Department of applied-economics &commerce management programme

Patna University

BRM, sem-2nd

By

Ranjeet Kumar Ranjan,

Part time assistant professor, P.G department of psychology

Contact no. 6203743650

E-mail id- ranjeetkrbhu1234@gmail.com

MEASUREMENT

Measurement scales are used to categorize and/or quantify variables. This lesson describes the four scales of measurement that are commonly used in statistical analysis: nominal, ordinal, interval, and ratio scales.

Properties of Measurement Scales

Each scale of measurement satisfies one or more of the following properties of measurement.

- **Identity**. Each value on the measurement scale has a unique meaning.
- **Magnitude**. Values on the measurement scale have an ordered relationship to one another. That is, some values are larger and some are smaller.
- **Equal intervals**. Scale units along the scale are equal to one another. This means, for example, that the difference between 1 and 2 would be equal to the difference between 19 and 20.
- **A minimum value of zero**. The scale has a true zero point, below which no values exist.

The Four Scales of Measurement:-

Data can be classified as being on one of four scales: **nominal, ordinal, interval or ratio.** Each level of measurement has some important properties that are useful to know. For example, only the ratio scale has meaningful zeros.

1. **Nominal Scale.** Nominal variables (also called categorical variables) can be placed into categories. **They don't have a numeric value** and so cannot be added, subtracted, divided or multiplied. They also have no order; if they appear to have an order then you probably have ordinal variables instead. A nominal scale simply describes difference between things by assigning them into categories.
   Nominal data is, thus, counted data.
   Note: a sub-type of nominal scale with only two categories (e.g. male/female) is called "**dichotomous**."
   Nominal scales are used for labeling variables, without any quantitative value. "Nominal" scales could simply be called "labels."

2. **Ordinal Scale**: The lowest level of ordered scale that is commonly used is the ordinal

scale. The ordinal scale contains things that you can place in order.

Ordinal scales are typically measures of non-numeric concepts like satisfaction, happiness, discomfort, etc.

"Ordinal" is easy to remember because is sounds like "order" and that's the key to remember with "ordinal scales"–it is the *order* that matters, but that's all you really get from these.

For example, hottest to coldest, lightest to heaviest, richest to poorest. Basically, if you can rank data by 1st, 2nd, 3rd place (and so on), then you have data that's on an ordinal scale.

3. **Interval Scale**: An interval scale has ordered numbers with meaningful divisions.

Interval scale provide more powerful measurement than ordinal scales.

Temperature is on the interval scale: a difference of 10 degrees between 90 and 100 means the same as 10 degrees between 150 and 160. Compare that to high school ranking (which is ordinal), where the difference between 1st and 2nd might be .01 and between 10th and 11th .5. If you have

meaningful divisions, you have something on the interval scale.

4. **Ratio Scale**: The ratio scale is exactly the same as the interval scale with one major difference: zero is meaningful. It have an absolute or true Zero of measurement. It represent the actual amount of variables. They tell us about the order, they tell us the exact value between units, AND they also have an absolute zero–which allows for a wide range of both descriptive and inferential statistics to be applied.

For example, a height of zero is meaningful (it means you don't exist). Compare that to a temperature of zero, which while it exists, it doesn't mean anything in particular (although admittedly, in the Celsius scale it's the freezing point for water).