Measurement Scales

The type of unit on which a variable is measured, is called a scale. Traditionally there are four types of measurement scales, viz. i) nominal, ii) ordinal, iii) interval & iv) ratio.

Theoretically, a measuring scale can have one or more of the following mathematical attributes: a) magnitude, b) an equal interval bet^n adjacent units, c) an absolute zero point.

Nominal Scale:

The word 'nominal' is derived from 'nomen', the latin word for name. A nominal scale is the lowest level of measurement and most often it is used with variables that are qualitative (categorical) in nature rather than quantitative. Thus, the key attribute for a nominal scale is that there is no inherent quantitative difference among the categories.

A fundamental property of nominal scales is that of "Equivalence", ie all members of a given class are the same from the stand point of the classification variable.

An operation often performed in conjunction with nominal measurement is that of counting the instances within each class. Thus, a nominal scale does not possess any of the mathematical attributes viz. magnitude, equal interval or absolute zero point. It merely allows categorization of objects into mutually exclusive categories.

Example: Male & female workers in organized sectors & unorganized sector etc. depending on their status.

Ordinal scale

An ordinal scale represents the next higher level of measurement. It possesses a relatively low level of the property of magnitude. We rank-order the objects being measured according to whether they posses more, less or the same amount of the variable being measured, ie it allows determination of whether $A > B$, $A = B$ or $A < B$.

However it says nothing about the magnitude of difference betn adjacent units on the scale. The scale also doesnot tell about the absolute level of the variable (eg. they all could be high - or - they all could be low)

Eg. Rank in Exam

Interval Scale

The interval scale represents a higher level of measurement than the ordinal scale. Unlike the ordinal scale, an interval scale has a constant interval ~~bn~~ betn two ~~consect~~ consecutive values but lacks a true 0 - point.

[Here by 'equal interval betn adjacent units' we mean that there are equal amounts of the variable being measured betn adjacent units on the scale.]

As a result one can add or subtract values on an interval scale but can not multiply or divide units.

Temperature used in day - to - day weather report is ~~the~~ a classical example of an interval scale. The assignment of the no. 0 to a particular height in a column of mercury is ~~an~~ the arbitrary convenience, apparent to ~~everyone~~ anyone familiar with the difference betn

Date / /

the celsius & Fahrenheit scales. As a result, one can not say that 30°C is twice as warm as 15°C because that statement involved implied multiplication. To cross check the claim, these two temperatures can be converted into fahrenheit & they become 86°F & 50°F respectively.

Nevertheless temperature has constant interval betn nos, permitting one to add & subtract. The difference betn 28°C & 21°C is 7°C as is the diff. betn 53°C & 46°C.

Ratio Scale:

The next & the highest level of measurement scale is called a ratio scale. It has all the properties of an interval scale & in addition, has an absolute zero point.

As a result, one can multiply & divide as well as add & subtract using ratio scales. Units of time (sec., hour); distance & length (cm., km.); weight (mg., kg) & volume (cc) are all ratio ~~scale~~ scales.

Scales involving division of two ratio scales are also themselves ratio scales. Hence speed (mile per hour) is also ratio scale.

Note that even though ratio scale has a true 0-point, it is possible that the nature of the variable is such that the value of 0 will never be observed. For example, human height is measured on a ratio scale but every human has a height greater than 0.