Measurement: Concepts in Practice

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Concept Definition

- Classical approach
- Family resemblance approach

Family Resemblance

- Necessary and sufficient:

  Rule of Law

- Unnecessary and sufficient:

  Rule of Law $\vee$ Equality

- Necessary and insufficient:

  Rule of Law $\wedge$ Equality $\wedge$ *Elections*

- Unnecessary and insufficient:

  (**Rule of Law** $\vee$ Equality) $\wedge$ *Elections*

Gerring's Criteria

1. Resonance (face validity)
2. Domain/scope
3. Consistency
4. Fecundity
5. Differentiation
6. Causal utility
7. Operationalization

An Example: Opinion

- *Opinion* is a summary evaluation of a particular object
- Only one necessary feature: evaluation/favorability
- How do we measure this?

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- Recall the definition of *variable*:
  - A dimension that describes an observation
  - The operationalization of a concept

Some definitions!

- Variable: A dimension that describes an observation
- Operationalization: the process of deciding on measures for concepts
- Coding: Assigning a score for a variable to an observation

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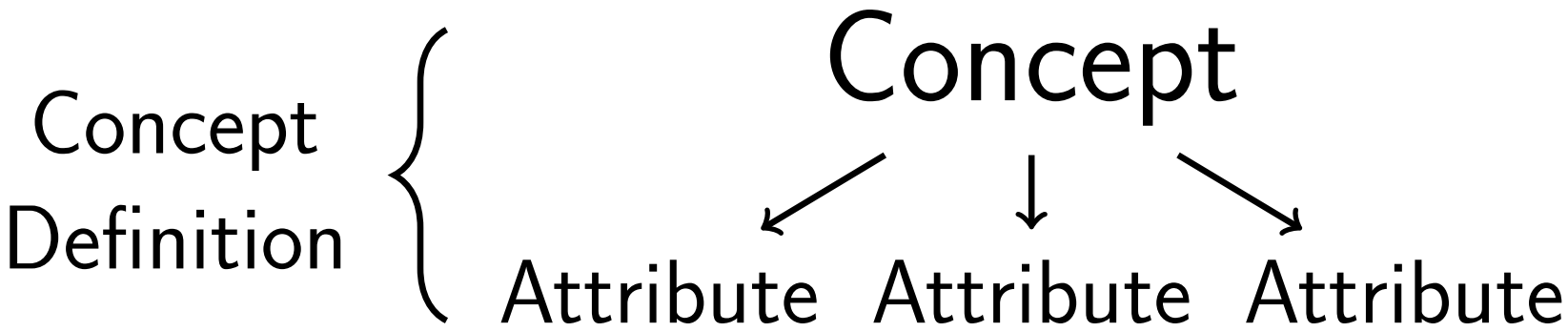
- Variable: A dimension that describes an observation
- Operationalization: the process of deciding on measures for concepts
- Coding: Assigning a score for a variable to an observation
  - Manual or hand coding
  - Automated coding

Operationalization II



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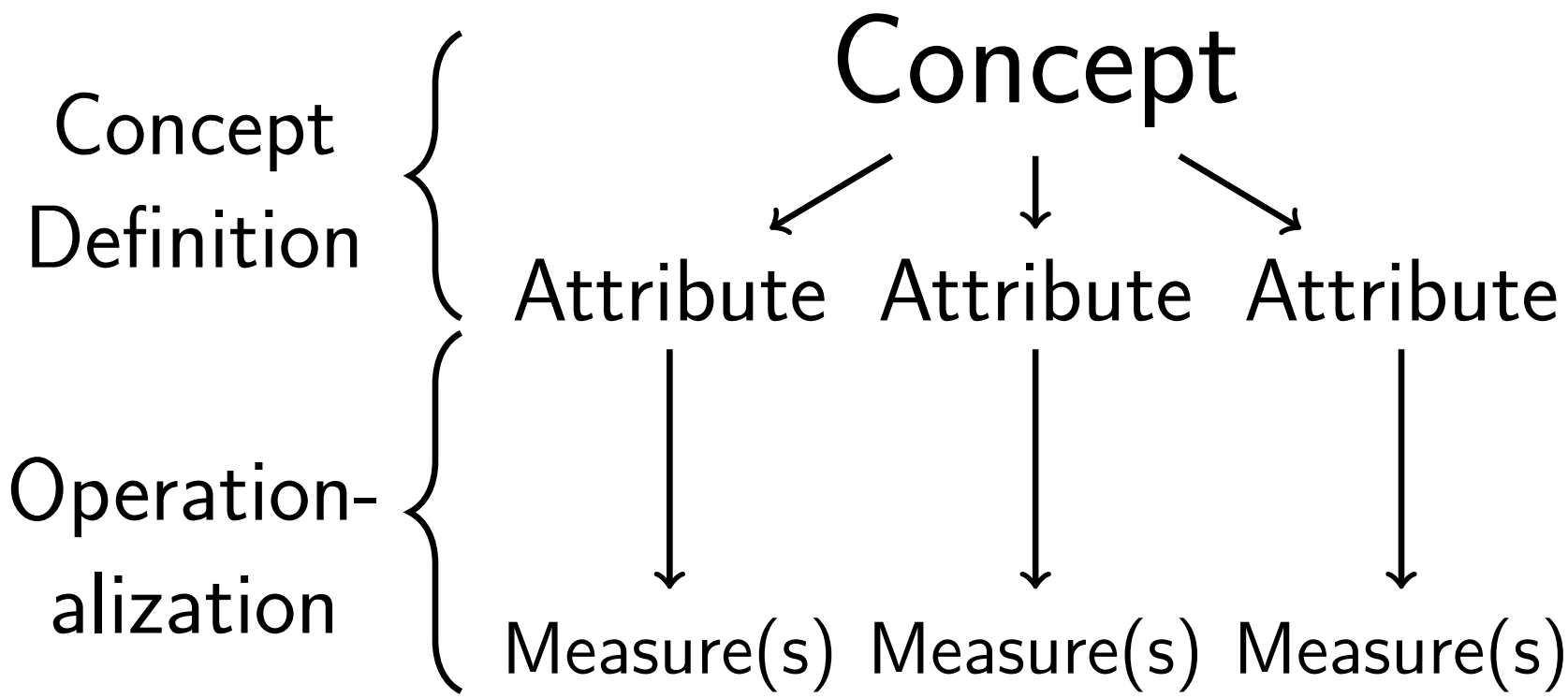

Operationalization III

Definition

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Definition

$\rightarrow$ Feature

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Definition

→ Feature

→ Indicator(s)

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Example: Democracy

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How do we operationalize this concept?

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Democracy

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$\rightarrow$?

How do we operationalize this concept?

Questions?

Once we have an operationalization, *coding* turns observations of attributes into **data set observations** (DSOs)

Case	Measure1	Measure2	Measure3
UK	?	?	?
France	?	?	?
Germany	?	?	?
Spain	?	?	?
...			

Types of Measures

1. Categorical
   - Binary
2. Ordinal
3. Interval

Qualitative: Categorical, Ordinal

Quantitative: Ordinal, Interval

Note: *Ratio* scale measures are interval measures with a non-arbitrary zero value

Activity

- Concept: Democracy
- Attribute: Free and fair elections
- Measure:
  1. Categorical
  2. Ordinal
  3. Numeric

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Once we have measured *variables* for *observations*, we can conduct *analysis*!

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And once we have analysis, we can *draw inferences* and *make evidence-based claims*.

Preview: Analysis

Analysis is the "systematic and detailed examination of data."

Two broad categories of analytic strategies:

1. Quantitative analysis
2. Qualitative analysis

Preview: Analysis

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  - Count/sum
  - Mean, median, mode
  - Variance, standard deviation

Preview: Analysis

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  - Statistic: "a quantitative summary of a variable for a set of units"
- Examples
  - Count/sum
  - Mean, median, mode
  - Variance, standard deviation
- *Qualitative analysis* is more general and fluidic

Questions?

Assessing Measurement Quality

1. Conceptual clarity
2. Construct validity
   - Convergent validity
   - Divergent validity
3. Accuracy and precision

Assessing Measures I

- Conceptual clarity is about knowing what we want to measure
- Sloppy concepts make for bad measures
  - Ambiguity
  - Vagueness

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- Revise concept definition as needed

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- Construct validity is **high** if a variable is a measure of the concept we care about
- Construct validity is **low** if a variable is actually a measure of something else

Example: Polity IV[1]

Institutionalized Democracy: Democracy is conceived as three essential, interdependent elements. One is the presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders. Second is the existence of institutionalized constraints on the exercise of power by the executive. Third is the guarantee of civil liberties to all citizens in their daily lives and in acts of political participation. Other aspects of plural democracy, such as the rule of law, systems of checks and balances, freedom of the press, and so on are means to, or specific manifestations of, these general principles. We do not include coded data on civil liberties.

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Authority Coding	**Scale Weight**
Competitiveness of Executive Recruitment (XRCOMP):	
(3) Election	+2
(2) Transitional	+1
Openness of Executive Recruitment (XROPEN):	
only if XRCOMP is Election (3) or Transitional (2)	
(3) Dual/election	+1
(4) Election	+1
Constraint on Chief Executive (XCONST):	
(7) Executive parity or subordination	+4
(6) Intermediate category	+3
(5) Substantial limitations	+2
(4) Intermediate category	+1
Competitiveness of Political Participation (PARCOMP):	
(5) Competitive	+3
(4) Transitional	+2
(3) Factional	+1

Assessing Construct Validity

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- For example, the multi-trait, multi-method matrix

Using Multiple Indicators

- Choose the "best" one
- Apply an AND operator
  - Must have all indicators to be coded 1
  - Treat indicators as "ordinal" in Gerring's sense
- Scale the indicators (e.g., sum or mean)

Assessing Measures III

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- Accuracy

Accurate

Synonyms: true, correct, unbiased, valid

Image Source: Wikimedia, Public Domain

Assessing Measures III

- Accuracy

Assessing Measures III

- Accuracy
- Precision

Precise

Synonyms: certain, exact, specific, low variance

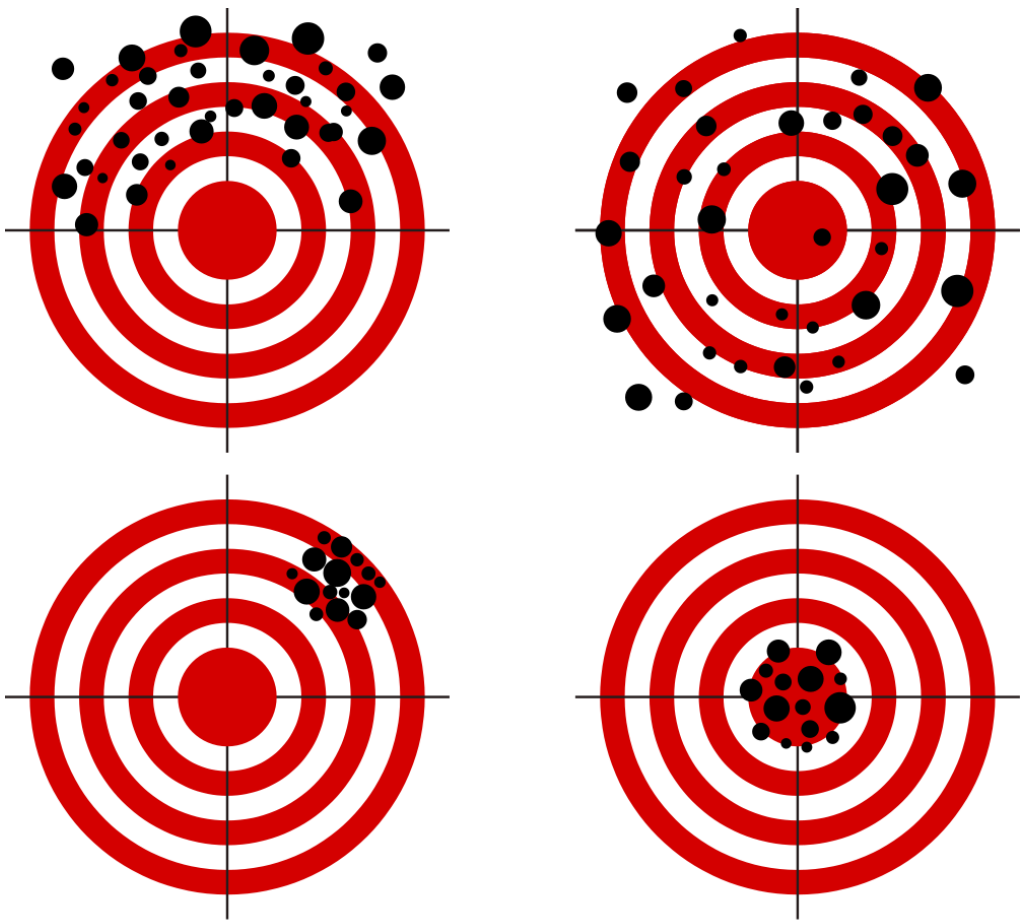

Image Source: Wikimedia, Nevit Dilmen

Assessing Measures III

- Accuracy
- Precision

Assessing Measures III

- Accuracy
- Precision
- Reliability

Reliable

Synonyms: dependable, replicable, repeatable, consistent

Typically used in the context of:

- Multiple measures used in a scale
- Multiple scores at different times
- Multiple individuals coding using one method

Questions?

Key Points

1. We want to make claims about *concepts*
2. But we only observe and can only analyse observed, measured *variables*
3. So our task as scientists is to:
   - Link the concepts we care about to observable phenomena
   - Draw out theoretical implications from measures