

VARIABLES

1. Types of variables

- Continuous or quantitative variables
- Discrete or qualitative variables

2. Continuous or quantitative variables

- Interval-scale variables
 - Interval scale data has order and equal intervals.
 - Interval scale variables are measured on a linear scale, and can take on positive or negative values.
 - It is assumed that the intervals keep the same importance throughout the scale.
 - They allow us not only to rank order the items that are measured but also to quantify and compare magnitudes of differences between them.
 - With interval data, one can perform logical operations, add, and subtract, but one cannot multiply or divide.
 - For instance, if a liquid is at 40 degrees and we add 10 degrees, it will be 50 degrees. However, a liquid at 40 degrees does not have twice the temperature of a liquid at 20 degrees because 0 degrees does not represent 'no temperature'
- Ratio-scale interval
 - Finally, in ratio measurement there is always an absolute zero that is meaningful.
 - This means that you can construct a meaningful fraction (or ratio) with a ratio variable.
 - Weight is a ratio variable.

- In applied social research most 'count' variables are ratio, for example, the number of clients in past six months.
- Why? Because you can have zero clients and because it is meaningful to say that "...we had twice as many clients in the past six months as we did in the previous six months."

3. Qualitative or Discrete Variables

- Discrete variables is also called categorical variables
 - Nominal variables
 - Ordinal variables
- Nominal variables
 - Nominal variables allow for only qualitative classification.
 - That is, they can be measured only in terms of whether the individual items belong to certain distinct categories, but we cannot quantify or even rank order the categories
 - Nominal data has no order, and the assignment of numbers to categories is purely arbitrary.
 - Because of lack of order or equal intervals, one cannot perform arithmetic (+, -, / or *) or logical operation (<, >, =) on the nominal data.
 - E.g. male and female, unmarried, married, divorce or widower.
- Ordinal variables
 - A discrete ordinal variable is a nominal variable, but its different states are ordered in a meaningful sequence
 - Ordinal data has order, but the intervals between scale points may be uneven.
 - Because of lack of equal distances, arithmetic operations are impossible, but logical operations can be performed on the ordinal data.

- A typical example of an ordinal variable is socio-economic status of families.
- We know upper middle is higher than middle but we cannot say how much higher.
- Ordinal variables are quite useful for subjective assessment of quality; importance or relevance.
- Ordinal scale data are very frequently used in social and behavioral research.
- Almost all opinion surveys today request answers on three-, five- or seven-point scale.
- Such data are not appropriate for analysis by classical techniques, because the numbers are comparable only in terms of relative magnitude, not actual magnitude.
- Consider for example a questionnaire item on the time involvement by selecting one of the following codes:
 - 1 = very low or nil
 - 2 = low
 - 3 = medium
 - 4 = great
 - 5 = very great

4. Response variables/target variables

- Often called a dependent variable or predicted variable.
- This is the variable that is being watched and/or measured

5. Explanatory variables/predictor variables

- Any variable that explains the response variable or predictor variable.
- Its values will be used to predict the value of the target variable.
- This is the variable manipulated by the experimenter.

Ratio	absolute zero
Interval	distance is meaningful
Ordinal	attributes can be ordered
Nominal	attributes are only name; weakest

6. Confounding variable

- A confounding variable (also confounding factor, lurking variable, a confound, or confounder) is an extraneous variable in a statistical model that correlates (positively or negatively) with both the dependent variable and the independent variable.
- Extraneous variables are undesirable variables that influence the relationship between the variables that an experimenter is examining.
- In other words, confounding is a variable that is associated with the predictor variable and is a cause of the outcome variable.