Chapter 5 – Measures
Study Questions

- What is the difference between conceptual and measured variables?
- What is an operational definition?
- What are the differences among nominal, ordinal, interval and ratio scale variables?

We will be talking about things you measure

- DVs are measured (in an experimental design)
    - Outcome variables are measured (in correlational design)
    - Predictor variables are measured (in correlational design)

Measurement

- Refers to the assignment of numbers or objects or events according to specific notes
    - You make the rules
    - This can be good or bad
        - If you construct your measures properly it's good
        - If you don't, it's bad

An Example of the Good and Bad

- Say you want to measure the construct "Self-Respect"
- One conceptualization is…
    - Taking the time to present a good appearance
        - Dressing in nice clothing
        - Doing your Hair
- Another is…
    - Speaking with confidence
        - Making eye contact
        - Time and volume
- Which is 'correct'?

Another "Good" Example

- **Kim & Spelke (1992)**
- **Do infants understand Gravity?**
    - We know that young children are interested in novel events, but that after repeated exposure to those events, they lose interest (Habituation)
    - You can measure the amount of time that a child stares at a stimuli

The Results

- Infants who were 5 months old looked at the Gravity-consistent 'up' path longest. (2 "new" events)
- Infants who were 7 months old looked at the Gravity-inconsistent path longest. (1 'new' event compared to the laws of gravity)

Fundamentals of Measurement

Conceptual Variables

- The ideas that form the basis of a research hypothesis

Measured Variables

- Consist of items that represent (approximate) conceptual variables

Operational Definition

- Refers to a precise statement of how a conceptual variable is turned into a measured variable
    - You always want to tell your reader how your concepts are represented by your measures

Image

Conceptual and Measured Variables in a Correlational Resign Design

Image

Conceptual and Measured Variables in an Experimental Research Design

- Attracted people and unattractive people are offered help differently
- Attracted people are more likely to be given help
- Conceptual Variables: Attractiveness, helping
- IV with a Measured DV: Attractive Person vs. Average Person, Number of people who help

Converging Operations

- The use of different operationalization of the same conceptual variable allowing the research to triangulate in on the conceptual variable of interest

Nominal Variable

- Used to name or identify a particular characteristic
    - People who share a value on the variable are equivalent in some way
    - Those that do not share the value are different from each other
- Gender, Favorite Ice Cream Flavor, Birth Order, Relationship Status, etc.

Quantitative Variable

- Uses numbers to indicate the extent to which a person possess a characteristic of interest
- The number, in some way clarifies the specific application of the conceptual variable
- How much X?

Measurement Scales

Scaling

- Specifics the relationship between the numbers on a quantitative measured variable and the values of the conceptual variable
- 3 types of scaling

1. Ordinal Scale

- Numbers indicate whether there is more or less of the conceptual variable, but do not indicate the exact interval between the individuals on the conceptual variable
    - Rating your liking for ice cream flavors from 1 (like most) to 4 (like least) is an example of an ordinal scale

2. Interval Scale

- Equal distances between scores on a measure are known to correspond to equal changes in the conceptual variable
- A change from 4 to 7 is equal to a change from 7 to 10.
- Also, fractions have meaning
    - E.g. 4.5, 5.87, 6.95, etc.

3. Ratio Scale

- Interval scales that also have a true zero point
    - A complete absence of what is being measured
- The presence of a zero point allows us to multiply and divide scale values
- The Kelvin temperature scale, where zero degrees represents absolute zero, is an example of a ratio scale
    - Also distance
    - Fractions have meaning

Self-Report Measures

- Individuals are asked to respond to questions posed by an interviewer or a questionnaire

Behavioral Measures

- Designed to directly measure what people do
- AKA Observational Measures

Free-formal Self-Report Measures

- Allow respondents to indicate whatever thoughts or feelings they have about the topic, without any constraints imposed

3 Types

1. Projective Measures
2. Associative Lists
3. Think-aloud Protocols

Project Measures

- A measure of personalities
- An unstructured image is shown to participants who are asked to freely list what comes to mind as they view the image
- Example – Thematic Apperception Test (TAT)
    - Respondents are shown one more pictures and asked to describe what I happening, what dialogue might be carried between characters and/or how the ‘story might continue

    - Someone who has anxiety can describe image as something that they are anxious
    - You can below surface and understand client is processing information and get sense where they need help

Associative Lists

- Free-format responses to a list of words
- E.g. “List anything that comes to mind when you think about these college majors.”
    - English -> Book Worm
    - Math -> Nerd
    - Computer Science -> Geek
    - History -> Clueless
    - Pre-Med -> Overachiever
    - Psychology -> Cool Person

Think-aloud Protocols

- Individuals are asked to verbalize the thoughts they are having as they complete a task
    - I am interested in assessing people’s frustration threshold. “Can you solve the puzzle tell me everything that you are thinking or feeling”
    - Fixed-format “Think-Aloud Example”: Test subjects are subjected to various levels of pain, ranging from “I don’t feel anything” to “Worst Pain ever”. Subjects were told that as the pain levels changed, they should move the slider toward one end of the box or the other

Difficulties of Coding Free-Format Data

- Free-format self-report measures can produce a rich set of data
- Can be difficult and time-consuming to turn the generated thoughts into a set of measured variables
- Hard to compare individuals (Some people are more expressive, better vocabulary)

Fixed-format Self-Report Measures

- The individual is presented with set of questions called “items”
- Responses that can be given are more structured than in free-format measures

Scales

- Fixed-format self-report measures that contain more than one item, but that are all measuring the same concept
- The most popular type is the “Likert Scale”
    - A Likert scale consists of a series of items that indicate agreement or disagreement with the issue that is to be measured

Example of Likert Scale: Swim, Aikin, Hall & Hunter, 1995
Selected items from the Modern Sexism Scale

1. Women often miss out on good jobs due to sexual discrimination
2. It is rare to see women treated in a sexist manner on television
3. Society has reached the point where women and men have equal opportunities for achievement

- Strongly Disagree (-3)
- Strongly Agree (3)

Acquiescent Responding

- May occur if all the items on a Likert scale are phrased in the same direction
    - Not possible to tell if the respondent is simply tending to agree with everything
- Or
    - If he or she really agrees with the content of the items

Semantic differential

- The topic being evaluated is presented once at the top of the page
- Items consist of pairs of adjectives located at the two endpoints of a standard response format
    - Example: Bad vs. Good (-3 to 3)
    - Skilled vs. Inept (-3 to 3)
    - Disappointing vs Inspiring (-3 to 3)

Guttman scale

- Involves the creation of differences in the items themselves
- Items are arranged in a cumulative order
- If a respondent correctly answers any one item, it is assumed he or she also will correctly answer all of the previous items so they get harder questions
- If you make mistakes, you will go back to easier questions
    - IQ tests, the GRE test

Chapter 6
Problems with Self-report Measures
Reactivity

- Changes in responding that occur when individuals know they are being measured
- Common types include
    - Social desirability
    - Self-promotion

Social Desirability

- The natural tendency for research participants to present themselves in a positive or socially acceptable way to the researcher