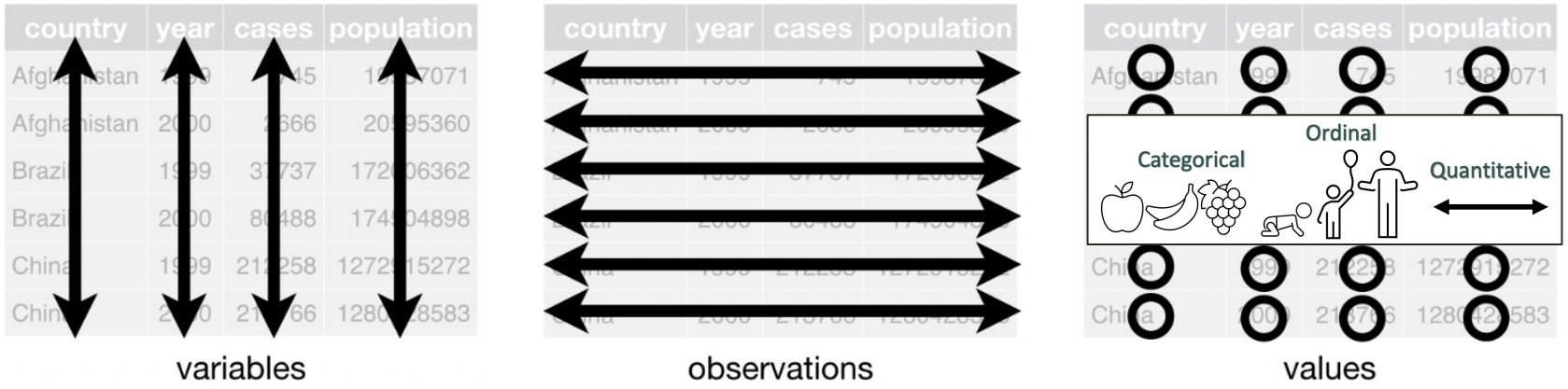


# Data → Visuals

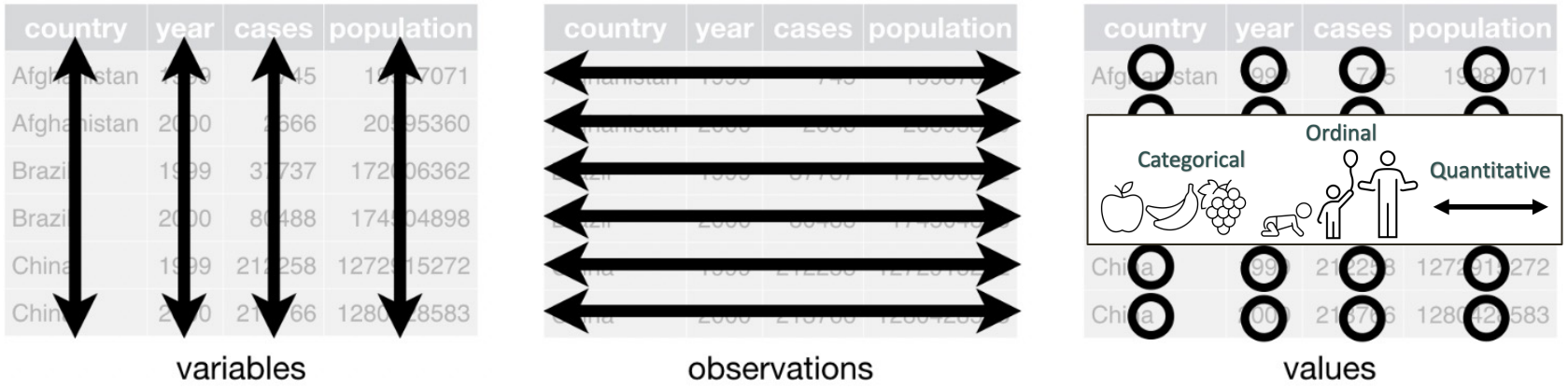
- Remember…




- **Big idea behind visualization**
  - Data have dimensions
  - Visualizations have dimensions, too
  - To build good visualizations, we need to **map data dimensions to visual dimensions** in a principled way

# Data → Visuals

- Remember…

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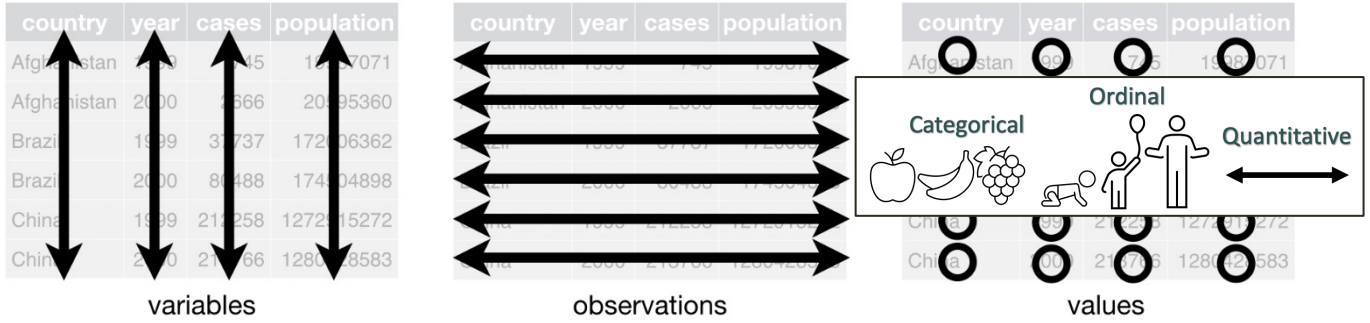
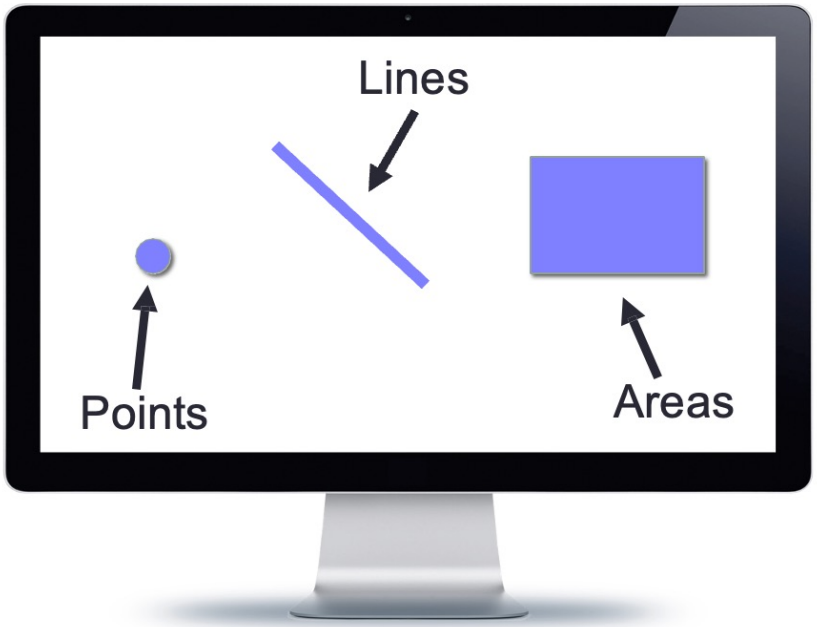
# Data → Visuals

## Data




## Visuals

- **Marks**
  - The "ink"



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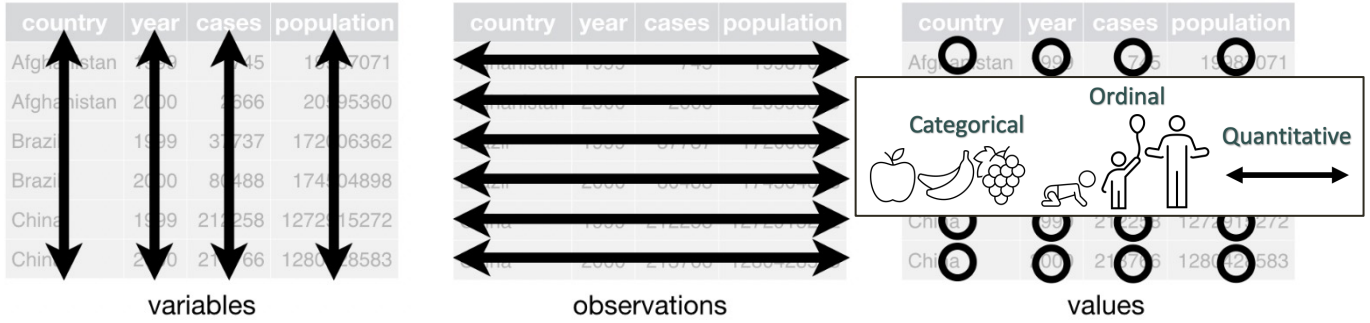


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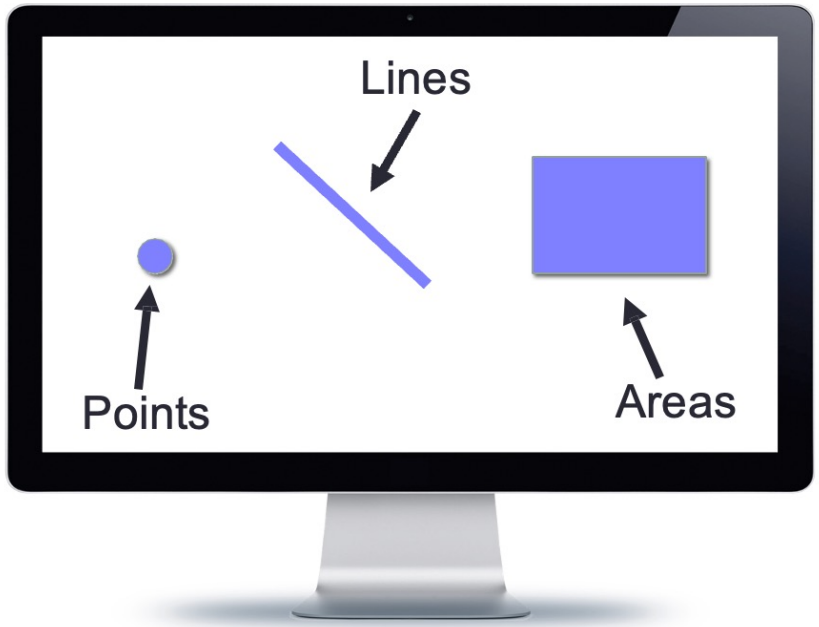
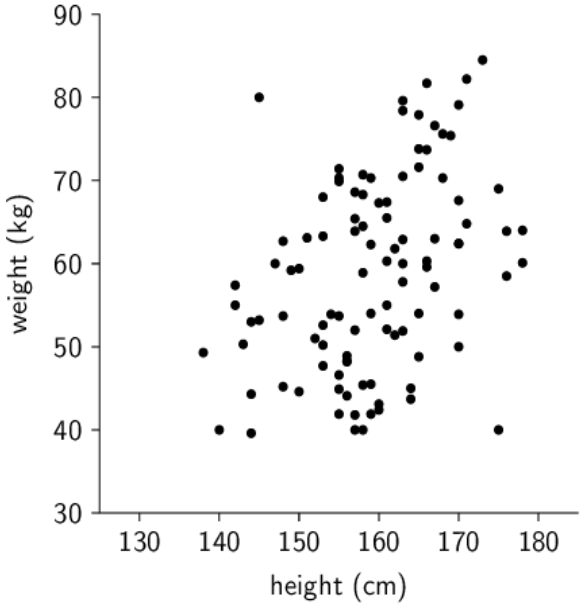


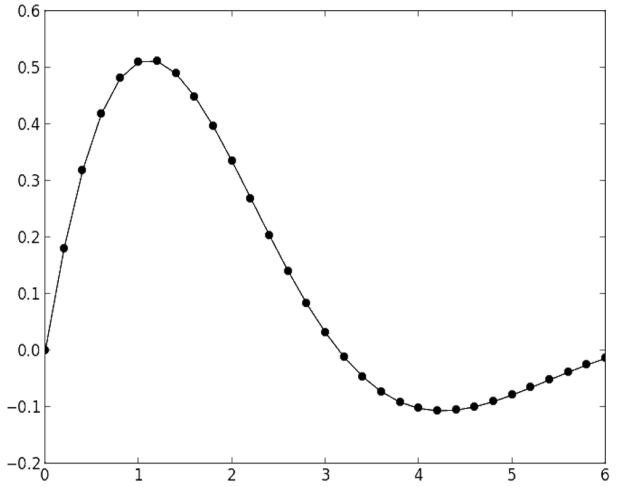

- **Channels or dimensions**
  - *How* the marks show up on the page

# Visual Channels / Dimensions

## *Position*

- Encode information using *where* mark is drawn
- Ex.

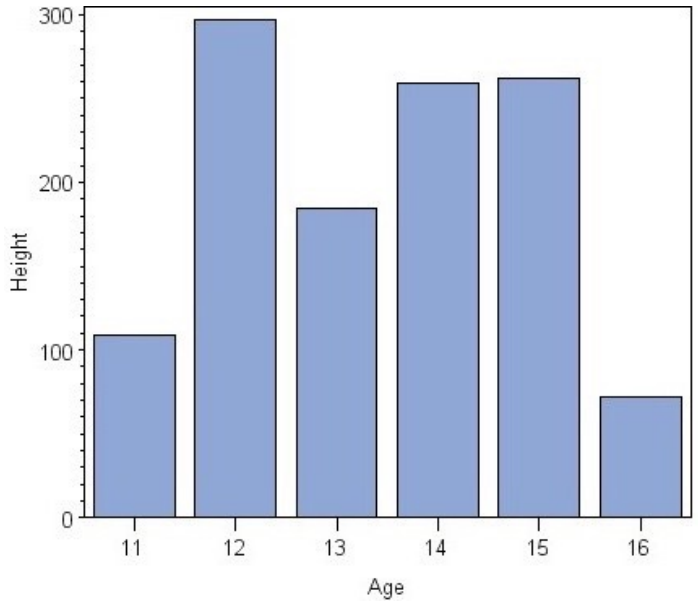


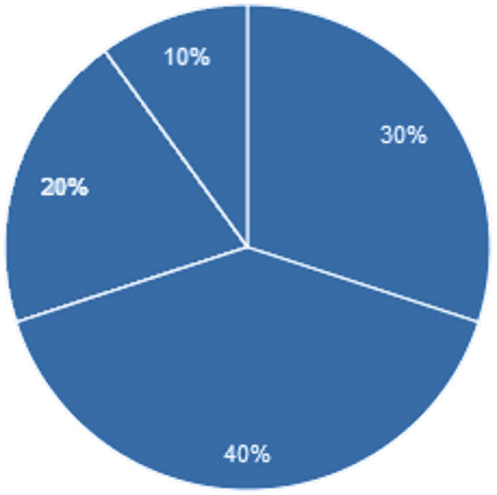




# Visual Channels / Dimensions

## *Size*

- Encode information using *how big* mark is drawn
- Ex.

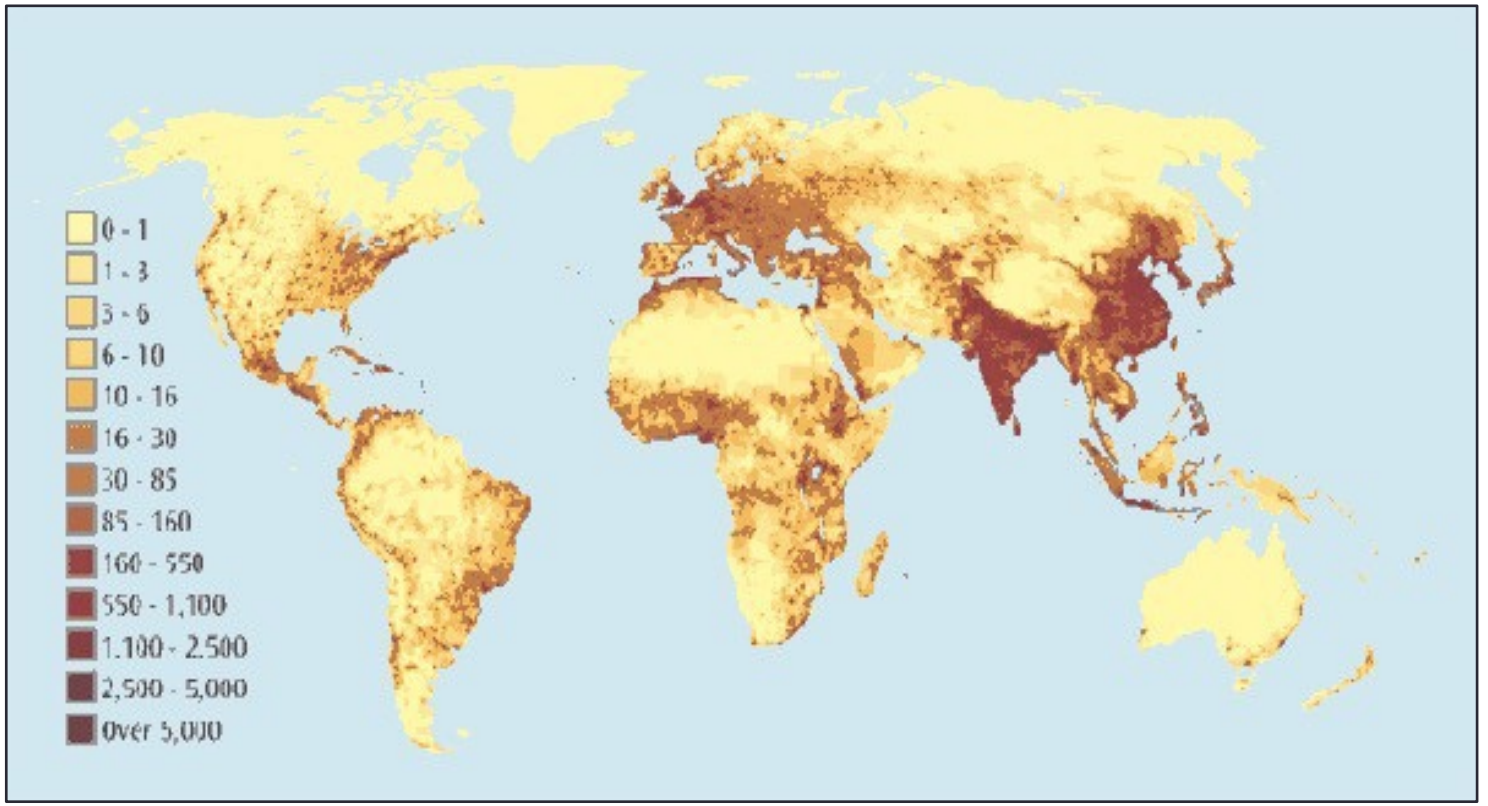



# Visual Channels / Dimensions

## *Value*

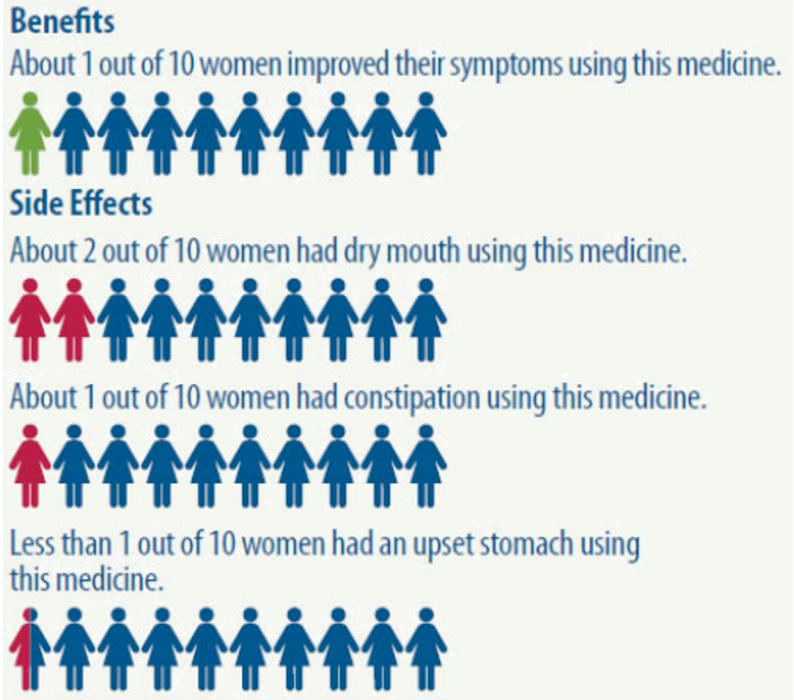
- Encode information using *how dark* mark is drawn
- Ex.

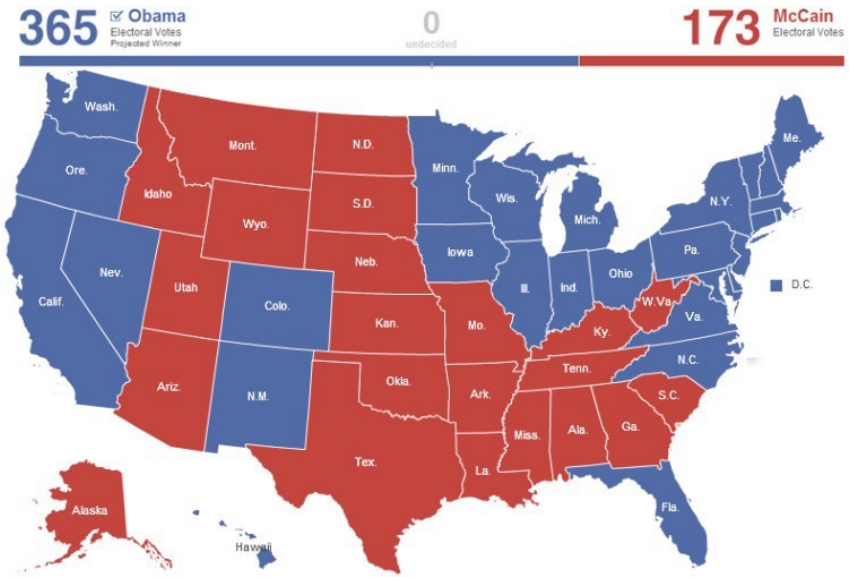


# Visual Channels / Dimensions

## *Color*

- Encode information using *hue* of mark
- Ex.

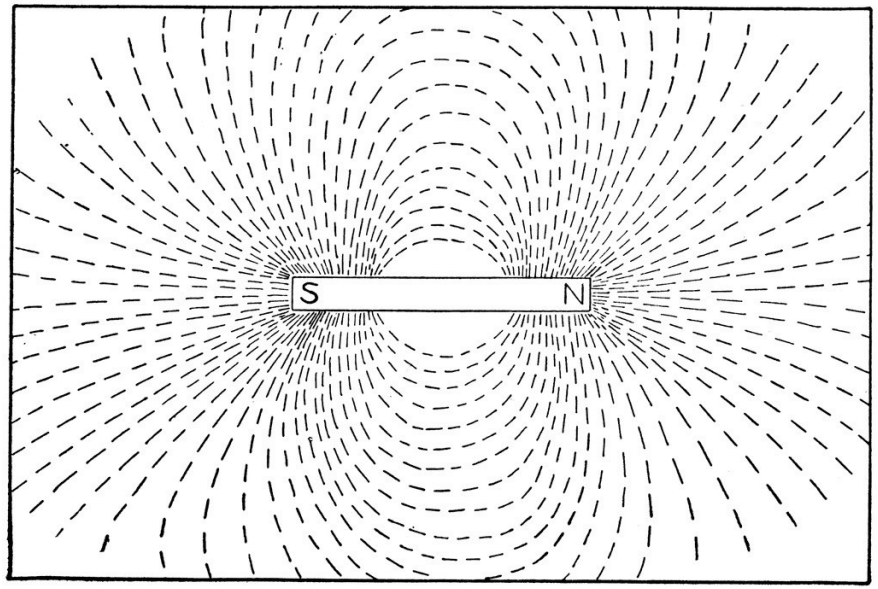


# Visual Channels / Dimensions

## *Orientation*

- Encode information using how mark is *rotated*
- Ex.




# Visual Channels / Dimensions

## *Shape*

- Encode information using how mark is *shaped*
- Ex.

# Data → Visuals

- Remember… **Big idea behind visualization**
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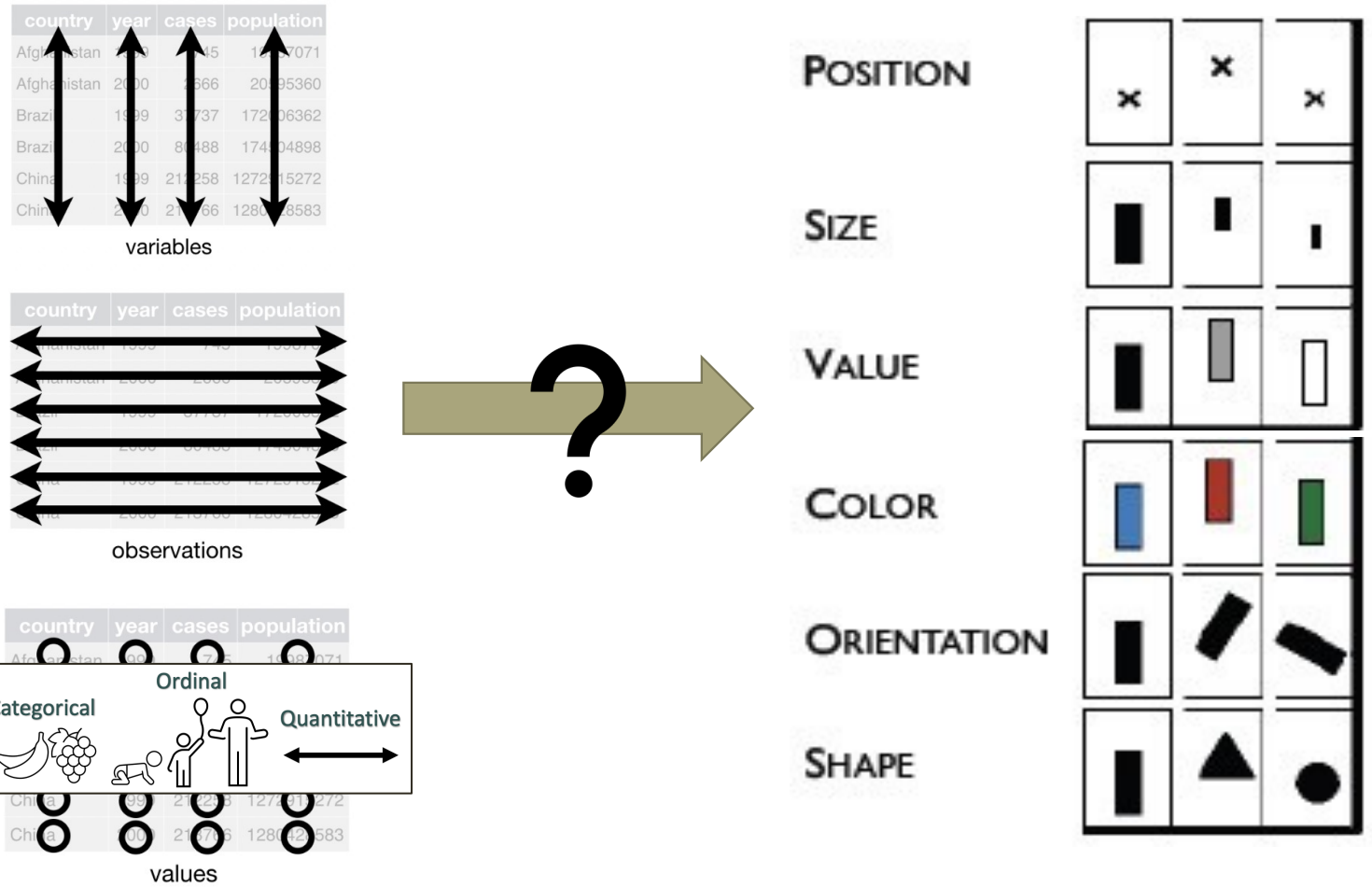

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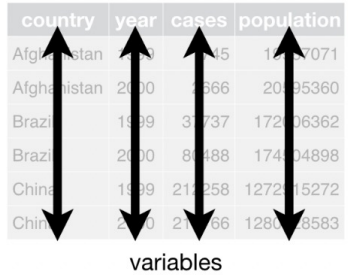
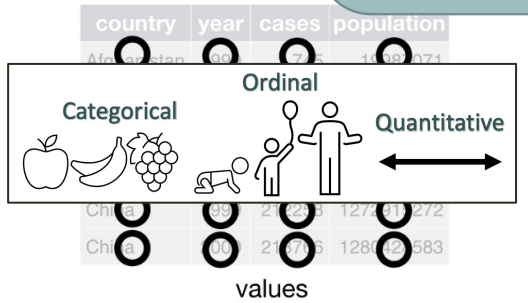




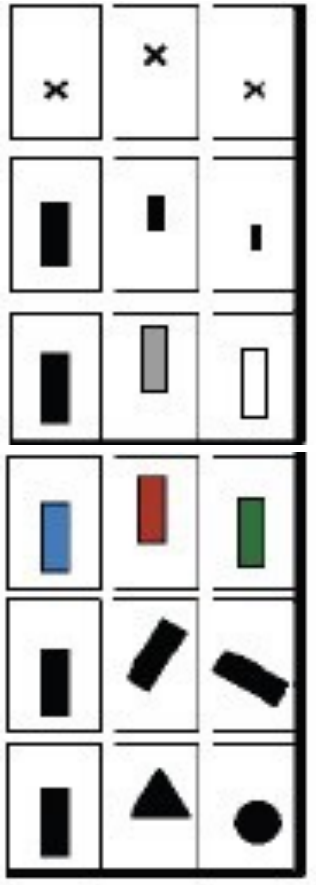



POSITION

SIZE

ORIENTATION

SHAPE

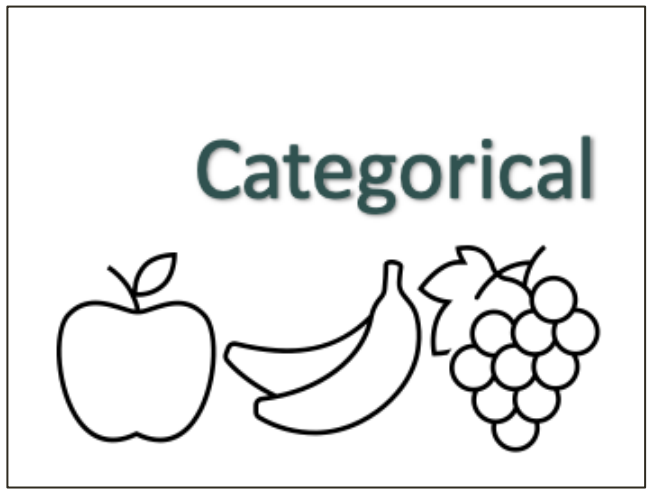


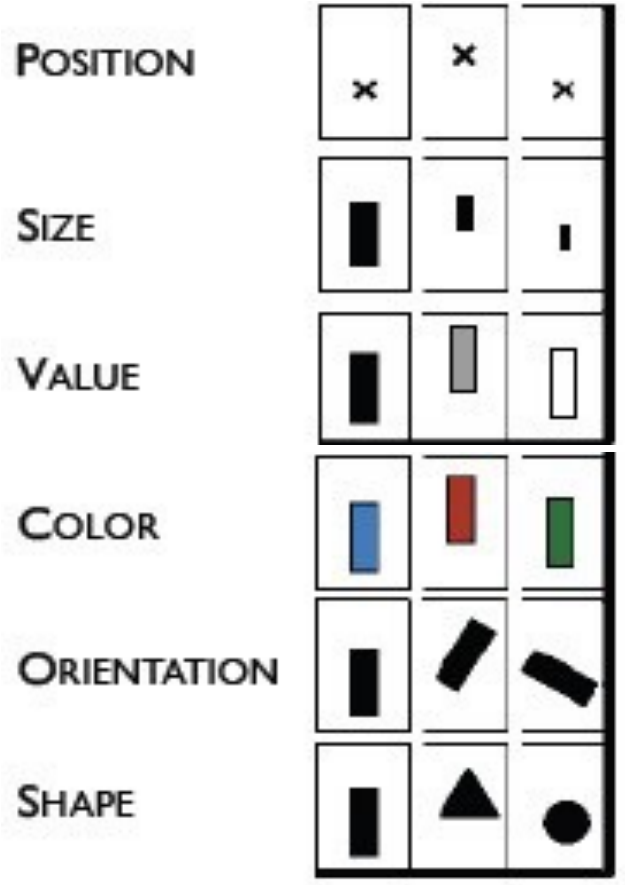
Let's experiment. Pair up with someone for the next activity.

# Data → Visuals

Work with your partner to represent apple, banana, grapes, with each visual channel.

Be prepared to share with the class.

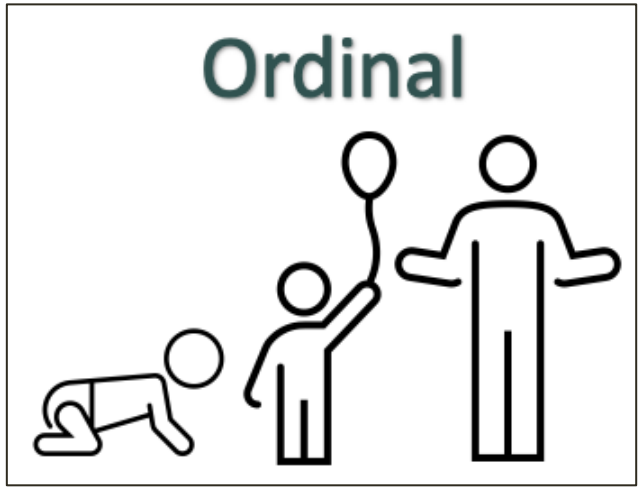


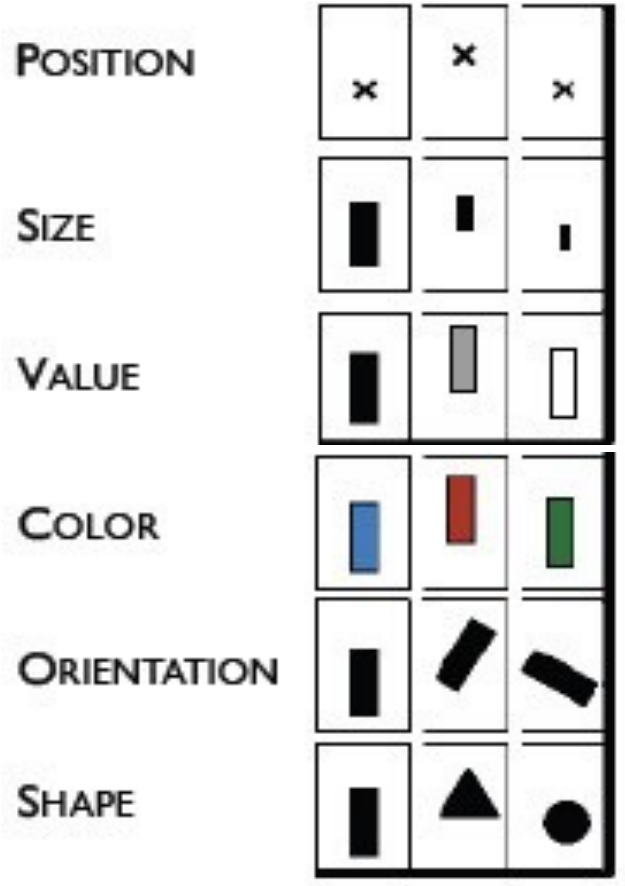



# Data → Visuals

Work with your partner to represent baby, toddler, adult, with each visual channel.

Be prepared to share with the class.



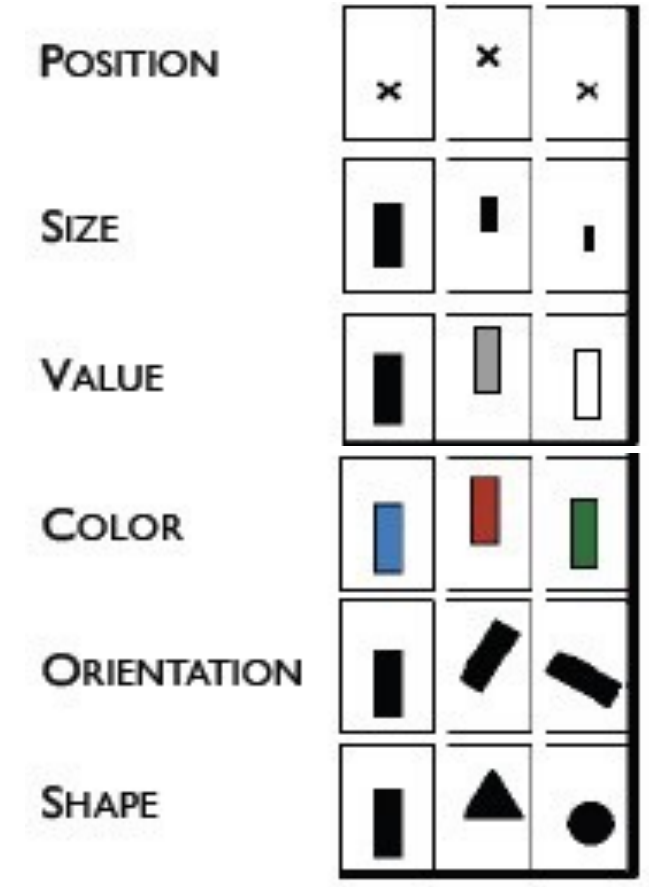



# Data → Visuals

Work with your partner to represent 1, 2, 3, with each visual channel.

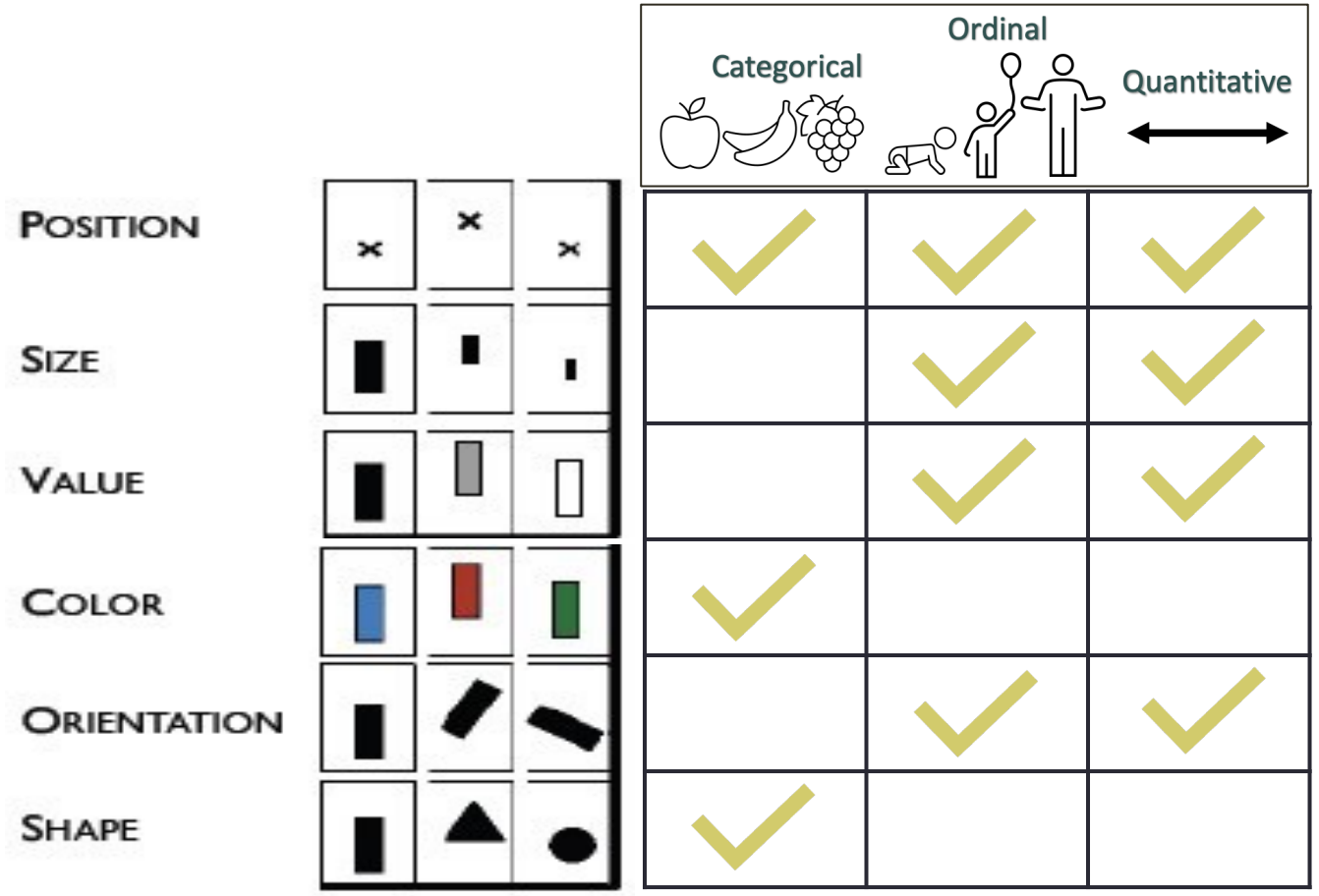
Be prepared to share with the class.

Quantitative



# Data → Visuals

- Remember… **Big idea behind visualization**
  - Map data dimensions to visual dimensions in a principled way
  - Not all visual dimensions can represent all data types




Jacques Bertin, *Semiologie Graphique* (Semiology of Graphics), 1967.

# Try it out!

- Work with 1 – 2 other people. Be prepared to share your work with the class.
- Find a data visualization you think is interesting
  - Some ideas: NYTimes, VisualisingData.com, Visual.ly
  - Remember to cite your source!
- Identify the following:
  - What is the data that's being visualized? Where did it come from?
  - Which data dimensions are mapped to which visual dimensions?
  - How does this shape your understanding of the data?
  - If you liked the visualization: what is it doing well?
  - If you disliked the visualization: what would you change?