

# Measurement: Concepts in Practice

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- 1 Review

- 2 Measurement

- 3 Assessing Measurement Quality

# 1 Review

## 2 Measurement

## 3 Assessing Measurement Quality

# Concept Definition

- Classical approach
  - Minimal
  - Maximal
  - Ordinal
- 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

1 Review

2 **Measurement**

3 Assessing Measurement Quality

# 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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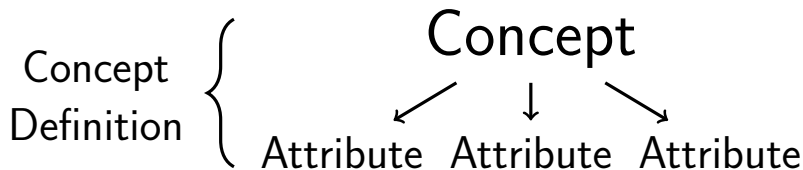
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- Recall the definition of *variable*:
  - A dimension that describes an observation

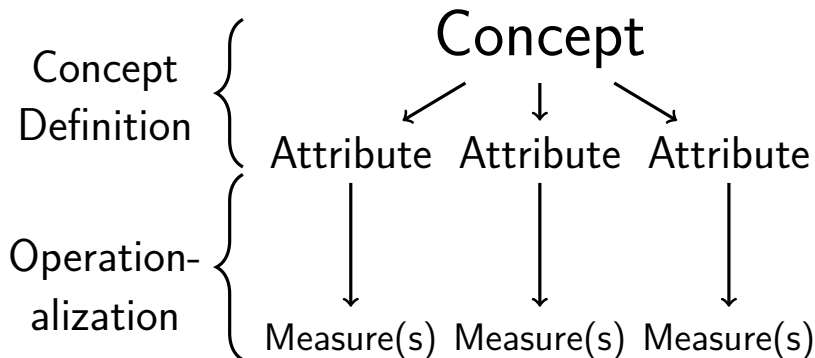
# Operationalization I

- To study concepts, we need to be able to observe those concepts
- *Operationalization* is the process of creating measures for concepts
- Recall the definition of *variable*:
  - A dimension that describes an observation
  - The operationalization of a concept

# Operationalization II



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# Operationalization III

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# Example: Democracy

Democracy

How do we operationalize this concept?

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→ Free and fair elections

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# Example: Democracy

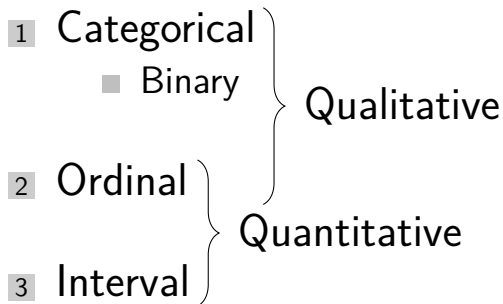
Democracy

→ Free and fair elections  
→ ?

How do we operationalize this concept?

# Questions?

# Types of Measures



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

# Coding

- Variable: A dimension that describes an observation
- Coding: Assigning a score for a variable to an observation

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- Variable: A dimension that describes an observation
- Coding: Assigning a score for a variable to an observation
  - Manual or hand coding
  - Automated coding

# 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)

# Questions?

1 Review

2 Measurement

3 Assessing Measurement Quality

# 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



# Assessing Measures I

- Conceptual clarity is about knowing what we want to measure
- Sloppy concepts make for bad measures
  - Ambiguity
  - Vagueness
- Revise concept definition as needed

# Assessing Measures II

- Construct validity is the degree to which a variable measures a concept<sup>1</sup>

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<sup>1</sup>Note: Kellstedt and Whitten call this “content validity”. They use “construct validity” to mean whether a measure has predictive validity (i.e., that the measure is related to measures of other concepts that are theorized to be related).

# Assessing Measures II

- Construct validity is the degree to which a variable measures a concept<sup>1</sup>
- Construct validity is **high** if a variable is a measure of the concept we care about

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# Assessing Measures II

- Construct validity is the degree to which a variable measures a concept<sup>1</sup>
- 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

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# Assessing Construct Validity

- Multiple measures!
- Look for:
  - Convergence (Convergent validity)
  - Discrimination (Discriminant validity)

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- Look for:
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- For example, the multi-trait, multi-method matrix

# Assessing Measures III

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- Accuracy



# Accurate

Synonyms: true, correct, unbiased, valid



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# Assessing Measures III

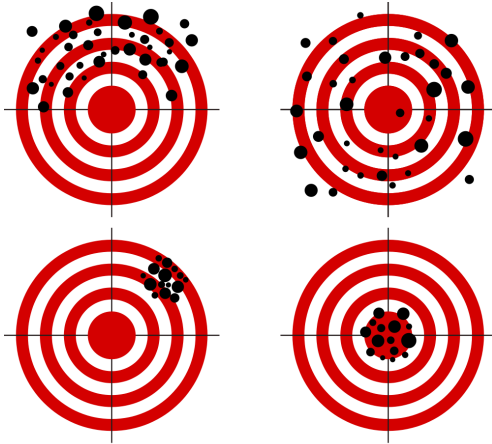
- Accuracy

# Assessing Measures III

- Accuracy
- Precision

# Precise

Synonyms: certain, exact, specific, low variance



# 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 Theory is about concepts
- 2 Analysis is about measured variables
- 3 So our task as scientists is to:
  - Find observable implications of theory
  - Draw theoretical implications from measures

