

# Basic Concepts of Measurement

Assigning numbers to object to facilitate the use of mathematics

## 1. Levels of Measurement

- Nominal data
- Ordinal Data
- Interval Data
- Ration Data
- Continuous and discrete

## 2. Operationalisation

- The process of specifying how a concept will be defined and measured.
- For eg Intelligence has no definite metric , instead we use IQ score to measure intelligence,
- Disaster preparedness, quality in life, pain etc are other examples

## 3. Proxy measurement

The process of substituting one measurement with another

## 4. Errors

- Reducible errors /systemic errors
- Irreducible errors / random errors

## 5. Reliability and Validity

To evaluate methods of measurement, we use reliability and validity,

### 5.1 Reliability

- How consistent or repeated measurements are.
- Many of the measures of reliability draws on correlation coefficient
- Three primary approaches: multiple occasion reliability, multiple forms reliability and internal consistency.
- Multiple occasion : how similarly a test or scale performs over repeated administration. Also referred as temporal stability - stability over time. A common technique for assessing is to measure the correlation coefficient of the scores from each occasion of the testing - this is called coefficient of stability
- Multiple form : how similarly different versions of testing perform in measuring the same entity, coefficient of equality is used to assess this.
- Internal consistency : how well the items that make up an instrument reflect the same construct. Average inter item correlation, average item total correlation

### 5.2 Validity

- Refers to how well a test or scale measures what it is supposed to measure
- Degree to which a data adheres to business needs or constraints.
- Types : Content validity, Construct validity, concurrent validity, predictive validity

## 6. Triangulation

- The process of combining different information from different sources to arrive at a true or at least most accurate value
- Multi method matrix(MTMM)

## **7. Measurement Bias**

- Source of systemic errors.
- Basically classified in two groups : bias during selection/retention and bias during information collection/recording
- Bias during Selection/retention : selection bias, volunteer bias, nonresponse bias, informative censoring
- Bias during information collection and recording : interviewer bias, social desirability bias, detection bias, Recall bias