

Measurement

Conceptualization

- Process of specifying what we mean when we use particular terms.
- Produces an agreed upon meaning for a concept for the purposes of research.
- Describes the indicators we'll use to measure the concept and the different aspects of the concept.
- Action, Attribute, Attitude

Conceptualization

- Indicator – the presence or absence of the concept we are studying
 - Using racist terms is an Indicator of racism.
- Dimension- the specific aspect of a concept that we are looking at.
 - Using racist terms is an Overt dimension of racism.

Conceptualization and Operationalization

- What are different strategies you could use?
 - Using existing data
 - Constructing new questions
 - Observations
 - Collecting unobtrusive measures

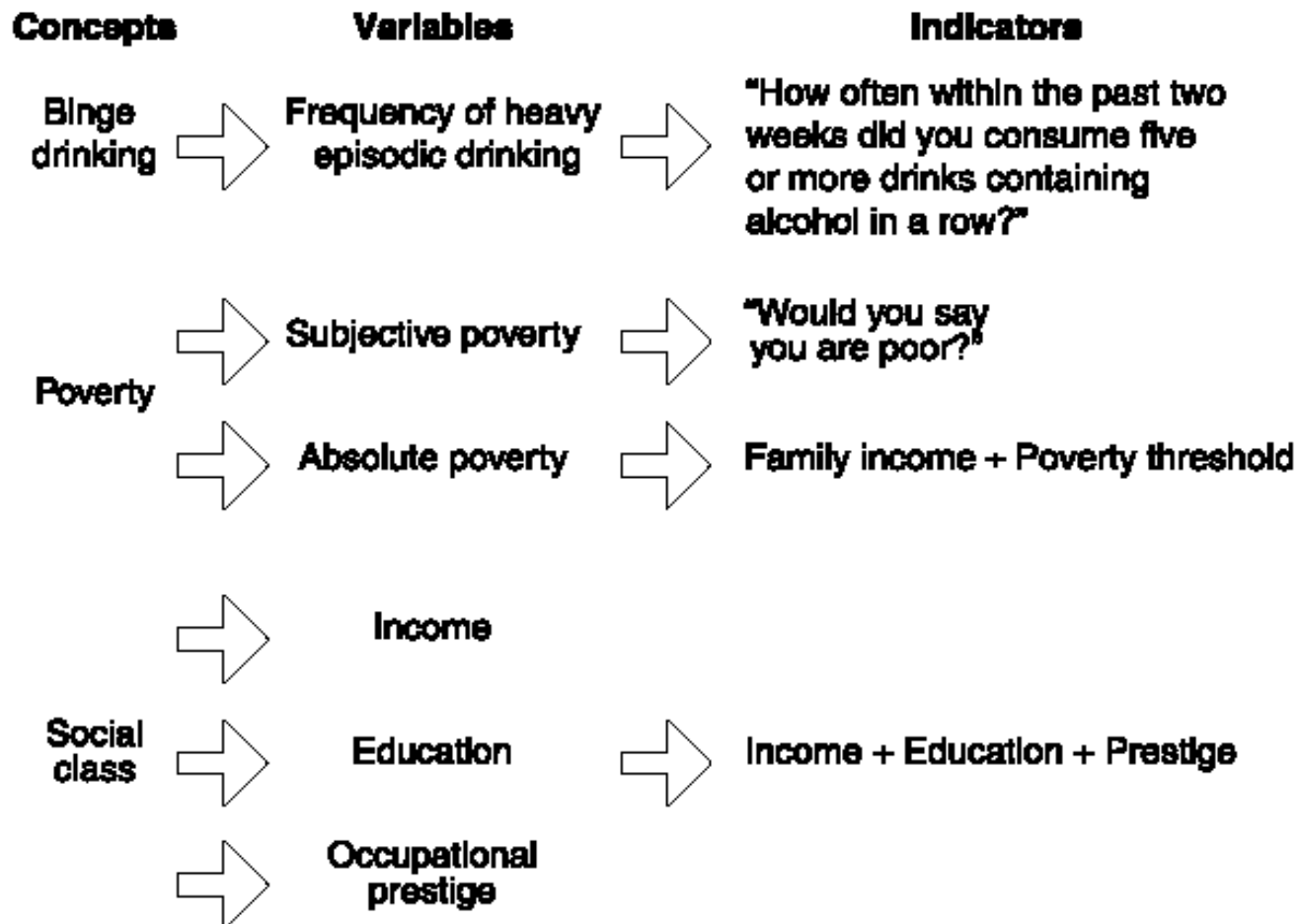
Definitions of variables

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

From Concept to Measurement

- Progression from what a term means to measurement in a scientific study:
 - Conceptualization
 - Nominal Definition
 - Operational Definition
 - Measurements in the Real World

Exhibit 4.2 Concepts, Variables, and Indicators



Levels of Measurement

The mathematical precision with which the values of a variable can be expressed is the level of measurement.

- The nominal level of measurement, which is qualitative, has no mathematical interpretation;
- The quantitative levels of measurement—ordinal, interval, and ratio—are progressively more precise mathematically.

Four Levels of Measurement

- **NOIR**
- Nominal
- Ordinal
- Interval
- Ratio

Four Levels of Measurement

1. **Nominal** - offer names for labels for characteristics (gender, birthplace).
2. **Ordinal** - variables with attributes we can logically rank and order. But the distance between measures can not be established. (1st, 2nd, 3rd)

Four Levels of Measurement

- 3. Interval** – Known and measurable distances separating variables (temperature scale-Fahrenheit).
- 4. Ratio** - attributes composing a variable are based on a true zero point (age). Celsius

For the most part Social Scientists do not distinguish between Interval or Ordinal measures. The difference matters when running more complex statistical equations that you will not learn in Statistics.

From Operationalization to Levels of Measurement

When we know a variable's **level of measurement**, we can better understand how cases vary on that variable and so understand more fully what we have measured.

The Case of Dummies

- Dichotomies (or dummy variables) have only two values
 - categorical (by definition)
 - could be thought of as ordinal (or even interval). Coded as 1 and 0.
 - Gender example (even more confusing, if we take social construction of gender into account)

Measurement Quality

- Reliability
- Validity
- Precision and accuracy

Evaluating Measures

- Validity
 - Does it measure what it is supposed to measure?
 - Does the researcher measure what they said they wanted to measure?
- Reliability
 - When «reality» does not change, the measure stay the same
 - When «reality» changes, the measure changes accordingly

Reliability

- Each time I measure my office space I get the same results.
- The measure remains the same so it is reliable.
- Though it does not change the fact that veal cages are more spacious than my office.

Validity

- Face Validity - «looks fine»
- Content Validity - «covers everything»
- Criterion Validity - check with some objective measure (if it exists)
- Construct Validity - check through the theory
 - Your theory predicts that strong ties to the community promotes good mental health. You find that those who visit and use the community center are generally more happy than those who don't. Happiness is an indicator of good mental health. Validity.

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.

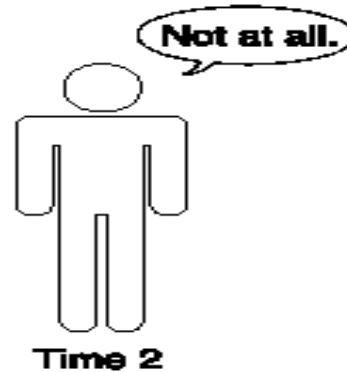
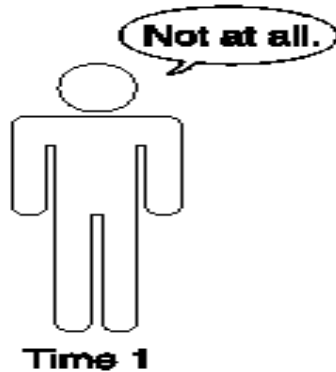
Reliability

- Test-retest reliability
 - intraobserver reliability; same observer, two time periods (if observation is used)
- split-halves reliability (survey)
- Interobserver Reliability: two (or more) observers, the same time period

Exhibit 4.13 The Difference Between Reliability and Validity: Drinking Behavior

Measure: "How much do you drink?"

Subject 1



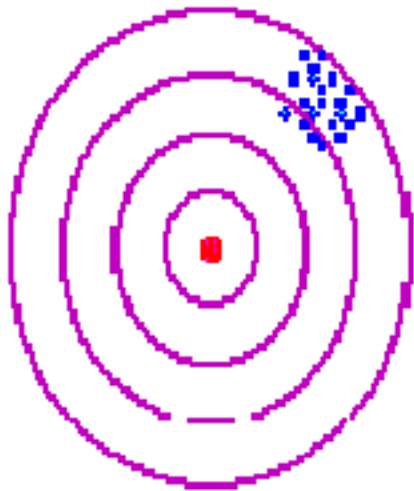
Measure is reliable and valid.

Subject 2

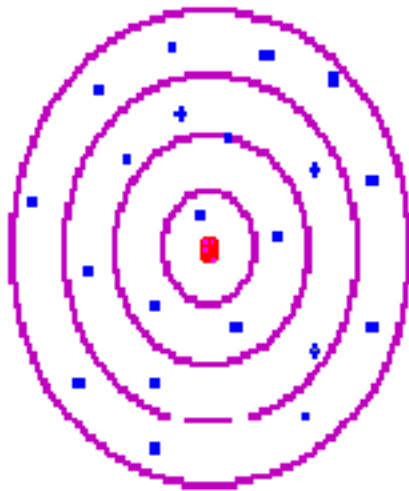


Measure is reliable but invalid.

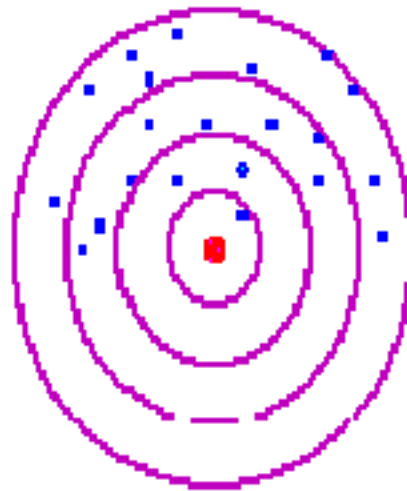
Target Shooting



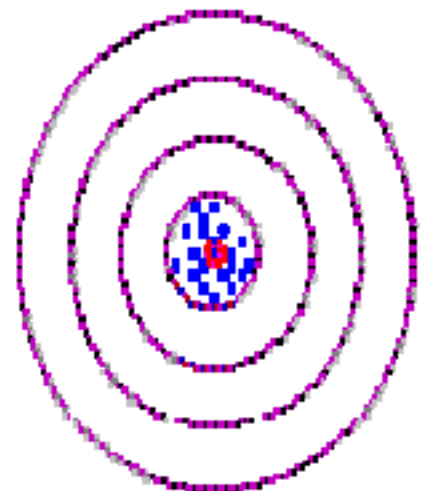
**Reliable
Not Valid**



**Valid
Not Reliable**



**Neither Reliable
Nor Valid**



**Both Reliable
And Valid**

Which of these is not a criteria for Causation?

1. Spuriousness
2. Nominal
3. Time order
4. Correlation

Reliability involves

1. Whether a particular technique applied repeatedly to the same object would yield the same results each time
2. ensuring accuracy
3. ensuring that your measure measures what you think it should measure
4. ensuring precision
5. all of these choices

Which of the following is a nominal variable?

1. Education
2. Age
3. employment status
4. occupational prestige
5. not enough information to know