Choosing the Right Data Visualization: An Overview of Different Types of Graphical Representation

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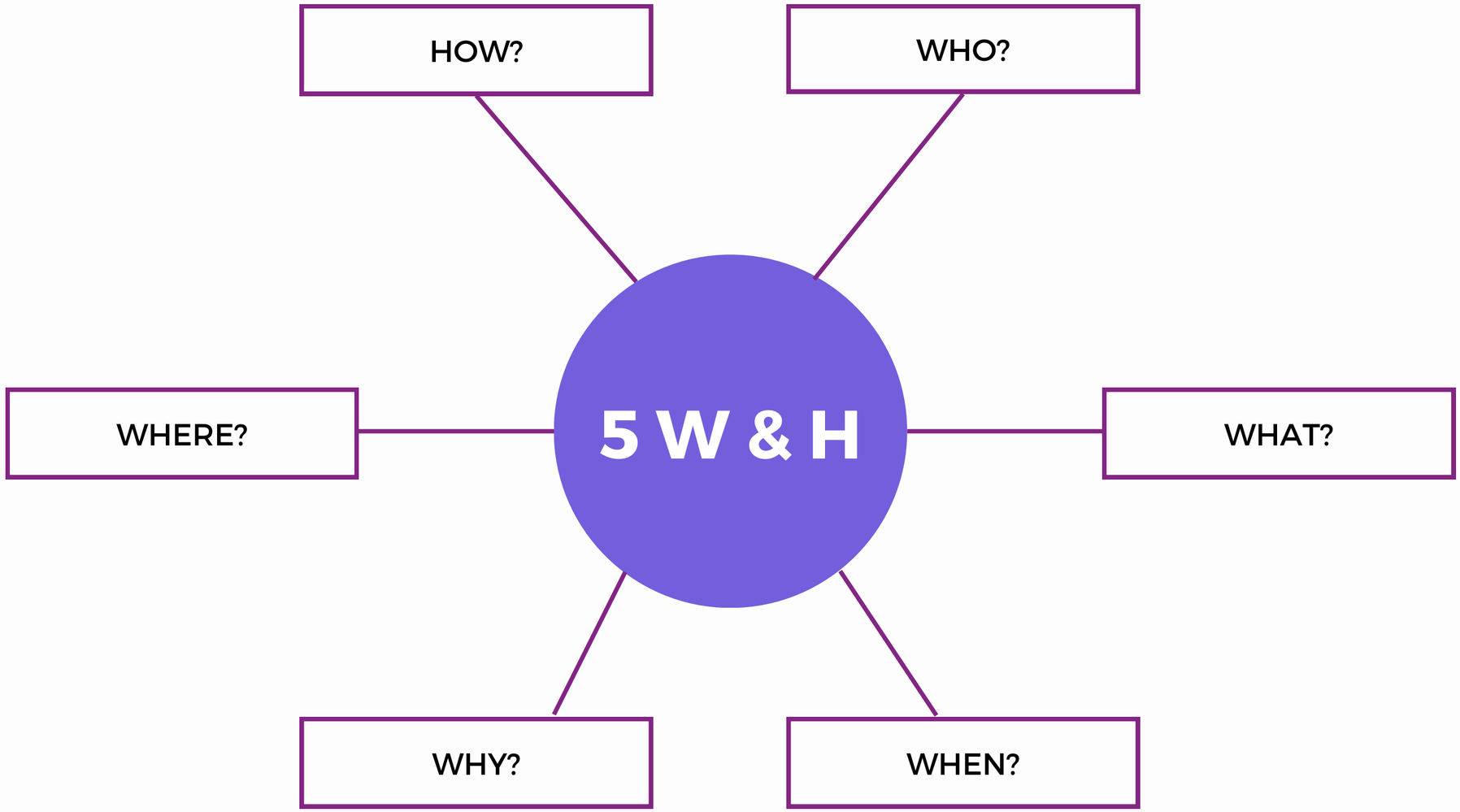

HOW?
WHO?
WHERE?
5 W & H
WHAT?
WHY?
WHEN?

Who?

Graphical representation can be useful for:

01
Data Analysts and Data Scientists

02
Researchers and Academics

03
Financial and Business analysts

04
Health-care Providers

05
Journalists and Media Professionals

06
Urban Planners and Geographers

What?

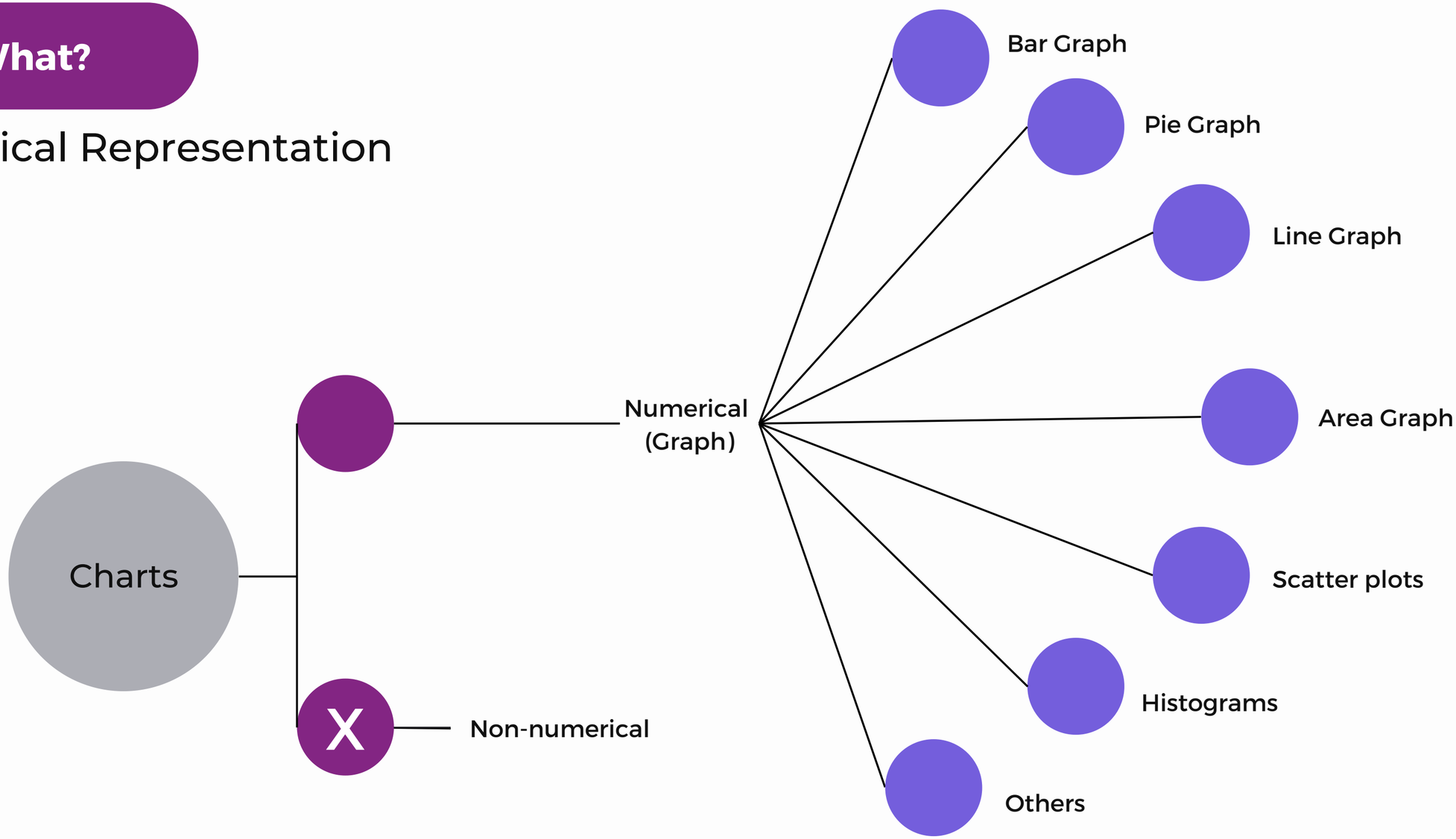
Graphical Representation

Refers to the **use of visual elements,** such as graphs, charts, diagrams, maps, and illustrations, t**o present information or data** in a visual format.

It involves converting numerical or abstract data into visual forms that are **easier to understand, interpret, and communicate.**

What?

Graphical Representation



When?

You graphically represent your data if:

01

Data analysis and exploration

02

Explaining relationships and comparisons

03

Monitoring and tracking performance

04

Decision-making and strategic planning

05

Storytelling and journalism

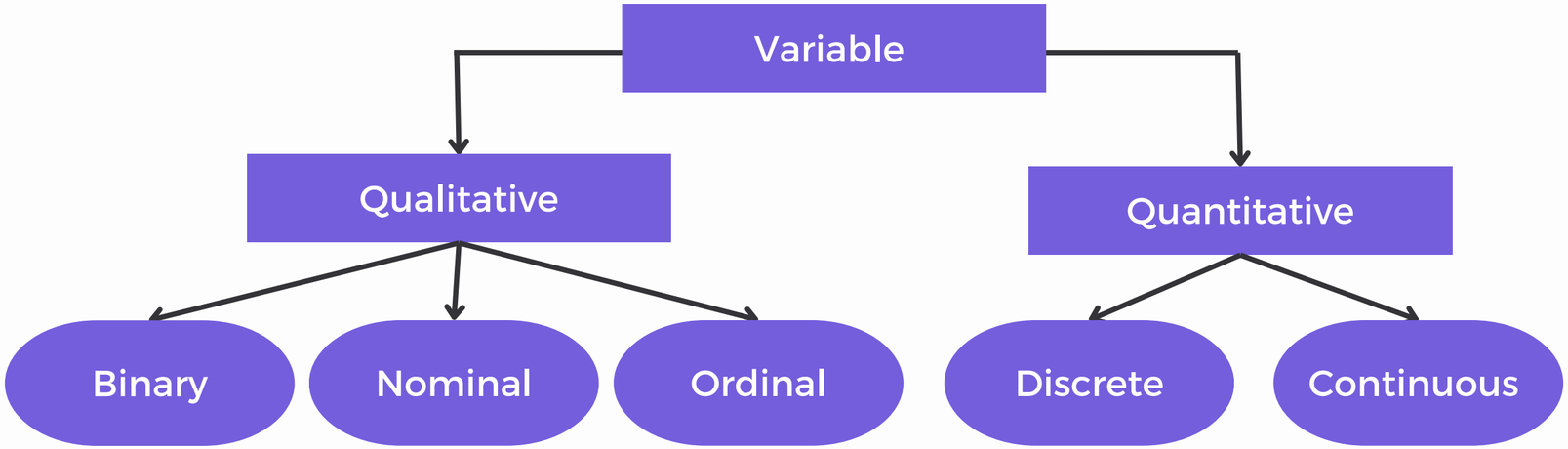
06

Designing user-friendly interfaces

All in all, when you need to **present** data, **convey** information, or facilitate **understanding** through visual representation

HOW?

1- What type of variable you have?



Why?

2- What would you like to show?

01

Comparison

02

Distribution

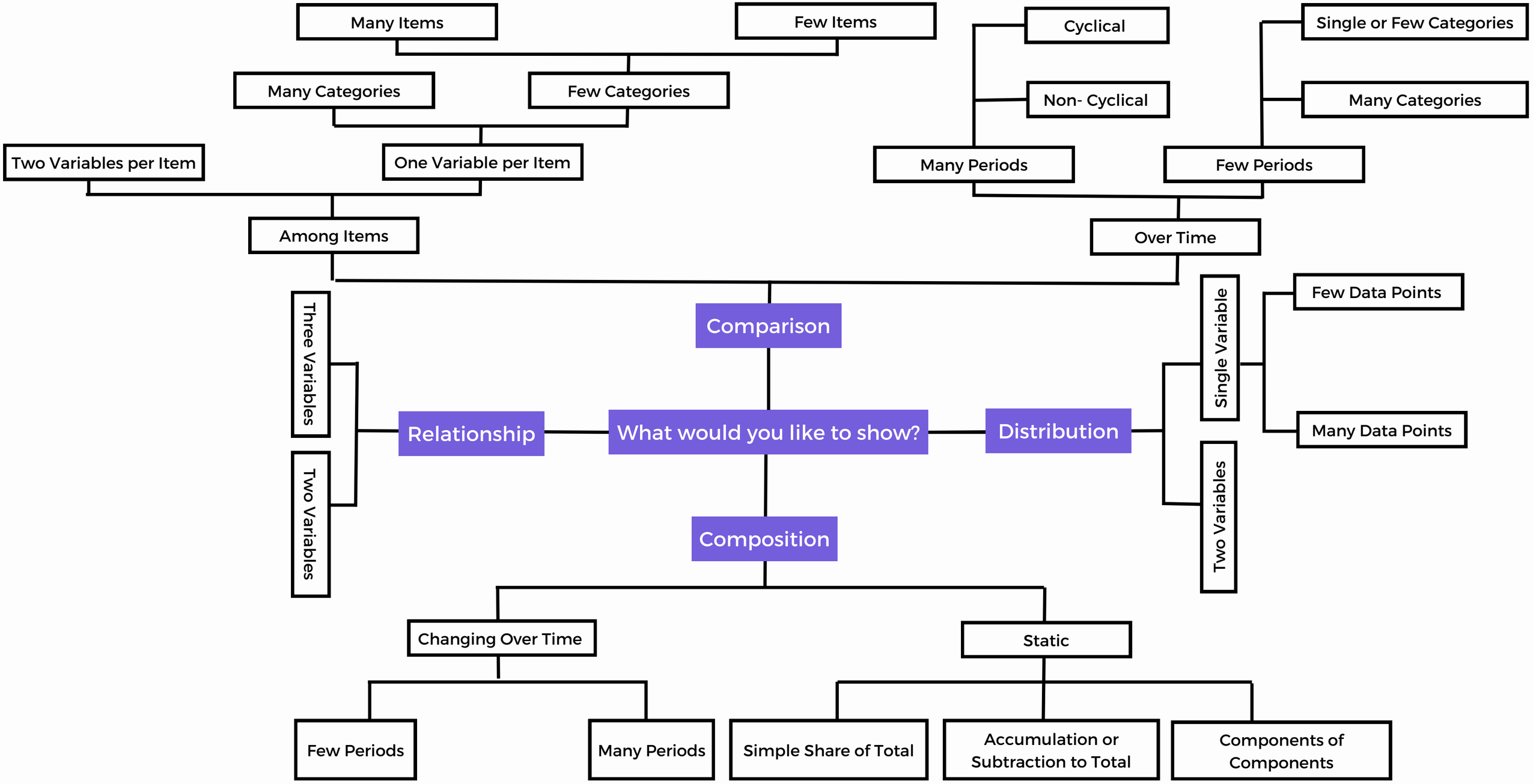
03

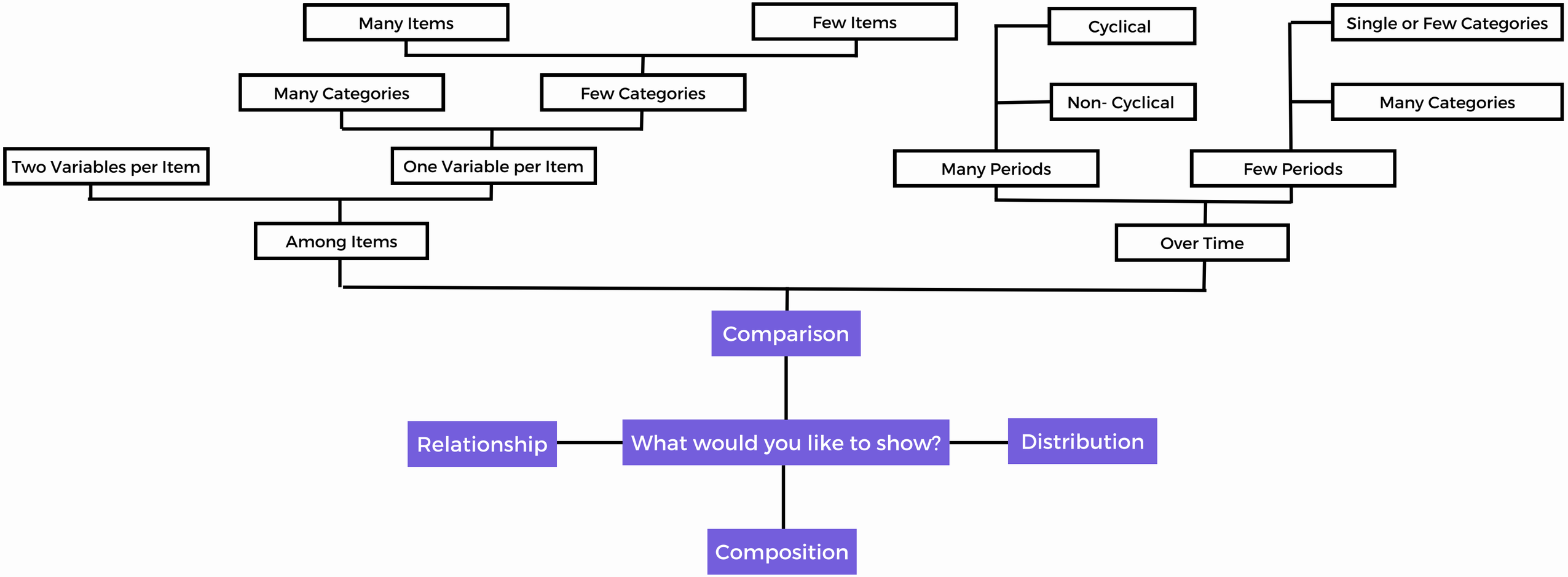
Composition

04

Relationship

To support decision making and present data to stakeholders


What would you like to show?
Comparison
Relationship
Distribution
Composition
Many Items
Few Items
Many Categories
Few Categories
One Variable per Item
Two Variables per Item
Among Items
Three Variables
Two Variables
Cyclical
Non- Cyclical
Many Periods
Few Periods
Over Time
Single or Few Categories
Many Categories
Single Variable
Few Data Points
Many Data Points
Two Variables
Changing Over Time
Few Periods
Many Periods
Static
Simple Share of Total
Accumulation or Subtraction to Total
Components of Components


What would you like to show?
Relationship
Distribution
Composition
Comparison
Among Items
Over Time
Two Variables per Item
One Variable per Item
Many Categories
Few Categories
Many Items
Few Items
Many Periods
Few Periods
Cyclical
Non- Cyclical
Single or Few Categories
Many Categories

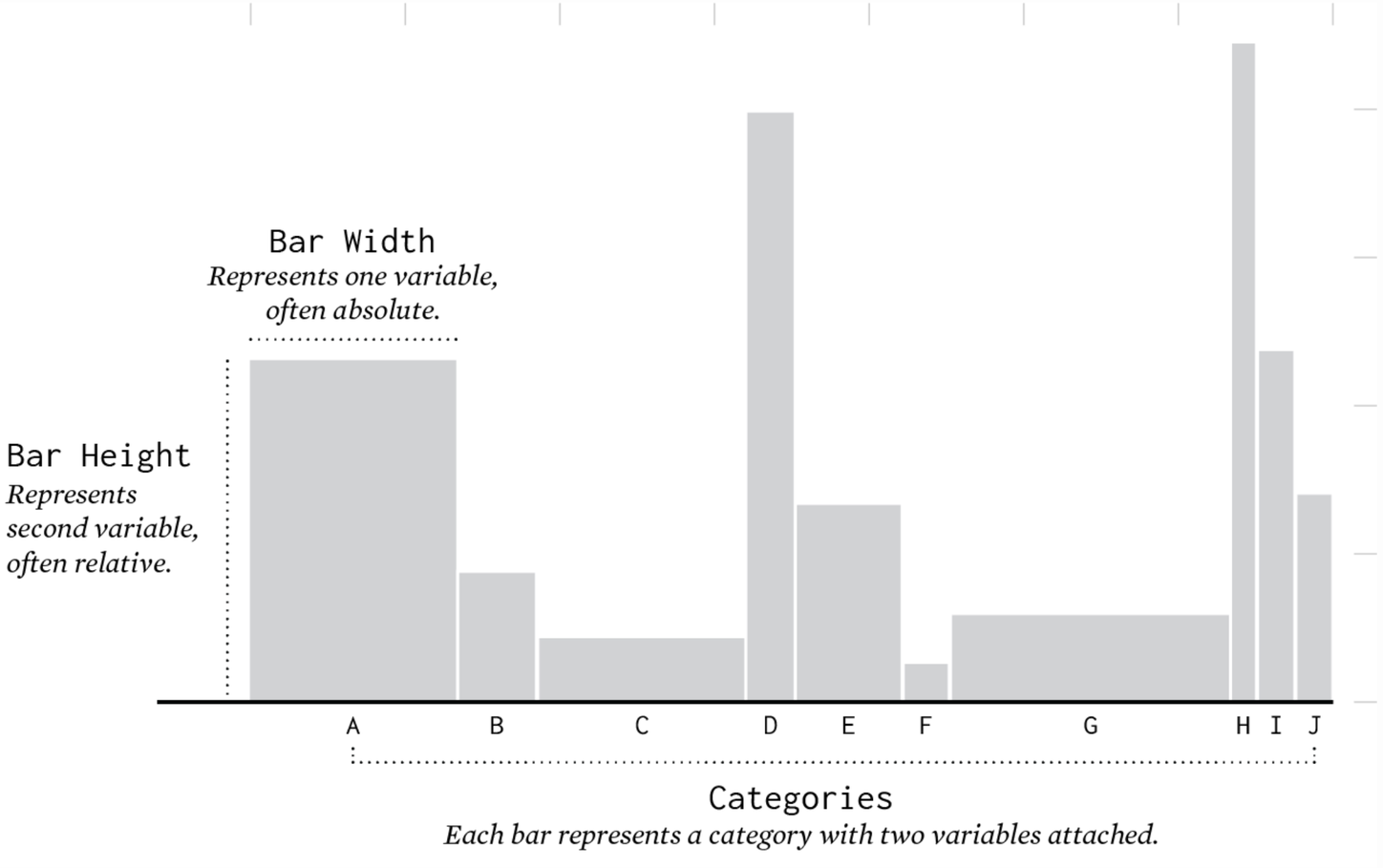
Comparison

Comparison among two variable per item

Variable Width Column Chart

A variable width column chart, also known as a bar Mekko chart, is a chart where **column widths are scaled** such that the total width matches the desired chart width and there are no gaps between columns.

This chart can be used for **tracking the values of two different variables for each category in the data.**



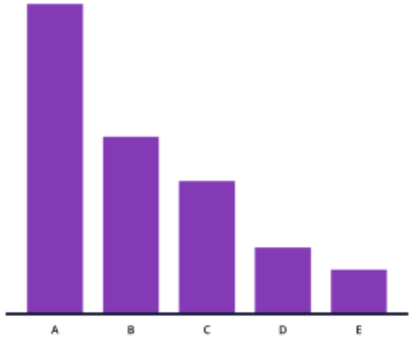
Comparison

Comparing

One variable per **few** categories

Column Chart

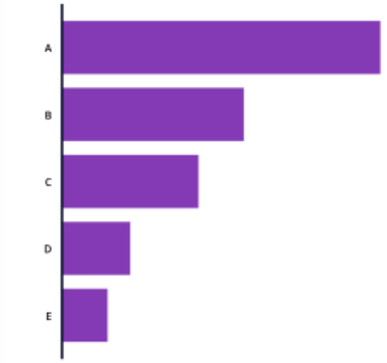
Sometimes called vertical bar charts.



One variable per **many** categories

Bar Chart

plots numeric values for levels of a categorical feature as bars.

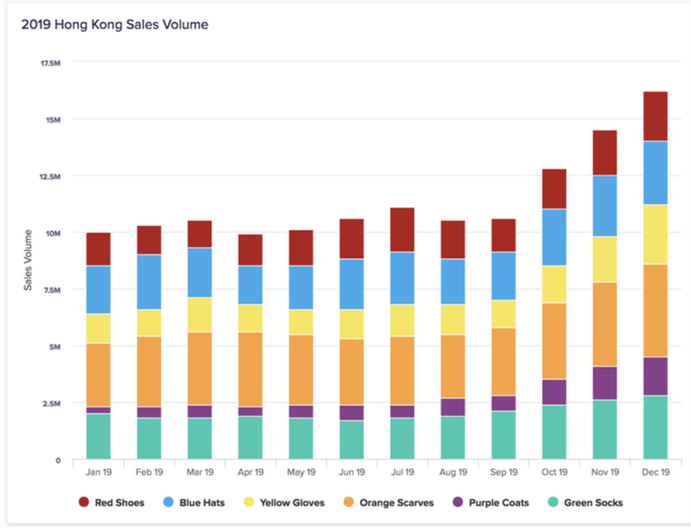


Other types of bar and column charts

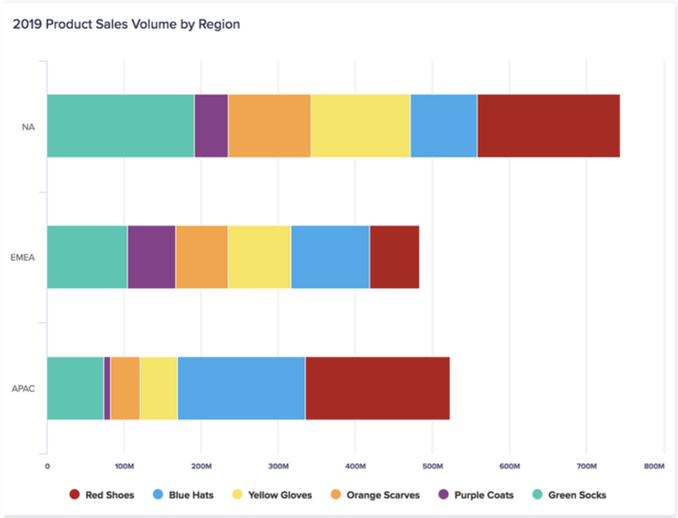
Bar/Column charts can be extended with a second categorical variable to divide each of the groups in the original categorical variable.

The second categorical variable will divide each bar count into subgroups.

Stacked Column Chart



Stacked Bar Chart



Comparison

Bar Chart

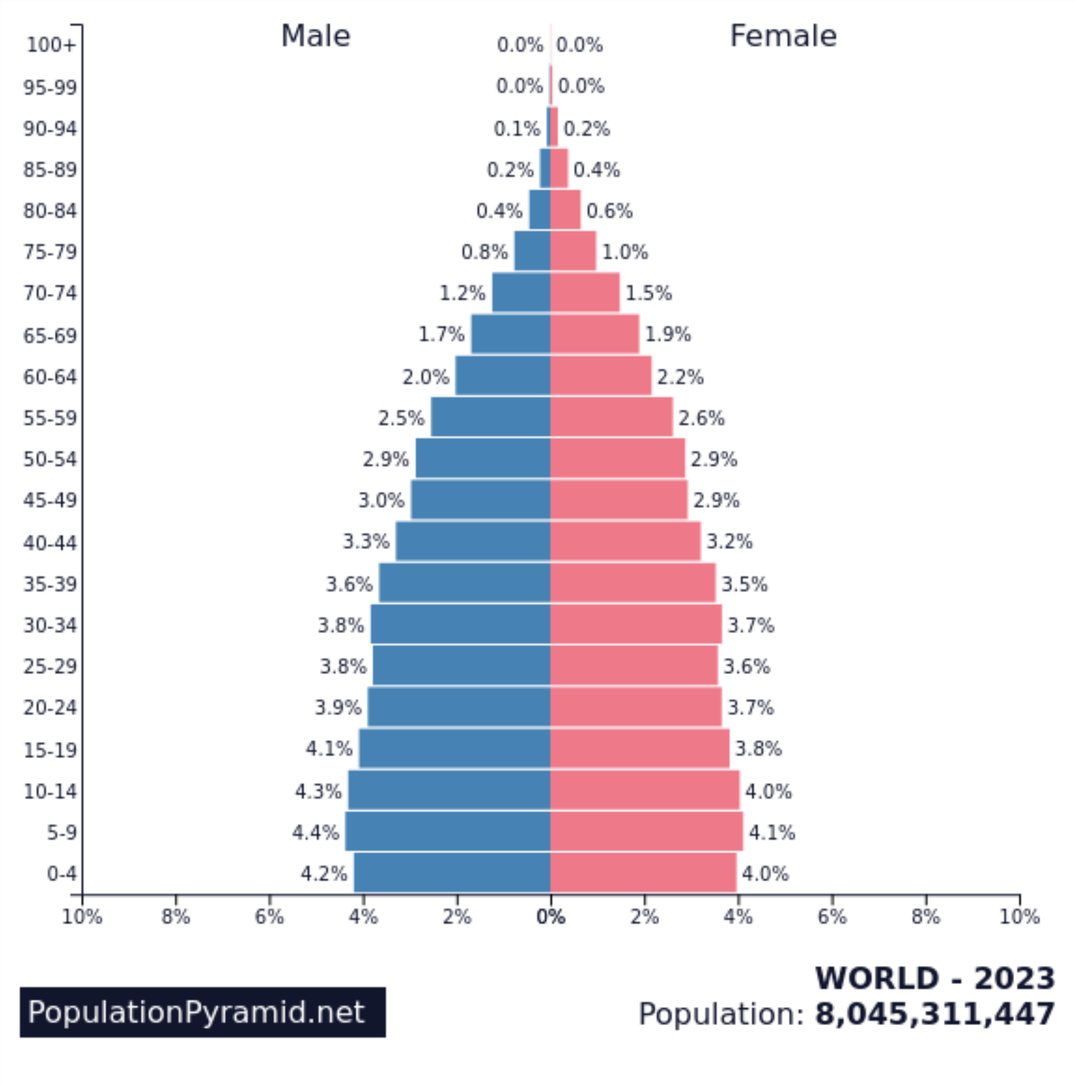
Population pyramids

Population pyramids are a graphical illustration of the distribution of a population by age groups and sex

Variable 1: Population

Variable 2: Gender

Variable 3: Age (Generation)



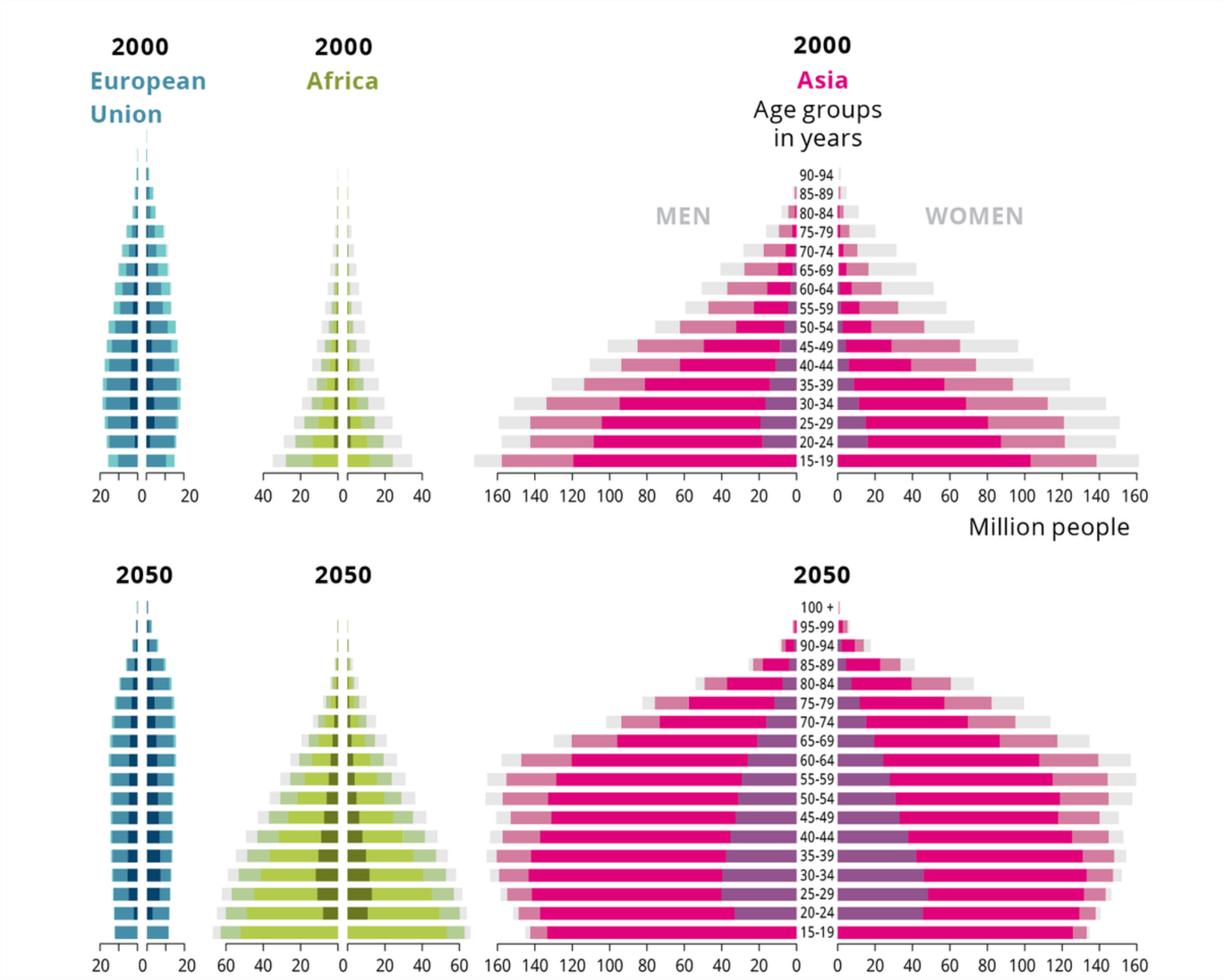
Population pyramids by education attainment

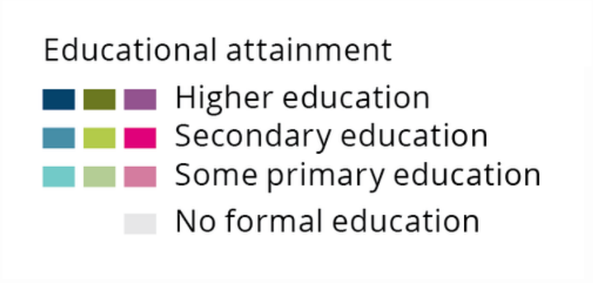
Variable 1: Population

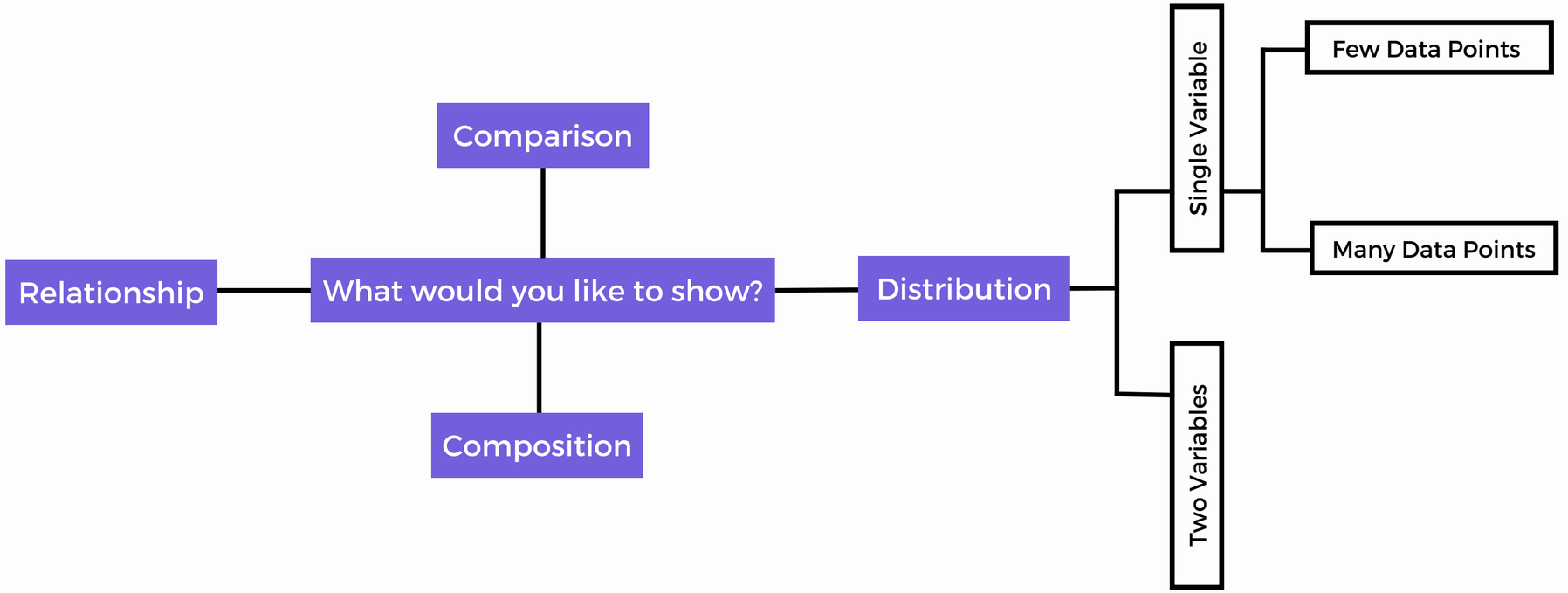
Variable 2: Gender

Variable 3: Age (Generation)

Variable 4: Education



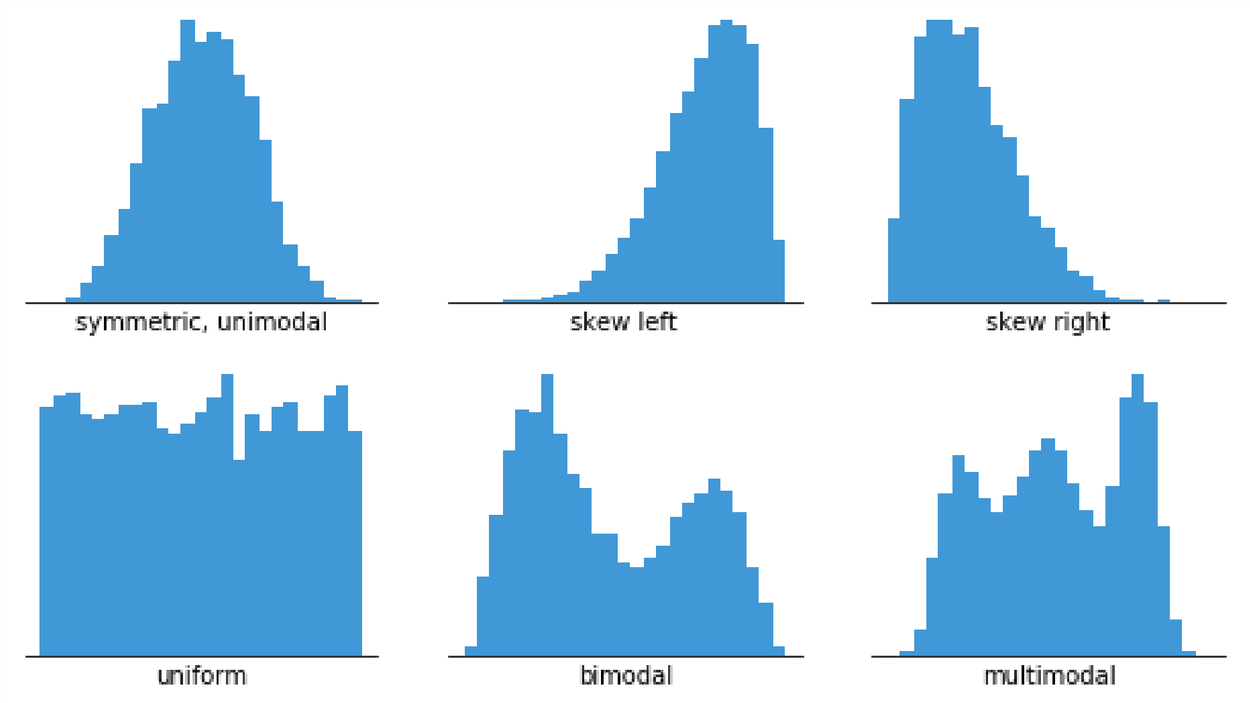



Comparison
Relationship
What would you like to show?
Distribution
Composition
Single Variable
Few Data Points
Many Data Points
Two Variables

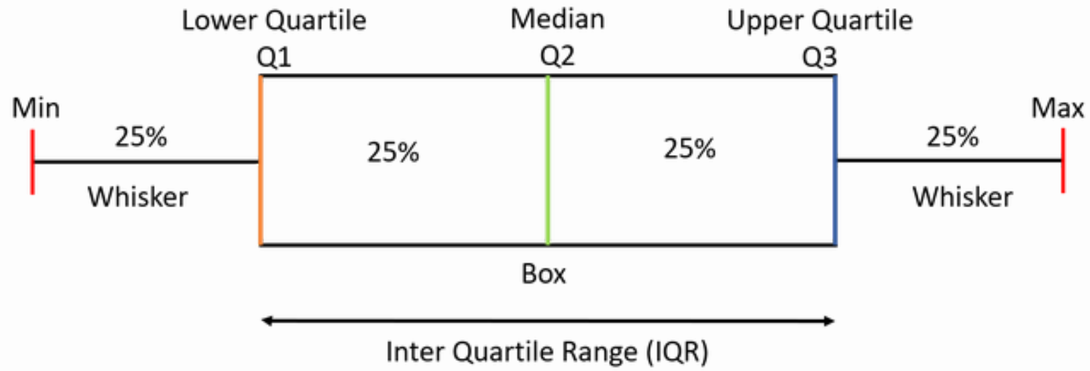
Distribution

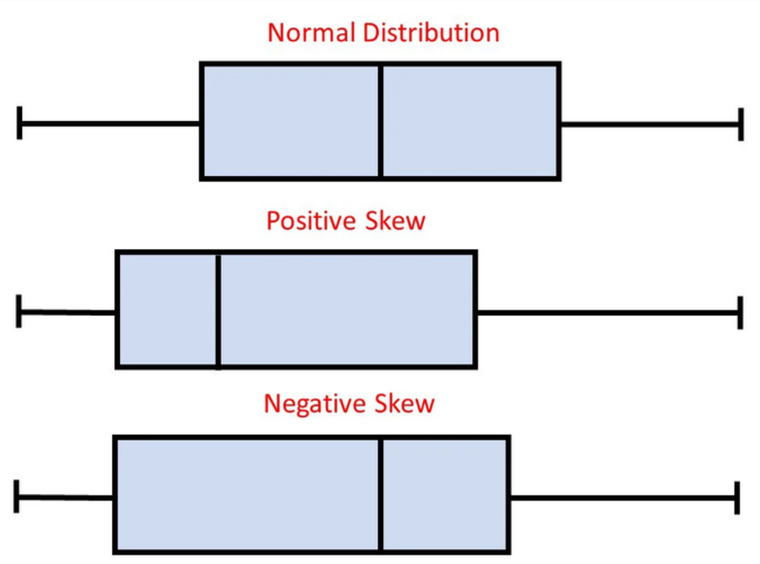
Single Variable

Few Data Points (Histogram)



Few Data Points (Boxplot)



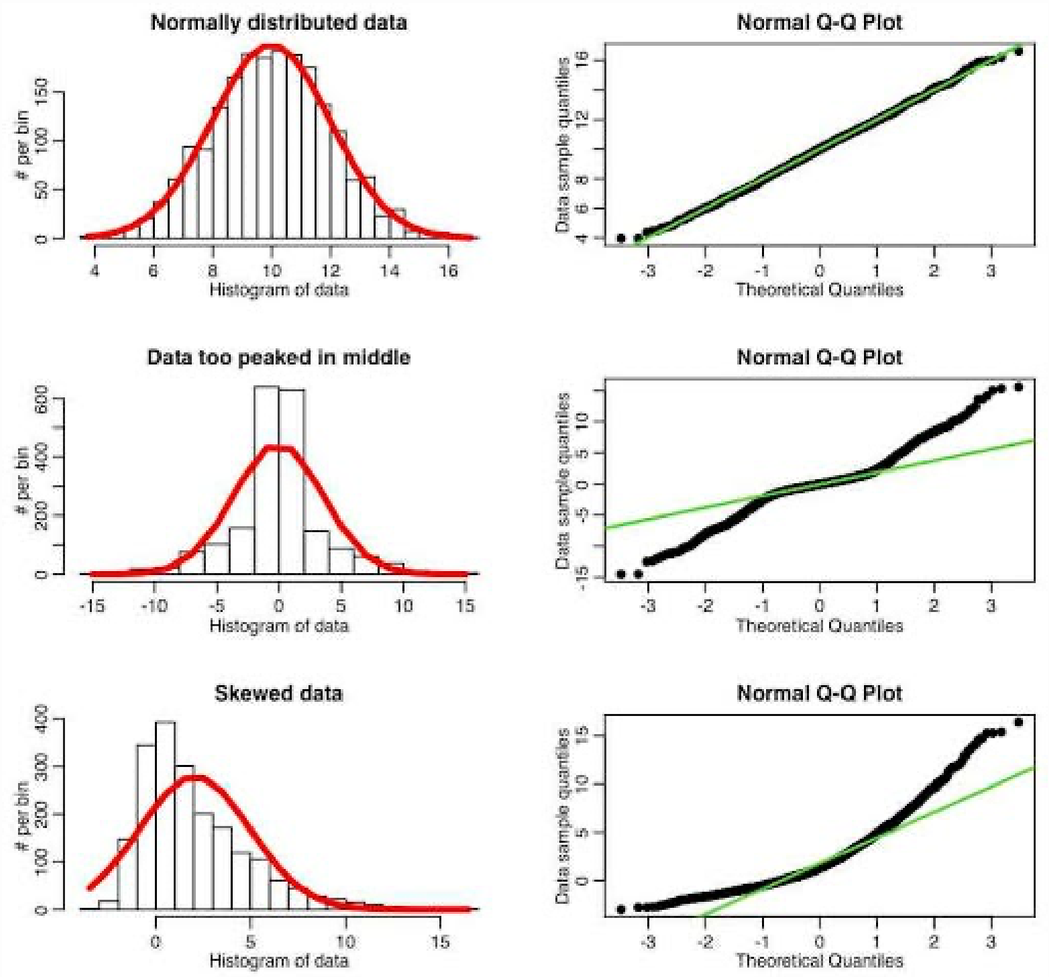


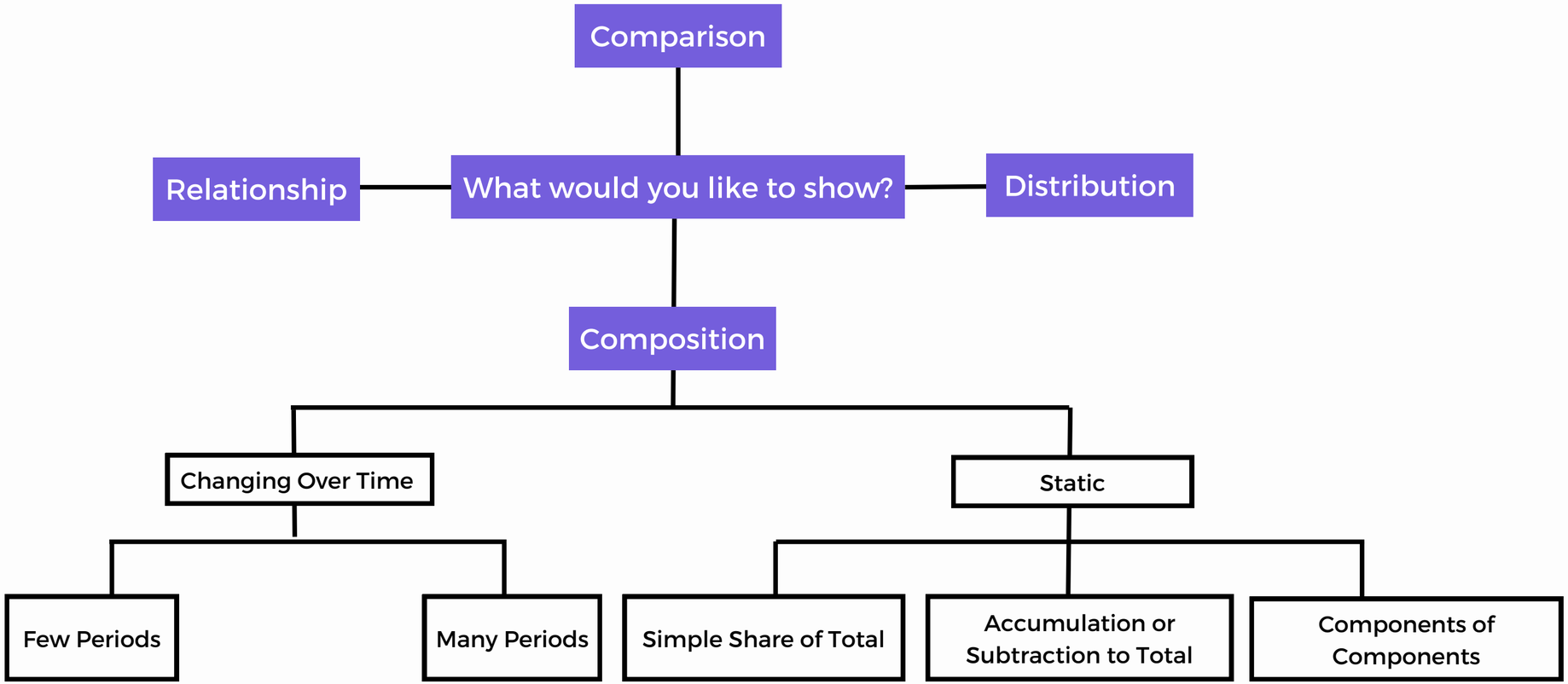
Distribution

Two Variables

Q-Q Plot

The quantile-quantile (Q–Q) plot is used to compare the shapes of distributions, providing a graphical view of how properties such as location, scale, and skewness are similar or different in the two distributions.




Comparison
Relationship
What would you like to show?
Distribution
Composition
Changing Over Time
Static
Few Periods
Many Periods
Simple Share of Total
Accumulation or Subtraction to Total
Components of Components

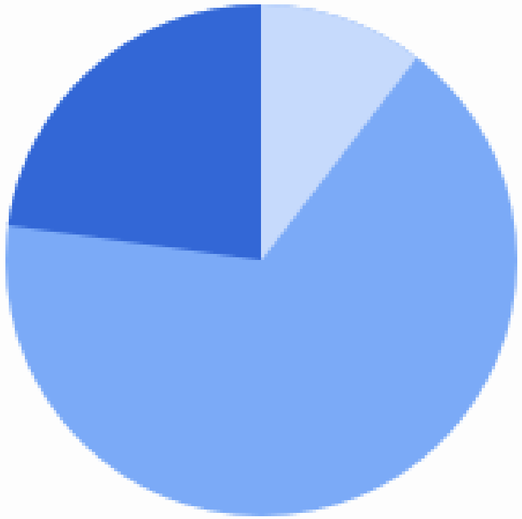
Composition

Pie Chart

Each categorical value corresponds with a single slice of the circle,

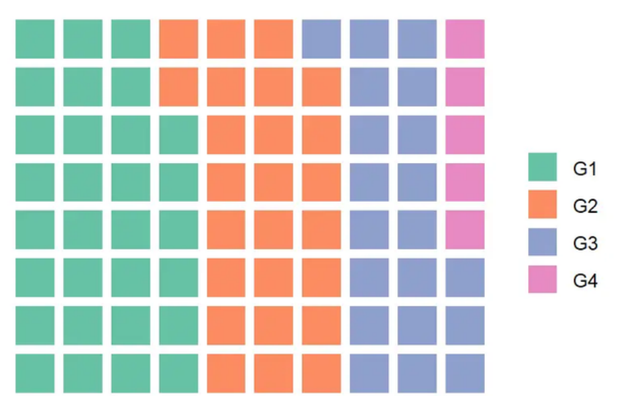
Size of each slice indicates the proportion of the **whole** each category level takes.

Part of whole



Pie Chart Types

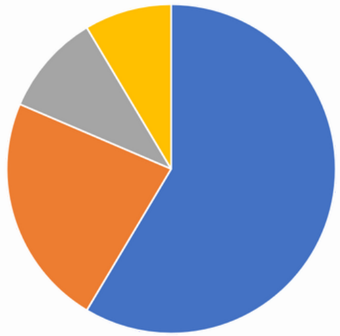
Waffle chart



Stacked bar chart

A single stacked bar can be thought of as a pie chart's slices rolled out into a rectangular form

Doughnut plot

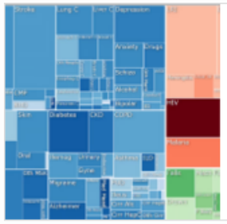


Composition

Treemap

Treemaps are an alternative way of visualising the hierarchical structure of a Tree Diagram

Displaying quantities for each category via area size and each category is assigned a rectangle area with the subcategory rectangles nested inside.



GBD Compare

Analyze updated data about the world's health levels and trends from 1990 to 2019 in this interactive tool using estimates from the Global Burden of Disease (GBD) study.

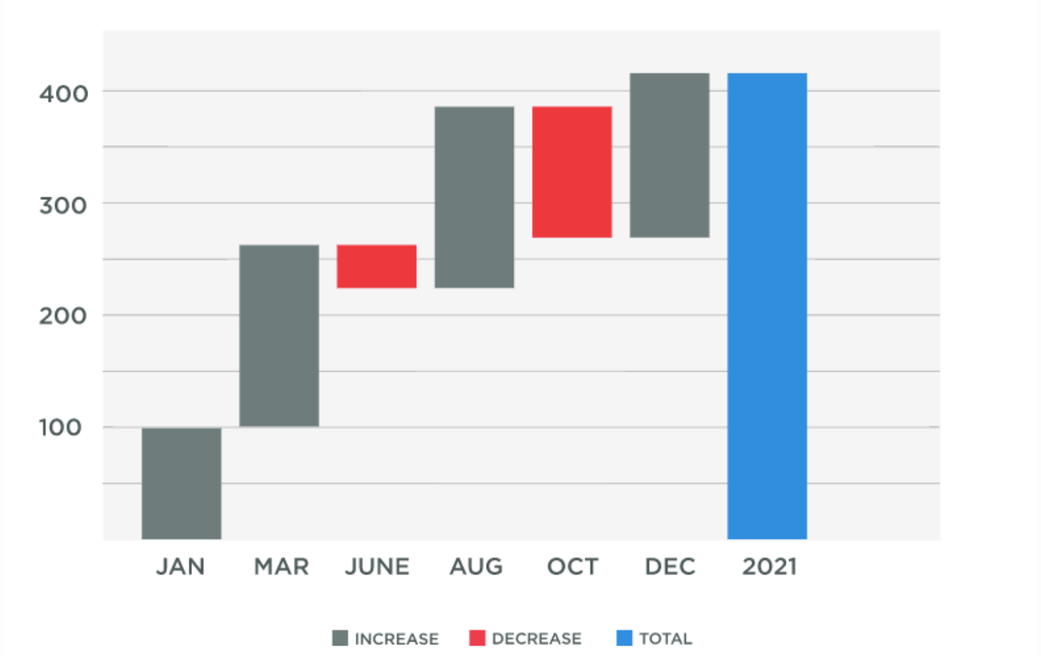
Institute for Health Metrics and Evaluation

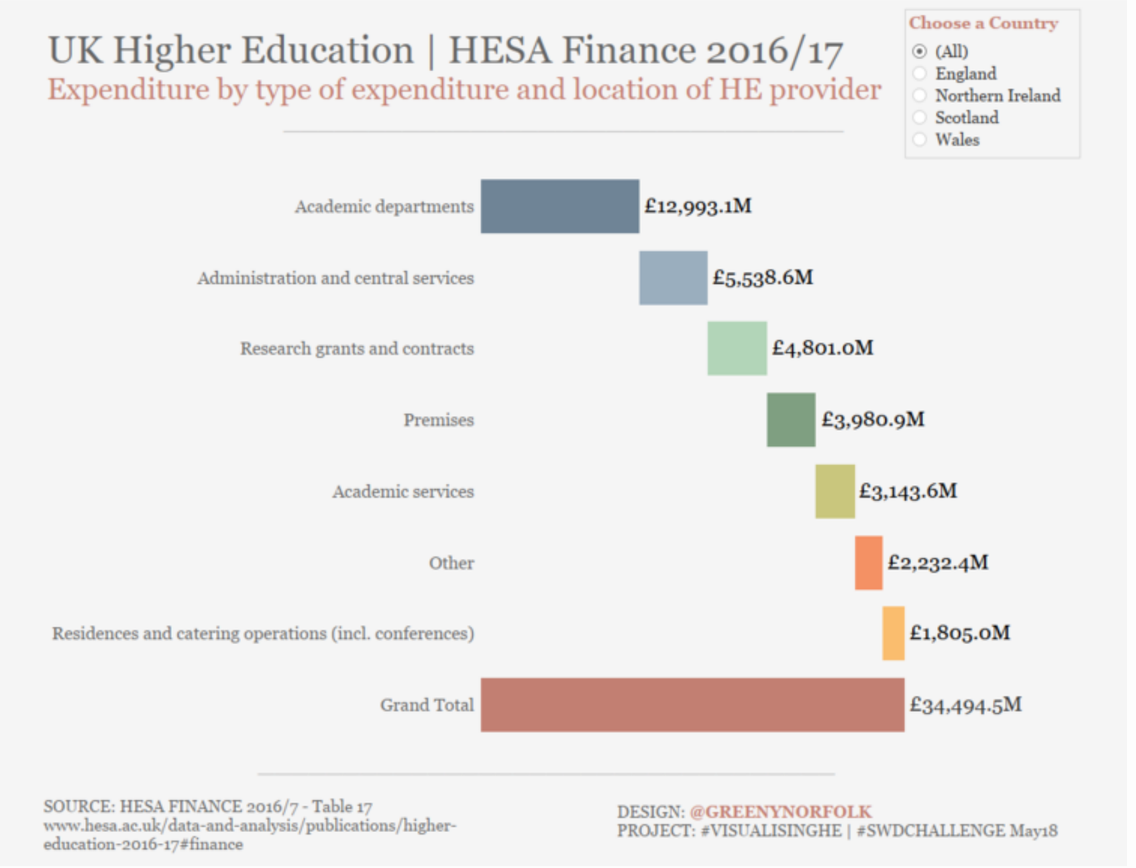
Composition

Waterfall

Shows how an **initial value** can be affected by the cumulative effect of sequential positive and negative values.

It uses a series of bars that show gains and losses, clearly showing how an opening figure was changed by events and led to the closing figure.





Composition

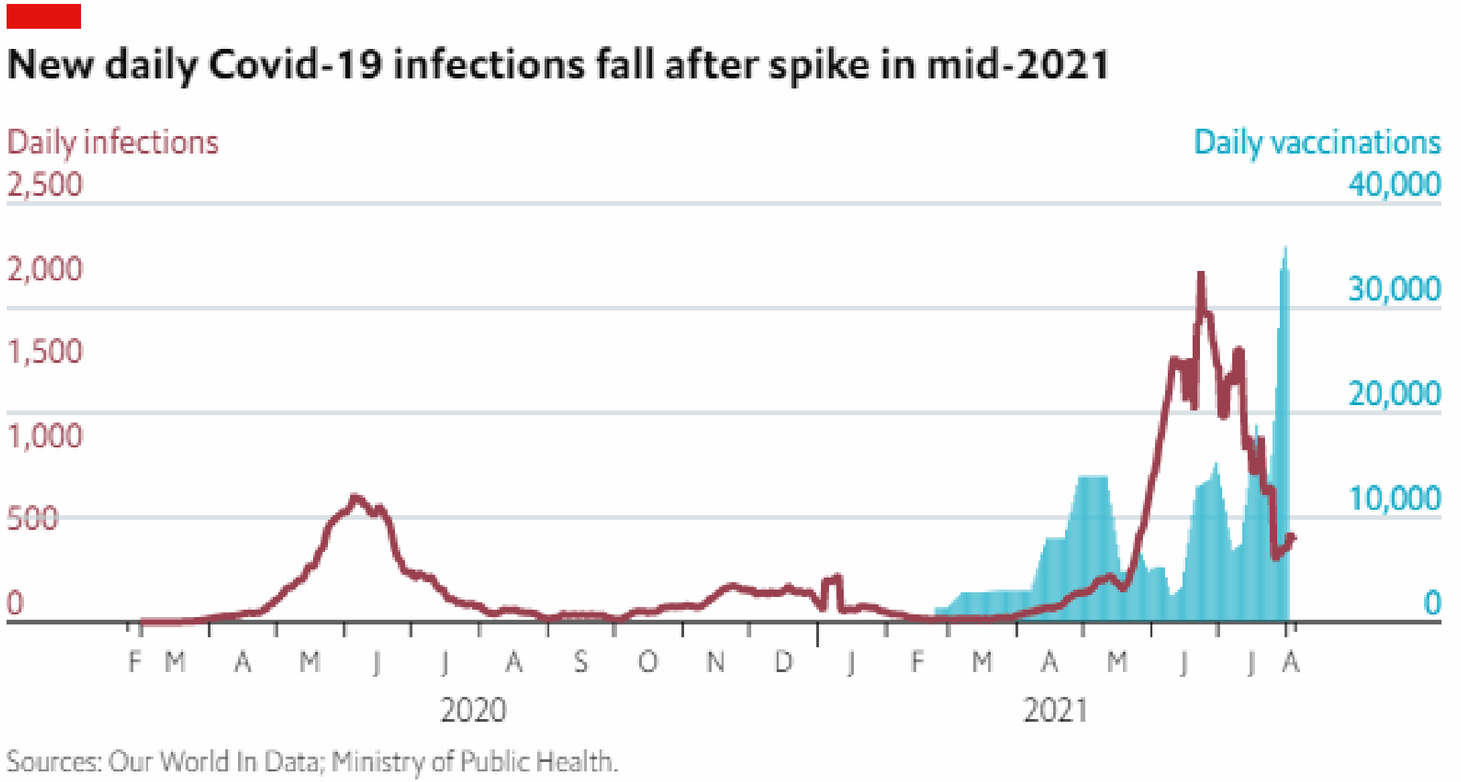
Changing Over Time

Line Graph

This chart is used to display quantitative values over a continuous interval or time period. A Line Graph is most frequently used to show trends and changed over time.

When grouped with other lines (other data series), individual lines can be compared to one another

Note: avoid using **more than 3-4 lines per graph**



Composition

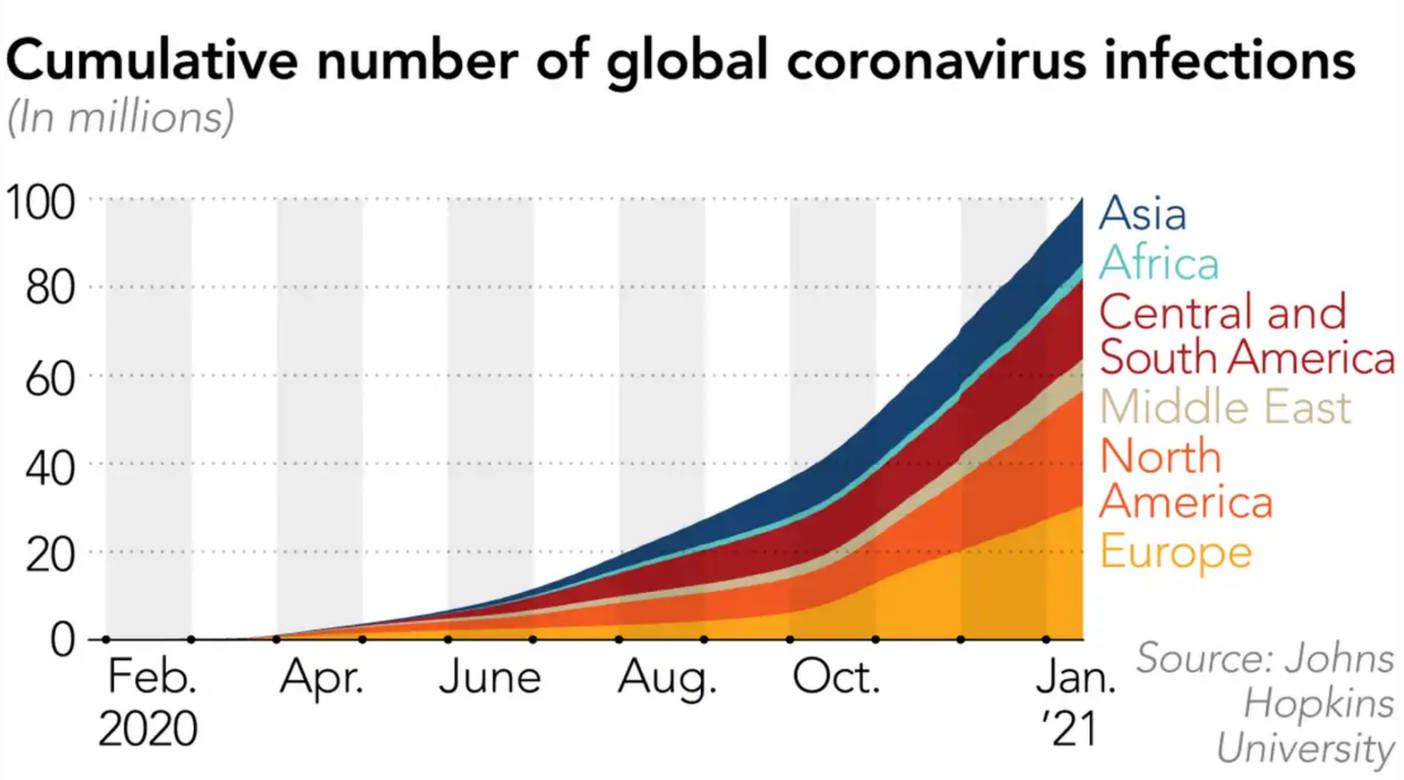
Changing Over Time

Area Graph

Are Line Graphs but with the area below the line filled in with a certain colour or texture.

Like Line Graphs, Area Graphs are used to display the development of quantitative values over an interval or time period.

Stacked Area Graphs work the same way as simple area graph, **except** for displaying multiple data series that start each point from the point left by the previous data series.



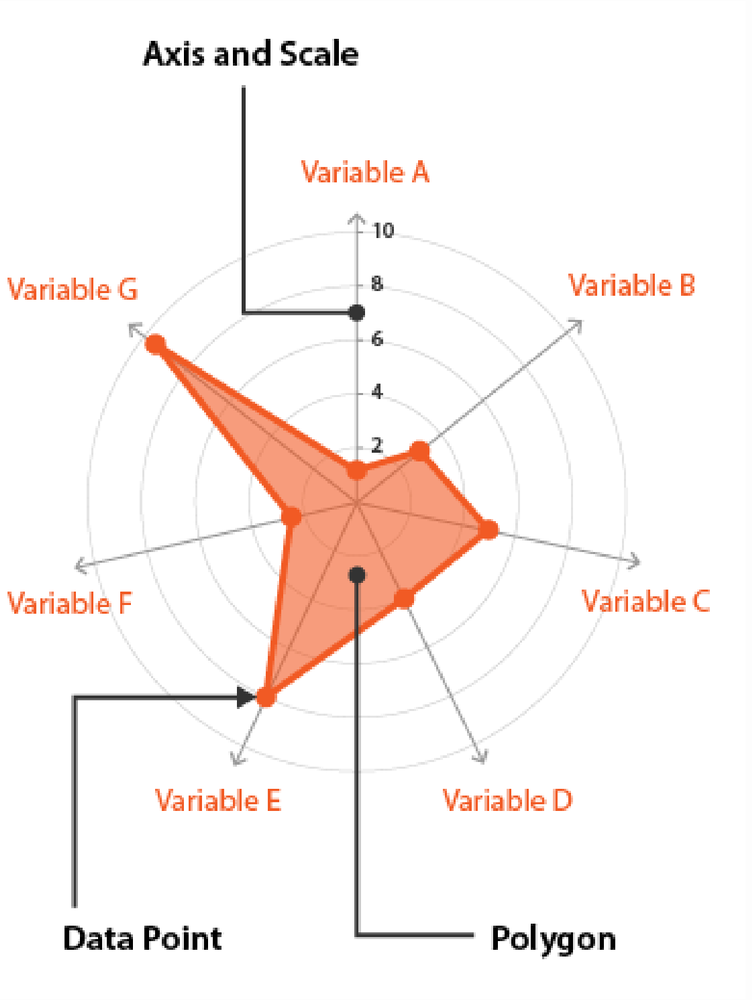
Composition

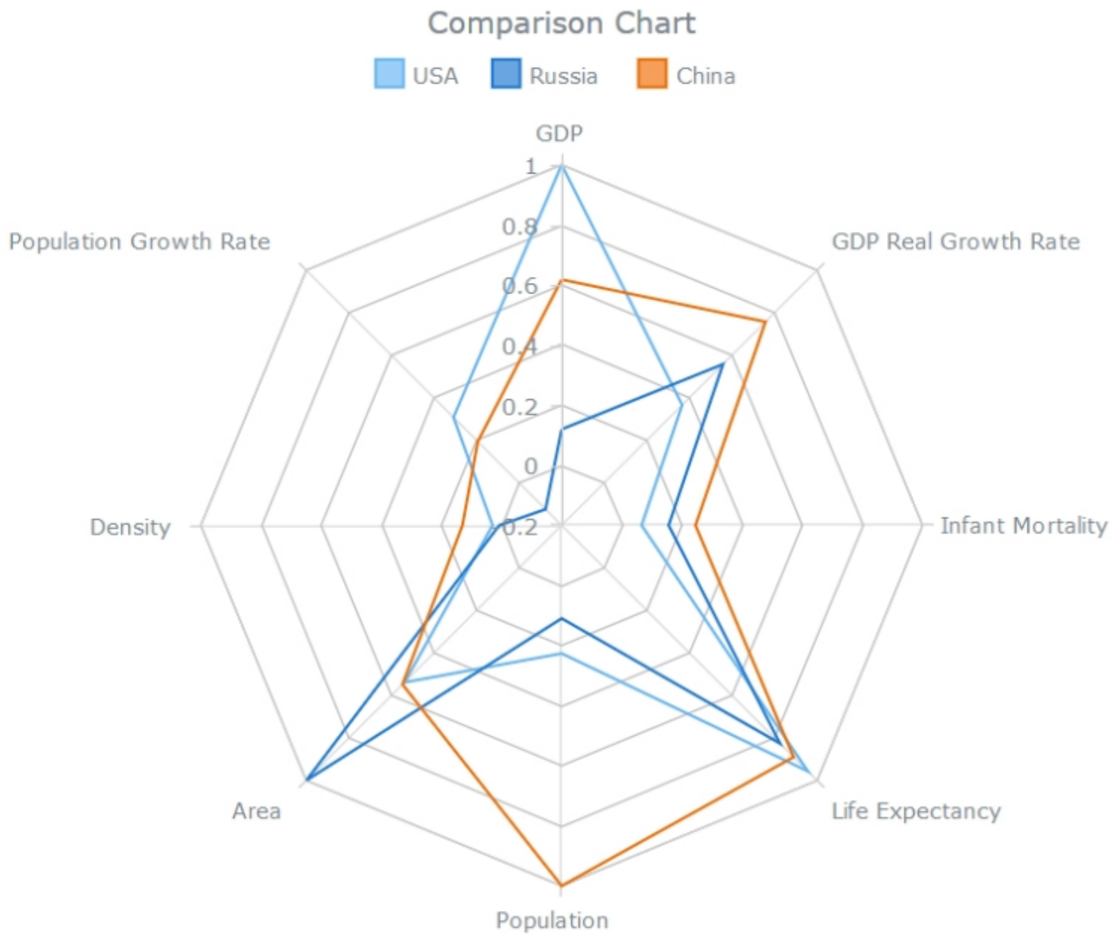
Radar Chart (Spider Chart, Web Chart, Polar Chart, Star Plots)

Radar Charts are a way of comparing multiple **quantitative variables.**

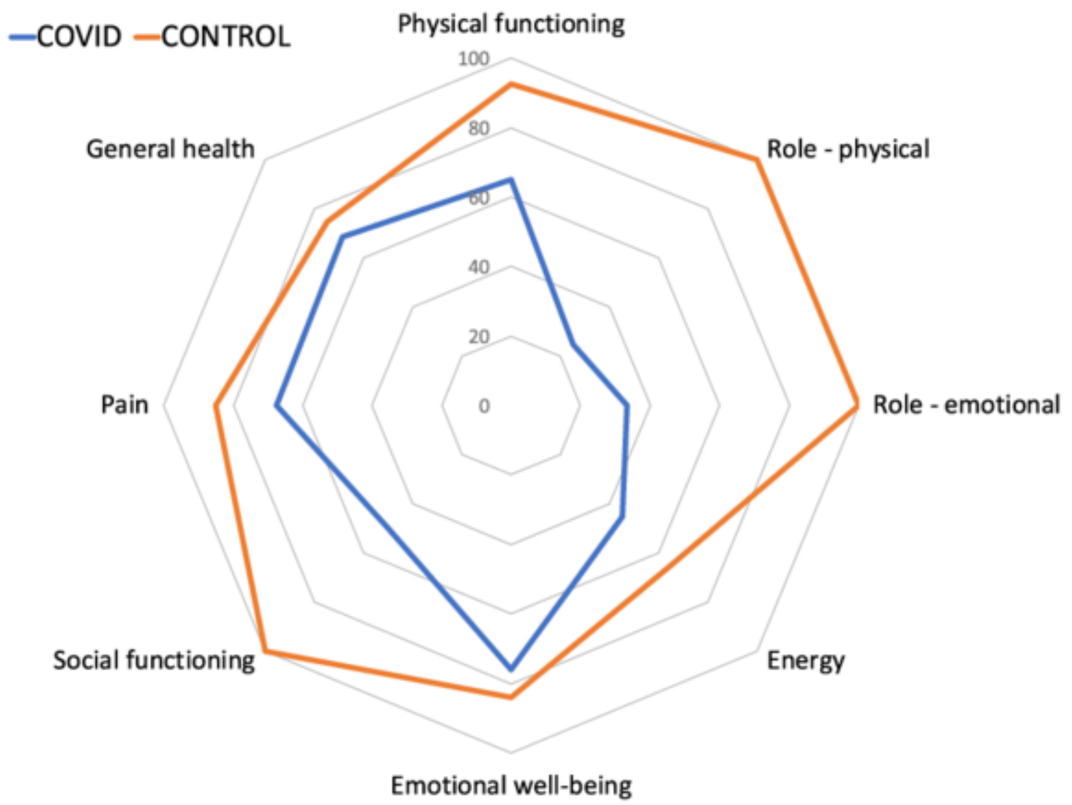
Radar Charts are also useful for seeing which variables are scoring high or low within a dataset, making them suited for displaying performance.

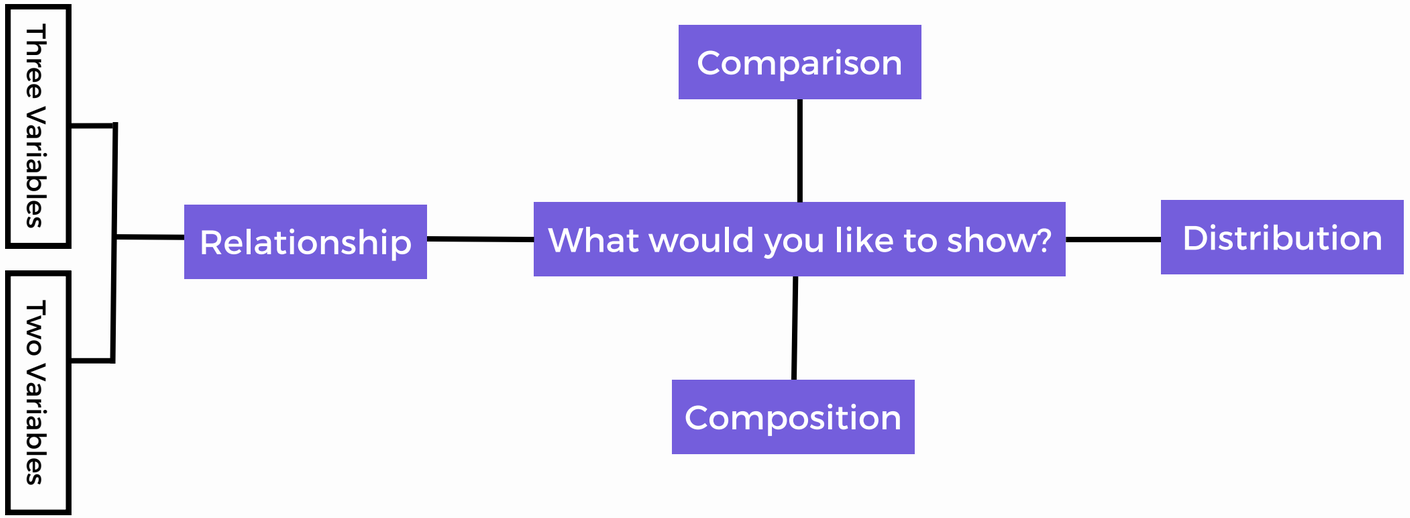
IMPORTANT NOTE: you need to determine how each category relates to the others, know what each category axis of the radar chart represents, to determine whether each category relates in terms of scales of measurement. It is possible that these scales will be the same for each category. However, the radar chart may also represent data using different techniques of quantifying data.





Effect of COVID-19 on QoL.

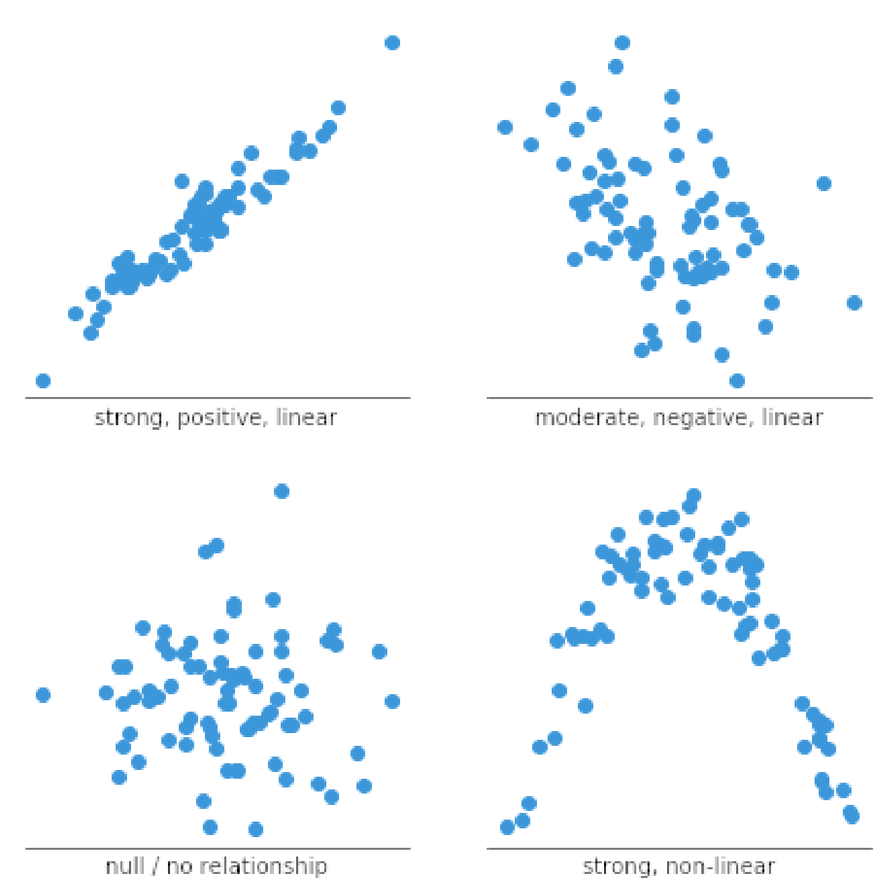



Comparison
Three Variables
Relationship
What would you like to show?
Distribution
Two Variables
Composition

Relationship

Two Variables

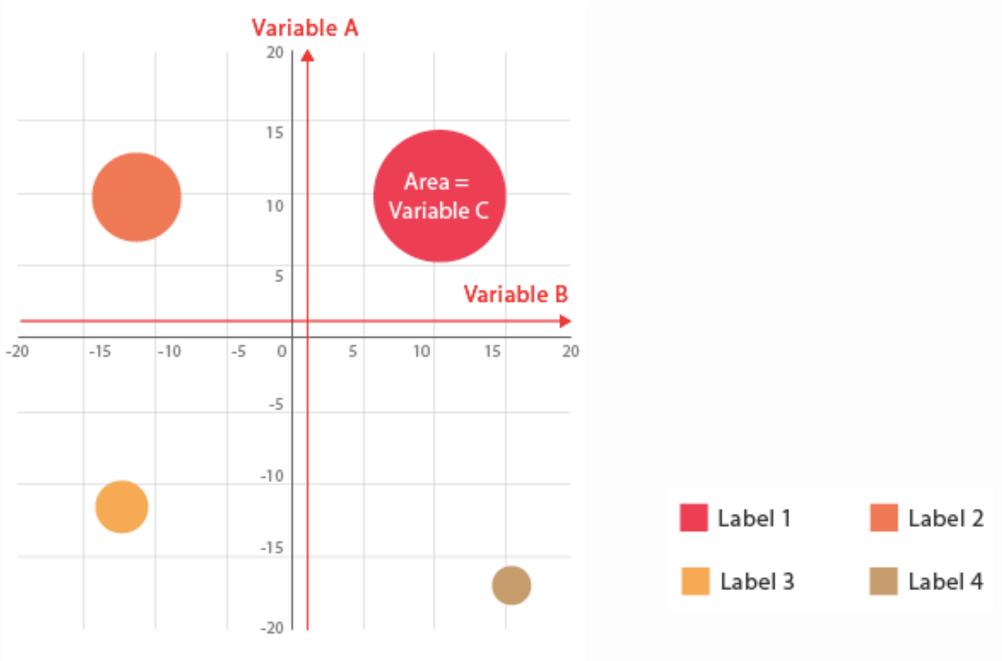
A scatter plot uses dots to represent values for two different numeric variables.



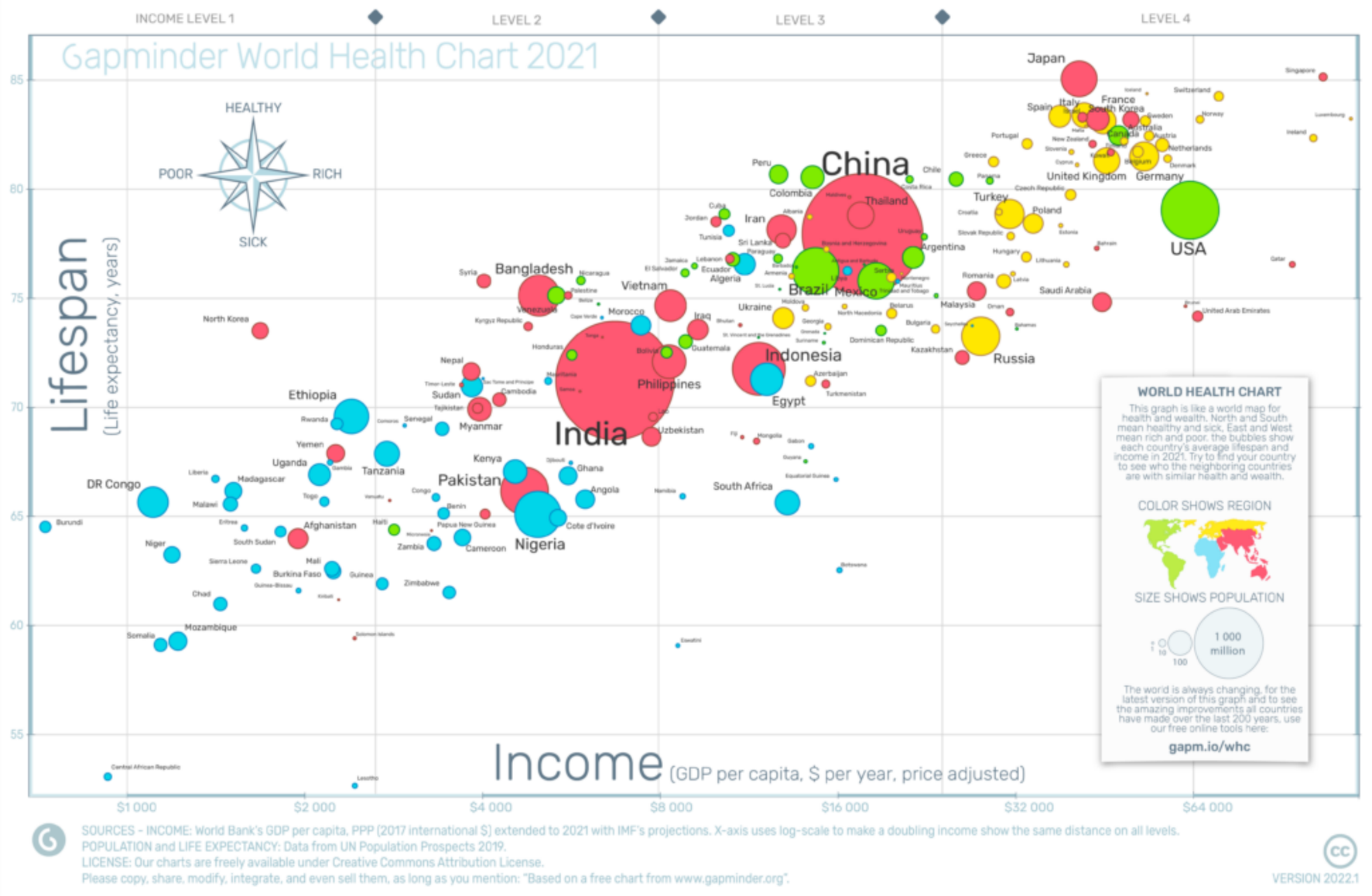
Three Variables

A bubble chart is primarily used to show relationships between numeric variables.

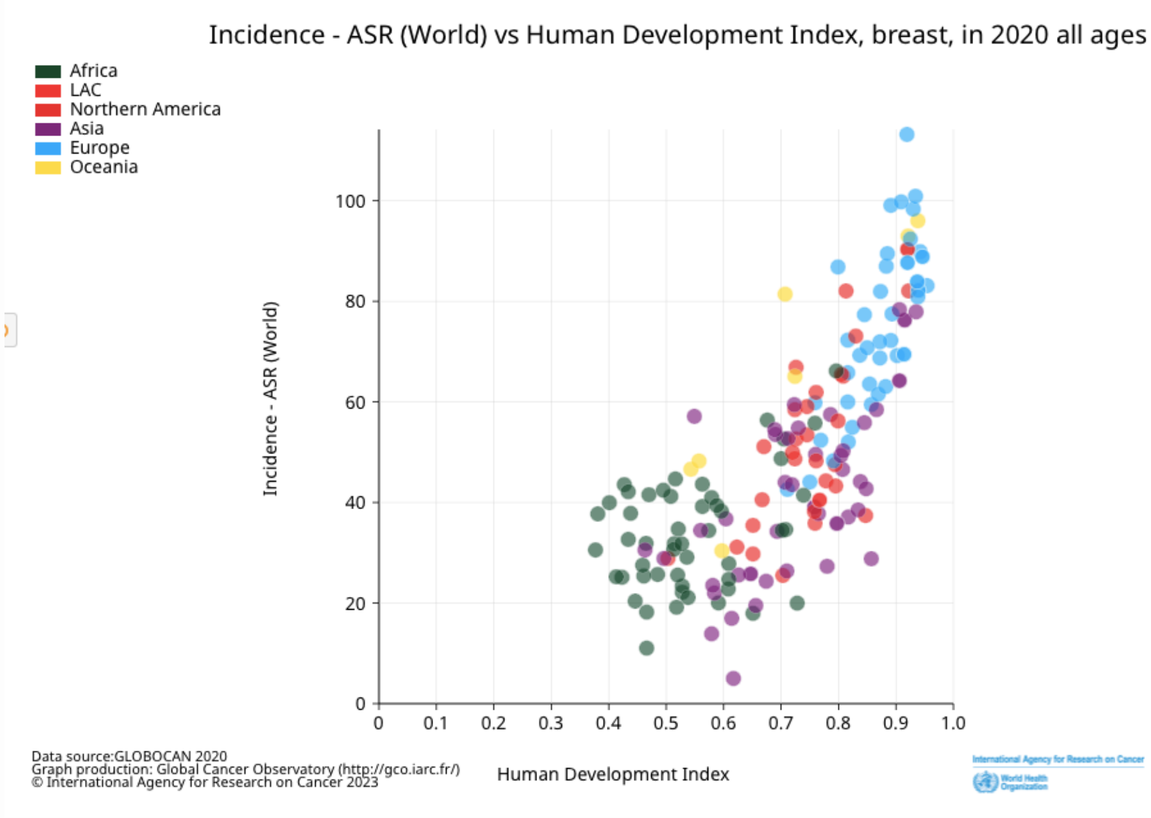
Note: the bubble chart is, of course, built upon the scatter plot as a base, just with the addition of a third variable through point size



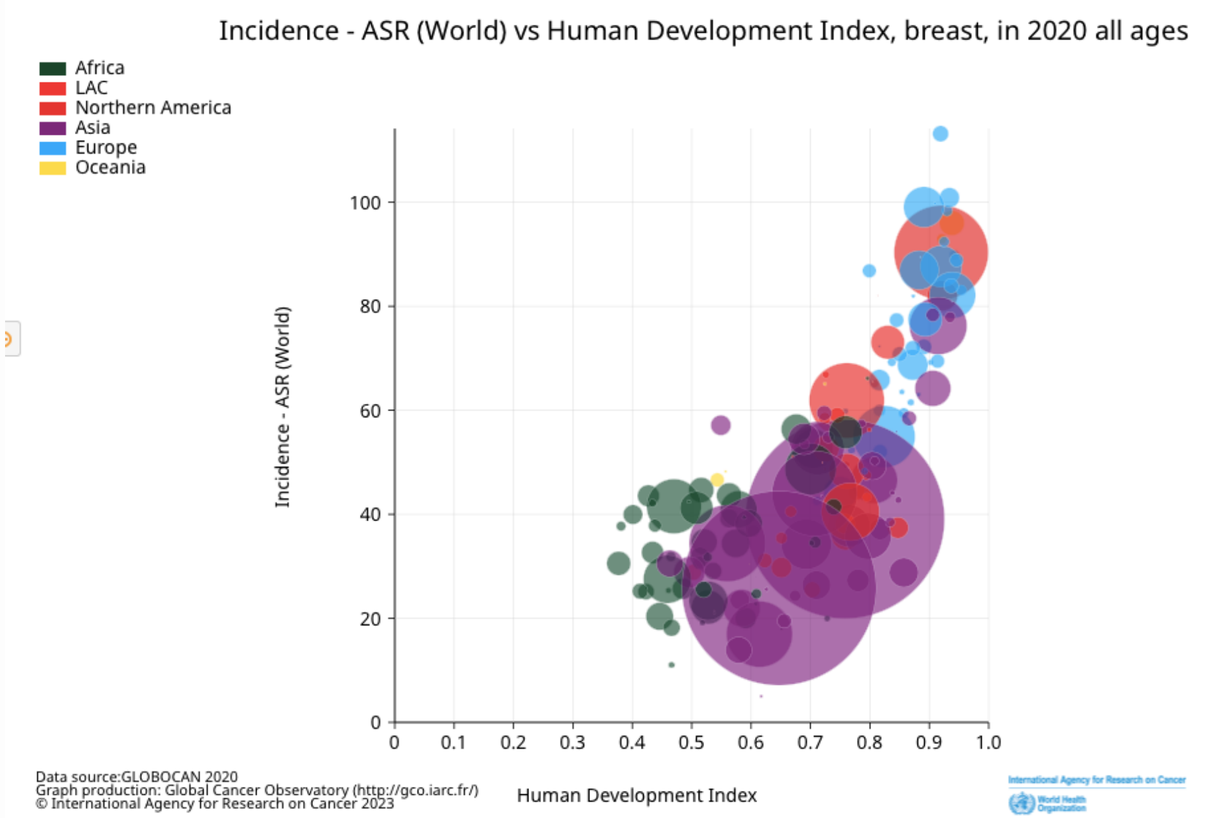
People live longer in richer countries.



Scatter Plot



Bubble Chart



HELPFUL RESOURCES

From Data to Viz

From data to Viz | Find the graphic you need

A classification of chart types based on their input data format.

data-to-viz.com /

The Data Visualisation Catalogue

The Data Visualisation Catalogue

A handy guide and library of different data visualization techniques, tools, and a learning resource for data visualization.

datavizcatalogue.com

THANK YOU