

Statistics

The definition

Is the science of conducting studies to collect, organize, summarize, analyze the data.

Collect
organize
analyze
summarize

Introduction

Variable

Characteristics that can assume different values

A. Data Set	B. Variable	C. Data	D. Data value
A	B	age	Nationality
		20	Saudi
		25	Yemeni
		30	Egypt
		23	Jordanian
		30	Lebanese
gender			
male			
female			

- Data: The values (measurements or observations) that variables can assume
- Random variable: Variables whose determined by chance
- Data set: Collection of data values
- Data value (datum): Each value in the data set
- Population: Consists of all subjects (human or otherwise) that are being studied
- Sample: Subset of the population (group of subjects selected from a population)

Data collection

Sampling techniques

- Random sampling: A sample that all members of the population have an equal chance of being selected
- Systematic sampling: Kth (keyword)
- Stratified sampling: Dividing the population into subgroup then subjects are selected from each subgroup
 - Example: A researcher select a random sample from each gender to check their blood pressure.
 - Each group is a sample
 - Select all groups and take a sample from each group
- Cluster sampling: Dividing the population into sections and then selecting one or more section and using all members
 - Example: Take some groups "not all" then as a sample you take them all randomly

Survey

- Telephone surveys
- Mailed questionnaire surveys
- Personal interview

Studies

- Observational: Observes what is happening and type conclusions
 - Example: If a researcher records how many students are wearing lab coats over a period of time.
- Experimental: The researcher manipulates one of the variables and tries to determine how the manipulation influences other variables
 - Quasi experimental study: Sometimes when random assignment is not possible and a researcher uses intact groups
 - Groups: Treatment group (The group receives the specific treatment), Control group (The group don't receive the specific treatment)
 - Experiment variables: Independent "explanatory variable" (The variable being manipulated by the researcher), Dependent "outcome variable" (Is the result of the independent)

Branches

Descriptive

- Collection
- Organization
- Summarization
- Example: Average, Median

Inferential

- Generalizing
- Relationships
- Predictions
- Probability
- Studies and evidence

Qualitative

Categories

Nominal

No order or ranking

- Eye color
- Gender
- Blood type

Ordinal

Order and ranking

- Grade
- Size
- Rating scale

Measurement of scale of

Interval level

No meaningful zero at starting point

- Temperature
- IQ tests

Ratio level

A true zero at starting point

- Height
- Weight
- Time
- Salary
- Age

Quantitative

Numerical

Discrete

Integers

- Number of...

Continuous

Number between to specified numbers

- Temperature
- Height
- Weight
- Time