



DESCRIPTIVE STATISTICS

INTRODUCTION

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TOPIC OUTLINE

Descriptive Statistics

Types of Data

Levels of Measurement

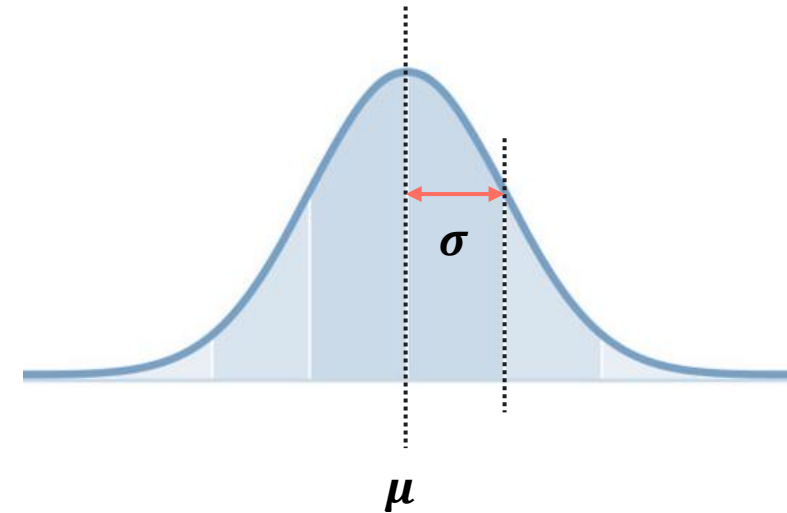


DESCRIPTIVE STATISTICS



DESCRIPTIVE STATISTICS

Descriptive statistics is a branch of statistics that summarizes and organizes data to provide meaningful insights. It focuses on presenting raw data in a more understandable form using measures of central tendency, measures of variability, and graphical representations.



POPULATION VS SAMPLE

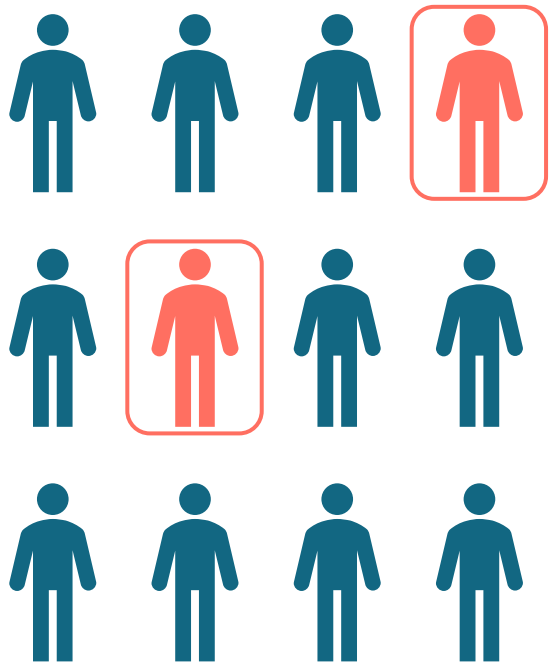
Population (N) refers to the entire group of individuals or observations being studied.

Sample (n) refers to subset of the population selected for analysis.

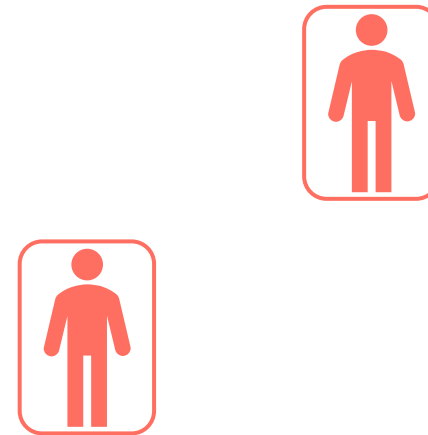


POPULATION VS SAMPLE

Population (N) refers to the **entire** group of individuals or observations being studied.



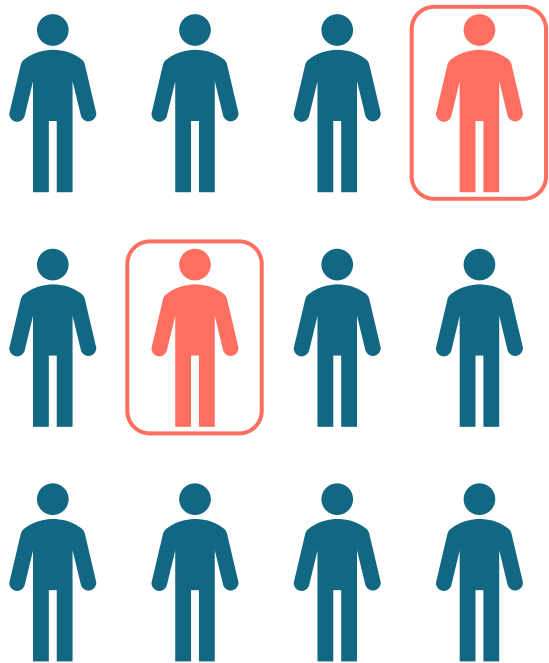
Sample (n) refers to **subset** of the population selected for analysis.



PARAMETERS VS STATISTICS

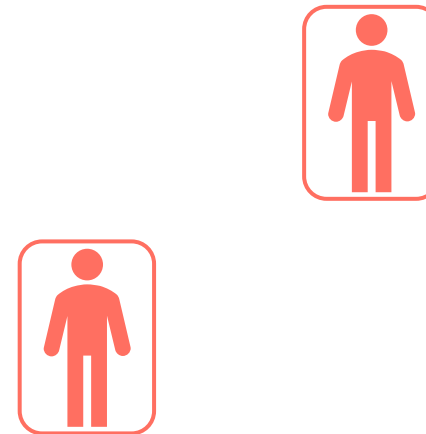
Characteristics of a population are called parameters.

e.g., mean – μ , standard deviation – σ



Characteristics of a sample are called statistics.

e.g., mean – \bar{x} , standard deviation – s



TYPES OF DATA



DATA

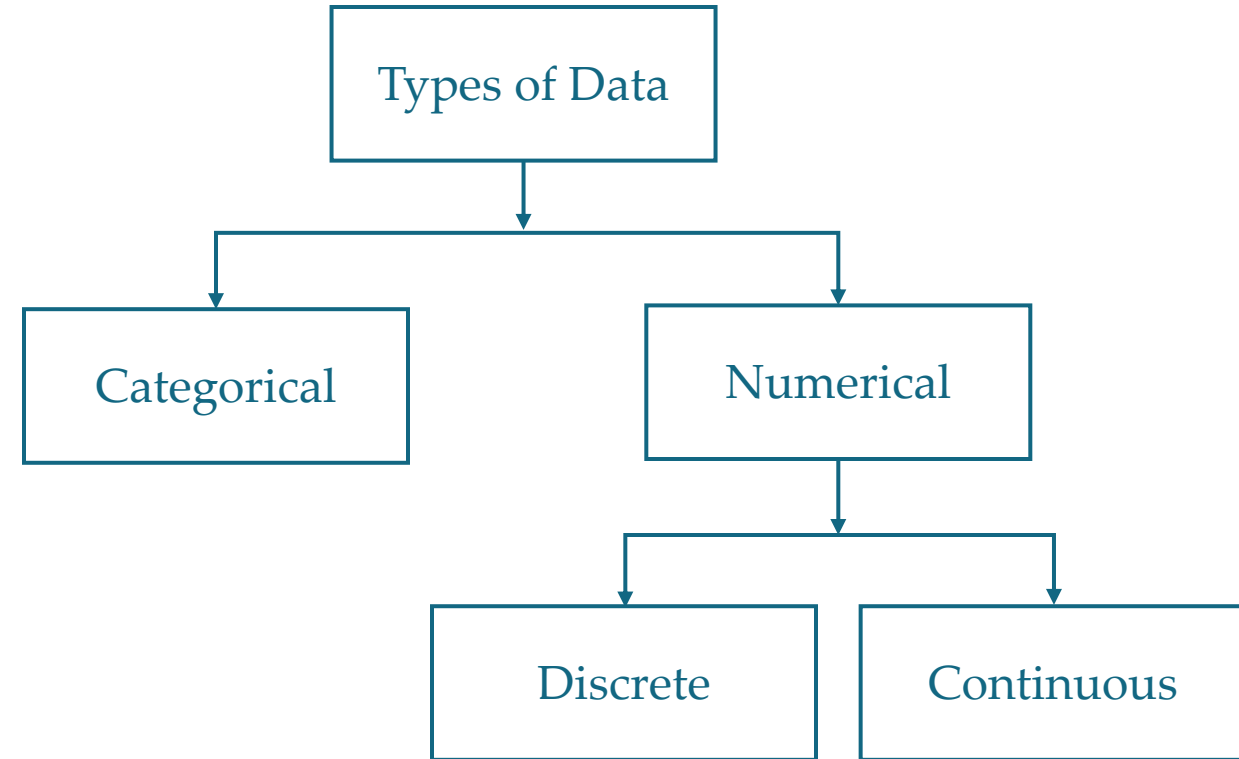
Data refers to the raw facts, figures, and information collected from various sources that can be analyzed to extract insights, identify patterns, and support decision-making.

Voltage Response		
Measurement No.	Instrument A	Instrument B
1	12	2.8
2	5	4.5
3	9.1	6
4	3.3	9
5	24	11.7
6	18.5	14.8
7	15.2	17.3
8		20



TYPES OF DATA

This classification focuses on the nature of the data and how it can be categorized or measured.



CATEGORICAL

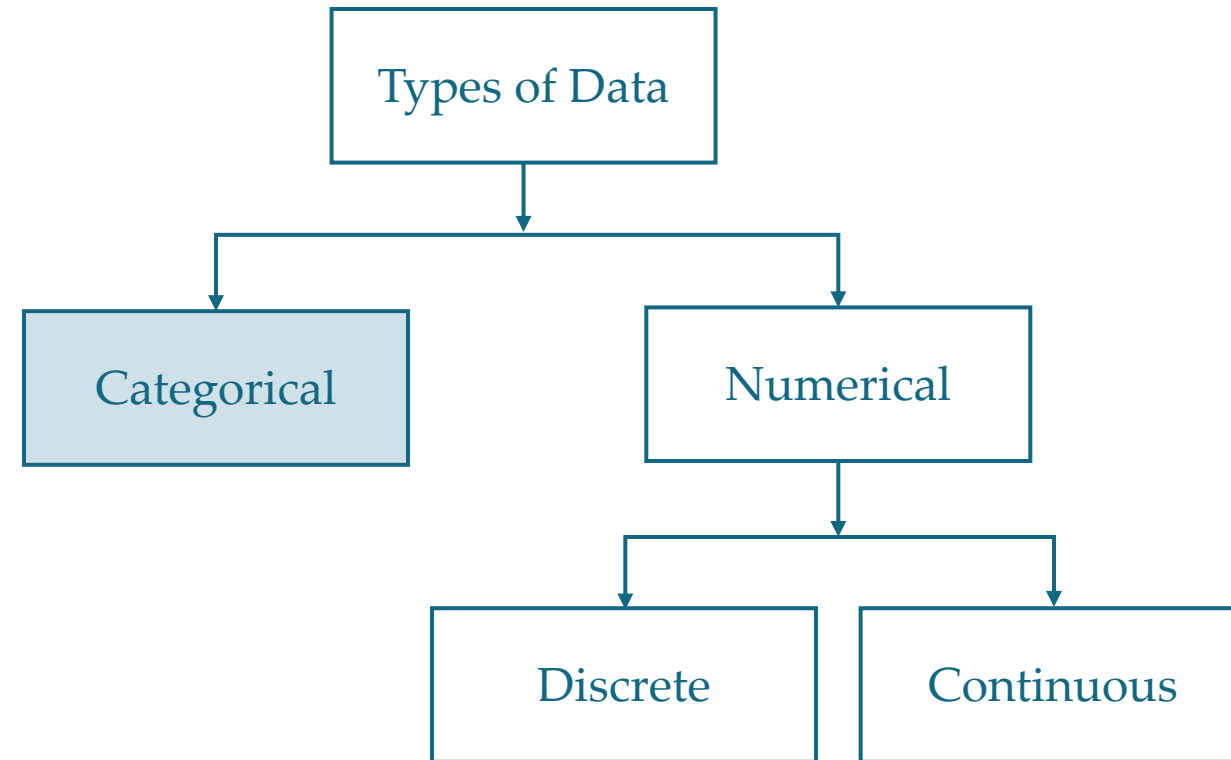
Categorical data represents groups or categories.

Examples:

Gender (Male, Female)

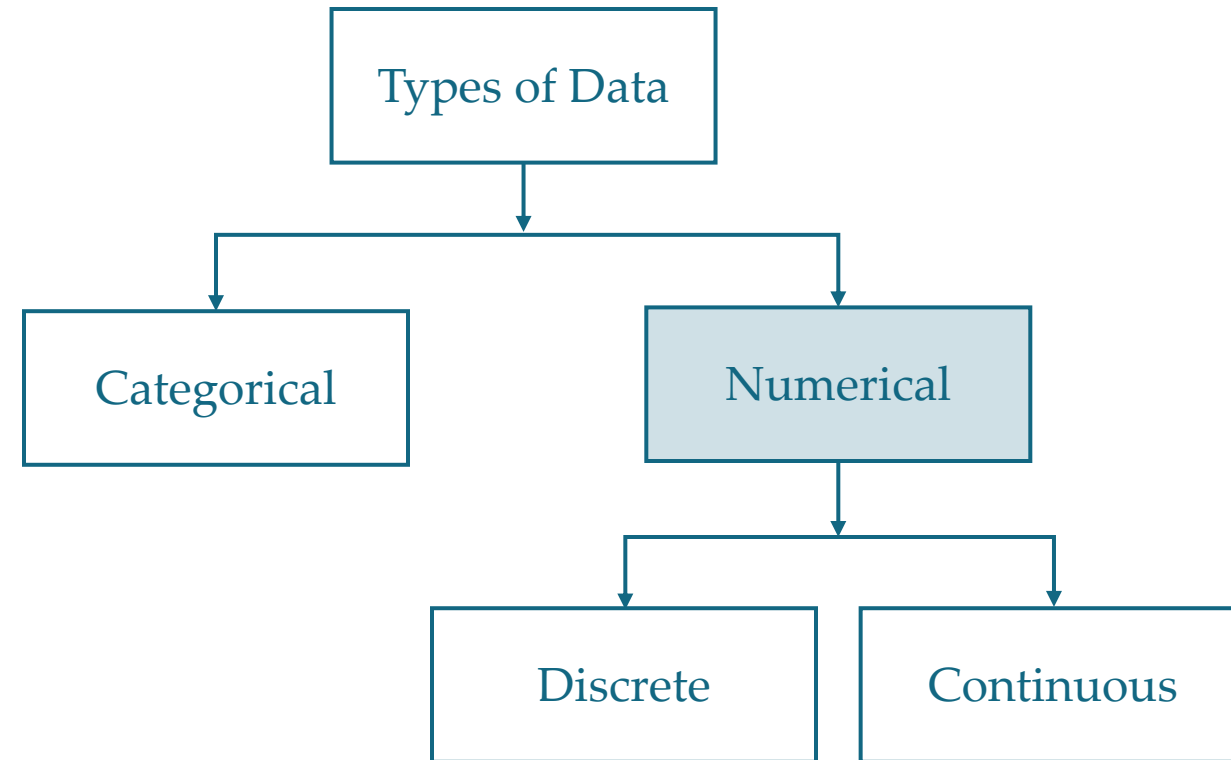
Colors (Red, Blue, Green)

Types of Cars (Sedan, SUV, Truck)



NUMERICAL

Numerical data represents quantities or numbers.



DISCRETE

Discrete data are data that can be counted in finite manner.

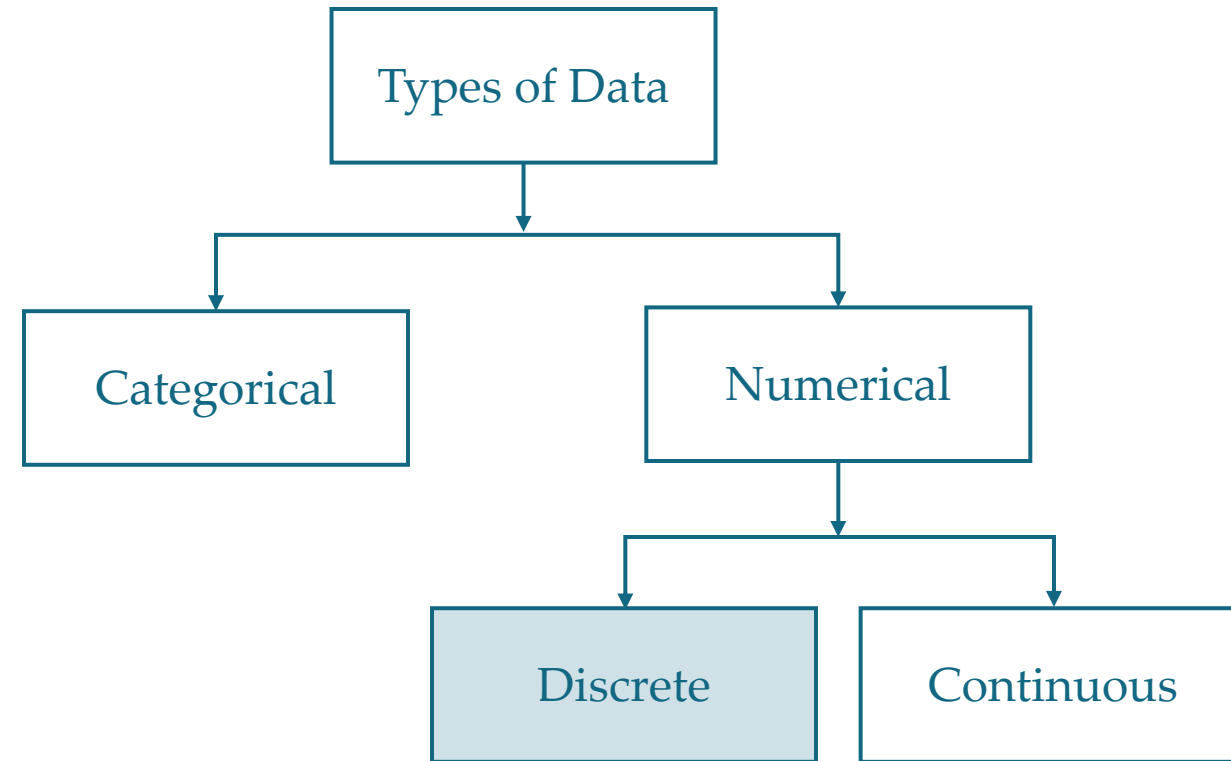
"You can imagine each member of the dataset."

Examples:

Number of students in a class

Number of correct answers

Count of defective products



CONTINUOUS

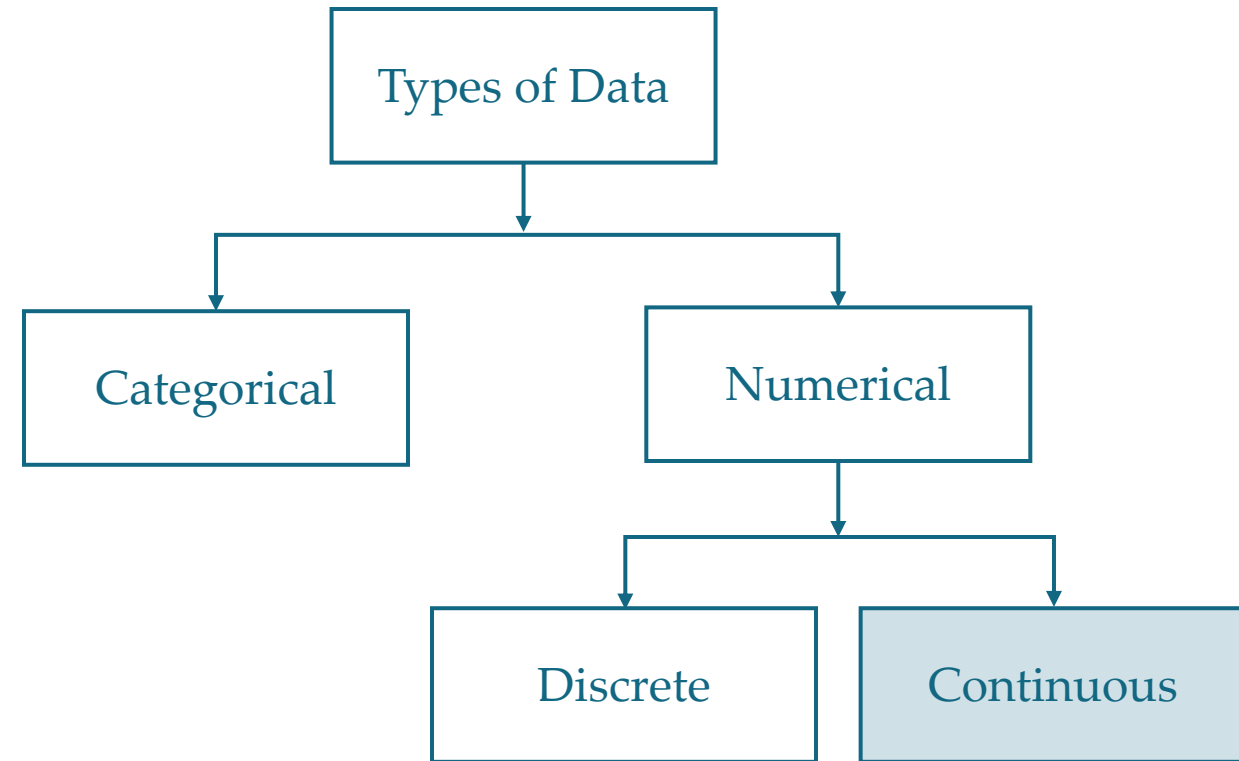
Continuous data can vary by infinitely small amounts, making them impossible to count directly. Measuring continuous data requires an instrument (e.g., ruler, thermometer) to obtain precise values.

Examples:

Weight

Temperature

Voltage



EXERCISE

Determine if the given example is discrete or continuous data.

Grades discrete

Area continuous

Number of objects discrete

Time continuous

Time on the clock discrete

Money continuous

Physical Money discrete

Height continuous

Distance continuous

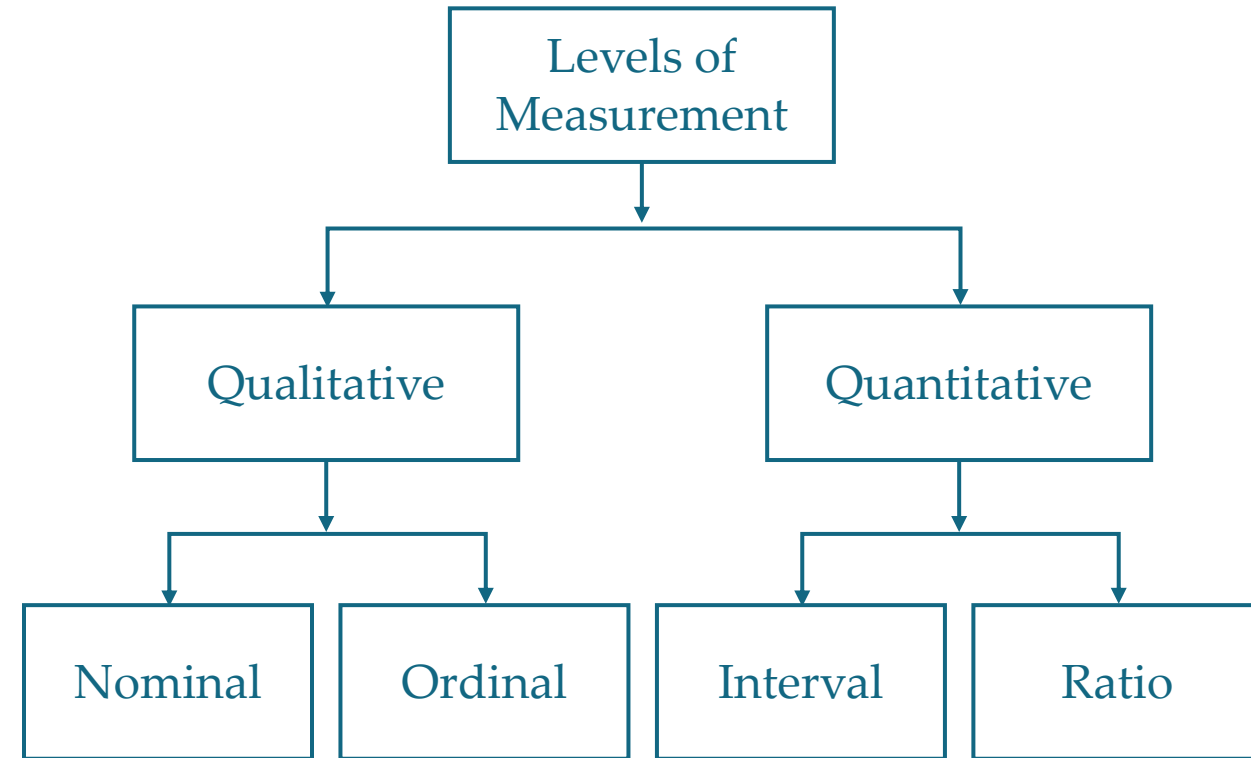


LEVELS OF MEASUREMENT



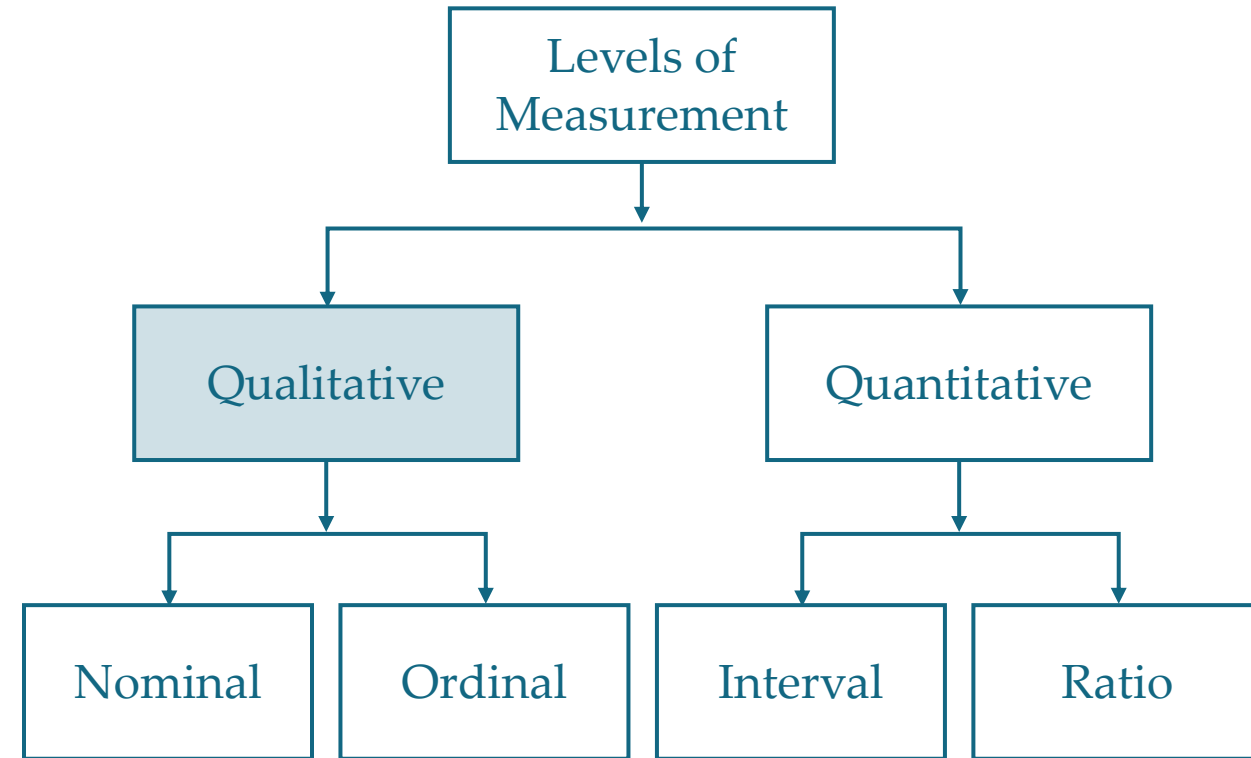
LEVELS OF MEASUREMENT

This classification focuses on the properties of the data and how it can be analyzed mathematically.



QUALITATIVE

Qualitative data refers to non-numerical information that describes characteristics or attributes (e.g., customer feedback). It is subjective in nature, as it is derived from personal perceptions, opinions, and interpretations.



NOMINAL

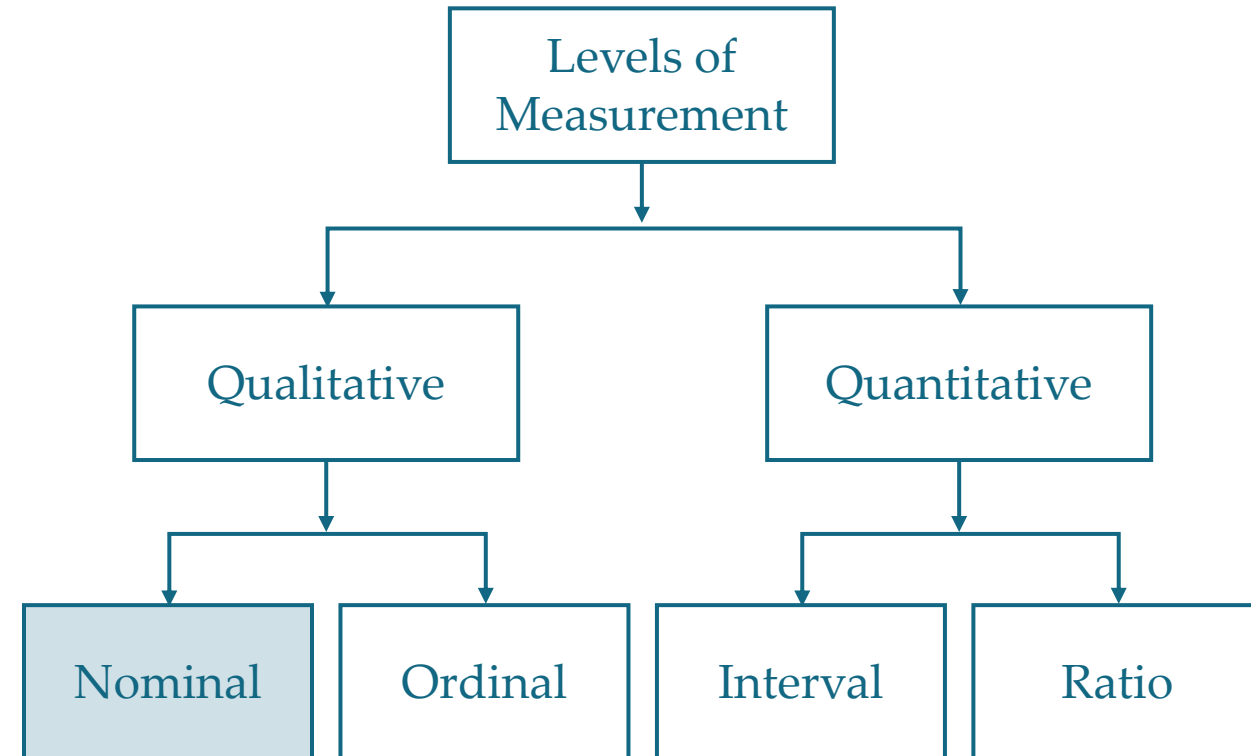
Nominal data can be categorized without any order or ranking.

Examples:

Gender (Male, Female)

Fours seasons (winter, spring, summer, autumn)

Types of Cars (Sedan, SUV, Truck)



ORDINAL

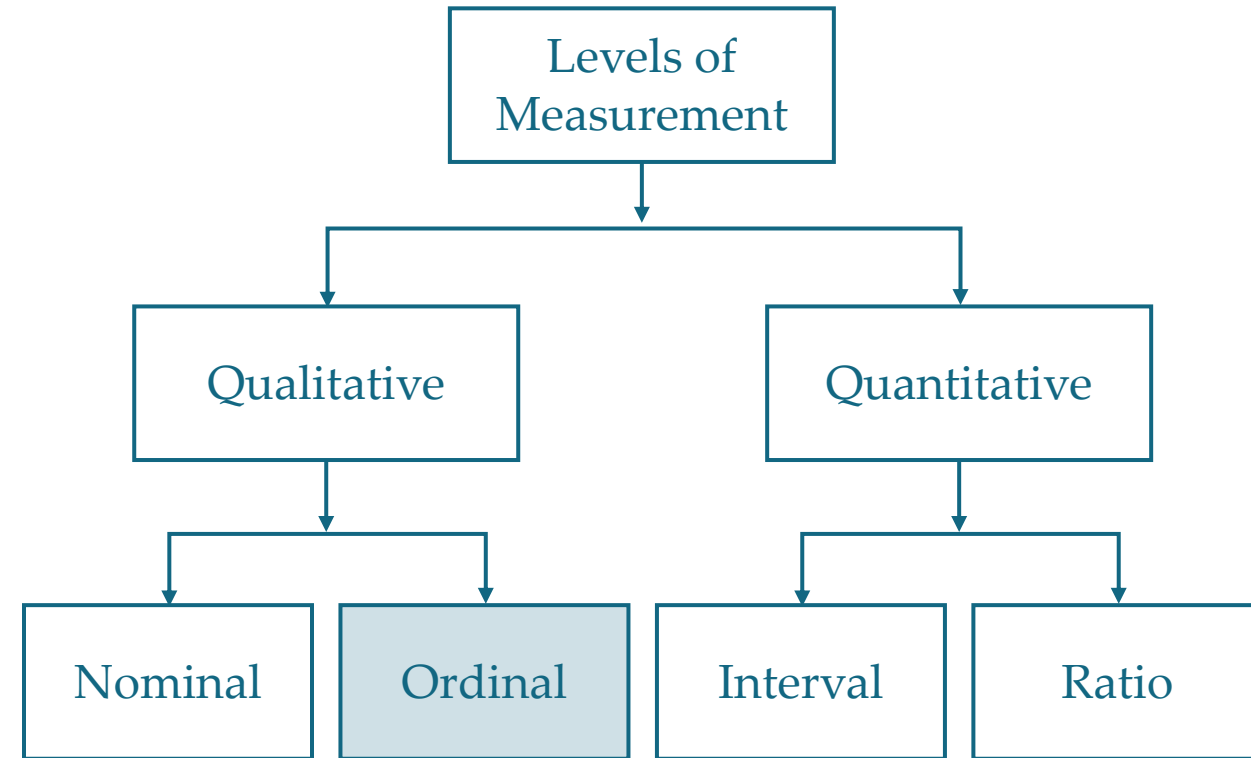
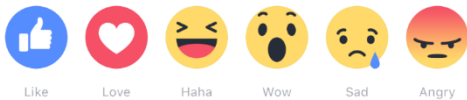
Ordinal data can be categorized with a meaningful order or ranking.

Examples:

Customer feedback:

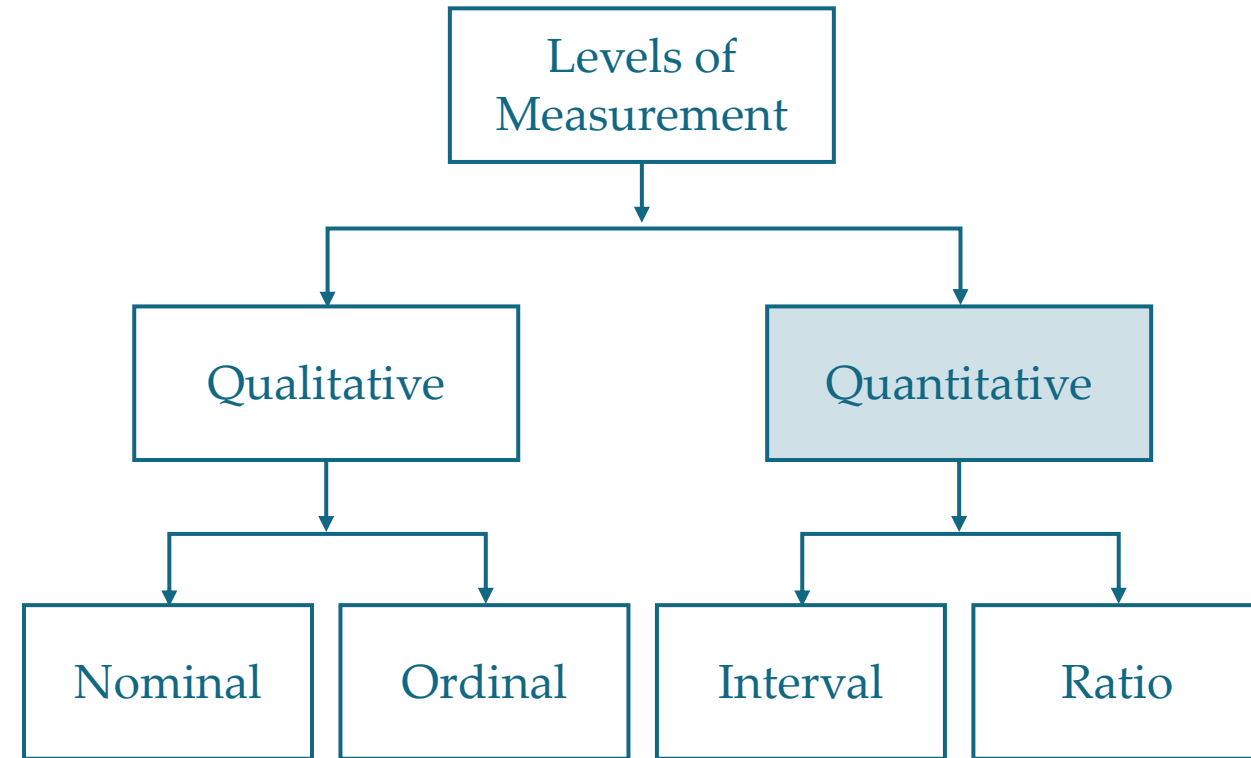


Facebook reactions:



QUANTITATIVE

Quantitative data refers to numerical data that can be measured and analyzed statistically (e.g., age, income, temperature).

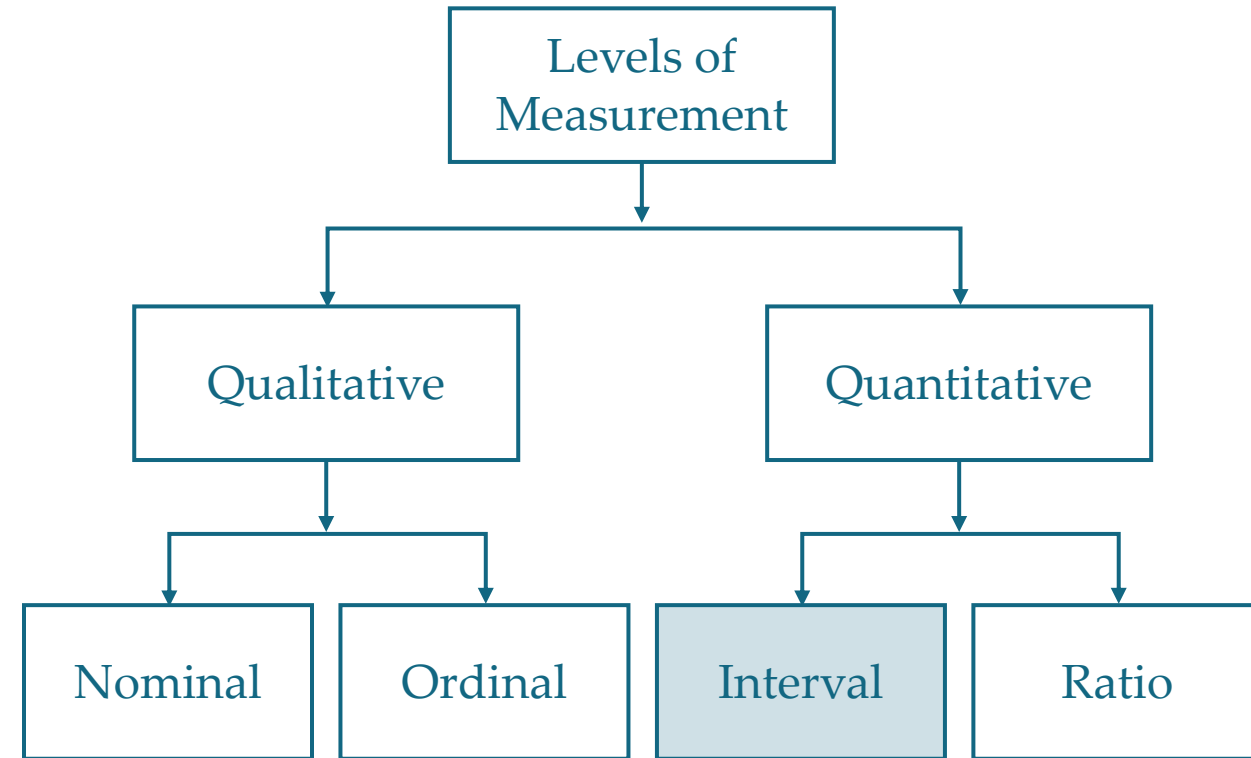


INTERVAL

Interval data has no true zero, meaning that the value of zero does not indicate the absence of the measured quantity.

Example:

Temperature in Celsius or Fahrenheit – 0°C or 0°F does not mean there is no temperature; it is just a reference point.



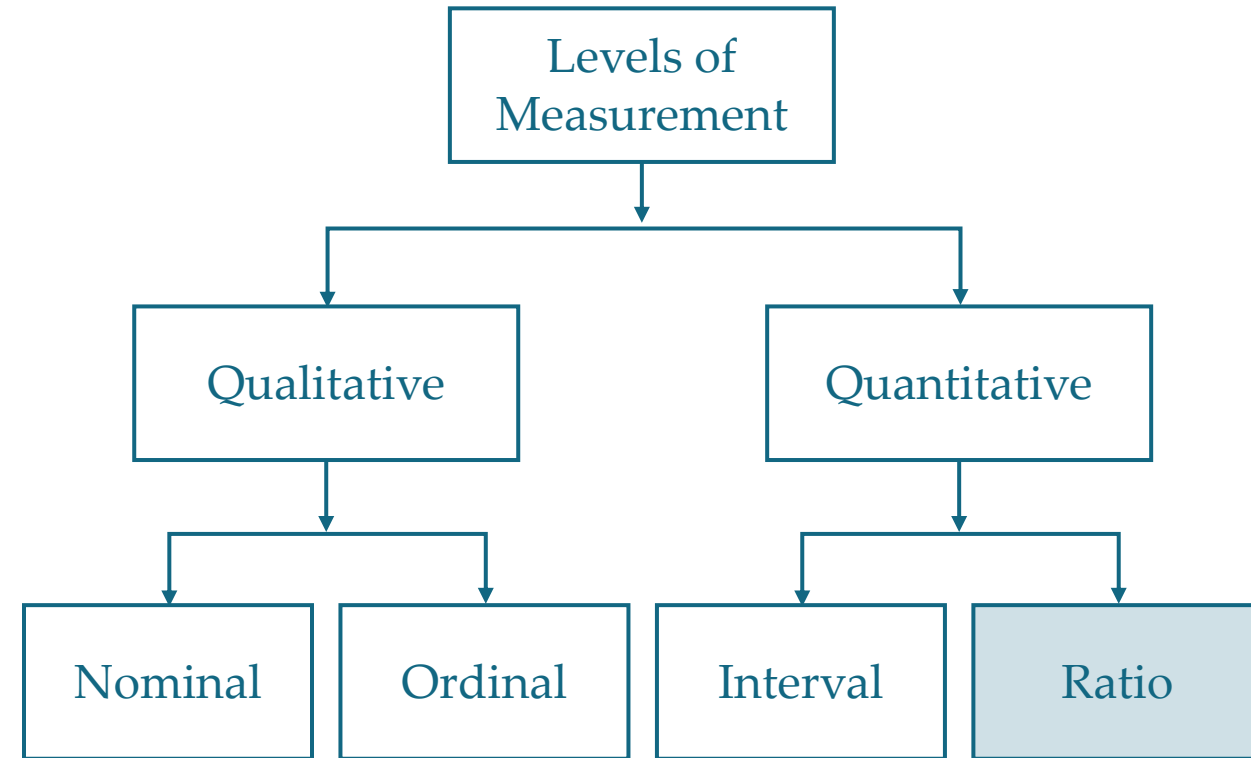
RATIO

Ratio data has a true zero, meaning that the value of zero represents the complete absence of the measured quantity.

Example:

Weight, if an object has a weight of 0 kg , it means it has no weight.

Temperature in Kelvin – 0°K represents absolute zero, where molecular motion stops.



EXERCISE

Determine if the given example is interval or ratio data.

Height of a building (m)

Time to complete a race (seconds)

Exam scores (out of 100)

Year of historical event (1776, 1945, 2001)

Altitude above sea level (m)

Ratio—zero meters means no height

Ratio—zero seconds means no time has passed

Interval—zero does not mean absence of knowledge

Interval—no absolute zero in the calendar

Interval—zero does not mean absence of altitude.

However, if we measured height above the ground, it would be ratio data.



LABORATORY

