Chapter 6. Composite Measures - Indexes, Scales and Typologies

- What are indexes, scales, and typologies
- Index construction
  - Item selection
  - Examination of empirical relationships
  - Index scoring
  - Handling missing data
  - Index validation
- Index and Scale construction
  - Bogardus social distance scale
  - Thurstone scale
  - Likert scale
  - Semantic Differential
- Typologies

What are indexes, scales, and typologies?

- Index
  - Ordinal
  - Unidimensional
  - Simple accumulation of scores assigned to individual indicator
- Scale
  - Ordinal
  - Unidimensional
  - Assignment of scores to patterns of indicators
- Typology
  - Nominal
  - Multi-dimensional
  - Summarize the interaction of two or more variables

An Example of Index

- Variable: Power/Prestige dimension of money attitude
  - I tend to judge people by their money rather than their deeds
  - I behave as if money were the ultimate symbol of success
  - I find that I seem to show more respect to those people who possess more money than I do.
  - I own nice things in order to impress others
  - I purchase things because I know they will impress others
  - People that know me tell me that I place too much emphasis on the amount of money people have, as a sign of their success.
  - I enjoy telling people about the money I make.
  - I try to find out if other people make more money than I do.
- Always=1, never=7, sometimes=4. Highest score=7*8=56, lowest score=1*8=8.

An Example of Scale – note the pattern of structure in indicators

- A scale of overall political activism
  - Ran for office
    - Yes(4), no (go to the next indicator)
  - Worked on a political campaign
    - Yes(3), no (go to the next indicator)
  - Contributed money to a political campaign
    - Yes(2), no (go to the next indicator)
  - Voted
    - Yes(1), no(0)
- Attributes: 0-4
  - 0 (lowest political activism)
  - 4 (highest political activism)

An Example of Typology

- The color code personality questionnaire (Taylor Hartman, a total of 45 items)
  - Example of one of the 45 items
    - In social situations, I am most often
      - A. Feared by others
      - B. Admired by others
      - C. Protected by others
      - D. Envied by others
  - Add the number of A answers, then the B answers, etc.
  - Attributes: 4 personalities
    - Red: decisive, responsible, arrogant, selfish
    - Blue: loyal, caring, suspicious, self-righteous
    - White: tolerant, inventive, unproductive, silently stubborn
    - Yellow: fun, outgoing, undisciplined, too impulsive

Constructing Indexes and Scales

- Item(Indicator) selection
- Examination of relationships among items(indicators)
- Index scoring
- Handling missing data
- Index validation

Item(Indicator) Selection

- Face validity: the items should make sense
- Unidimensionality: the items should reflect only one dimension
- Variance: there should be enough people who would choose different categories on an item. If everybody would choose the same value on an item (say if everybody agrees with a statement used as an item), then this item should not be included.

Examination of Relationships

- Bivariate relationships among items –
  - If two items are perfectly correlated, then one of them is redundant as it does not provide any additional information
  - If two items are not correlated at all, then it is not likely that they are measuring the same concept
  - Partially related indicators are valid
- Multivariate relationships among indicators
  - This is a more complicated statistical issue involves multiple regression for those of you who have had statistics. The idea is to make sure that an item should not be predicted by two or more other items. If that is the case, then this item is redundant (as the two other items combined provide all information this item would provide).

Index Scoring

- Range of the index scores
  - As in the example of the variable Power/Prestige dimension of money attitude, there are 8 items for that measurement (see a previous slide). The highest score=7*8=56, lowest score=1*8=8. Thus the range is 8-56. A researcher might think these are too many categories for his or her particular project. So he or she could regroup things by calling 8-20 "low", 21-38 "medium" and 39-56 "high". This way, there are only three attributes left, low, medium , and high. Thus the range of scores is a lot narrower compared to the original.
- Weigh indicators equally or differently
  - Most of the time researchers weigh items equally, meaning the same weight is assigned to each item when the scores are added up. However, if a researcher believes that one item is more important than other items, the researcher can weigh the score on that item more heavily than other items by multiplying the score on that item by 2, for example, before adding up all the scores.

Handling Missing Data

- Exclude observations with missing data from index and analysis when having relatively few cases of missing data
- Treat as one of the available responses - use other information to logically infer the missing value.
- Interpret their meaning through analysis
- Assign values to the missing cases

Index Validation

- Internal validation - Item analysis
  - Examine the extent to which the composite index is related to the items in the index.
- External validation
  - The index is valid if the correlation between the index and the external validator is high.

Common Format for Indexes and Scales

- Bogardus social distance scale - often used as a format for scales
- Thurstone scale - often used as a format for scales
- Likert scale - often used as a format for index
- Semantic differential - often used as a format for index

Bogardus Social Distance Scale

- A scale of attitude toward ex-cons (bank-robber):
  - 1. Are you willing to permit an ex-con to live in your state?
  - 2. Are you willing to permit an ex-con to live in your community?
  - 3. Are you willing to permit an ex-con to live in your neighborhood?
  - 4. Are you willing to have an ex-con as your next-door neighbor?
  - 5. Would you let your child marry an ex-con?

Thurstone Scale

- Procedure
  - Create hundreds of indicators for a variable
  - Judging each indicator by judges (scores 1-13)
  - Examine which indicators provide the greatest agreement among the judges
  - Among indicators that yielded general agreement, select one from each score group (1-13).
  - The selected 13 indicators are used to construct the scale.

Thurstone Scale Example

- This district treats its teachers better than any other district. (10.2)
- Doing it all over again, I'd still teach for this district. (8.5)
- The teachers and the district cooperate to make change. (5.0)
- If you don't have "pull" in this district, you are dead. (2.3)
- I would leave this district in a flash. (1.2)

Likert Scaling

- The Rosenberg Self-Esteem Scale
- Please rate yourself on the following items by writing a number in the blank before each statement, where: 4=Strongly agree, 3=Agree, 2=Disagree, 1=Strongly disagree
  - 3 (1) I feel that I am a person of worth, at least on any equal base with others.
  - 4 (2) I feel that I have a number of good qualities.
  - 2 (3) All in all, I am inclined to think that I am a failure. (R)
  - 3 (4) I am able to do things as well as others.
  - 2 (5) I feel I do not have much to be proud of. (R)
  - 4 (6) I take a positive attitude toward myself.
  - 3 (7) On the whole, I am satisfied with myself.
  - 2 (8) I wish I could have more respect for myself. (R)
  - 1 (9) I certainly feel useless at times. (R)
  - 1 (10) At times I think I am no good at all. (R)
- The total score for this person is 34 (R is reverse-scored).

Semantic Differential

- A semantic differential scale assessing attitudes toward a university
  - My university is
    - Beautiful __ __ __ __ __ __ __ Ugly
    - Bad __ __ __ __ __ __ __ Good
    - Pleasant __ __ __ __ __ __ __ Unpleasant
    - Dirty __ __ __ __ __ __ __ Clean
    - Smart __ __ __ __ __ __ __ Stupid

Things to do:

- In the article by Mittelman et al (1995), the researchers used a 30-item questionnaire in a yes/no format to measure caregiver depression. The measurement is called the Geriatric Depression Scale (p796). Use library resources to find out what that scale is. What are the highest and lowest scores on the original scale? Did the authors change the range of this scale when they used it in this article?