

Chapter 5 Conceptualization, Operationalization, and Measurement

Chapter Outline

- Measuring anything that exists
 - Conceptions, concepts, and reality
 - Conceptions as constructs
- Conceptualization
 - Indicators and dimensions
 - The interchangeability of indicators
 - Real, nominal, and operational definitions
 - Creating conceptual order
- Definitions in descriptive and explanatory studies
- Operationalization choices
 - Range of variation
 - Variation between the extremes
 - A note on dimensions
 - Defining variables and attributes
 - Levels of measurement
 - Single for multiple indicators
- Criteria for measurement quality
 - Precision and accuracy
 - Reliability and validity

How to classify things scientists measure? - Kaplan's three classes

- **Direct observables** - things that can be observed simply and directly.
 - Example: gender
- **Indirect observables** - things that require more subtle or complex observations.
 - Example: looking through records to infer things
- **Constructs** - based on observations that can not be observed.
 - Example: social class, economic status, wellbeing

What are conceptions?

- Conceptions are mental images we use as summary devices for bringing together observations and experiences that seem to have something in common.
 - Example:
 - We observe some people
 - Talk a lot about men and women being equal
 - Go the rallies about the equality of men and women
 - Give speeches about the equality of men and women
 - At first, when we want to describe these people to others, we list all the above things they do
 - When the phenomena become more common, somebody develops a term "feminism" as a shorthand notion for efficiency
 - This term eventually becomes widely accepted.
 - The concept "feminism" is thus created.

What are concepts?

- Concepts are constructs; they represent the agreed-on meanings we assign to terms. Our concepts don't exist in the real world, so they cannot be measured directly, but we can measure the things our concepts summarize.
 - For example, the concept "feminism" does not exist in the real world. But one can measure whether somebody talks a lot about men and women being equal, goes to the rallies about the equality of men and women, and/or gives speeches about the equality of men and women. From the measurement of these behavior, one can construct a measurement for "feminism."

What is conceptualization?

- Conceptualization is the process of specifying what we mean when we use particular terms. It is the reverse process of conception.
 - Example: When we see the concept "feminism", we make a list of phenomena representing the concept. The list could include the three items listed on the previous slide.
 - This list can be somewhat different individual by individual. But people usually agree on the basic things.
- In research, conceptualization produces an agreed upon meaning for a concept for the purposes of research. Different researchers may conceptualize a concept slightly differently.
- Conceptualization describes the indicators we'll use to measure the concept and the different aspects of the concept.

What are nominal, and operational definitions?

- **Nominal** - assigned to a term without a claim that the definition represents a "real" entity.
- **Operational definitions** - Specifies how a concept will be measured.

What are dimensions and indicators?

- Complicated concepts have dimensions and indicators
- Dimensions are specific aspects of a concept.
- Indicators are groups by dimensions.
- The end product of conceptualization is the specification of a set of indicators of what we have in mind, indicating the presence or absence of the concept
- The Interchangeability of Indicators
 - If several different indicators all represent the same concept, then all of them will behave the same way that the concept would behave

An Example: Attitude toward Money

- Medina, Jose, Joel Saegart & Alicia Gresham (1996). Comparison of Mexican-American and Anglo-American attitudes toward money. *Journal of Consumer Affairs*, 30(1), 124-145.
 - The concept: attitude toward money
 - Attitude has more to do with the psychological value of money than its relative economic value.

- End result of conceptualization: 4 Dimensions, a total of 31 indicators

- Dimension 1: Power/Prestige, 8 indicators
 - 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.

- Dimension 2: Retention/Time, 7 indicators

- I put money aside on a regular basis for the future.
- I do financial planning for future.
- I save now to prepare for my old age.
- I have money available in the event of an economic depression.
- I follow a careful financial budget.
- I am prudent with the money I spend.
- I keep track of my money.

- Dimension 3: Distrust/Anxiety, 11 indicators

- It bothers me when I discover I could have gotten something for less elsewhere.
- I complain about the cost of things I buy.
- I show worrisome behavior when it comes to money.
- I worry about not being financially secure.
- When I make a major purchase, I have suspicion that I have been taken advantage of.
- I show signs of anxiety when I don't have enough money.
- After buying something, I wonder if I could have gotten the same for less elsewhere.
- I hesitate to spend money, even on necessities.
- It is hard for me to pass up a bargain.
- I automatically say, "I cannot afford it".
- I am bothered when I have to pass up a sale.

- Dimension 4: Quality, 5 indicators
 - I am willing to spend more to get the very best.
 - I buy top-of-the-line products.
 - I buy name brand products.
 - I pay more for some things because I know I have to in order to get the best.
 - I buy the most expensive items available.

Are definitions more important in descriptive or explanatory studies?

- Definitions are more important in descriptive studies
 - For example, if one is interested in describing the percentage of people who are conservative in Utah, different definitions of conservativeness would lead to different conclusions.
 - However, if one is interested in explaining whether there is a relationship between age and conservativeness, one could usually find a positive correlation between these two with different measures of conservativeness.

What is operationalization?

- Operationalization is the development of specific research procedures that will result in empirical observations representing the concepts.

Operationalization issues – Range of variation, variation between extremes, and dimensions

- Range of variation: the limits of your attributes
 - Examples: age, income
- Variations between the Extremes
 - How many attributes to have between the extremes
 - Example: age, income, marital status
 - More-precise measurement is usually better than less- precise measurement.
 - Rule of thumb: Whenever you are not sure how much detail you want to get in a measurement, get too much rather than too little.
- Dimensions: most variables only measure on dimension of a concept

Operationalization issues: Level of measurement

- Two important qualities of all variables
 - Exhaustive
 - You should be able to classify every observation into one attribute.
 - Mutually exclusive
 - You must be able to classify each observation into one and only one attribute.

- Four Levels of Measurement
 - Nominal measures are variables with attributes that have
 - exhaustiveness + mutual exclusiveness only.
 - Example: gender, occupation
 - Ordinal measures are variables with attributes that have
 - exhaustiveness + mutual exclusiveness + can be logically ordered.
 - Example: social status, marital happiness
 - Interval measures are variables with attributes that have
 - exhaustiveness + mutual exclusiveness + logically ordered + the distances separating attributes have meanings
 - Interval measures are not very common. GPA is an example
 - Ratio measures are variables with attributes that have
 - exhaustiveness + mutual exclusiveness + logically ordered + the distances separating attributes have meanings + the attributes are based on a true zero point
 - Example: age, income

Sample Questions from the National Survey of Families and Households (NSFH)

- Example of a nominal measure:

- Now let's talk about your full-time and part-time work experience. Are you currently working for pay in any job?
 - 1- Yes (63.47%)
 - 2- No (35.76%)
 - 6- Inapplicable (currently in Armed Forces) (0.55%)
 - 9- No answer (0.22%)

- Another example of a nominal measure

- Which of the groups on this card best describes you?

- 01-Black (11.09%)
- 02-White-not of Hispanic origin (79.99%)
- 03-Mexican American, Chicano, Mexicano (4.28%)
- 04-Puerto Rican (1.13%)
- 05-Cuban (0.43%)
- 06-Other Hispanic (1.31%)
- 07-American Indian (0.43%)
- 08-Asian (1.15%)
- 09-Other (0.01%)

- 97-Refused (0.02%)
- 99-No answer (0.16%)

- Example of an ordinal measure:

- Here are a few questions about your current marriage. Taking things all together, how would you describe your marriage?

- 01-very unhappy (1.18%)
- 02 (0.89%)
- 03 (1.09%)
- 04 (4.21%)
- 05 (7.26%)
- 06 (16.84%)
- 07-very happy (26.56%)

- 96-Inapplicable (40.13%)
- 98-Don't know (0.00%)
- 99-No answer (1.84%)

- Example of a ratio measure:

- Altogether, how many times have you been married?

- 00 (20.73%)
- 01 (62.93%)
- 02 (13.30%)
- 03 (2.44%)
- 04 (0.45%)
- 05 (0.09%)
- 06 (0.02%)
- 07 (0.01%)

- 99-No answer (0.03%)

Operationalization issues: Single or multiple indicators

- Simple variables need only a single indicator
 - Example: age, race, gender
- Complicated variables need multiple indicators - composite measure
 - Example: depression, attitudes toward money, GPA

How do we know whether our measurements are good or not? Criteria for measurement quality

- Precision and Accuracy
 - Precision
 - The exactness of the measure
 - Accuracy
 - Whether a description is true
 - Relationship of precision and accuracy

- Reliability and Validity

- General reliability
 - The degree to which a measurement is consistent and reproducible
 - Tests for checking reliability
 - Test-retest method - take the same measurement more than once.
 - Split-half method - make more than one measurement of a social concept (prejudice).
 - Use established measures.
 - Check reliability of research-workers.
- General validity
 - The extent to which a procedure measures what it is intended to measure
- Tension between reliability and validity
 - It's trade-off relationship. Usually if a measurement has high reliability, it tends to have lower validity, and vice versa.

An Overall Example of Conceptualization and Operationalization

- Step 1. Determine dimension(s) of the concept you want to study by looking at your topic
 - Example: The impact of communication on depression. The concept of depression of interest is severity of depression. Other dimensions could be "People's belief of whether depression is caused by chemical imbalance or by psychological problems?"
 - In this case, only one dimension is studied. Thus only one variable is usually needed.
- Step 2. Finding out the indicators for the particular dimension of the concept you want to study

- Example: Develop 12 indicators for the severity of depression
 - Feel bothered by things that usually don't bother you
 - Poor appetite
 - Feel that you could not shake off the blues even with help from your family or friends
 - Feel distracted
 - Feel depressed
 - Feel that everything you do is an effort
 - Feel fearful
 - Sleep restlessly
 - Do not feel like to talk
 - Feel lonely
 - Feel sad
 - Feel you can not get going

- Step 3. Decide on operationalization issues.
 - Based on the indicators, determine what questions to ask, what observations to make, what scores to give, and what attributes to have for the measurement.
 - Example:
 - In the past seven days, how many days did you feel ...?
 - Score range: 0-84
 - Level of measurement: covert from interval to ordinal
 - Decision: 1-28 no depression, 29-56 moderate depression, 57-84 severe depression
- Step 4. End product of operationalization - a variable and its attributes
 - Example:
 - Variable: severity of depression
 - Attributes: no depression, moderate depression, severe depression

Think about this ...

- Use of SAT scores as a measurement for academic proficiency in college admission
 - Reliability problems
 - Validity problems
- How can the measurement of academic proficiency be improved?
 - Dimensions of this concept
 - Indicators?