Week-05-L-05

Data Presentation and Interpretation

Good Data Tracking

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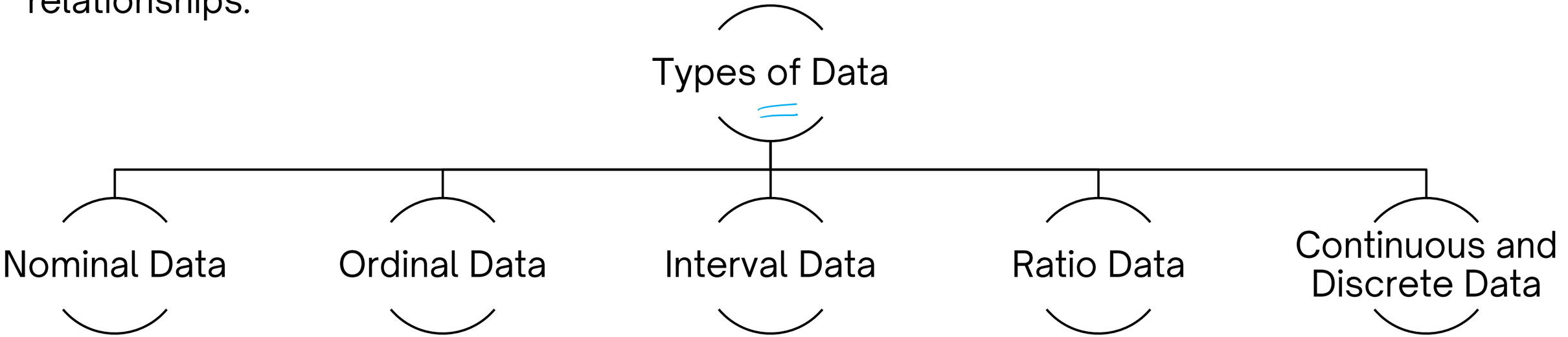
Measurement (recalling)

Measurement is the process of systematically assigning numbers to objects and their properties to facilitate the use of mathematics in studying and describing objects and their relationships.



Operationalization

- Operationalization means turning abstract concepts into measurable observations.
- Operationalization is always necessary when a quality of interest cannot be measured directly.
- An obvious example is intelligence, spirituality or anxiety.
- For example, there is no way to measure intelligence directly, so in the place of such a direct measurement, we accept something that we can measure, such as the score on an IQ test.

Source:
https://www.southsouth-galaxy.org/partner-of-the-month-fao/

Proxy Measurement

- The term proxy measurement refers to the process of substituting one measurement for another.
- Although deciding on proxy measurements can be considered as a subclass of operationalization, this book will consider it as a separate topic.
- The most common use of proxy measurement is that of substituting a measurement that is inexpensive and easily obtainable for a different measurement that would be more difficult or costly, if not impossible, to collect.
- Another example is collecting information about one person by asking another, for instance, by asking a parent to rate her child's mood state.

True and Error Scores

Classical measurement theory conceives of any measurement or observed score as consisting of two parts: true score (T) and error (E). This is expressed in the following formula:

$$X = T + E$$

- where X is the observed measurement,
- T is the true score, and
- E is the error.

- However, both T and E are hypothetical constructs, in the real world, we seldom know the precise value of the true score and therefore cannot know the exact value of the error score either.

- Much of the process of measurement involves estimating both quantities and maximizing the true component while minimizing error.

Reliability and Validity

Reliability refers to how consistent or repeatable measurements are.

It has four characteristics,

performance (x),
probability (p),
time period (t), and
environment (e).

From statistical viewpoint, it is of three types:

1. Multiple-occasions reliability (‘t’ varied)

2. Multiple-forms reliability (‘e’ varied)

3. Internal consistency reliability (‘x’ or/and ‘p’ varied)

Reliability and Validity

Validity refers to how well a test or rating scale measures what it is supposed to measure. It's of four types:

1. Content Validity:

- It is the extent to which a measure covers the construct of interest.
- For example, if a researcher conceptually defines test yield as involving both seed quality and rainfall, then his measure of test yeild should include items about seed type and extent of rainfall.

2. Face Validity

- It is the extent to which a measurement method appears "on its face" to measure the construct of interest.
- For example, farmers would expect a seedbag specifications (size, date, etc.) to expect the good yield.

Reliability and Validity

Validity refers to how well a test or rating scale measures what it is supposed to measure. It's of four types:

3. Concurrent Validity
- When the criterion is measured at the same time as the construct, i. e., when live or parallel observations and measurements happen.
- For example, sowing seeds and measuring depth.

4. Predictive Validity
- When the criterion is measured at some point in the future (after the construct has been measured).
- For example, sowing seeds (knowing the depth) and predicting the size of plant or fruit.

Thank you