

The Promise and Perils of Quantitative Research in International Relations¹

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MVPd002 Quantitative Research in International and European Politics

¹Yes, this paraphrases the title of the compulsory reading.

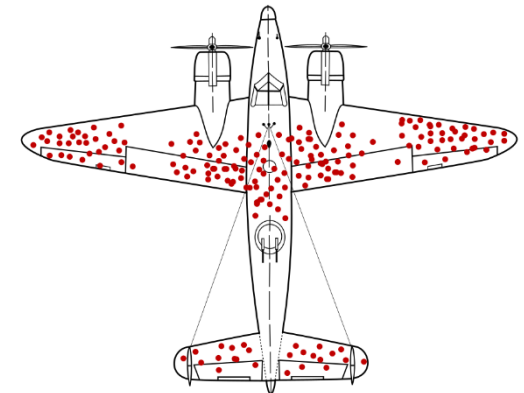
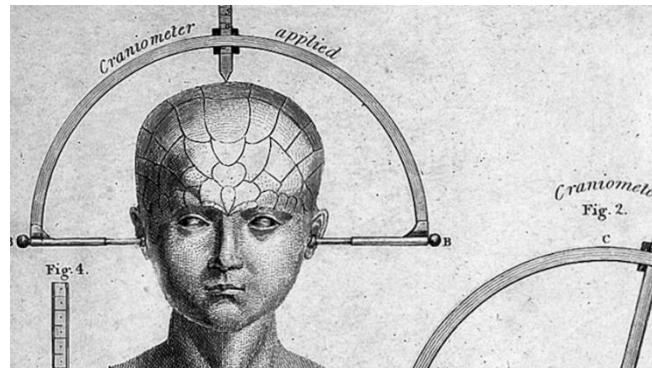
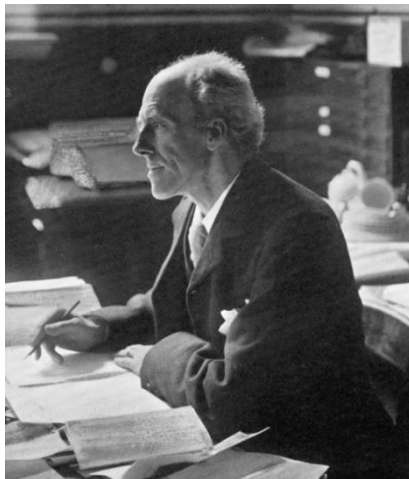
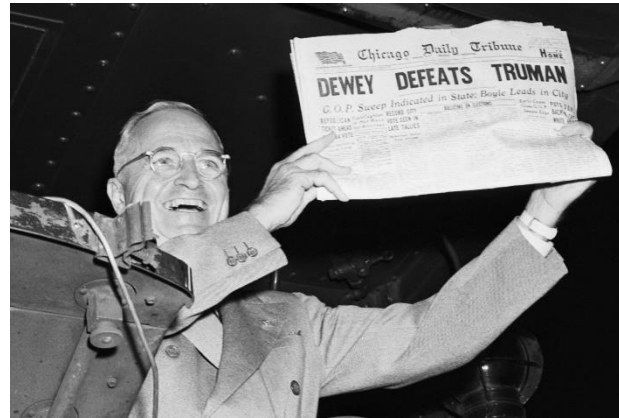
Plan for today

- **1. Introduction round:**
 - What is your background?
 - What is your dissertation research about?
 - What is your experience with quantitative research?

- **2. Seminar:**
 - What is (and should be) the role of quantitative research in political science?
 - What challenges need to be addressed when using quantitative methods in political science research?
 - What is the relationship between statistical inference and causality?

Politics and statistics

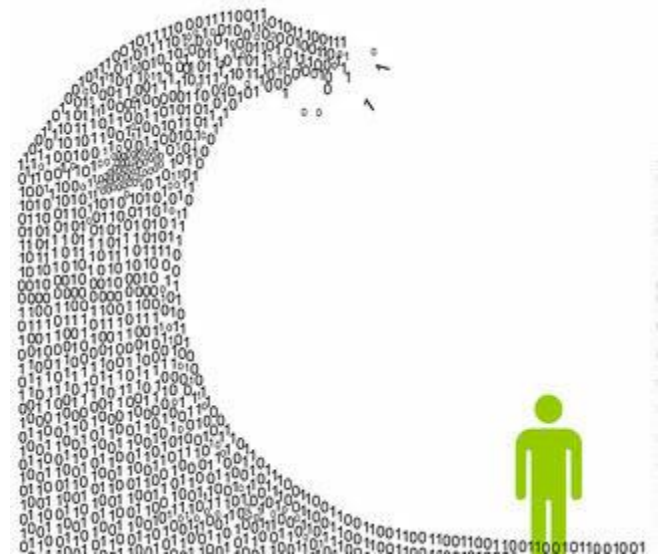
- The history of politics and statistics is closely intertwined.



What is (and should be) the role of quantitative research in political science?

Aggregation

- In 2020, IBM estimated that **2,5 trillion** (10^{18}) **bytes** of digital data are generated globally every day.
- The ongoing **information revolution** is strengthening the demand for methods of processing and analyzing **aggregated data**.
- The ability to analyze such data is not only essential **academic**, but also a **civic, competence**.



*“We are drowning in information,
but we are starved for knowledge”*
- Various authors, original probably John Naisbitt

Pattern detection: Simpson's paradox

Table 1.4: Berkeley students by gender

(a)

(b)

	Number of applicants	Percent admitted
Males	8442	44%
Females	4321	35%

Table 1.4: Berkeley students by gender

(a)

(b)

	Number of applicants	Percent admitted
Males	8442	44%
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Table 1.5: Berkeley students by gender for six largest Departments

(a)

(b)

Department	Males		Females	
	Applicants	Percent admitted	Applicants	Percent admitted
A	825	62%	108	82%
B	560	63%	25	68%
C	325	37%	593	34%
D	417	33%	375	35%
E	191	28%	393	24%
F	272	6%	341	7%

Transparency, standardization, uncertainty quantification



"Don't jump to conclusions"

Me:



Inference

- How do you understand the concept of inference?

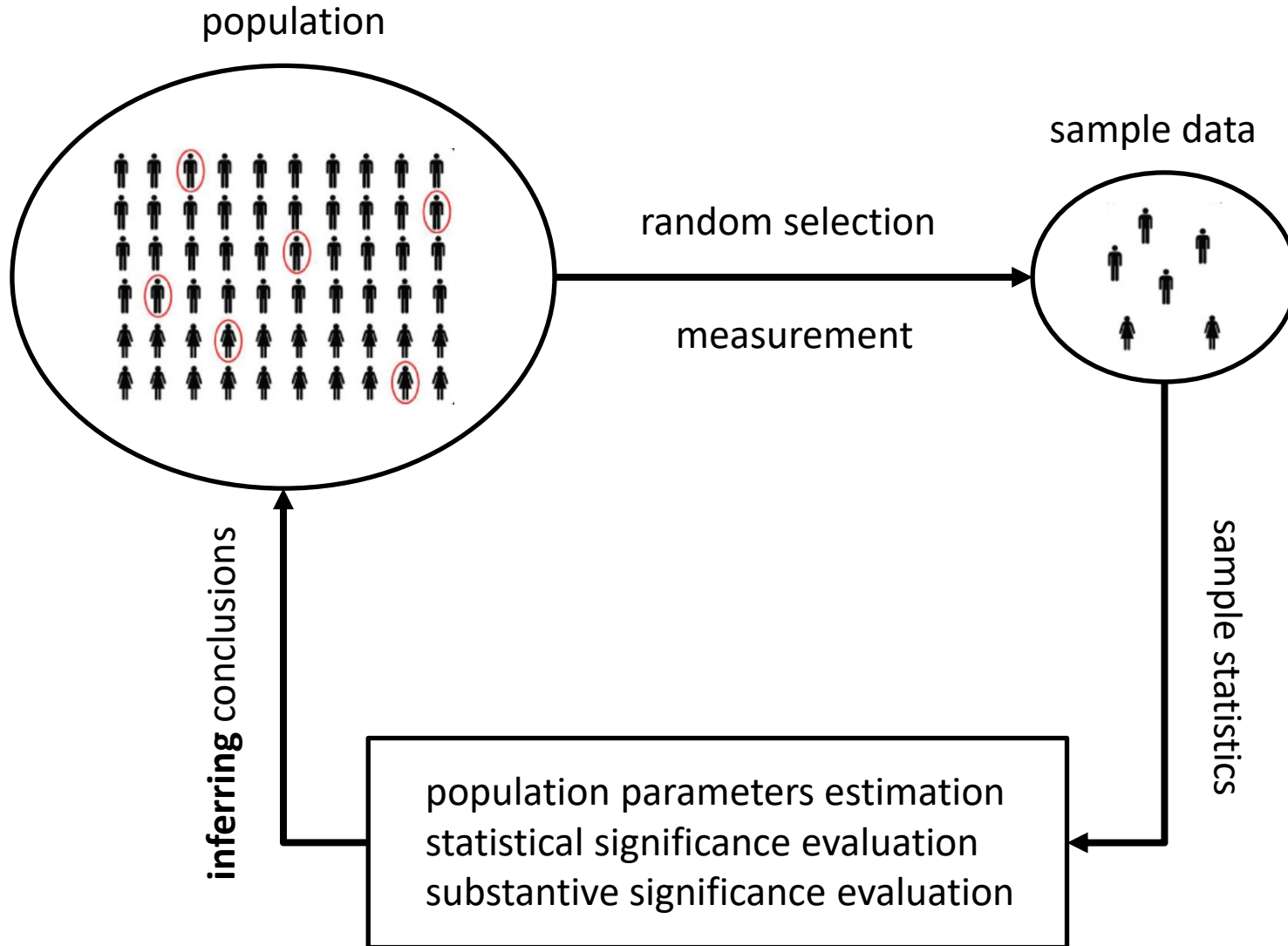
Inference

- Gary King: *inference is impossible – we try to use the facts we have to learn about the facts we don't have.*

Inference

- Gary King: *inference is impossible* – we try to use the facts we have to learn about the facts we don't have.
- **Choose:** substantive questions of interest
- **Formalize:** quantity of interest (QOI), given question
- **Collect:** data, given QOI, question
- **Assume:** class of models, given data, QOI, question
- **Estimate from data:** best model in class, given the above
- **Present results:** given the above

Statistical inference



What challenges need to be addressed when using quantitative methods in political science research?

What kind of challenges we face?

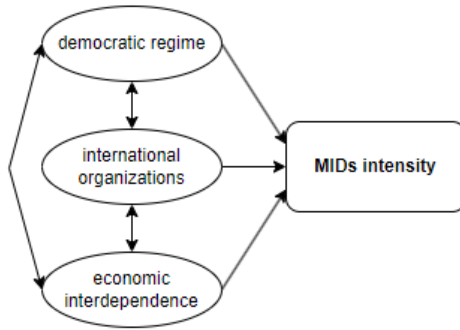
- Braumoeller and Sartori (2011) identify (1) **specification** errors and (2) **inference** errors.
- **Specification errors**
 - Statistical models do not connect with the relevant theory
 - Theory is (A) neglected and/or it is (B) insufficiently developed
 - Statistical models are imposed to data (phenomena)
- **Inference errors**
 - Models misrepresent the data (phenomena)
 - Best models are parsimonious: “Everything should be made as simple as possible, but not simpler.”

Reducing specification error:
bringing in theory

Statistics and theory

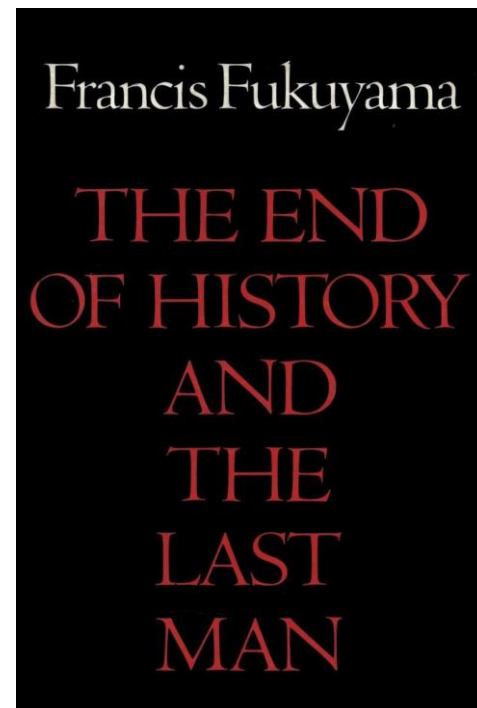
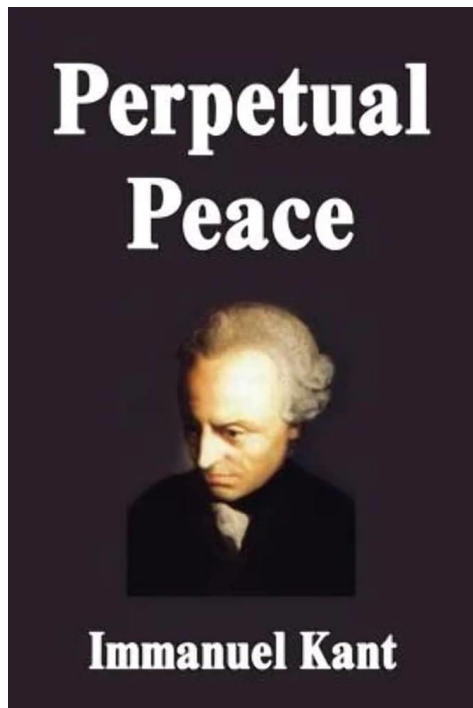


The golem of statistics



The role of theory

- What factors decrease the probability of inter-state military conflict?

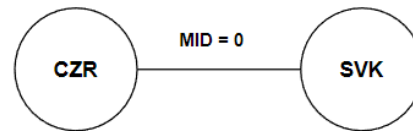


The role of theory

- Are democracies less likely to engage in inter-state military conflict?



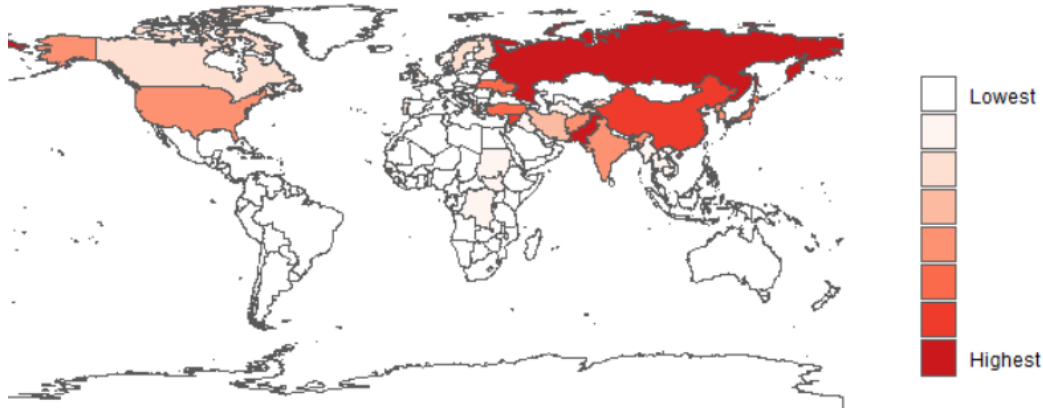
Correlates of War



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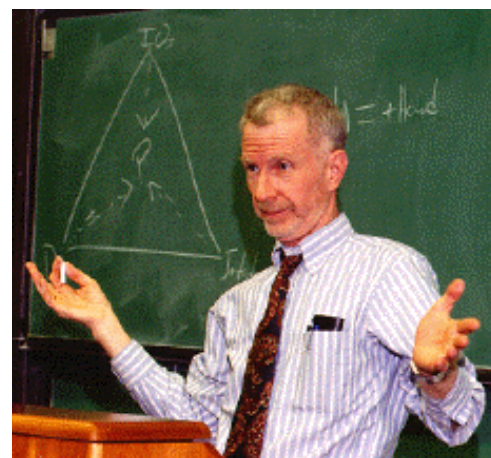
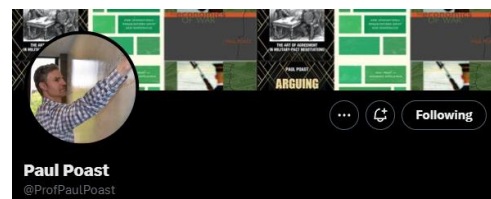
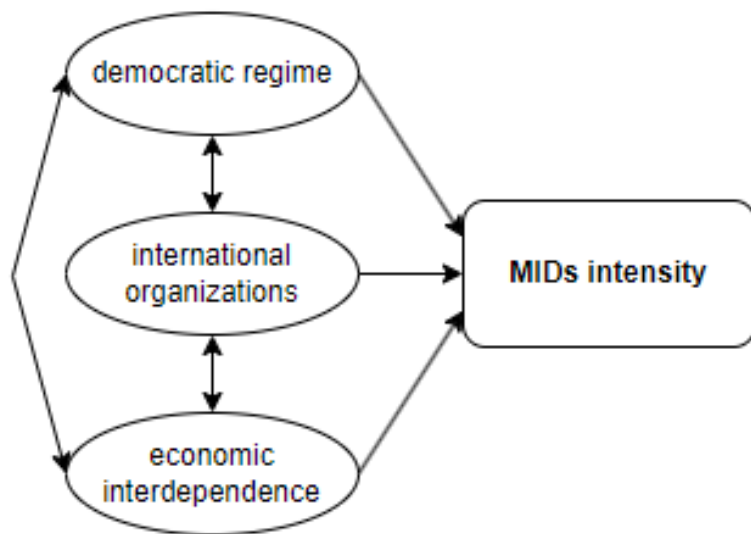
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Involvement in MIDs Incidents 2014



The role of theory

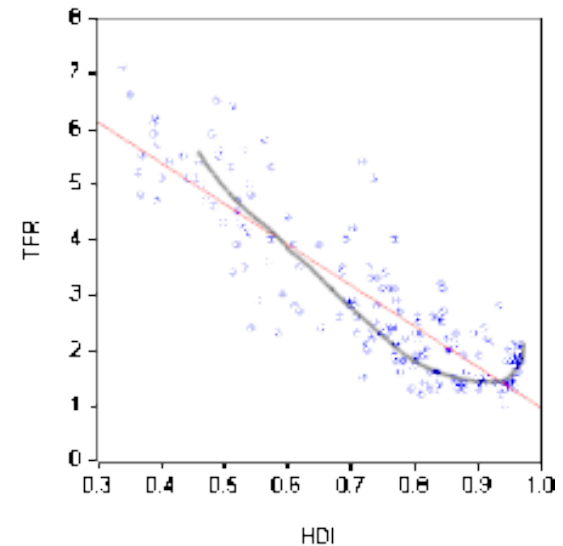
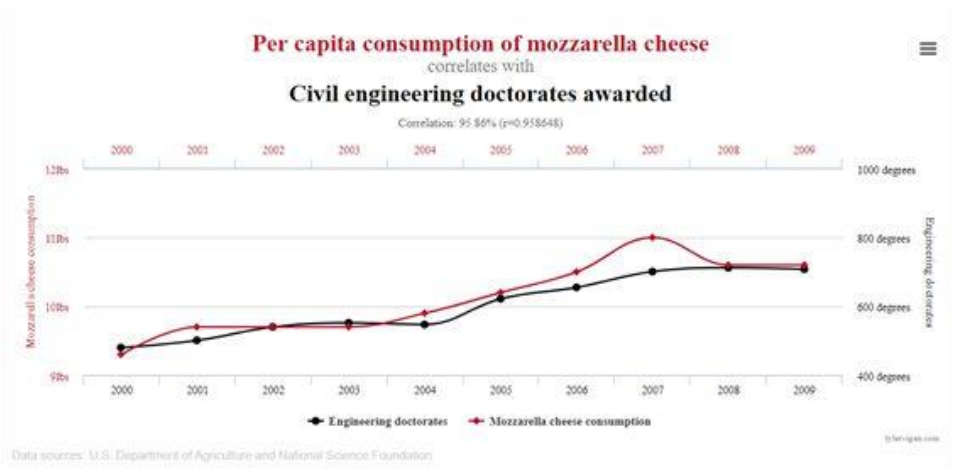
- Are democracies less likely to engage in inter-state military conflict?



Bruce Russett

The role of theory

- The theory describes a **causal mechanism** through which the effect of a given cause (predictor) is transferred to the effect (dependent variable).



The role of theory: causal mechanisms

- The exercise of power in **democracies (predictor)** requires the support of a large portion of the public; because military engagement imposes significant costs with public repercussions, political elites in democracies exhibit higher **conflict aversion (dependent variable)** (Mesquita et al. 1999).

American Political Science Review

Vol. 93, No. 4 December 1999

An Institutional Explanation of the Democratic Peace

BRUCE BUENO DE MESQUITA *Hoover Institution*

JAMES D. MORROW *Hoover Institution*

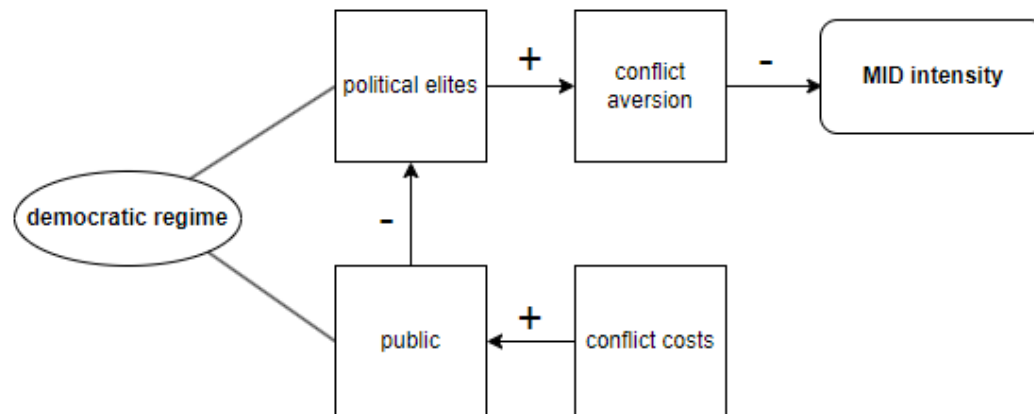
RANDOLPH M. SIVERSON *University of California, Davis*

ALASTAIR SMITH *Yale University*

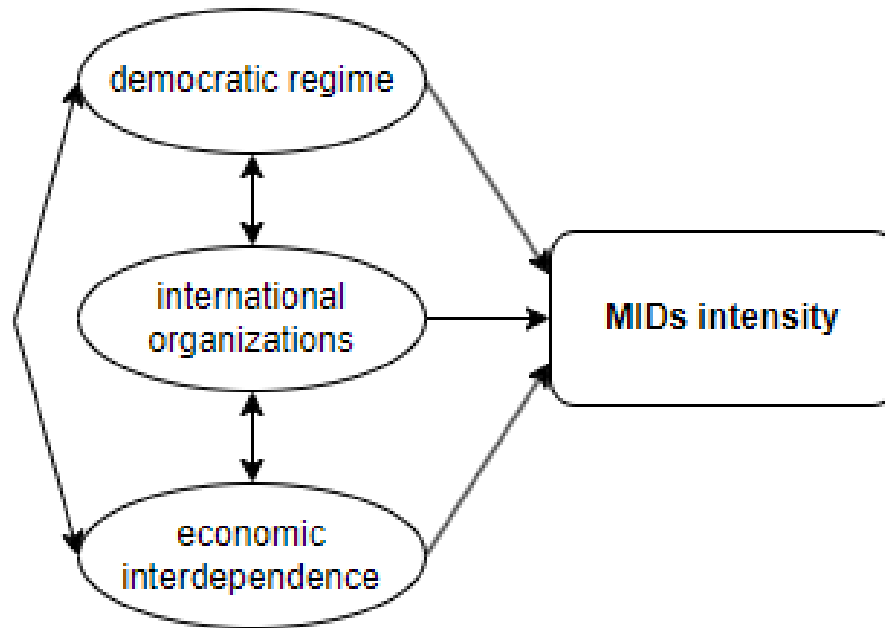
We examine formally the link between domestic political institutions and policy choices in the context of eight empirical regularities that constitute the democratic peace. We demonstrate that democratic leaders, when faced with war, are more inclined to shift extra resources into the war effort than are autocrats. This follows because the survival of political leaders with larger winning coalitions hinges on successful policy. The extra effort made by democrats provides a military advantage over autocrats. This makes democrats unattractive targets, since their institutional constraints cause them to mobilize resources for the war effort. In addition to trying harder, democrats are more selective in their choice of targets. Because defeat is more likely to lead to domestic replacement for democrats than for autocrats, democrats only initiate wars they expect to win. These two factors lead to the interaction between polities that is often referred to as the democratic peace.

The role of theory: causal mechanisms

- The theory describes a **causal mechanism** through which the effect of a given cause (predictor) is translated into the change in the dependent variable.
- The exercise of power in **democracies (predictor)** requires the support of a large portion of the public; because military engagement imposes significant costs with public repercussions, political elites in democracies exhibit higher **conflict aversion (dependent variable)** (Mesquita et al. 1999).



The role of theory



Models and hypotheses

- A **theoretical model** is a set of assumed causal mechanisms (e.g., institutional brake) defined to represent a class of phenomena (e.g., MID).
- A **statistical model** is a set of probabilistic relationships between variables (level of democracy, intensity of MIDs, etc.) defined to represent a particular observed phenomenon (selection of MIDs).

*“All models are wrong –
but some are useful.”*

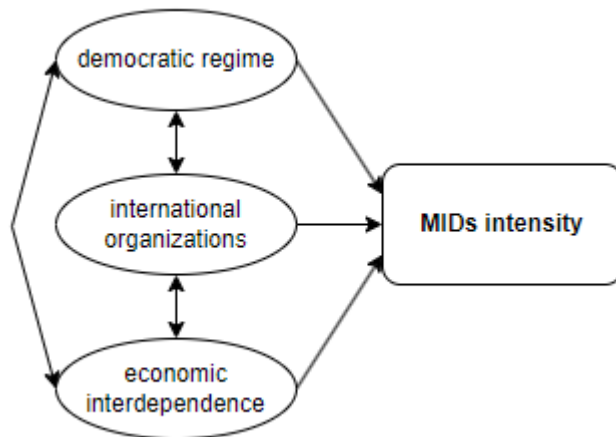
-- George Box

Models and hypotheses

- A **statistical model** is a set of probabilistic relationships between variables (level of democracy, intensity of MIDs, etc.) defined to represent a particular observed phenomenon (selection of MIDs).
- **Variables:** characteristics of a given phenomenon taking on different values.
- **Probability:** quantifies the degree of uncertainty due to random events (noise) and imprecision (measurement error).
- **Parameters:** quantify the strength and/or direction of relationships between variables

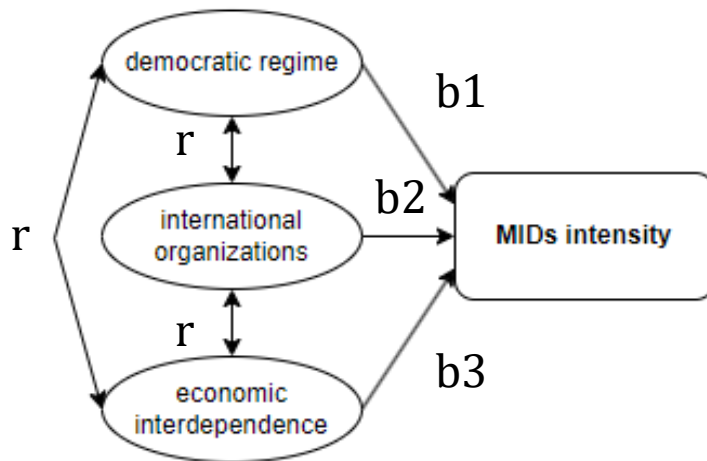
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$$\text{MID} = a - b1 * \text{DEM} - b2 * \text{IO} - b3 * \text{EIN}$$

Models and hypotheses

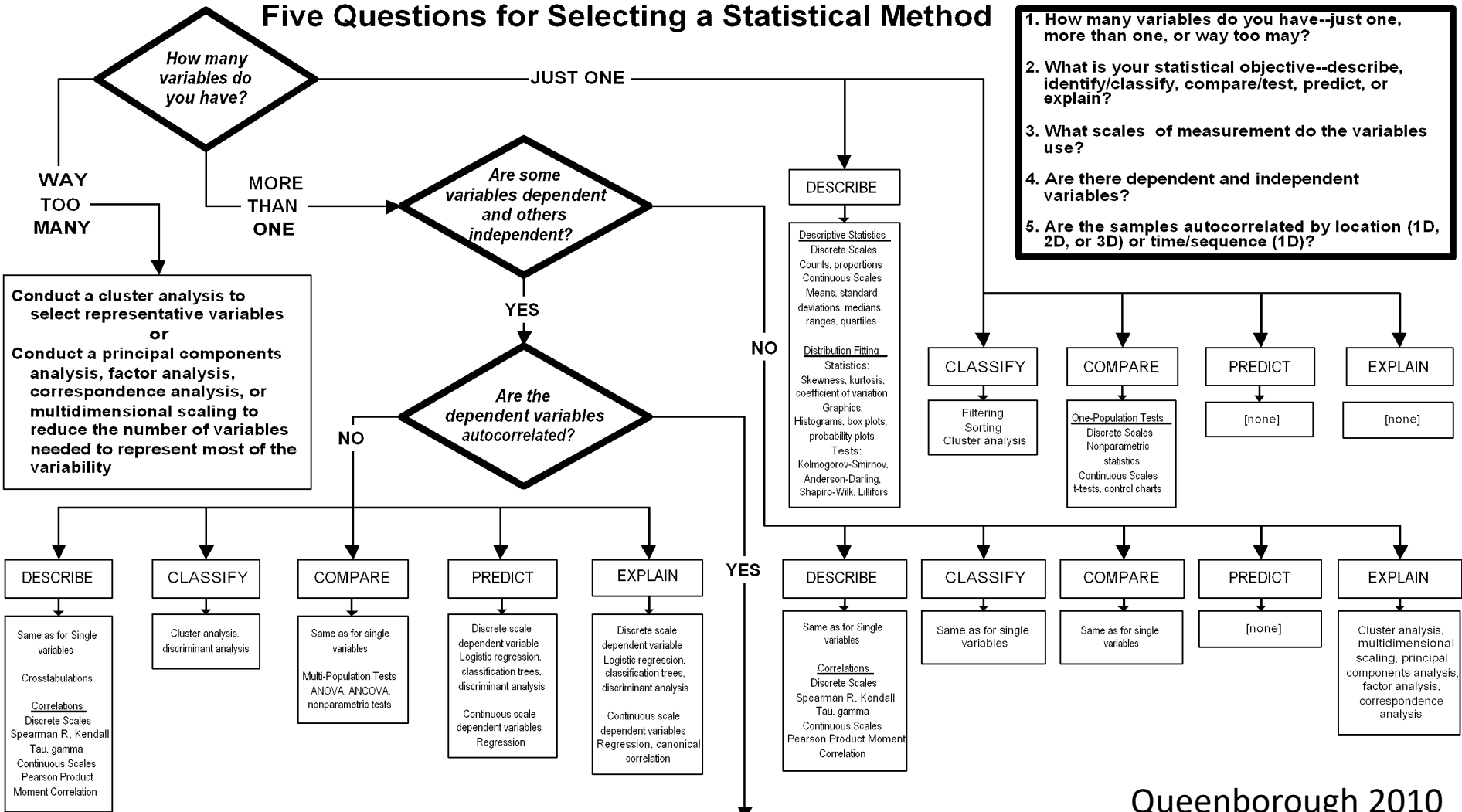
- It is useful to distinguish between theoretical and statistical hypotheses.
- **Theoretical hypotheses:** assume a certain relationship between two or more variables.
- E.g.: H1. *The democratic nature of the dyad reduces the intensity of MIDs.*
- **Statistical hypotheses:** allow generalization (inference) of results from a representative sample to the target population from which the sample was drawn.
- H1: $b_1 \neq 0$

$$\text{MID} = a - b_1 * \text{DEM} - b_2 * \text{IO} - b_3 * \text{EIN}$$

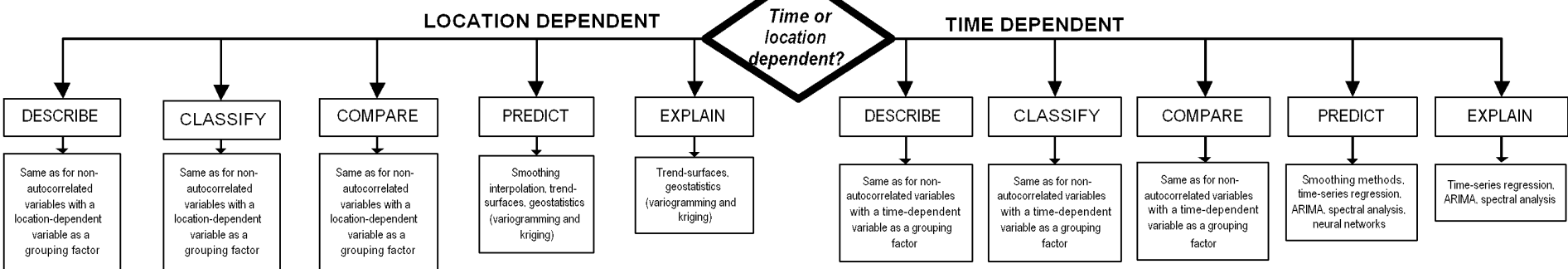

Reducing inference error:
choosing adequate model

Five Questions for Selecting a Statistical Method

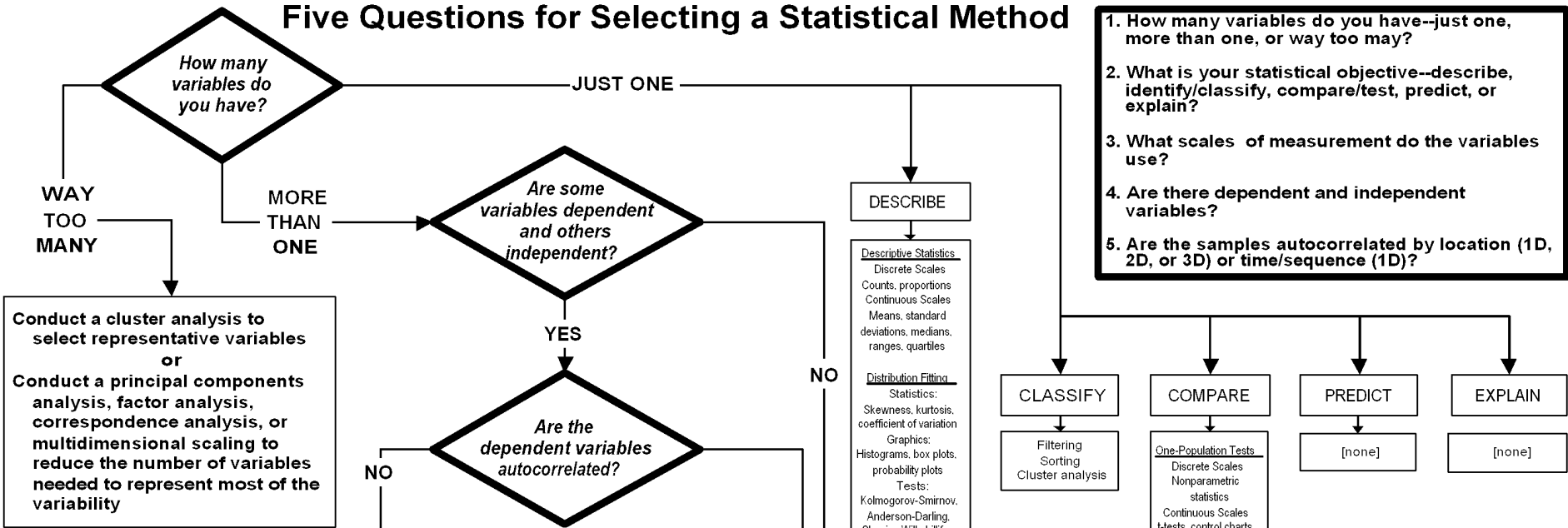
1. How many variables do you have--just one, more than one, or way too many?
2. What is your statistical objective--describe, identify/classify, compare/test, predict, or explain?
3. What scales of measurement do the variables use?
4. Are there dependent and independent variables?
5. Are the samples autocorrelated by location (1D, 2D, or 3D) or time/sequence (1D)?



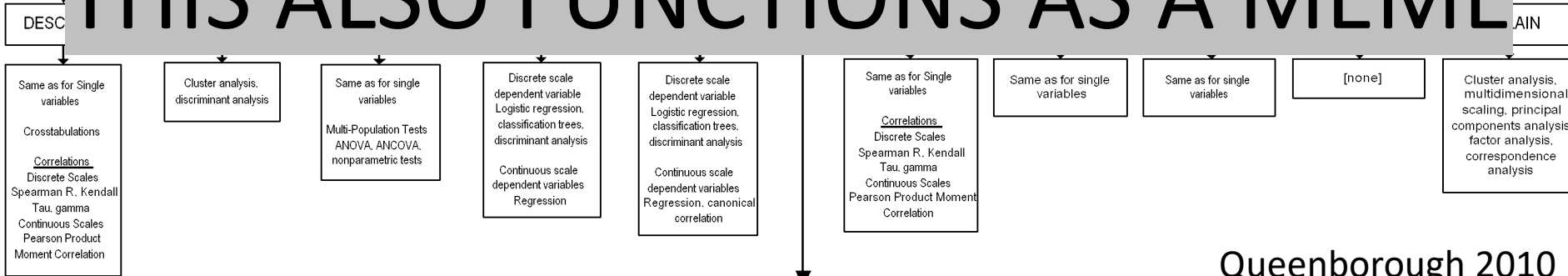
Queenborough 2010



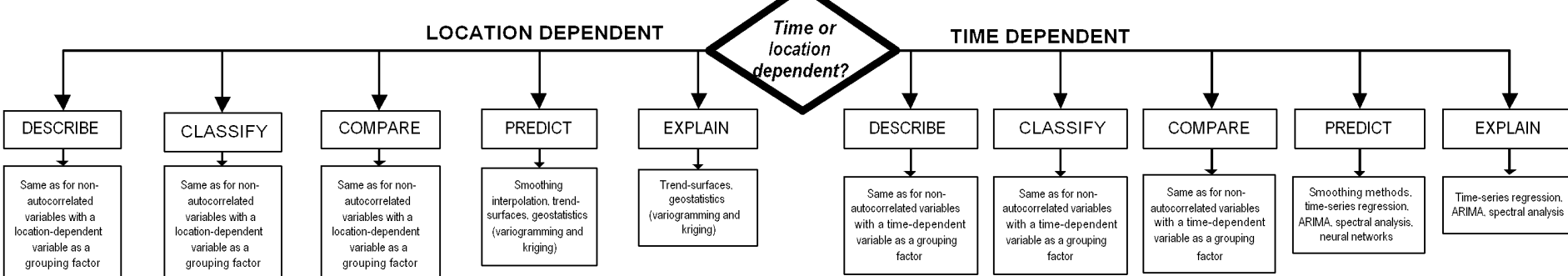
Five Questions for Selecting a Statistical Method



THIS ALSO FUNCTIONS AS A MEME



Queenborough 2010

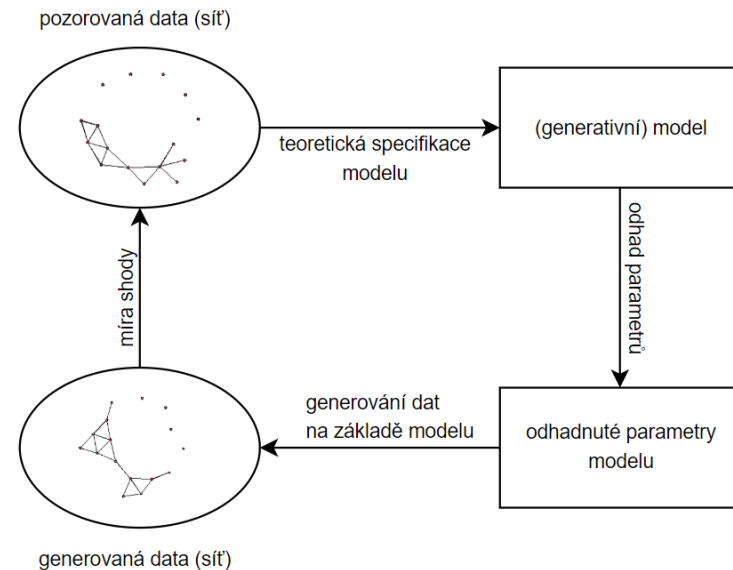
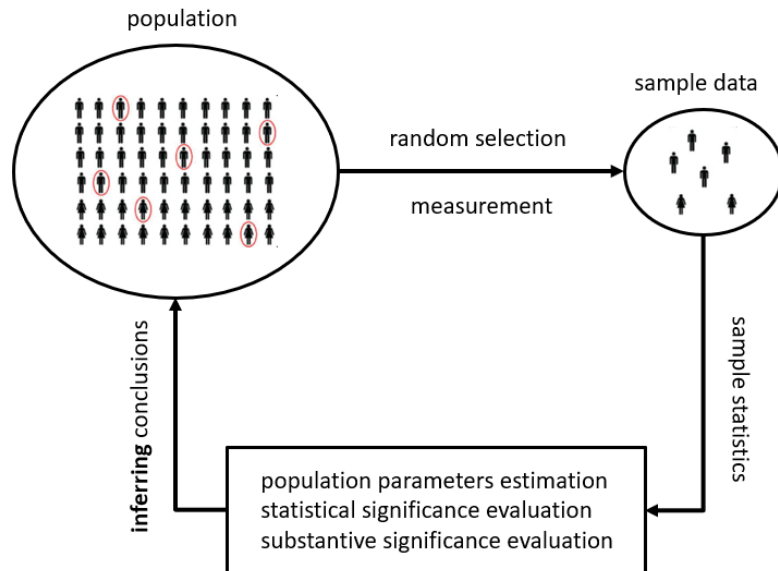


Observational interdependent data

- We often work with **observational data** that is **interdependent**.
- Especially in International Relations, we collect data on set of entities (states) that are interdependent.
- **Why this could be a problem?**

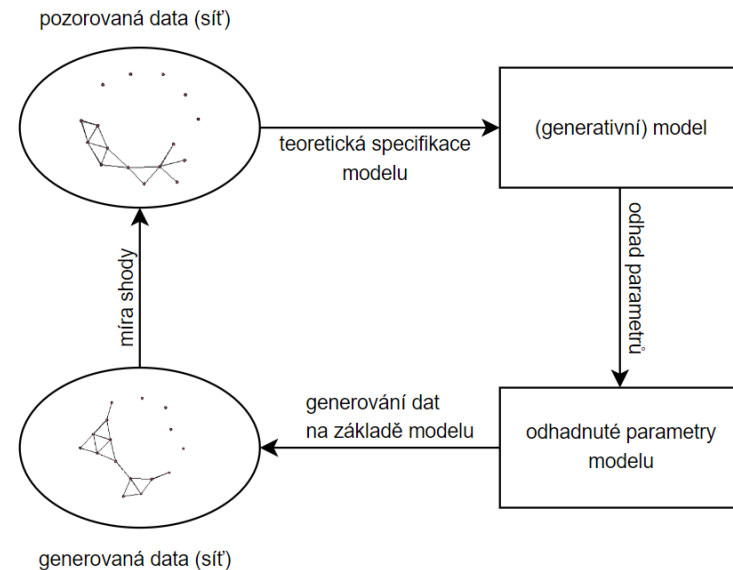
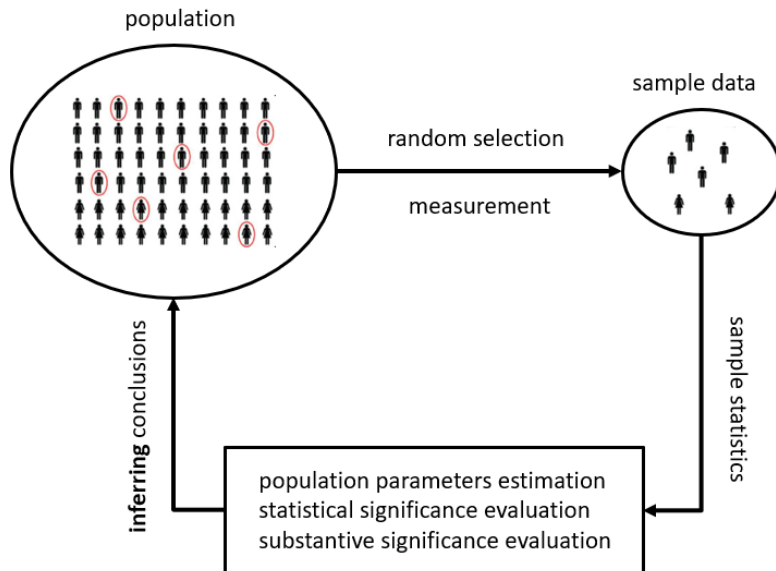
Two approaches to inferences

- Statistical generalization (inference) **from sample to population** (design-based) vs. inference **from data to model** (model-based).

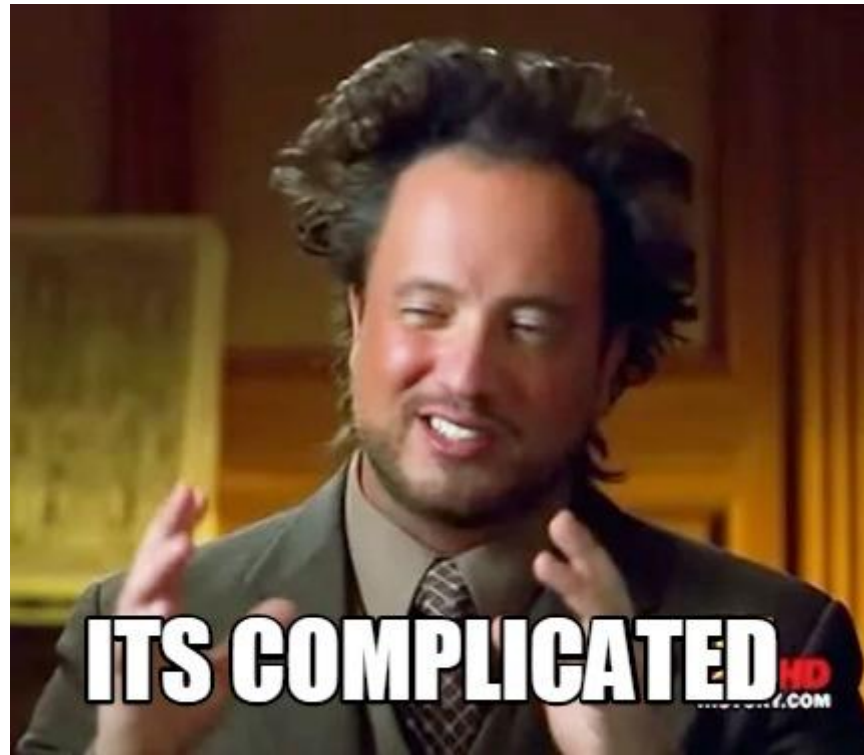


Two approaches to inferences

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What is the relationship between statistical inference and causality?



Statistics and causality

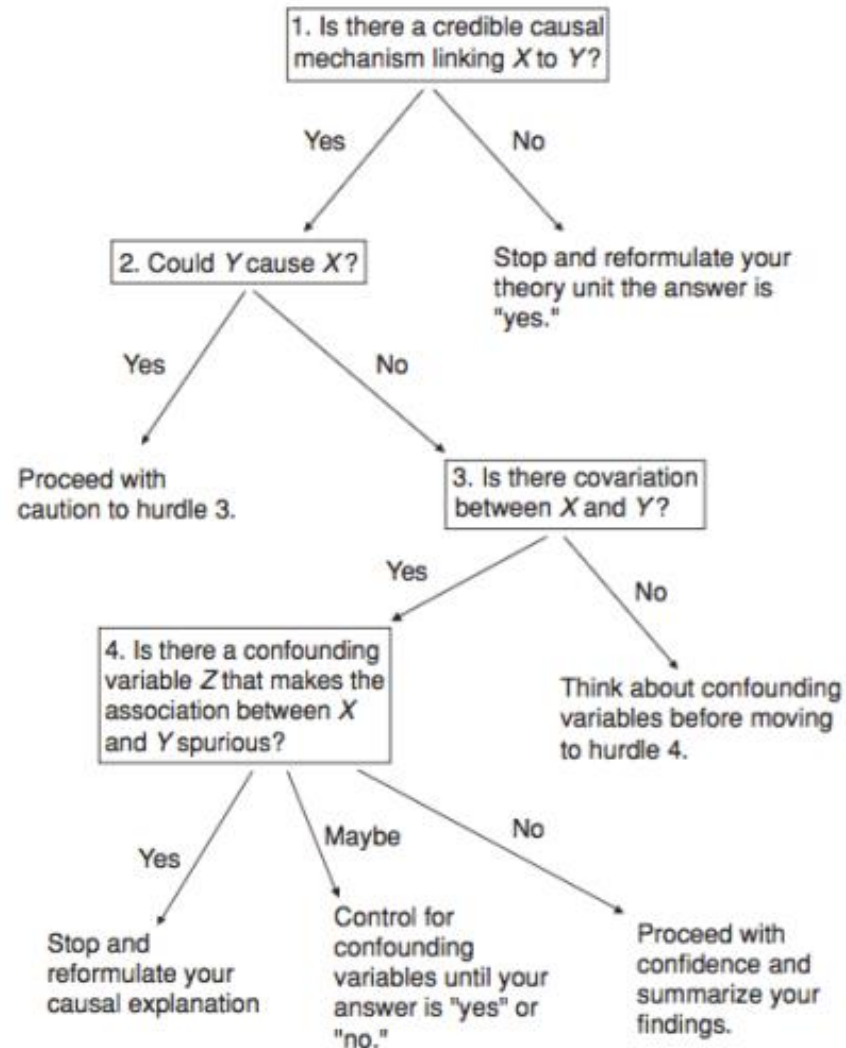


Figure 3.1. The path to evaluating a causal relationship.

P.S.: What needs to be avoided

- Hyper-exactness: *the average wage is 37384,425 Kč*
- Pseudo-skepticism
- p-value fetishization
- Mechanistic application

**Předvolebním průzkumům
nevěří ani Babiš. Strany si
radši platí vlastní**

