Scales of Measurements

Course: Statistics

Lecturer: Dr. Courtney Pindling

Measurements

- Measurement is the assignment of numbers to objects or events according to prescribe rules

- The scale of measurement determines the amount of information contained in the data and the most appropriate data summarization and statistical analysis applicable

Scales

- Once assigned, these numbers have certain properties that must be adhere to
- Types of measurement scales
  - Nominal scale
  - Ordinal scale
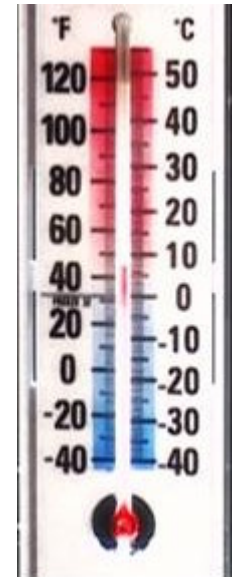 - Interval scale
  - Ratio scale

Nominal Scale

- Assignment for sole purpose of **differentiating** one **object** from another
- Nominal: *not* subjected to arithmetic or statistical manipulations
- Variables consisting of **labels** or **names** to identify an attribute of an object
  - US 66 and US 99
  - Sam's locker number 68 vr. Mike's locker no. 45
  - "1" for males and "2" for females

Ordinal Scale

- Same as nominal but **order** or **rank** is meaningful

- Survey Questionnaire:
  - "1" for Poor
  - "2" for Good
  - "3" for Excellent

- "3" is better than "1"

- Labels: nonnumeric or numeric codes

Interval Scales

- Same as ordinal but the **amount of difference** meaningful (fixed units of measure)
- Interval data are always **numeric**
  - e.g. Deg. Fahrenheit scale
  - 20 to 40 deg is same difference as 50 to 70 deg
  - *Cannot* say that 80 deg is twice as hot as 40 deg
- Aptitude scores are interval numbers

Ratio Scale

- Same as interval and the ratio of the two numbers are meaningful
- Ratio numbers have absolute zero points
- **Abs. Zero**: "Nothing exist for variable"
- Ratio variables:
  - Distance, height, weight
  - Time, speed, cost
- 30 mph / 15 mph => 30mph is *twice as fast* as15mph

Summary

- Be aware of the scales of your measurements
- Learn appropriate statistical methods for each scale
  - Nominal – categories
  - Ordinal - less than or better than
  - Interval and Ratio – summaries and predictions