

PSC 202

SYRACUSE UNIVERSITY

**INTRODUCTION  
TO POLITICAL  
ANALYSIS  
VARIABLES**

# HOUSEKEEPING

- First problem set due on Friday
- Second problem set will be posted tomorrow

# CURRENT RESEARCH, EXPLAINED



Search...



ABOUT



JOHN SIDES AND KIM YI DIONNE SEPTEMBER 20, 2023

## Welcome to Good Authority

Welcome to Good Authority! We are excited to launch this new site. Its mission is simple: to bring insights from political science to a broader audience. We have assembled a great group of political scientists who will draw on their expertise and the discipline's research to



DANIELLE GILBERT SEPTEMBER 20, 2023

### Biden's hostage diplomacy, explained

It's a marriage of concessions and sanctions.



MICHAEL TESLER SEPTEMBER 20, 2023

### The remarkable rise of isolationist Republicans

Trump's rise has turned back the clock to the 1930s.



MARC LYNCH SEPTEMBER 20, 2023

### Why does Biden want Saudi-Israeli normalization so badly?

The Abraham Accords may define a new regional order.



SARAH BINDER SEPTEMBER 20, 2023

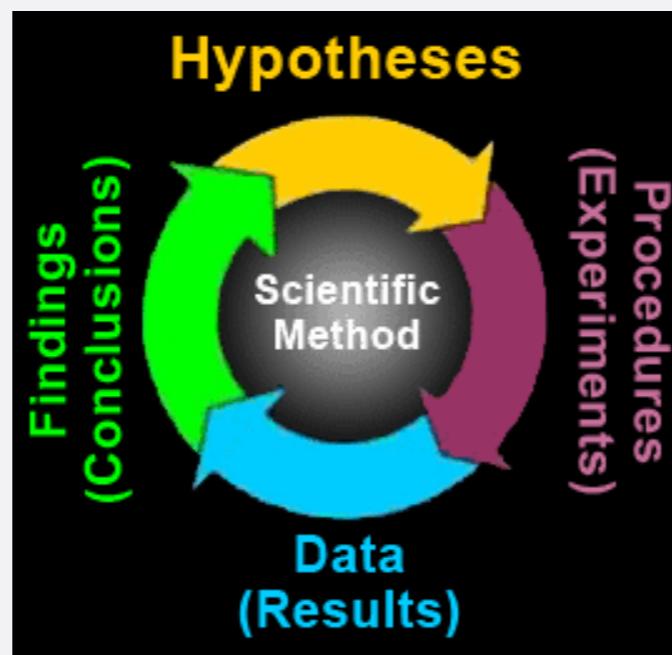
### Why Democrats won't outmaneuver Tommy Tuberville

There are risks to changing Senate rules.

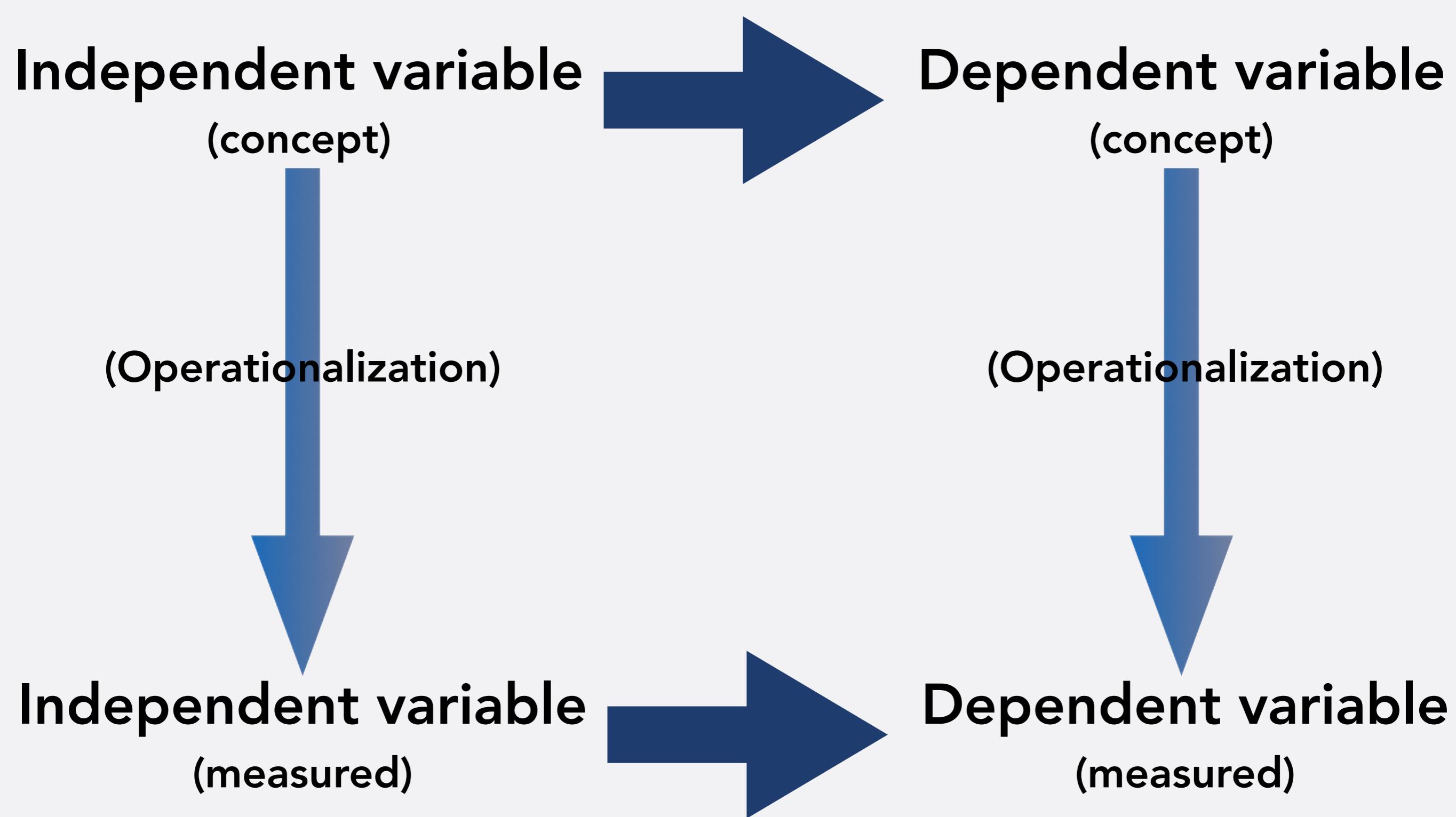
- [goodauthority.org](http://goodauthority.org)

# WHERE WE ARE

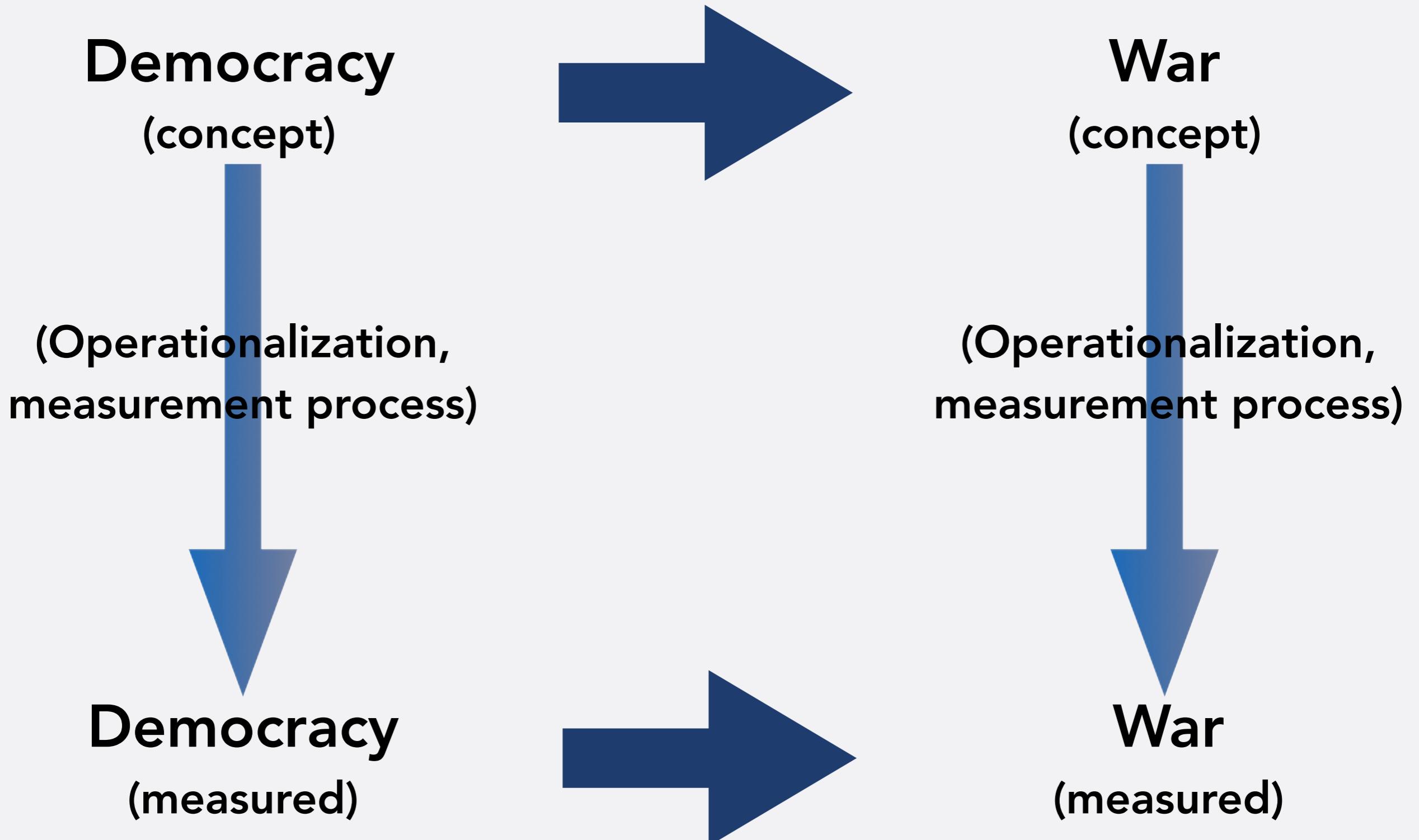
- Formulate research question
- Propose explanation/theory, hypotheses
- Data collection process
- Use data to evaluate hypotheses
- Reassess explanation



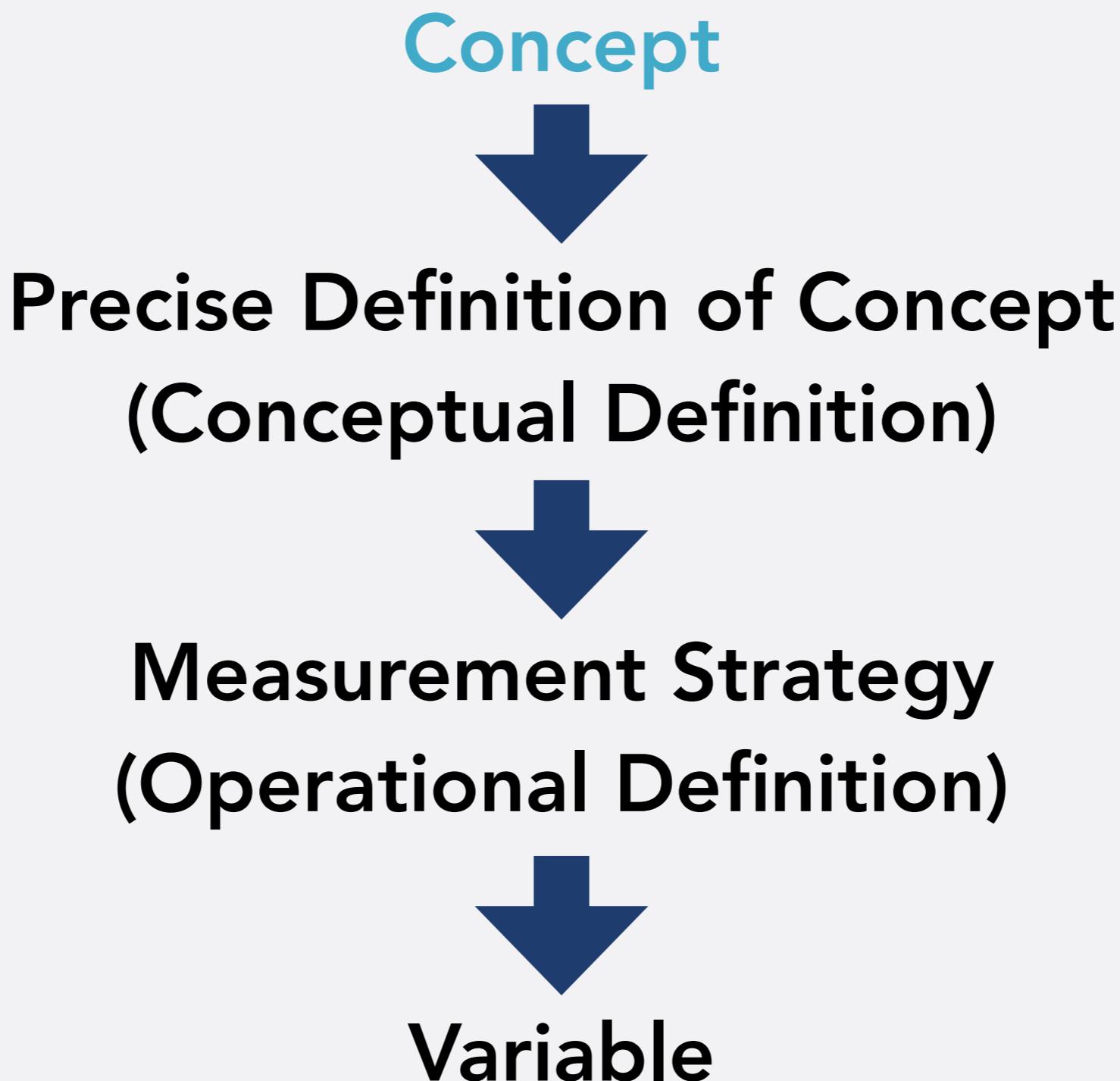
# RECAP



# MEASUREMENT PROCESS

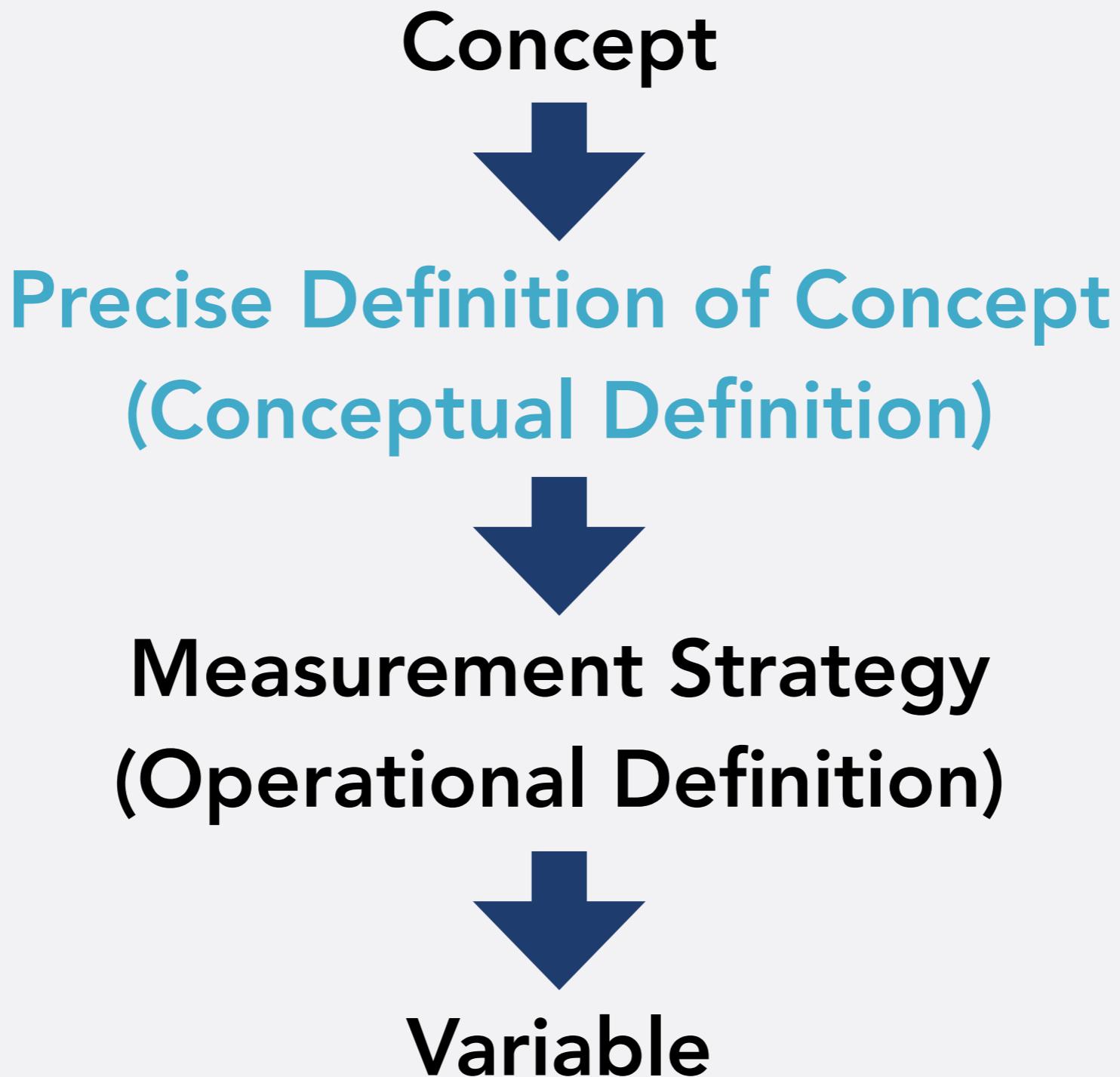


# MEASUREMENT PROCESS



- Example: Democracy

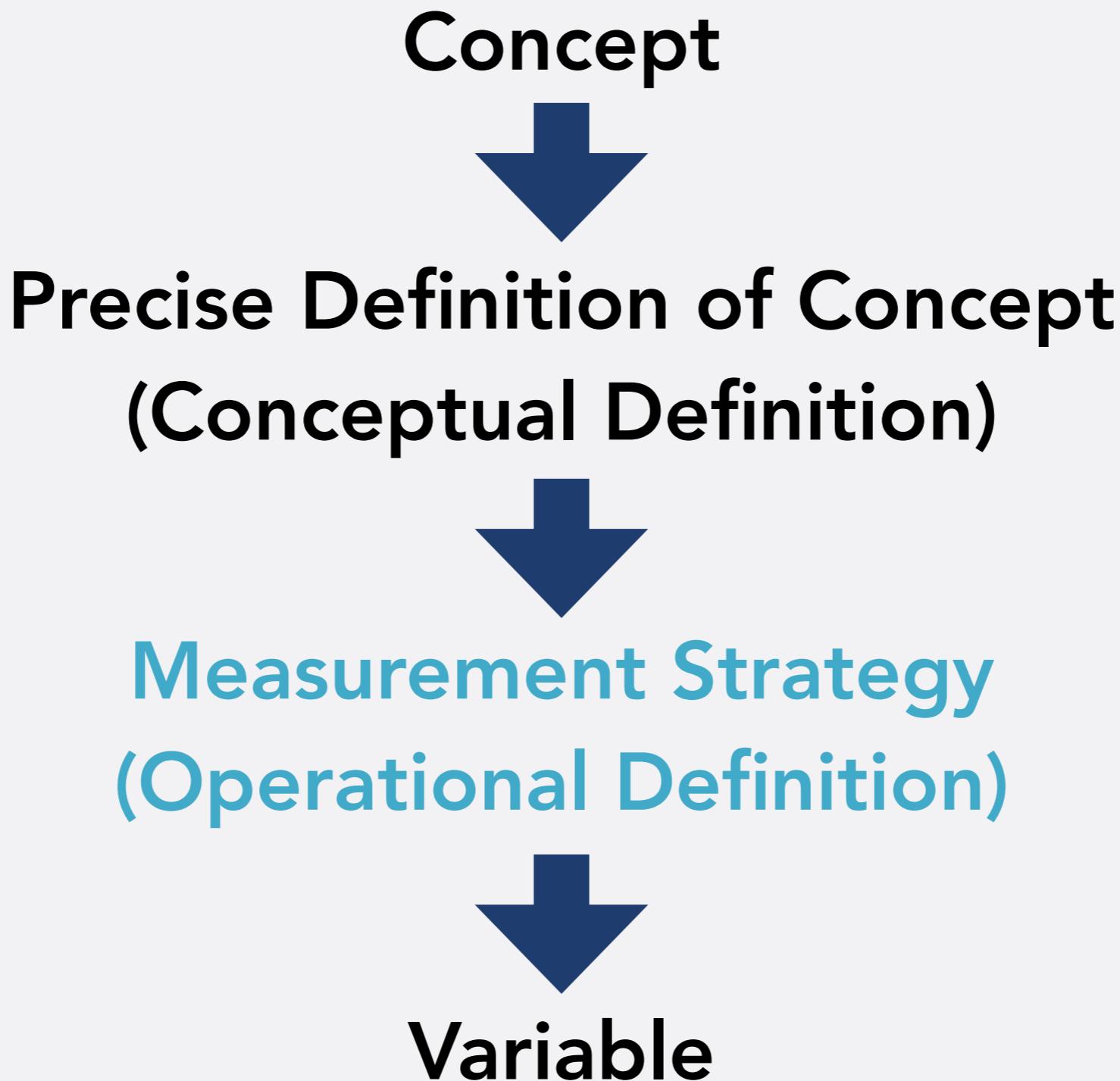
# MEASUREMENT PROCESS



# CONCEPTUAL DEFINITION

- The concept of democracy is defined as the extent to which countries exhibit the characteristic of having open and competitive contests to decide leadership

# MEASUREMENT PROCESS



# OPERATIONAL DEFINITION

- How can we measure whether countries have open and competitive contests to decide leadership?

# OPERATIONAL DEFINITION

- A good operational definition
  - “Recipe”
  - Provides answers to:
    - What procedure is used to collect the data?
    - How will the concept be measured?
    - What “metric” will be employed?

# OPERATIONAL DEFINITION

- How can we measure whether countries have open and competitive contests to decide leadership?

# OPERATIONAL DEFINITION

- Example Democracy:
  - What procedure is used to collect the data?
    - Country experts rate countries
  - How will the concept be measured?
    - regulation of executive recruitment, competitiveness of executive recruitment, openness of executive recruitment, constraints on chief executive
  - What “metric” will be employed?
    - For each of the 4 components, experts rate country, then ratings are added up, resulting in score from -10 (strongly autocratic) to 10 (strongly democratic)

# TODAY

Concept



Precise Definition of Concept  
(Conceptual Definition)



Measurement Strategy  
(Operational Definition)



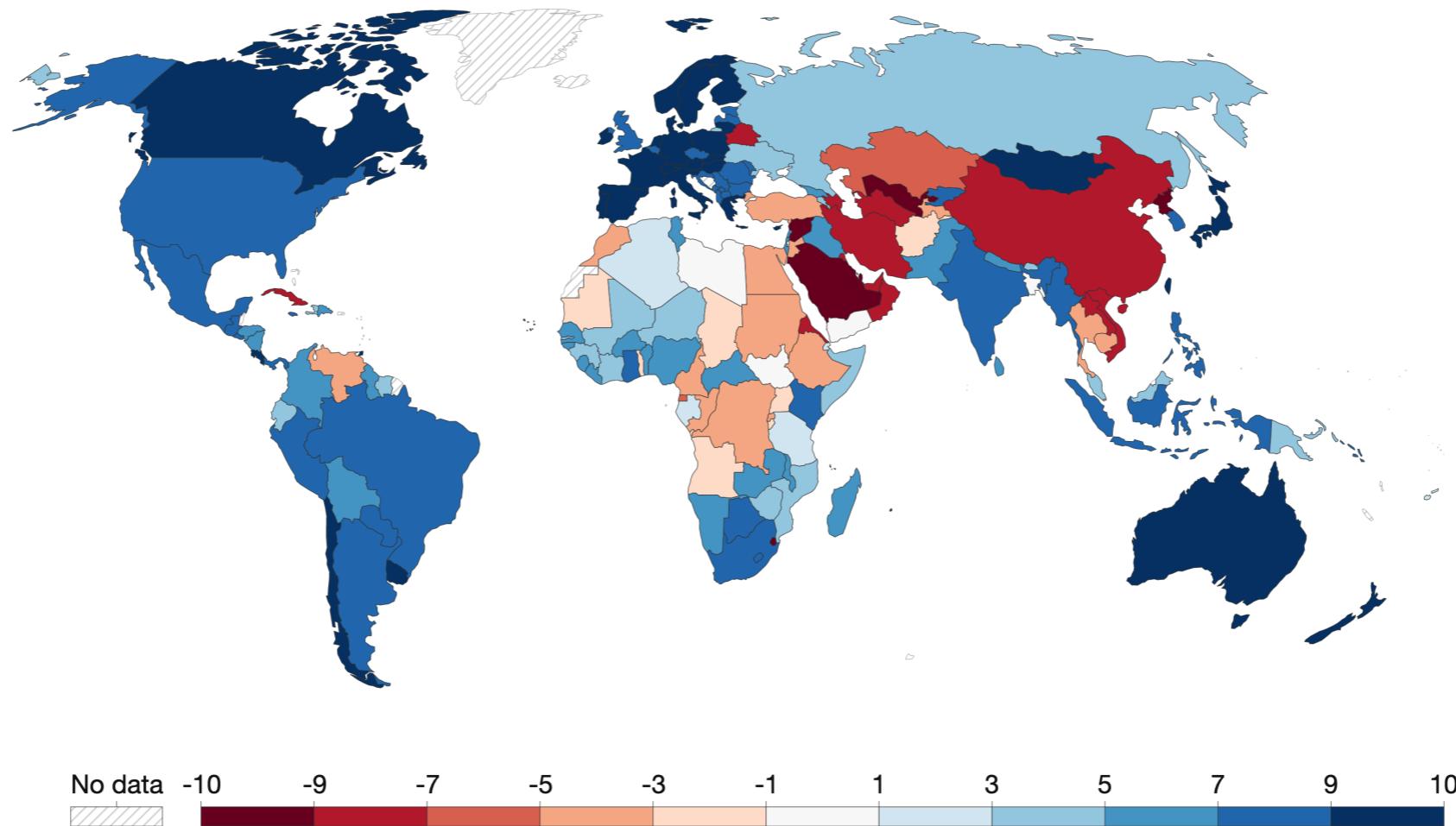
Variable

# VARIABLE

## Democracy index, 2017

Based on the assessments and index by Polity 5 (2021)<sup>1</sup>. It captures the extent to which open, multi-party, and competitive elections choose a chief executive who faces comprehensive institutional constraints, and political participation is competitive. It ranges from -10 to 10 (fully democratic).

Our World  
in Data



Source: Polity 5 (2021)

OurWorldInData.org/democracy • CC BY

1. **Polity**: The Polity project publishes data on democracy based on evaluations of its own researchers. The project is managed by the Center for Systemic Peace. Learn more: [Democracy data: how do researchers measure democracy?](#)

- Polity score

# **ANOTHER, SIMPLER, EXAMPLE**

- **Concept: religiosity**
- **Unit of analysis: ?**

# **ANOTHER, SIMPLER, EXAMPLE**

- **Concept: religiosity**
- **Unit of analysis: individuals**

# ANOTHER, SIMPLER, EXAMPLE

- Concept: religiosity
  - Conceptual definition: The concept of religiosity is defined as the extent to which individuals exhibit the characteristic of
-

# ANOTHER, SIMPLER, EXAMPLE

- Concept: religiosity
- Conceptual definition: The concept of religiosity is defined as the extent to which individuals exhibit the characteristic of attending religious services

# OPERATIONAL DEFINITION

- Example Religiosity:
  - What procedure is used to collect the data?
    - Face-to-face survey of a random sample of adult Americans
  - How will the concept be measured?
    - “How often do you attend religious services?”
  - What “metric” will be employed?
    - Never; Less than once/year; Once/year; Several times/year; Once/month; 2-3x/month; Nearly every week; Every week; More than once/week

# TODAY

- Concepts
- Measurement Process
- Measurement Issues

# THINGS TO CONSIDER

- **What qualities should a good operationalization have?**

# RELIABILITY

- Applying the same measurement rules to the same case should produce identical results

# RELIABILITY

## 3.3 XROOPEN (all versions)

Openness of Executive Recruitment: Recruitment of the chief executive is "open" to the extent that all the politically active population has an opportunity, in principle, to attain the position through a regularized process. If power transfers are coded Unregulated (1) in the Regulation of Executive Recruitment (variable 3.1), or involve a transition to/from Unregulated, Openness is coded 0. Four categories are used:

- (1) Closed: Chief executives are determined by hereditary succession, e.g. kings, emperors, beys, emirs, etc. who assume executive powers by right of descent. **An executive selected by other means may proclaim himself a monarch but the polity he governs is not coded "closed" unless a relative actually succeeds him as ruler.**
- (2) Dual Executive–Designation: Hereditary succession plus executive or court selection of an effective chief minister.
- (3) Dual Executive–Election: Hereditary succession plus electoral selection of an effective chief minister.
- (4) Open: Chief executives are chosen by elite designation, competitive election, or transitional arrangements between designation and election.

- Polity score: A team of experts applies a set of coding rules
- Is this likely to produce identical results when done repeatedly?

# RELIABILITY

- Applying same measurement rules to same case should produce identical results
  - If yes: measure is *reliable*
  - If not: Sometimes too high, sometimes too low
  - Random measurement error



not reliable

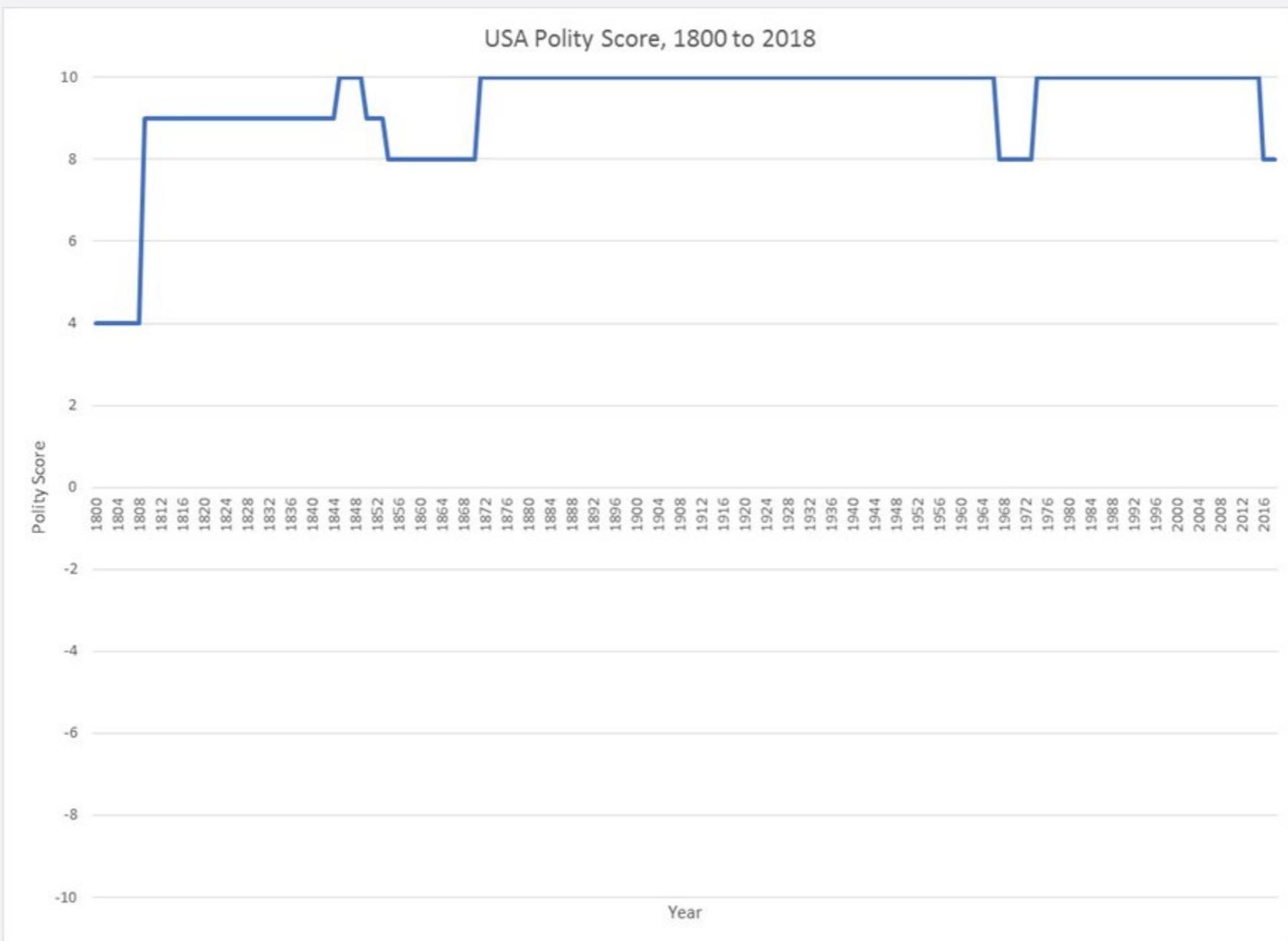
# RELIABILITY

- Religiosity
  - “How often do you attend religious services?”
  - Never; Less than once/year; Once/year; Several times/year; Once/month; 2-3x/month; Nearly every week; Every week; More than once/week
- Is this likely to produce identical results when done repeatedly?

# VALIDITY

- Measure should measure what it's supposed to measure

# VALIDITY



- Polity score for US
- Does this measure the concept of democracy?

# VALIDITY

- Robert Dahl: Democracy=contestation and participation
- Polity IV measure only considers contestation: whether country has open and competitive contest for leadership
- It does not consider participation: degree to which citizens can participate in that process

# VALIDITY

- Measure should measure what it's supposed to measure
  - If yes: measure is *valid*
  - If not: consistently measures something else than it sets out to measure
  - Systematic measurement error



not valid (but reliable)

# VALIDITY

- **Religiosity**
  - “How often do you attend religious services?”
  - Never; Less than once/year; Once/year; Several times/year; Once/month; 2-3x/month; Nearly every week; Every week; More than once/week
- Does this measure religiosity?

# TODAY

Concept



Precise Definition of Concept  
(Conceptual Definition)



Measurement Strategy  
(Operational Definition)



Variable

# DESCRIBING A VARIABLE

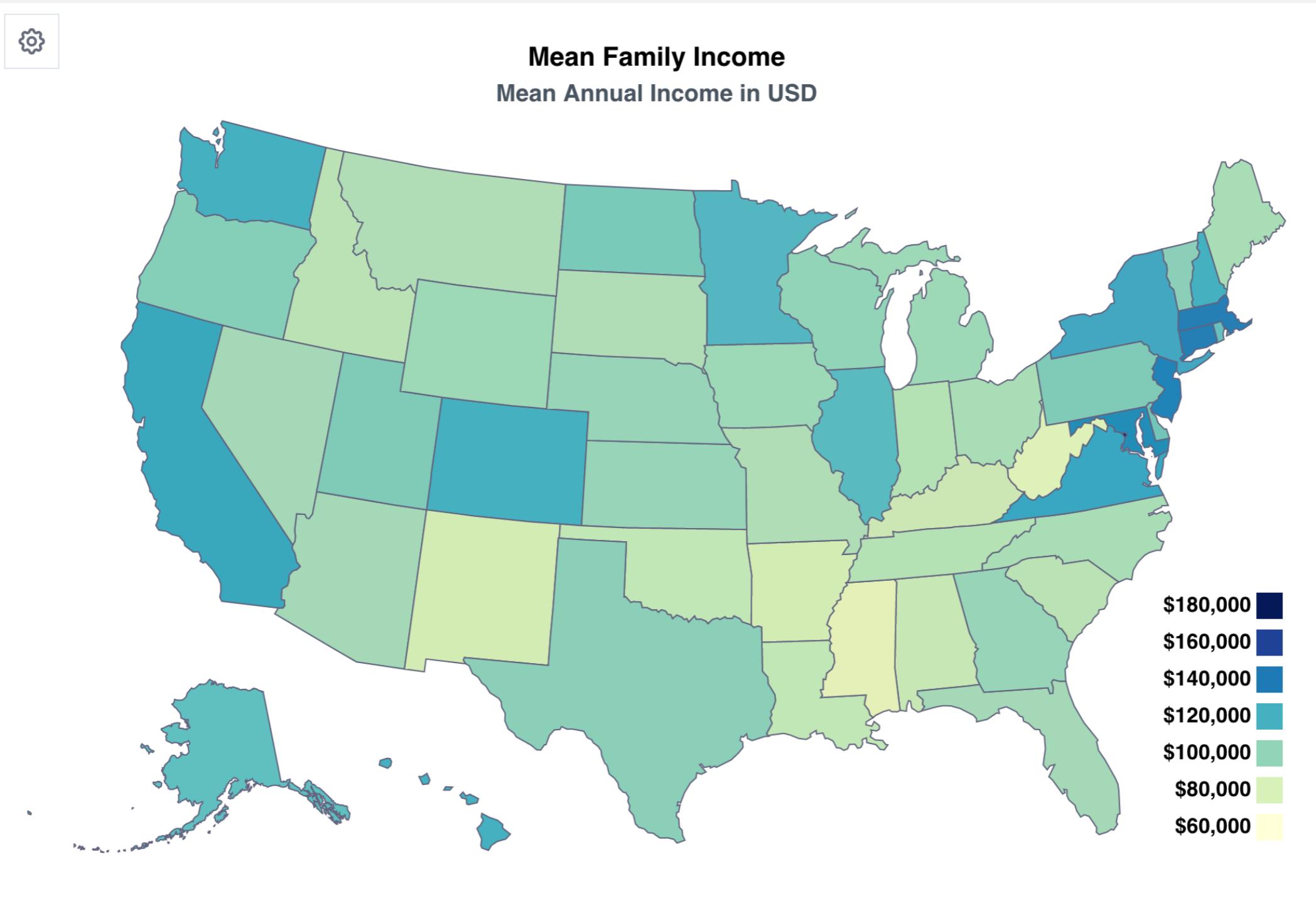
Data Editor (Browse) — mp\_final.dta

The screenshot shows the Stata Data Editor window titled "Data Editor (Browse) — mp\_final.dta". The window has a toolbar at the top with icons for Edit, Browse, Filter, Variables, Properties, and Snapshots. The main area displays a table with 48 rows and 26 columns. Row 1 is labeled "id[1]" and contains the value "10001". The columns are labeled with variable names such as selcom\_adm~t, selcom\_bac~t, selcom\_fin~t, selcom\_all~t, selc~iv\_post, selcom\_pro~t, selcom\_sel~t, com\_house\_~t, com\_public~t, com\_electo~t, com\_parl\_s~t, com\_eccles~t, com\_intell~t, gender, oxbridge, othertop, noun:, and a final column with a question mark. The data consists mostly of zeros, with some ones scattered across the rows, particularly in the gender, oxbridge, othertop, and noun: columns.

	selcom_adm~t	selcom_bac~t	selcom_fin~t	selcom_all~t	selc~iv_post	selcom_pro~t	selcom_sel~t	com_house_~t	com_public~t	com_electo~t	com_parl_s~t	com_eccles~t	com_intell~t	gender	oxbridge	othertop	noun:		
1	0	0	0	0	0	0	0	0	0	0	0	0	0	female	1	0			
2	0	0	0	0	0	0	0	0	0	0	0	0	0	female	1	0			
3	0	0	0	0	0	0	0	0	0	0	0	0	0	female	1	0			
4	0	0	0	0	0	0	0	0	0	0	0	0	0	female	1	0			
5	0	0	0	0	0	0	0	0	0	0	0	0	0	female	1	0			
6	0	0	0	0	0	0	0	0	0	0	0	0	0	female	1	0			
7	0	0	0	0	0	0	0	0	0	0	0	0	0	female	1	0			
8	1	0	1	0	0	0	1	0	0	0	0	0	0	male	0	0			
9	1	0	1	0	0	0	0	1	0	0	0	0	0	male	0	0			
10	1	0	1	0	0	0	0	1	0	0	0	0	0	male	0	0			
11	1	0	1	0	0	0	0	1	0	0	0	0	0	male	0	0			
12	1	0	1	0	0	0	0	1	0	0	0	0	0	male	0	0			
13	1	0	1	0	0	0	0	1	0	0	0	0	0	male	0	0			
14	0	0	0	0	0	0	0	1	0	0	0	0	0	male	0	0			
15	0	0	0	0	0	0	0	1	0	0	0	0	0	male	0	0			
16	0	0	0	0	0	0	0	1	0	0	0	0	0	male	0	0			
17	0	0	0	0	0	0	0	1	0	0	0	0	0	male	0	0			
18	0	0	0	0	0	0	0	1	0	0	0	0	0	male	0	0			
19	0	0	0	0	0	0	0	1	0	0	0	0	0	male	0	0			
20	0	0	0	0	0	0	0	1	0	0	1	0	0	male	0	0			
21	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0			
22	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0			
23	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0			
24	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0			
25	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0			
26	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0			
27	0	1	0	0	0	0	0	0	0	0	0	0	0	male	0	0			
28	0	0	0	0	0	0	0	0	0	0	0	0	0	1	male	1	0		
29	0	0	0	0	0	0	0	0	0	0	0	0	0	1	male	1	0		
30	0	0	0	0	0	0	0	0	0	0	0	0	0	1	male	1	0		
31	0	0	0	0	0	0	0	0	0	0	0	0	0	1	male	1	0		
32	0	0	0	0	0	0	0	0	0	0	0	0	0	1	male	1	0		
33	0	0	0	0	0	0	0	0	0	0	0	0	0	1	male	1	0		
34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0		
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0		
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0		
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0		
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0		
39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	male	0	0		
40	0	0	0	0	0	1	0	0	0	0	0	0	0	0	male	0	0		
41	0	0	0	0	0	1	0	0	0	0	0	0	0	0	male	0	0		
42	0	0	0	0	0	1	0	0	0	0	0	0	0	0	male	0	0		
43	0	0	0	0	0	1	0	0	0	0	0	0	0	0	male	0	0		
44	0	0	0	0	0	1	0	0	0	0	0	0	0	0	male	0	0		
45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	male	0	0		
46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	male	0	0	
47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	male	0	0	
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	male	0	0	

Vars: 264 Order: Dataset Obs: 4,722

# DESCRIBING VARIABLES



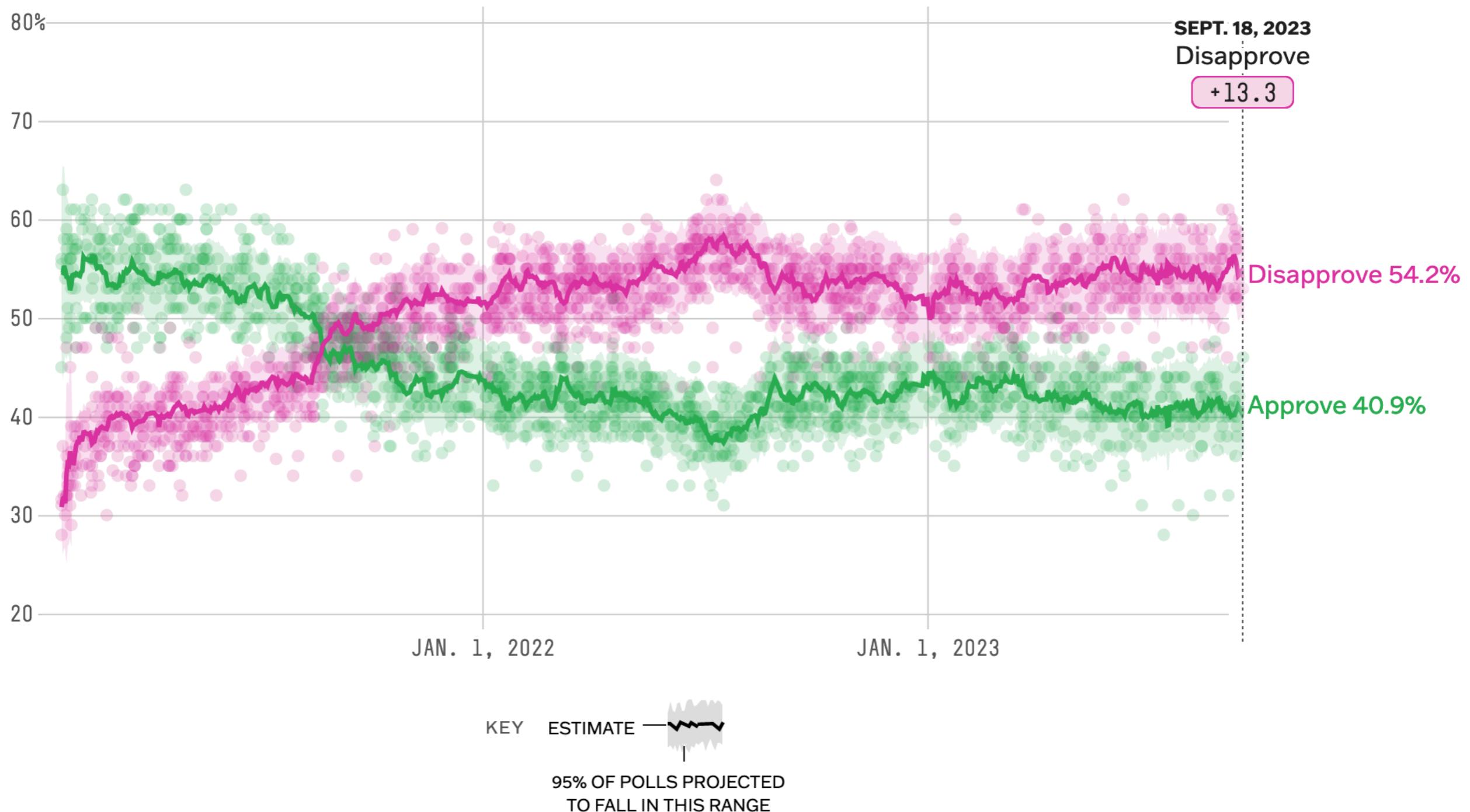
The average personal income in the [United States](#) is \$63,214, with the median income across the country being \$44,225. Real wages averaged \$67,521 in 2022, and average household incomes averaged to \$87,864.

# DESCRIBING VARIABLES

**US income inequality continues  
to grow**

# DESCRIBING VARIABLES

**Do Americans approve or disapprove of Joe Biden?**



# VARIABLES

- Today and next class: Variables
  - Properties of variables
  - How to describe variables
  - How to graph variables

# EXAMPLE VARIABLES

- **Gender**
  - male
  - female

# EXAMPLE VARIABLES

- **Gender**
  - male
  - female

Variable label

Variable values

# EXAMPLE VARIABLES

- **Ideology**
    - Extremely liberal
    - liberal
    - slightly liberal
    - moderate
    - slightly conservative
    - conservative
    - extremely conservative
- Variable label**
- Variable values**

# EXAMPLE VARIABLES

- **Age**
  - 0
  - 1
  - 2
  - 3
  - ...
- **Variable label**
- **Variable values**
- Three variables have different characteristics...

# AGE

- Values: 0, 1, 2, 3, ...
- Two people: A: 30, B: 60
- Three things we can say about A and B's age:
  - 
  - 
  -

# AGE

- Values: 0, 1, 2, 3, ...
- Two people: A: 30, B: 60
- Three things we can say about A and B's age:
  - Their ages are different
  - B has a higher age than A
  - B's age is twice as much as that of A

# IDEOLOGY

- Values: extremely liberal, liberal, slightly liberal, moderate, slightly conservative, conservative, extremely conservative
- Two people: A: slightly liberal, B: extremely liberal
- What can we say about A and B's political views?
  - 
  - 
  -

# IDEOLOGY

- Values: extremely liberal, liberal, slightly liberal, moderate, slightly conservative, conservative, extremely conservative
- Two people: A: slightly liberal, B: extremely liberal
- What can we say about A and B's political views?
  - Their political views are different
  - B is more liberal than A
  - B is two/three/four/X times as liberal as A

# IDEOLOGY

- Values: extremely liberal, liberal, slightly liberal, moderate, slightly conservative, conservative, extremely conservative
- Two people: A: slightly liberal, B: extremely liberal
- What can we say about A and B's political views?
  - Their political views are different
  - B is more liberal than A
  - ~~B is two/three/four/X times as liberal as A~~

# GENDER

- Values: male, female
- Two people: A: male, B: female
- What can we say about A and B's genders?
- 
- 
-

# GENDER

- Values: male, female
- Two people: A: male, B: female
- What can we say about A and B's genders?
  - Their genders are different
  - B is more \_\_\_\_?\_\_\_\_ than A
  - B is two/three/four/X times as \_\_\_\_?\_\_\_\_ as A

# GENDER

- Values: male, female
- Two people: A: male, B: female
- What can we say about A and B's genders?
  - Their genders are different
  - B is more \_\_\_\_? than A
  - B is two/three/four/X times as \_\_\_\_? as A

# LEVELS OF MEASUREMENT

- **Variables provide different amounts of information**
  - differences between values
  - ranking of values
  - exact differences between values
- **Determines how you can summarize/graph/analyze variable**

# LEVELS OF MEASUREMENT

Relative Differences			
Ranking			
Exact Differences			
Between Units			

# LEVELS OF MEASUREMENT

Nominal			
Relative Differences	✓		
Ranking	X		
Exact Differences	X		
Between Units			

- e.g. gender

# LEVELS OF MEASUREMENT

	Nominal	Ordinal	
Relative Differences	✓	✓	
Ranking	X	✓	
Exact Differences	X	X	
Between Units			

- e.g. ideology

# LEVELS OF MEASUREMENT

	Nominal	Ordinal	Interval
Relative Differences	✓	✓	✓
Ranking	✗	✓	✓
Exact Differences	✗	✗	✓
Between Units	✗	✗	✓

- e.g. age

# EXERCISE

- Variable names below
- What are the variable values?
- What level of measurement does the variable have?
- Income
- Marital status
- Support for universal health insurance
- Class grades

# INCOME

- Values: Dollars per year
- Relative Differences?
- Ranking?
- Exact differences between units?

# INCOME

- Values: Dollars per year
- Relative Differences? YES
- Ranking?
- Exact differences between units?

# INCOME

- Values: Dollars per year
- Relative Differences? YES
- Ranking? YES
- Exact differences between units?

# INCOME

- Values: Dollars per year
- Relative Differences? YES
- Ranking? YES
- Exact differences between units? YES

# INCOME

	Nominal	Ordinal	Interval
Relative Differences	✓	✓	✓
Ranking	✗	✓	✓
Exact Differences	✗	✗	✓
Between Units	✗	✗	✓

- There is an ordering to the values, and the distance between them is known

# MARITAL STATUS

- Values: single, married, divorced
- Relative Differences?
- Ranking?
- Exact differences between units?

# MARITAL STATUS

- Values: single, married, divorced
- Relative Differences? YES
- Ranking?
- Exact differences between units?

# MARITAL STATUS

- Values: single, married, divorced
- Relative Differences? YES
- Ranking? NO
- Exact differences between units?

# MARITAL STATUS

- Values: single, married, divorced
- Relative Differences? YES
- Ranking? NO
- Exact differences between units? NO

# MARITAL STATUS

	Nominal	Ordinal	Interval
Relative Differences	✓	✓	✓
Ranking	✗	✓	✓
Exact Differences	✗	✗	✓
Between Units	✗	✗	✓

- Values just represent a category, there is no ordering to the values