

# *Roadmap to Data Analysis*

II. Primer on Measurement &  
Variables - Preparatory to Choosing  
the Right Statistical Test

# Learning Objectives

- Understand the definitions of types of variables
- Understand the various levels of measurement
  - Continuous variables
  - Categorical, nominal and ordinal variables
- Identify best ways to report data

# Refresher Course: Variables

- *Variable* – characteristics that *vary* among individuals
- *Independent variable* – the variable we believe to be associated with, related to, or affecting, the dependent variable
- *Dependent variable* – the variable we believe changes in relation to changes in the independent variable
- *Example:* Does a longer treatment regime (independent variable) result in improved outcomes (dependent variable)?

# Levels of measurement: Continuous Variables

- Continuous variables are those that increase or decrease steadily, rather than differ by categories, such as
  - Age (but not age *categories* or *ranges*)
  - Total score of the PTSD checklist
  - Number of active clients
  - Proportion of clients in treatment
  - Annual income (but not *income ranges*)

# Levels of measurement:

## Categorical variables

- “Categories” of things
  - *Nominal*: discrete categories, but no order implied
    - Gender
    - Ethnicity
    - In treatment vs. not in treatment
  - *Ordinal*: discrete categories, but ordered
    - “I am satisfied” 1 (Strongly disagree) to 5 (Strongly agree)
    - Any *Likert* scale – “Answer how strongly... 1-5”
    - *Age group* (18-25; 26-40; 41-60; or over 60)
    - *Income categories* (\$0-\$14,999; \$15,000-\$29,999; \$30,000-\$59,999; or \$60,000 or higher)

# Exercise

- Review some of your data collection instruments (intake, outcomes, etc)
- What types of measurement do the instruments entail?
  - Continuous?
  - Nominal?
  - Ordinal?
- For “free text” questions (i.e. “Tell me what brought you to our agency...”), how might you change this to a more measurable variable?

# For new questions – which level of measurement?

- As a rule of thumb, it's always better to gather data in as much detail as possible
  - i.e., for income, collect it as a continuous variable, whenever feasible
    - “What is your monthly income?”
  - You can always create a categorical variable for analysis
    - i.e. “75% of our clients earn less than \$25,000 per year”
  - Whereas if you collected the data using categories (income ranges), you would not have the detail

# Reporting Ordinal and Nominal Data

- For Likert Scale questions, you have two options for reporting (each implying different statistical procedures)\*:
  - Report the count and percentage of people who responded, i.e. “40 clients, or 75% of respondents, reported ‘Satisfied’ or ‘Very satisfied’”)
  - Report averages scores (“The average response to the question ‘I was satisfied with my care’ was 3.5, out of a best rating of 5”). Here you would be treating an ordinal variable as if it was continuous.
- For nominal scale questions, you would, of course, report the count and percentage, such as
  - “Of our 40 SOT clients, 10 (25%) are from Iraq, 5 (12.5%) are Congolese... etc.”

\*See III. Choosing the Right Statistical Test