



**Research Methodology and Research Methods**

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**Quantitative Research Methods**

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**Session # 8**

**Quantitative Research Methods**

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**Quantitative Research Methods**

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**What is Statistics?**

- Science of gathering, analyzing, interpreting, and presenting data
- Branch of mathematics
- Course of study
- Facts and figures
- A death
- Measurement taken on a sample
- Type of distribution being used to analyze data

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### Quantitative Research Methods

#### Population Versus Sample

- Population — the whole
  - a collection of persons, objects, or items under study
- Census — gathering data from the entire population
- Sample — a portion of the whole
  - a subset of the population

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### Quantitative Research Methods

#### Descriptive vs. Inferential Statistics

- Descriptive Statistics — using data gathered on a group to describe or reach conclusions about that same group only
- Inferential Statistics — using sample data to reach conclusions about the population from which the sample was taken

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### Quantitative Research Methods

#### Parameter vs. Statistic

- Parameter — descriptive measure of the population
  - Usually represented by Greek letters
- Statistic — descriptive measure of a sample
  - Usually represented by Roman letters

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### Quantitative Research Methods

#### Symbols for Population Parameters

- $\mu$  denotes population mean
- $\sigma^2$  denotes population variance
- $\sigma$  denotes population standard deviation

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### Quantitative Research Methods

#### Symbols for Sample Statistics

- $\bar{x}$  denotes sample mean
- $S^2$  denotes sample variance
- $S$  denotes sample standard deviation

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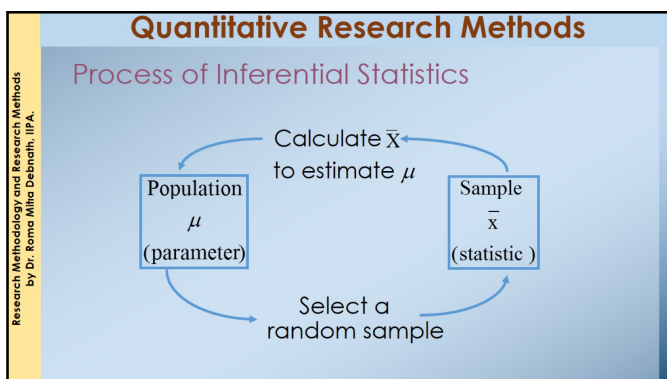
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## Quantitative Research Methods

### Levels of Data Measurement

- Nominal — Lowest level of measurement
- Ordinal
- Interval
- Ratio — Highest level of measurement

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## Quantitative Research Methods

### Nominal Level Data

- Numbers are used to classify or categorize
  - Example: Employment Classification
    - 1 for Educator
    - 2 for Construction Worker
    - 3 for Manufacturing Worker
  - Example: Ethnicity
    - 1 for African-American
    - 2 for Anglo-American
    - 3 for Hispanic-American

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## Quantitative Research Methods

### Ordinal Level Data

- Numbers are used to indicate rank or order
  - Relative magnitude of numbers is meaningful
  - Differences between numbers are not comparable
- Example: Ranking productivity of employees
- Example: Taste test ranking of three brands of soft drink
- Example: Position within an organization
  - 1 for President
  - 2 for Vice President
  - 3 for Plant Manager
  - 4 for Department Supervisor
  - 5 for Employee

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## Quantitative Research Methods

### Interval Level Data

- Distances between consecutive integers are equal
  - Relative magnitude of numbers is meaningful
  - Differences between numbers are comparable
  - Location of origin, zero, is arbitrary
  - Vertical intercept of unit of measure transform function is not zero

Example: Fahrenheit Temperature  
 Example: Calendar Time  
 Example: Monetary Utility

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## Quantitative Research Methods

### Ratio Level Data

- Highest level of measurement
  - Relative magnitude of numbers is meaningful
  - Differences between numbers are comparable
  - Location of origin, zero, is absolute (natural)
  - Vertical intercept of unit of measure transform function is zero

Examples: Height, Weight, and Volume  
 Example: Monetary Variables, such as Profit and Loss, Revenues, and Expenses  
 Example: Financial ratios, such as P/E Ratio, Inventory Turnover, and Quick Ratio.

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## Quantitative Research Methods

### Usage Potential of Various Levels of Data

The diagram consists of four concentric squares. The outermost square is yellow and labeled 'Ratio'. Inside it is a blue square labeled 'Interval'. Inside that is a white square labeled 'Ordinal'. The innermost square is blue and labeled 'Nominal'.

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