

SCALE DEVELOPMENT

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INTRODUCTION

- In quantitative research, measurement of variables is an indispensable requirement.
- Defining what is to be measured, and how it is to be accurately and reliably measured depends upon the research objective and instrument quality.
- Some concepts that are inherently abstract in nature (e.g. consumer satisfaction, brand loyalty of consumers) are more difficult to measure than concepts which can be assigned numerical values (e.g. sales volume).
- **However in order for a concept to have the quality of being measurable, it must first be made operational.**
- **An operational definition gives meaning to the concept by specifying the activities or operations which are necessary in order to measure it.**



MEASUREMENT AND SCALING

- Measurement means assigning numbers or other symbols to characteristics of objects according to certain pre-specified rules.
- Scaling is considered as an extension of measurement and involves creating a continuum upon which measured objects are located.
- There are four primary scales of measurement:
 - Nominal scales
 - Ordinal scales
 - Interval scales
 - Ratio scales



NOMINAL SCALE: MEANING

- A nominal scale is the simplest of the four scale types, in which numbers or letters assigned to objects and serve as labels for identification or classification of objects.
- It involves simply count of the frequency of the cases assigned to the various categories.
- Example: Registration/Roll number of students; Numbers assigned to cricket players
- The classes are mutually exclusive and collectively exhaustive.



NOMINAL SCALE: SIGNIFICANT CHARACTERISTICS

- The numbers have no arithmetic properties and act only as labels.
- The only measure of average which can be used is the mode because this is simply a set of frequency counts.



ORDINAL SCALE: MEANING

- An ordinal scale is a ranking scale that arranges objects or alternatives according to their magnitude.
- Numbers are assigned to objects which allows researchers to determine whether an object has more or less of a characteristics than some other object but not how much more or less.
- An ordinal scale indicates relative position, not the magnitude of the differences between the objects.
- Example
 - Investment Climate = Bad, inadequate, fair, good, very good
 - Merit = A grade, B grade, C grade, D grade



ORDINAL SCALE: SIGNIFICANT CHARACTERISTICS

- All of the information a nominal scale has, is also available from an ordinal scale.
- In addition, positional statistics such as the median, quartile and percentile can be determined.
- Order of preference is known but no information how much more one brand is preferred to another, that is there is no information about the interval between any two brands.



INTERVAL SCALE: MEANING

- An interval scale is a scale that not only arranges objects or alternatives according to their respective magnitudes, but also distinguishes this ordered arrangement in units of equal intervals (i.e. interval scales indicate order (as in ordinal scales) and also the distance in the order).
- Example: Temperature scale; Consumer Price Index
- Interval scale allows comparisons of the differences of magnitude (e.g. of attitudes) but do not allow determinations of the actual strength of the magnitude.



INTERVAL SCALE: SIGNIFICANT CHARACTERISTICS

- The interval or cardinal scale has equal units of measurement, thus interprets not only order of scale scores but also distance between them.
- Zero point on an interval scale is arbitrary and is not a true zero. It is possible to add or subtract a constant to all of the scale values without affecting the form of the scale but one cannot multiply or divide the values. It can be said that two respondents with scale positions 1 and 2 are as far apart as two respondents with scale positions 4 and 5, but not that a person with score 10 feels twice as strongly as one with score 5.
- Temperature is interval scaled, being measured either in Centigrade or Fahrenheit. 50°F being twice as hot as 25°F since the corresponding temperatures on the centigrade scale, 10°C and -3.9°C , are not in the ratio 2:1.



INTERVAL SCALE: SIGNIFICANT CHARACTERISTICS

- Unlike previous two scales, arithmetic mean as the measure of average is determined.
- Numerical Operations: Arithmetic Operations on Intervals between numbers
- Descriptive Statistics: Mean, standard deviation, variance
- Hypothesis testing



RATIO SCALE: MEANING

- The highest level of measurement is a ratio scale.
- It possesses all the properties of the nominal, ordinal, and interval scales. In addition, an absolute zero point is specified; that is, the origin of the scale is fixed.
- It allows comparisons of the differences of magnitude as well as determinations of the actual strength of the magnitude (ratios/multiplications).
- **Examples:**
 - Money
 - Weight
 - Distance



THANKS

- QUESTIONS ????

