

# Interpreting and Critiquing Causal Evidence

## Day 1 - Deconstructing an Argument

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January 29, 2024

# Objectives

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2. What **Evidence** strengthens an Explanation?
3. What Types of **Causation** are there?
4. How do we reach **Consistent** Conclusions?
5. How can we **Deconstruct** a Political Science Paper?
6. What Types of **Critiques** of an Argument can we make?

# Section 1

## Explanation



## Causal Evidence

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Does development lead to democracy?	"No, democracy causes development"
Does democracy prevent war?	"Of course not, India and Pakistan were democracies and had a war in 1999"
Did voters support President Trump because of jobs lost to immigration?	"Obviously not, jobs were lost to technological change"

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- ▶ If  $D$  explains  $Y$ , we are saying that the *absence* of  $D$  would have led to a different outcome - a different value of  $Y$
- ▶ There exists a 'counterfactual' possibility that did not happen

# What makes an Explanation Convincing?

- ▶ Explanation requires:
  1. Theory
  2. Evidence

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- ▶ No! We do not know if the laptop, the charger, the adapter or the socket is the problem. We do not have a *theory* to support our solution
- ▶ Next time the laptop fails to charge, our wiggling might not be enough and we won't know how to fix it

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  - ▶ Note we cannot *reject* the theory - it may be that both sockets are broken
- ▶ We can design other tests to check the laptop, charger, adapter etc.

## What makes an Explanation Convincing?

- ▶ We might arrive at an explanation like:
  - ▶ The socket works fine with other laptops
  - ▶ The laptop and charger work fine in newer sockets that don't require an international adapter
  - ▶ The problem is the same using alternative international adapters
  - ▶ Therefore, when an international adapter is used, the electrical connection between the wires is weak and unreliable, preventing the laptop from charging reliably.

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10. **Policy-relevance** - Can the argument help us design better policy?



## Section 2

## Evidence

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- ▶ A **Convincing Explanation** requires evidence that supports a *specific* theory
  - ▶ And *rejects other theories*

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- ▶ We need to design tests (produce evidence) that *distinguish between* specific theories

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4. **Doubly Decisive Test:** Can confirm a hypothesis and reject all other hypotheses
  - If we test the charger with an entirely new socket and laptop that we have previously checked work, *and* similarly for the socket and laptop

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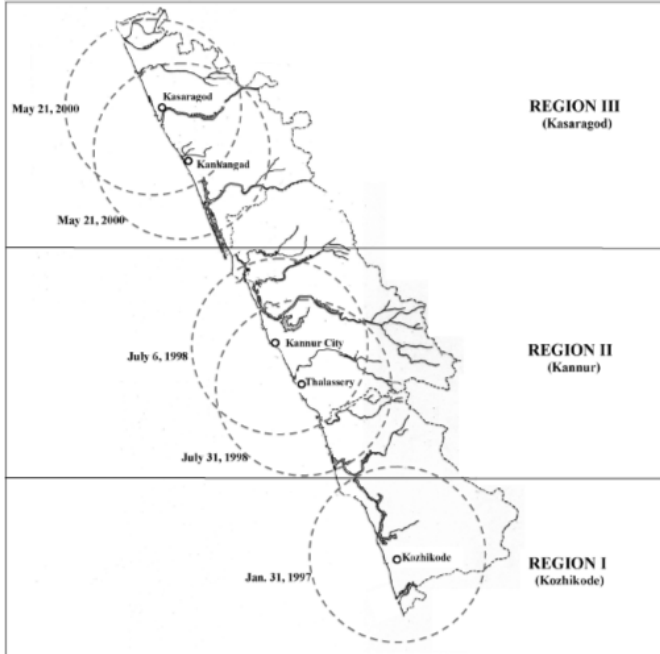
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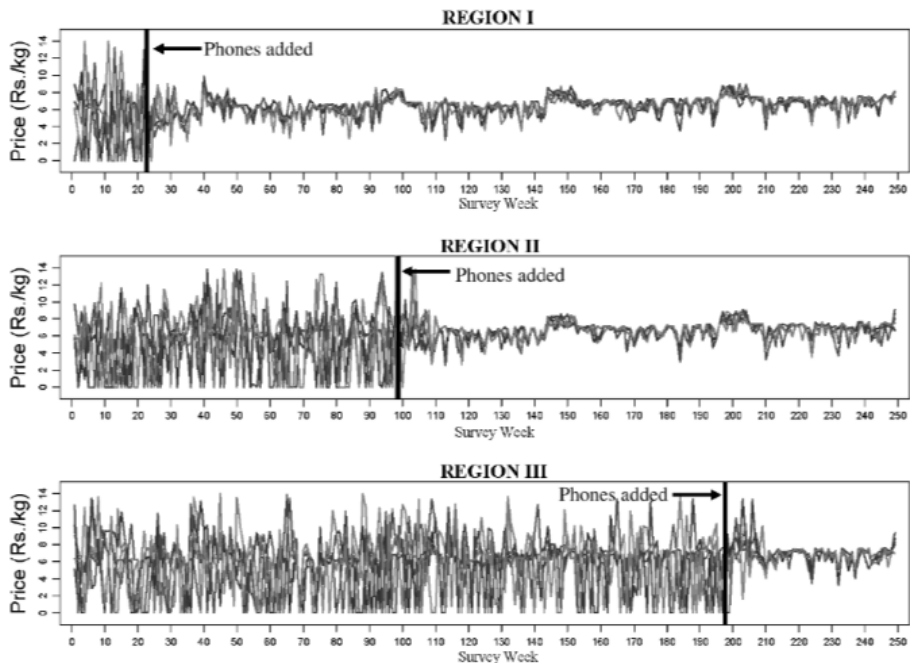
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- ▶ What caused the reduction in price variation in Kerala's fishing industry?
- ▶ **Hypothesis:** The introduction of mobile phone service
- ▶ **Theory:** Mobile phones allowed people to quickly share the price of fish in different villages, so fishermen got the best prices more consistently
  - ▶ Jensen et al (2007): Compare price dispersion with the timing of the introduction of new mobile phone masts
  - ▶ A 'smoking gun' test at least



**FIGURE II**  
Spread of Mobile Phone Coverage in Kasaragod, Kannur,  
and Kozhikode Districts



**FIGURE IV**  
Prices and Mobile Phone Service in Kerala



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7. **Replicability** - Can we take the same (or similar) data and reach the same conclusion?

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  2. Societies are even more complex interactions of millions of humans
  3. Everyone has an opinion, including researchers
  4. Ethical constraints on the data we can gather
  5. Political explanations in one place may not work in another

## Section 3

# Causation

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- ▶ When my laptop was not charging, I tried an alternative charger and it worked. But I came back later to use the same charger and it did not work!
- ▶ The charger only worked about half of the time



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- ▶ Most causes operate only if certain other hard-to-measure conditions are in place
- ▶ That means we need to treat causation as **probabilistic**
- ▶ For example, a left-wing party in government may not guarantee the passage of social welfare legislation
  - ▶ But it can make it more likely

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- ▶ If  $D$  happens, the **probability** of  $Y$  increases
- ▶ Treatment effects are a distribution, not a single value

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## Causal Diagrams

- Using Causal Diagrams to clarify arguments

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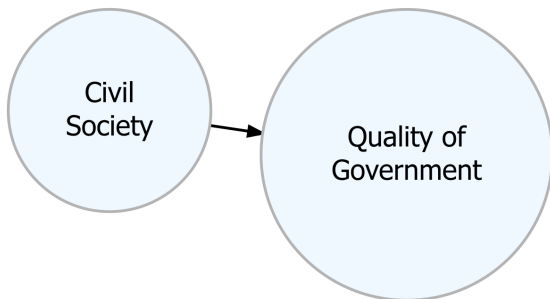
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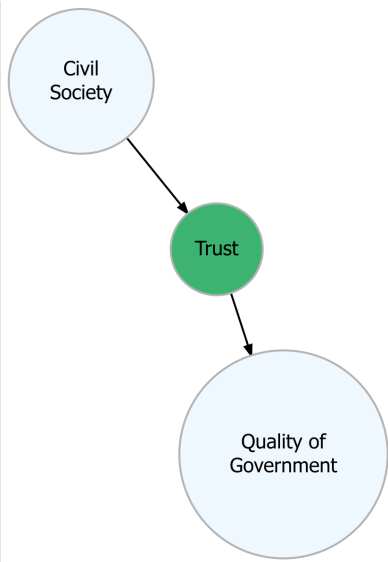
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    - ▶ Even if they can't be measured

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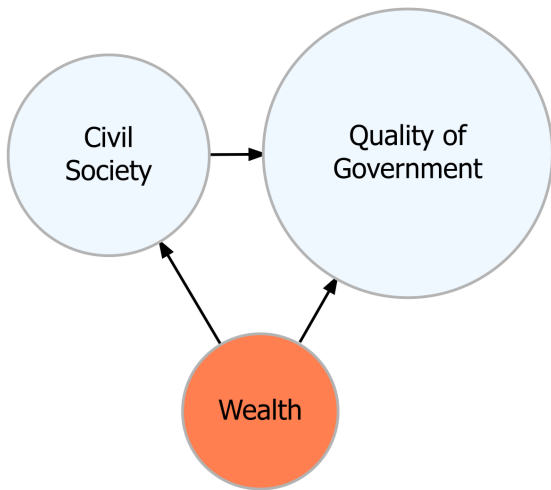


# Causal Diagrams





## Causal Diagrams



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- We can always break causal connections into smaller chunks

# Causal Diagrams

- ▶ We can always break causal connections into smaller chunks
- ▶ At some point we rely on theory to provide the causal power:
  - ▶ Physical processes (gravity, momentum)
  - ▶ Behavioural theory (incentives, psychology)

## Types of Explanation

- Two perspectives on explanation:

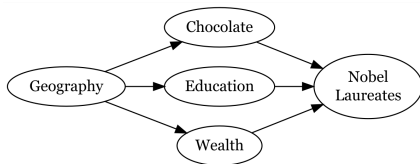
## Types of Explanation

- Two perspectives on explanation:

<b>Causes of Effects</b>	<b>Effects of Causes</b>
What caused Y?	Does D cause Y?
Why does Switzerland have so many Nobel laureates?	Does chocolate cause more Nobel laureates?
Backward-looking	Forward-looking

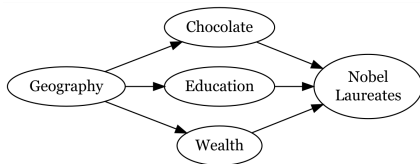
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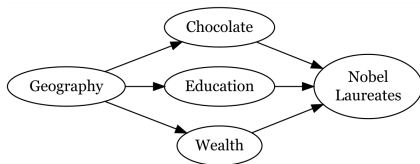
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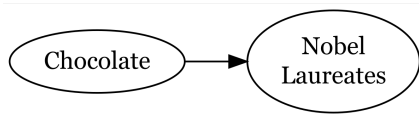
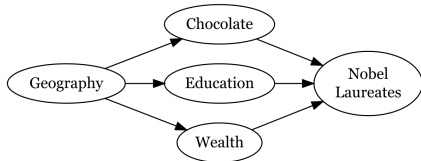


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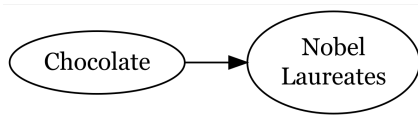
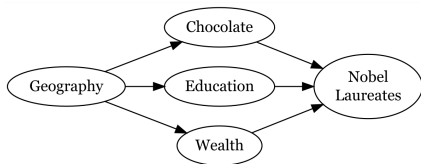
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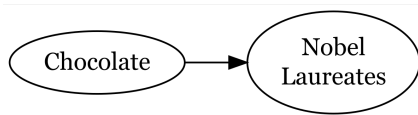
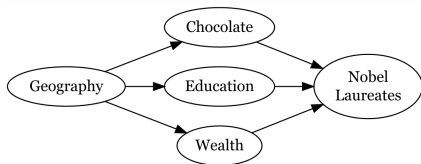


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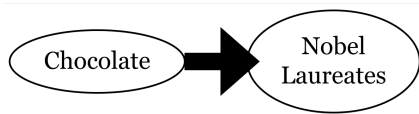
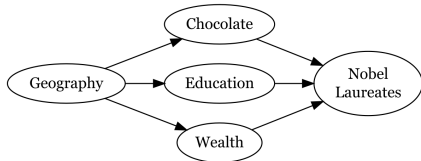


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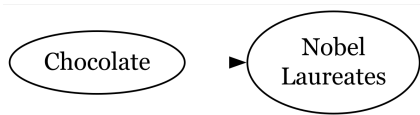
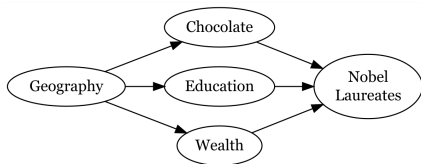


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## Section 4

# Consistent Conclusions

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  - There are alternative explanations!
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4. **Circular reasoning:** The conclusions just restate the premises
  - Eg. "Abortion should be legal because women have the right to an abortion."

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  - Eg. Assuming that political science professors know what they are doing!

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7. **Fallacy of Composition:** Extending what is true of part to being true of the whole

- Eg. "If someone stands up at a football match, they can see better. Therefore, if everyone stands up, they can all see better."

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8. **Appeal to ignorance:** Absence of evidence is not evidence of absence

- Eg. "There is no evidence that social distancing can reduce the transmission of coronavirus, therefore it does not work"

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  - ▶ How different are the alternative candidates?
  - ▶ How do voters interpret corruption?
  - ▶ Who is everyone else voting for?

## Consistent Conclusions

- ▶ Of course the other possibility is that the **premise is false**
  - ▶ That the explanatory variable/assumption is not present in a specific case
  - ▶ But that's a different type of critique

## Section 5

# Deconstructing Papers

## Deconstructing a Political Science Paper

- Before we can critique an argument we have to understand its content



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  - ▶ What is the **scope** of the argument's application?
- ▶ Critiques depend on understanding the building blocks of an argument

## Deconstructing a Political Science Paper

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(Marshall 2015)



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  - ▶ **Evidence** - What evidence does the methodology produce?

<b>Title:</b>			
<b>Authors:</b>		<b>Year:</b>	
<b>Research Question:</b>  <b>Answer/Causal Argument:</b>  <b>Scope of Argument</b> (in Time, Space, Demographics etc.):			
Concept/Variable	Measure	Unit of Analysis	Role (DV, XV, Control)

<b>Theory:</b>       	<b>Methodology:</b> <input type="checkbox"/> Case Study, Process Tracing <input type="checkbox"/> Comparative Cases <input type="checkbox"/> Regression with Controls <input type="checkbox"/> Matching <input type="checkbox"/> Field Experiment <input type="checkbox"/> Lab/Survey Experiment <input type="checkbox"/> Natural Experiment <input type="checkbox"/> Instrumental Variable <input type="checkbox"/> Regression Discontinuity <input type="checkbox"/> Difference-in-Differences
<b>Evidence:</b>       	

<b>Title:</b> Making Democracy Work			
<b>Authors:</b> Robert Putnam		<b>Year:</b> 1993	
<b>Research Question:</b> Why are some parts of Italy governed better than others?			
<b>Answer/Causal Argument:</b> Places with more civic social interactions have better government			
<b>Scope of Argument</b> (in Time, Space, Demographics etc.): Advanced Democracies			
Concept/Variable	Measure	Unit of Analysis	Role (DV, XV, Control)
Civil Society	Density of sports clubs, newspapers, electoral turnout	Region	Explanatory Variable
Government Performance	12 Indicators, eg. Budget on time, number of day care centres per child	Region	Dependent Variable
Wealth	GDP per capita	Region	Control Variable
<b>Theory:</b> Civic interactions between people and groups create trust and more ‘horizontal’ relationships that prevent government from being predatory		<b>Methodology:</b>	
		<input type="checkbox"/> Case Study, Process Tracing <input checked="" type="checkbox"/> Comparative Cases <input type="checkbox"/> Regression with Controls <input type="checkbox"/> Matching <input type="checkbox"/> Field Experiment <input type="checkbox"/> Lab/Survey Experiment <input type="checkbox"/> Natural Experiment <input type="checkbox"/> Instrumental Variable <input type="checkbox"/> Regression Discontinuity <input type="checkbox"/> Difference-in-Differences	
<b>Evidence:</b> Regions of Italy with similar institutional rules and similar wealth but with more civil society have, on average, better performing government			

## Section 6

# Fundamental Critiques

## Fundamental Critiques

- Every component of the argument is subject to causal critique

## Fundamental Critiques

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- ▶ **Conceptual Validity**



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# Fundamental Critiques

## ► Measurement Validity

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## Fundamental Critiques

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  - ▶ Does the scale make sense?

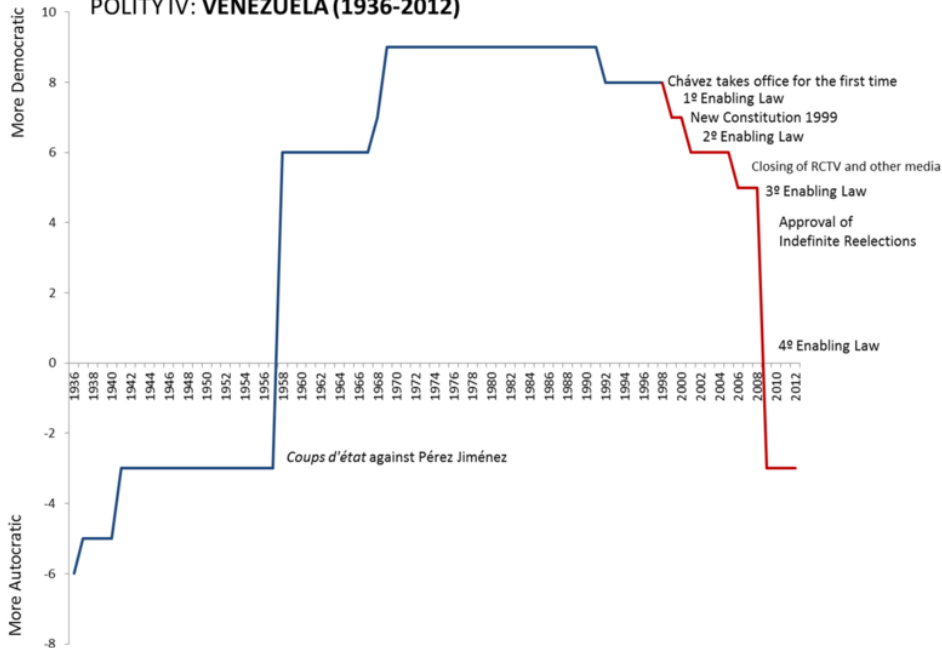
## Fundamental Critiques

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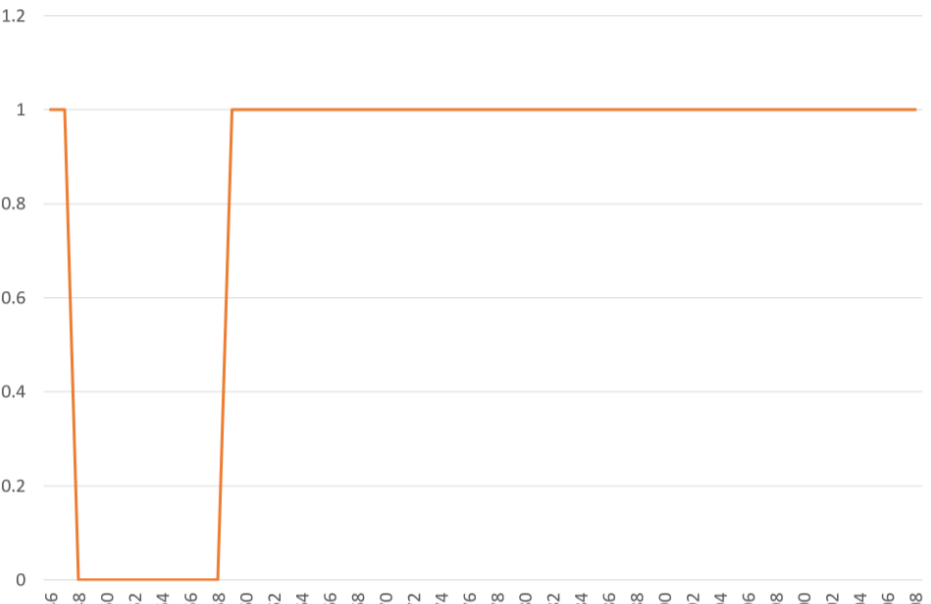
## Fundamental Critiques

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  - ▶ Are the cases (units) scored correctly? How reliable is the scoring?

# POLITY IV: VENEZUELA (1936-2012)



Venezuela



# Fundamental Critiques

## ► Unit of Analysis

## Fundamental Critiques

- ▶ **Unit of Analysis**
- ▶ Does the unit of analysis match the theory?

## Fundamental Critiques

### ► **Unit of Analysis**

- Does the unit of analysis match the theory?
- Would the argument work at an alternative level of analysis?



## Fundamental Critiques

### ► Unit of Analysis

- Does the unit of analysis match the theory?
- Would the argument work at an alternative level of analysis?
- Eg. Should we use annual data to assess the effect of Trump's tweets on the stock market?

# Fundamental Critiques

## ► Theory

## Fundamental Critiques

- ▶ **Theory**
- ▶ Is the theory internally consistent?

## Fundamental Critiques

- ▶ **Theory**
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# Fundamental Critiques

## ► **Theory**

- Is the theory internally consistent?
- Is the theory falsifiable?
- Is the theory portable?

# Fundamental Critiques

## ► Evidence

## Fundamental Critiques

- ▶ **Evidence**
- ▶ Where did the dataset come from?

# Fundamental Critiques

- ▶ **Evidence**
- ▶ Where did the dataset come from?
  - ▶ Sampling strategy



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## Fundamental Critiques

### ► **Evidence**

- Where did the dataset come from?
  - Sampling strategy
  - Questionnaire and survey protocol
  - Data entry, cleaning
  - Statistics/statistical model chosen
- What was the "Data Generating Process"?
- How does this data help us answer the question?

## Fundamental Critiques

- **Methodologies/Research Designs** for gathering evidence:

## Fundamental Critiques

- ▶ **Methodologies/Research Designs** for gathering evidence:
- ▶ Observational Studies:
  - ▶ Comparative Cases

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## Methodology

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- ▶ Quasi-Experimental Studies:

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- ▶ Methodologies for gathering evidence:
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  - ▶ Natural Experiment



# Methodology

- ▶ Methodologies for gathering evidence:
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