



Mute ur call

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Introduction to Statistics

Computer Oriented Numerical and Statistical Methods

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Outline

- Introduction
- Definition
- Functions of statistics
- Limitations

“Statistical thinking will one day be as necessary for effective citizenship as the ability to read and write” – H.G.Wells

Introduction

- The subject-matter of statistics has to do a great deal with the ‘[science of statecraft](#)’.
- The very word ‘statistics’ is said to have been derived from, say the Latin ‘*status*’, Italian ‘*statista*’, German ‘*statistik*’ or French ‘*statistique*’ all referring to the political state.
- In the past only population, its wealth or poverty was concern as statistics.
- Statistics in modern times is not a mere tool of state administration; it has become a fact of day-to-day life.

Introduction

- 'Statistics' is being used both as singular noun and a plural noun
 - As plural noun, it stood for data.
 - While as a singular noun, it represented a method of study based on analysis and interpretation of facts.
 - The word statistics may mean any one of the following:
 - Numerical statements of facts or simply data.
 - Scientific methods to help analysis and interpretation of data.
 - A measure based on sample observations.
 - But, only the first two of these being more relevant to general purposes.
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Who Uses Statistics?

Statistical techniques are used extensively by marketing, accounting, quality control, consumers, professional sports people, hospital administrators, educators, politicians, physicians, and many others.



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Introduction

- Statistics is concerned with reduction of data or with obtaining correct facts from figures.
 - Statistics deals with populations.
 - Statistics deals with variation.
 - Statistics deals with only numerically specified populations.
 - A single **figure** is not called as statistics.
e,g, Sales of computers in shop A is 300.
 - This is not a statistical statement.
 - But sales of a computers in three shops A, B and C are 300, 400 and 200 respectively.
 - This statement will be called a **Statistics**.
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Examples

- Production statistics is compiled for judging the progress of business firm (here 'statistics' has been used for data)
 - Statistics helps in simplification, analysis and presentation of data (here 'statistics' has been used to represent statistical methods)
 - Statistics derived from a small representative group taken from the whole lot use for drawing inference about the characteristics of the whole (here 'statistics' represents measure based on sample observations)
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Definition

- It is based under two main heads :
 - Statistics as data
 - Statistics as method
 - Statistics as data
 - Statistics are measurements, enumerations or estimation of natural or social phenomena, usually systematically arranged, analyzed and presented as to exhibit important inter-relationships among them. -----A.M. Tuttle
 - Statistics as method
 - The science which deals with the collection, classification and tabulation of numerical facts as a basis for explanation, description and comparison amongst phenomena.
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Definition

- Statistics as method
 - Statistics is the science and art of handling aggregate facts observing, enumeration, recording, classifying and other wise systematically treating them. -----Harlow
 - Statistics may be defined as the collection, presentation , analysis and interpretation of numerical data. ----- Croxton and Cowden.
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Characteristics Of Statistical As Data

- They must relate to the aggregate of facts
- They are affected to a marked extent by a multiplicity of causes
- They are numerically expressed.
- They should be enumerated or estimated.
- They should be collected with reasonable standard of accuracy.
- They should be collected in a systematic manner.
- They must be relevant to the purpose.
- They should be placed in relation to each other.

Distinction Between The Two

Statistics as data	Statistics as method
It is quantitative	It is an operational technique
It is often in the raw state	It helps in processing the raw data
It is descriptive in nature	It is basically a tool of analysis
It provides material for processing. Unprocessed data does not help in decision - making	The processing is done by the scientific methods of analysis and interpretation.
As it is, it would not make much sense without application of the tools of analysis	Tools of analysis will be idle without the facts available for making use of such tools

Distinction Between The Two

Statistics as data	Statistics as method
Surely the choice of tools will depends on the nature of data	The nature of the data to be collected will also depend on the tool sought to be used for processing

Functions Of Statistics

- To present facts in a proper form
- To simply wiely and complex data to make them easily understandable.
- To help classification of data.
- To provide technique for making comparisons.
- To enlarge individual experience
- To formulate policies in different fields.
- To study relationships between different phenomena.
- To indicate trend behavior.
- To measure uncertainty.
- To test a hypothesis.
- To draw valid inferences.

Limitations

- Statistics does not study individuals.
 - Statistics does not study qualitative phenomena.
 - Statistics results are true only on an average.
 - Statistical laws are not exact.
 - Statistic does not reveal the entire story.
 - Statistical relations do not necessarily bring out the cause and effect relationship between phenomena.
 - Statistics is collected with a given purpose and cannot be indiscriminately applied to any situations.
 - Statistics is liable to be misused.
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Levels of Measurement

There are four levels of data

Nominal

Ordinal

Interval

Ratio

Nominal data

Nominal level

Data that is classified into categories and cannot be arranged in any particular order.

Gender



Religious affiliation



Eye Color



Levels of Measurement

Nominal level variables must be:

Mutually exclusive

An individual, object, or measurement is included in only one category.

Exhaustive

Each individual, object, or measurement must appear in one of the categories.

Ordinal level: involves data arranged in some order, but the differences between data values cannot be determined or are meaningless.

During a taste test of 4 soft drinks, Coca Cola was ranked number 1, Dr. Pepper number 2, Pepsi number 3, and Root Beer number 4.



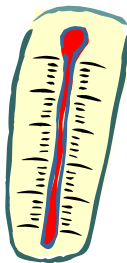
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Interval level

Similar to the ordinal level, with the additional property that meaningful amounts of differences between data values can be determined. There is no natural zero point.



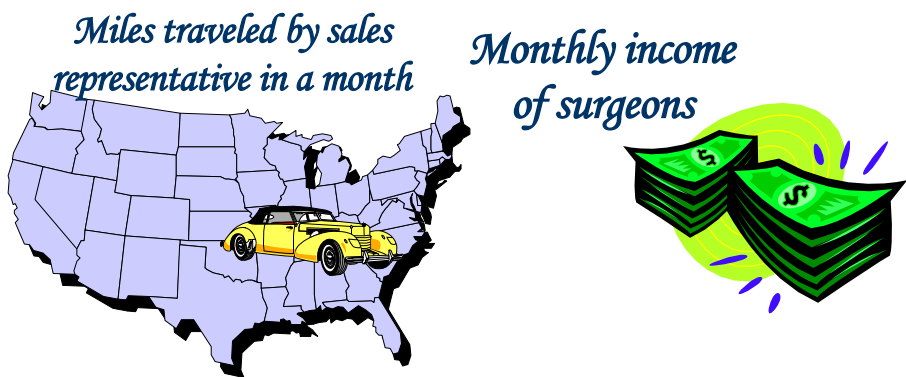
*Temperature on the
Fahrenheit scale.*

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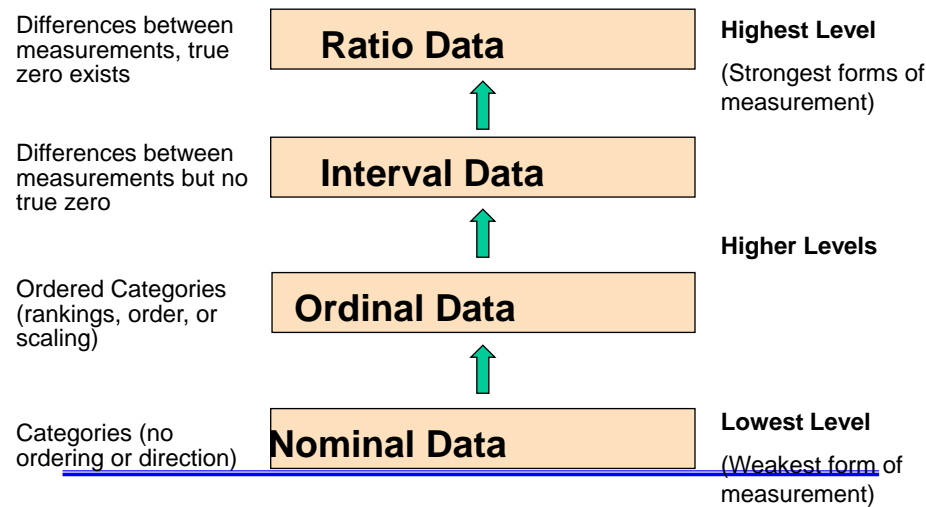
Ratio level: the interval level with an inherent zero starting point. Differences and ratios are meaningful for this level of measurement.



Levels of Measurement

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Levels of Measurement and Measurement Scales



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Levels of Measurement and Measurement Scales

EXAMPLES:

Ratio Data	Differences between measurements, true zero exists	Height, Age, Weekly Food Spending
Interval Data	Differences between measurements but no true zero	Temperature in Fahrenheit, Standardized exam score
Ordinal Data	Ordered Categories (rankings, order, or scaling)	Service quality rating, Standard & Poor's bond rating, Student letter grades
Nominal Data	Categories (no ordering or direction)	Marital status, Type of car owned

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