

# Research design

Political Analysis, Week 2

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26 January, 2015

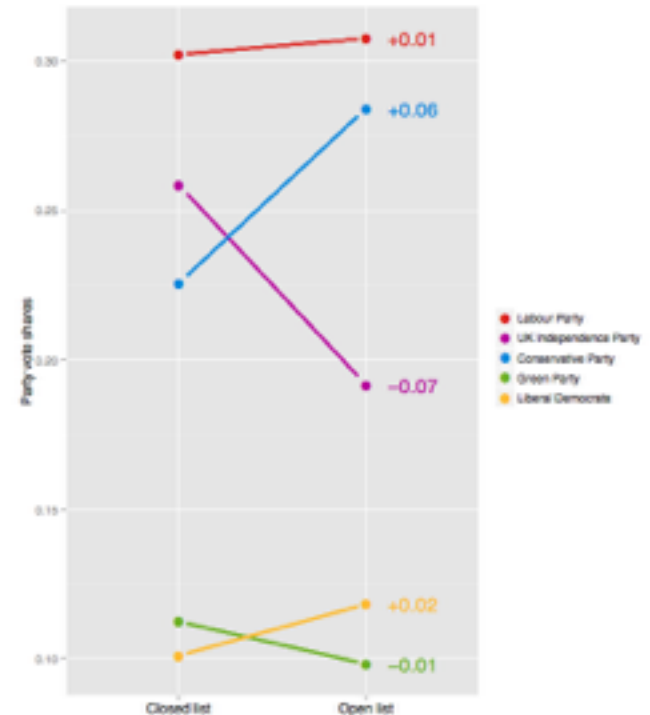
**Last week:** identifying a research question (often based on a puzzle, provoking a theory/hypothesis)

**This week:** how to choose a *design* to match the question/hypothesis.

From



to



# A typology of research questions

## Descriptive/predictive questions:

- What proportion of UK citizens support leaving the EU?
- Do democracies have better human rights records than non-democracies?



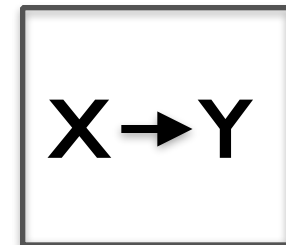
## Explanatory questions:

- Why do democracies seldom fight wars against each other?
- Why are incumbent legislators so likely to win re-election?



## Causal questions:

- What is the effect of campaign spending on election outcomes?
- What is the effect of consensus democracy on political stability?



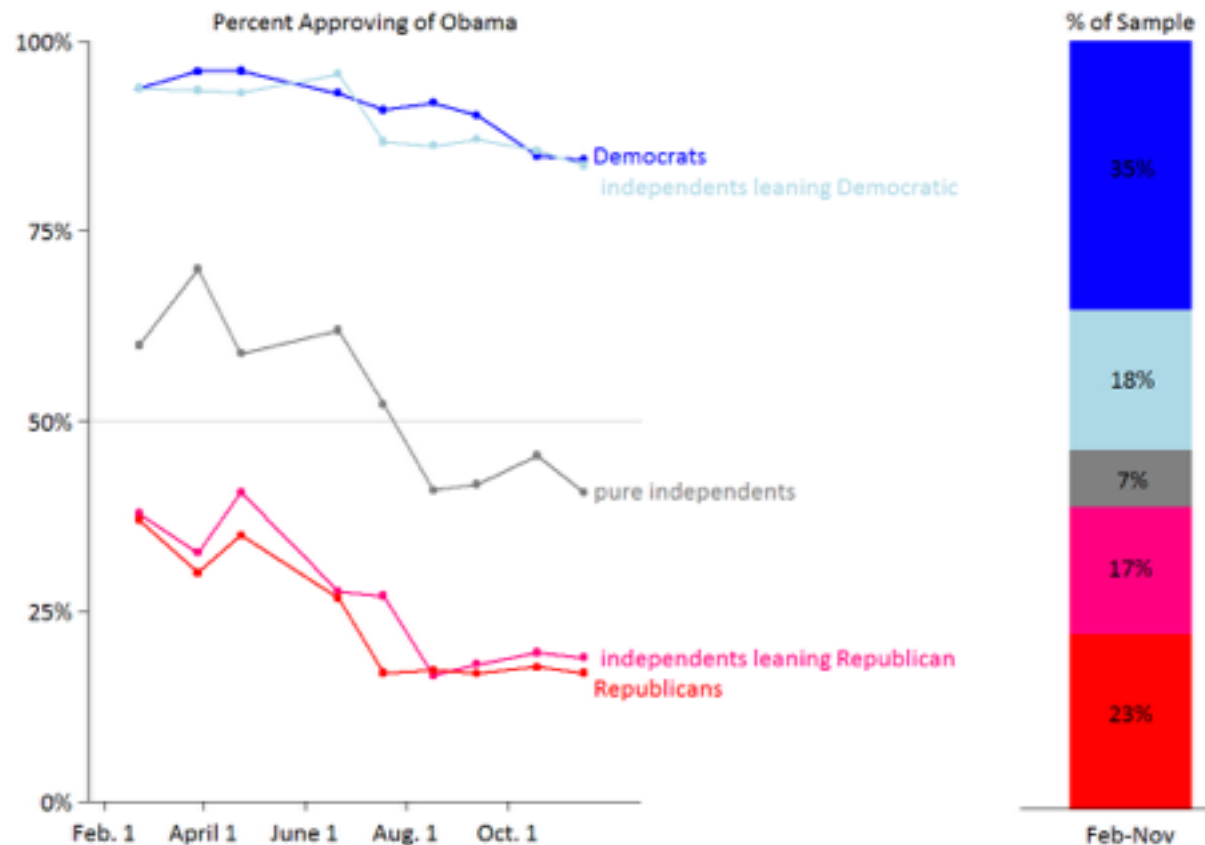


# Research design for descriptive/predictive questions

You need data:

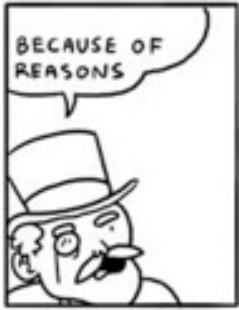
- Census vs survey
- Representative survey vs convenience sample

Then do some analysis: averages, correlations, regressions, etc.



Source: ABC/Washington Post polls

John Sides, *Monkey Cage*, [http://themonkeycage.org/2009/12/17/three\\_myths\\_about\\_political\\_in/](http://themonkeycage.org/2009/12/17/three_myths_about_political_in/)



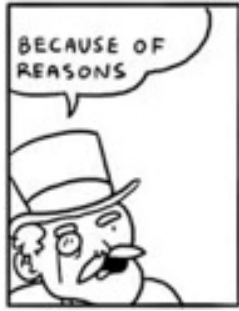
## Characteristics of explanatory questions (“why” questions)

They start from a puzzle, e.g.

1. “Why are wars between democracies so rare?”
2. “Why is there is so little money in U.S. politics?”

They require a resolution, e.g.

1. “Because democracies are more transparent”
2. “Because contributing to campaigns is not a very effective way to influence outcomes”



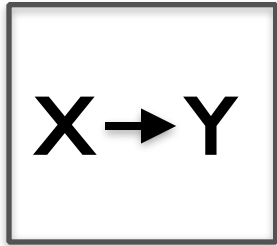
## Research design for explanatory questions

Types of resolutions:

- 1) Purely theoretical: “The pattern you are observing is not puzzling; it is exactly what we would expect given reasonable assumptions.”
- 2) Purely empirical: “Actually, there is no puzzle: the amount of money in politics is not small when you include expenditures on lobbying.”
- 3) Combination of theoretical and empirical: “Democracies do not fight each other considerably less than would be expected when you consider their wealth.”

Many approaches to answering explanatory questions!

For more on answering explanatory questions, see Andrew Gelman and Guido Imbens, “Why ask why? Forward causal inference and reverse causal questions”, unpublished manuscript 2013.

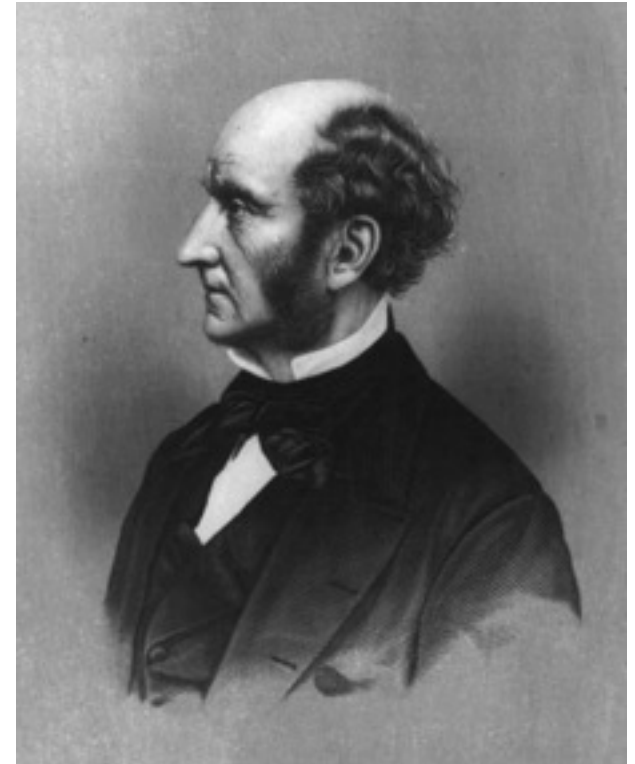


## Research design for causal questions: Making sense of cause and effect

In principle, there are two kinds of causal questions:

- a) What causes a particular outcome? (e.g. democracy, war)
- b) What is the effect of a particular “treatment” on a particular outcome? (e.g. what is the effect of democracy on development?)

To see why we focus on the **second type**, consider “Mill’s methods”.

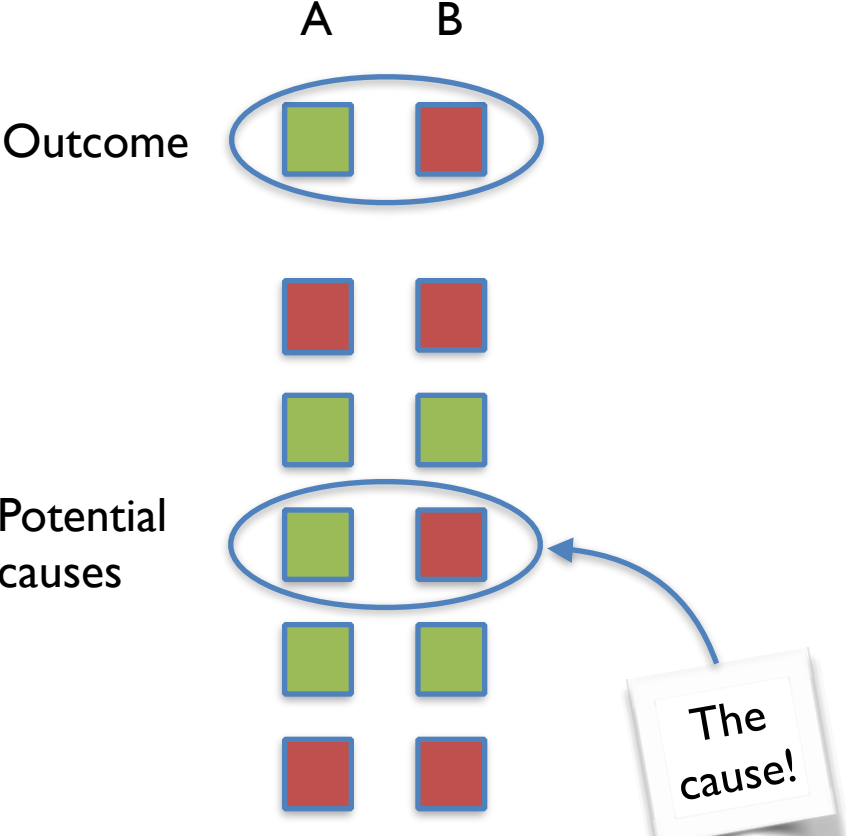
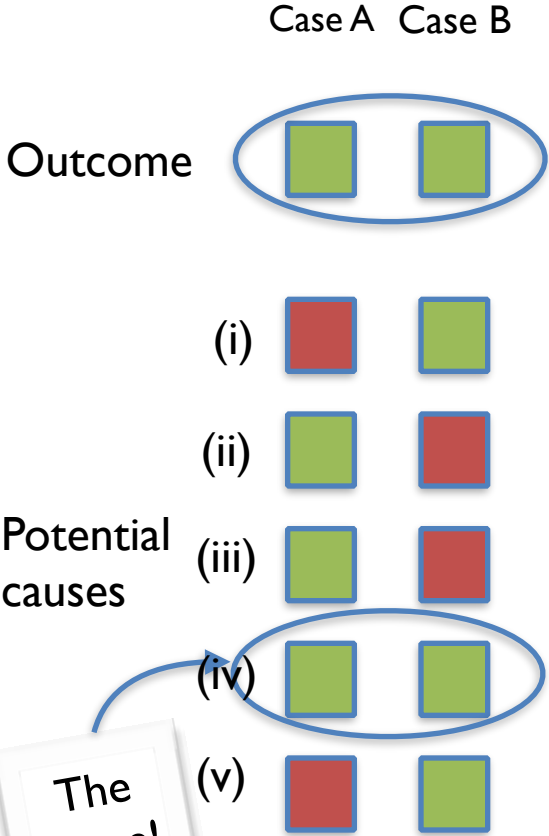


John Stuart Mill  
*A System of Logic* (1843)

Suppose all of the potential causes can be enumerated and accurately measured. Then these two methods will *in certain cases* tell us the cause of an outcome:

### Method of agreement

### Method of difference

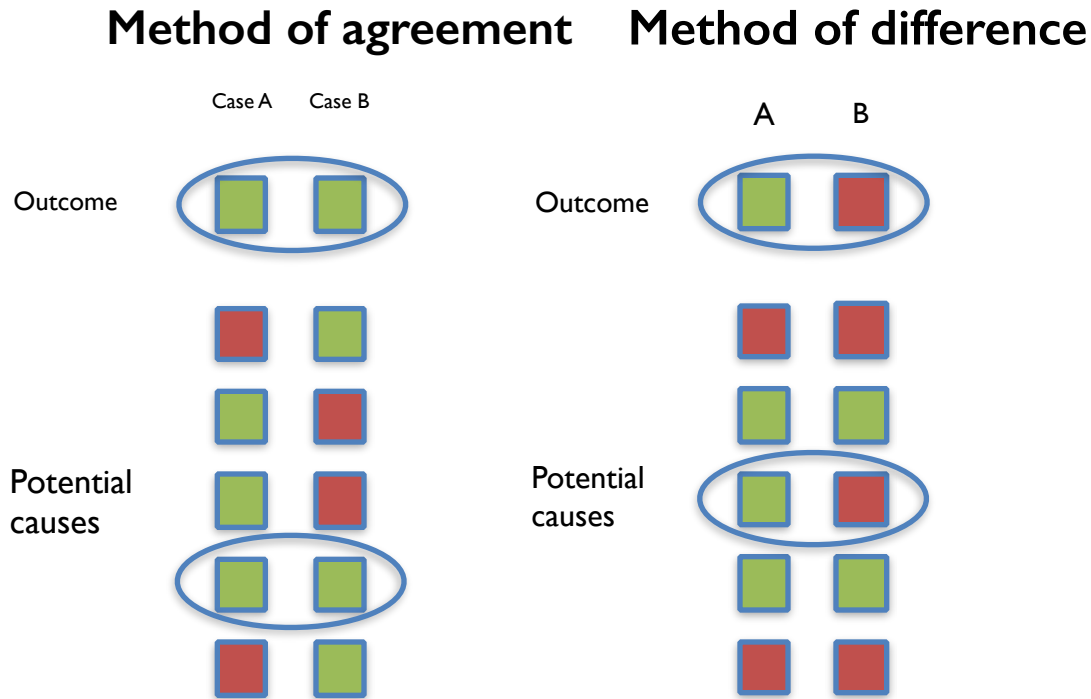


Causal inference from just two cases!!!

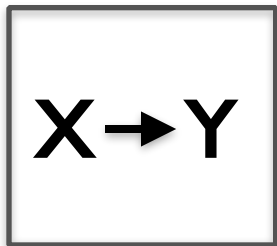


# Problems with applying Mill's methods in social science research

- What do you do when there is more than point of agreement or difference?
- How do you know if you have listed all of the potential causes?
- How do you judge agreement when factors are not binary?
- What if there is measurement error or randomness?



“... in the sciences which deal with phenomena in which artificial experiments are impossible (as in the case of astronomy), or in which they have a very limited range (as in mental philosophy, social science, and even physiology), *induction from direct experience is practiced at a disadvantage in most cases equivalent to impracticability.*” (Mill, *A System of Logic*)



# How do we measure the effect of X on Y?

We think in terms of **counterfactual scenarios**.

*what would  
have happened  
if I had taken the aspirin?  
(treatment)*

**vs**

*what would  
have happened  
if I had **not** taken the aspirin  
(control)*

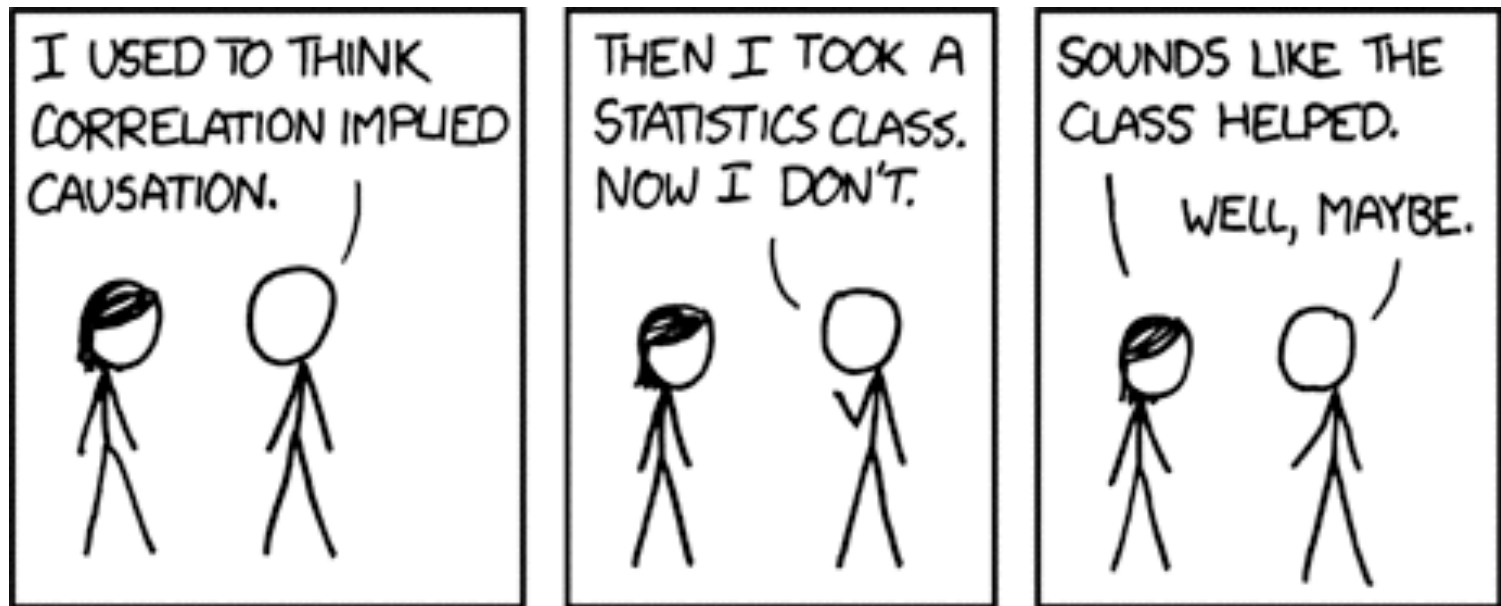


Fundamental problem of causal inference  
(Holland, 1986):

We only ever observe **one of these** for any  
particular individual.

$X \rightarrow Y$

# Fundamental problem of causal inference (Holland 1986)

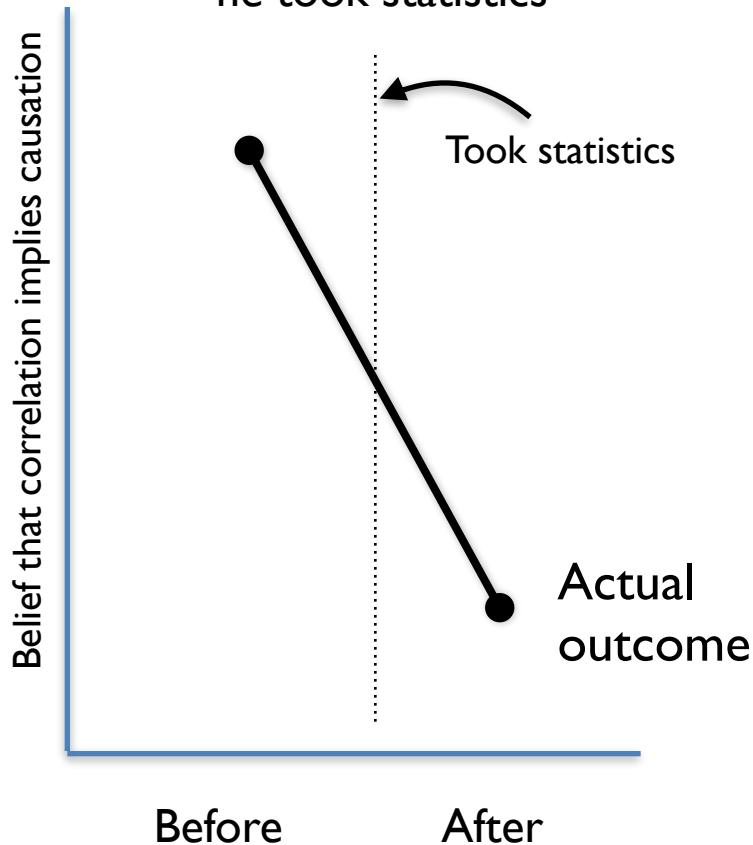


<http://xkcd.com/552/>

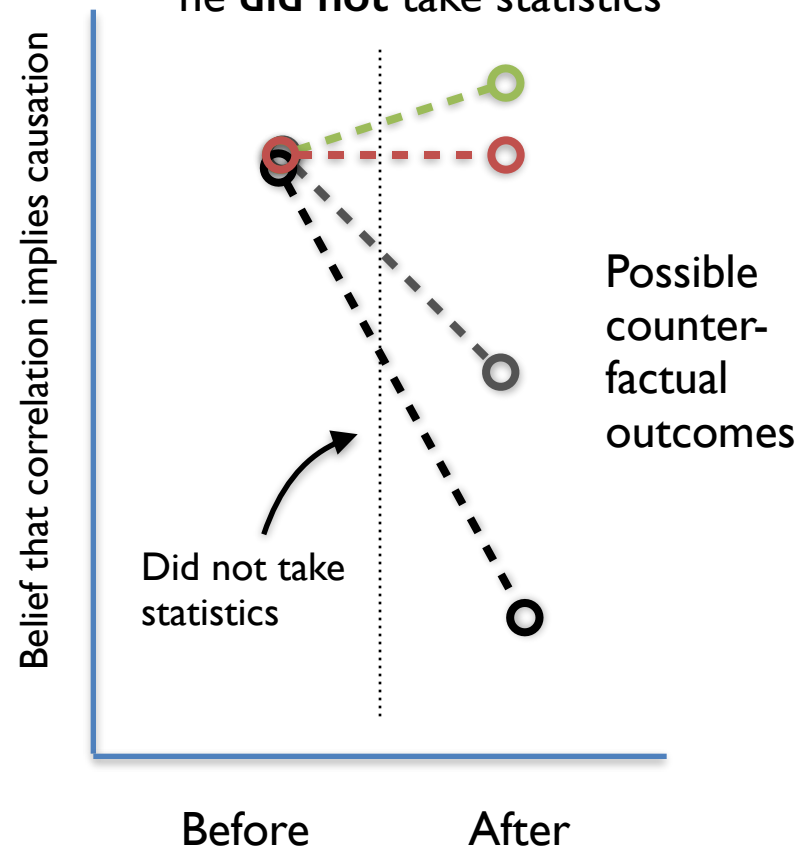
$X \rightarrow Y$

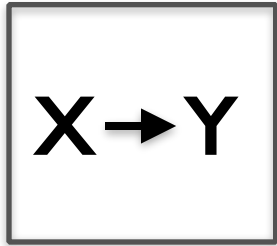
## Fundamental problem of causal inference (2)

What we observe:  
outcomes given that  
he took statistics



What we **don't** observe:  
outcomes given that  
he **did not** take statistics



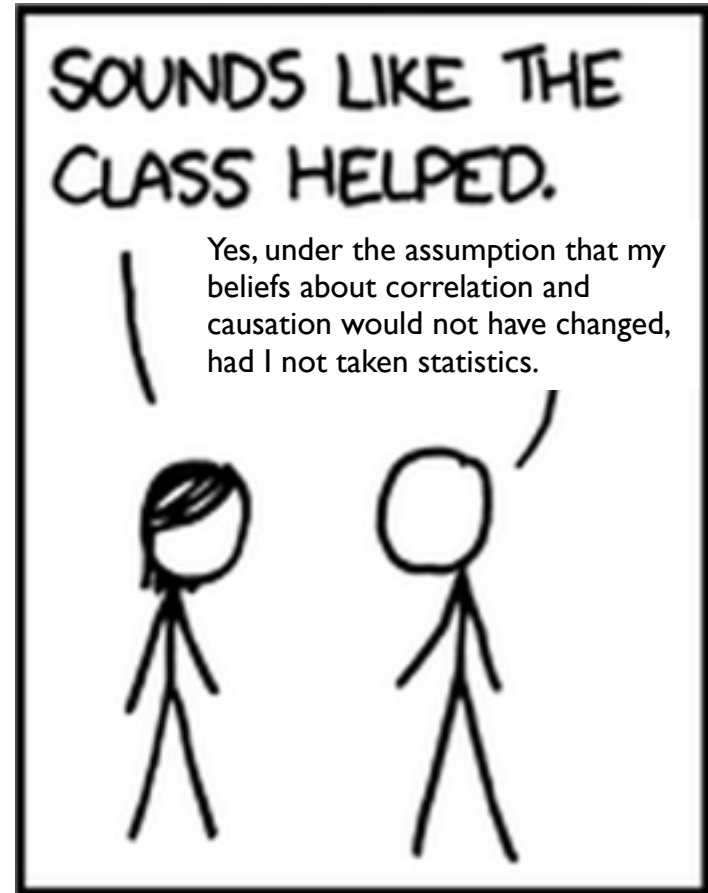


# How do we proceed? Make comparisons and state assumptions

We make comparisons among outcomes we do observe

and

we clearly state the assumptions under which our comparisons will give the right answer.



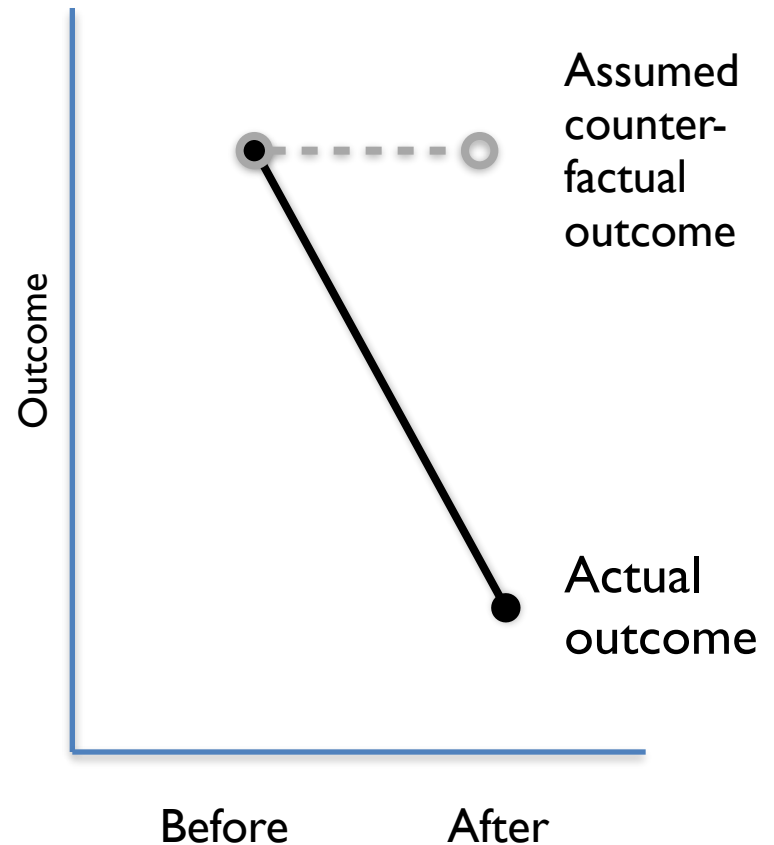
<http://xkcd.com/552/>

$X \rightarrow Y$

## Gallery of designs: “before-and-after”

**Comparison:** Same unit(s), before and after an intervention.

**Key assumption:** No change in outcome if treatment not applied.



**X→Y**

# Gallery of designs: “before-and-after”

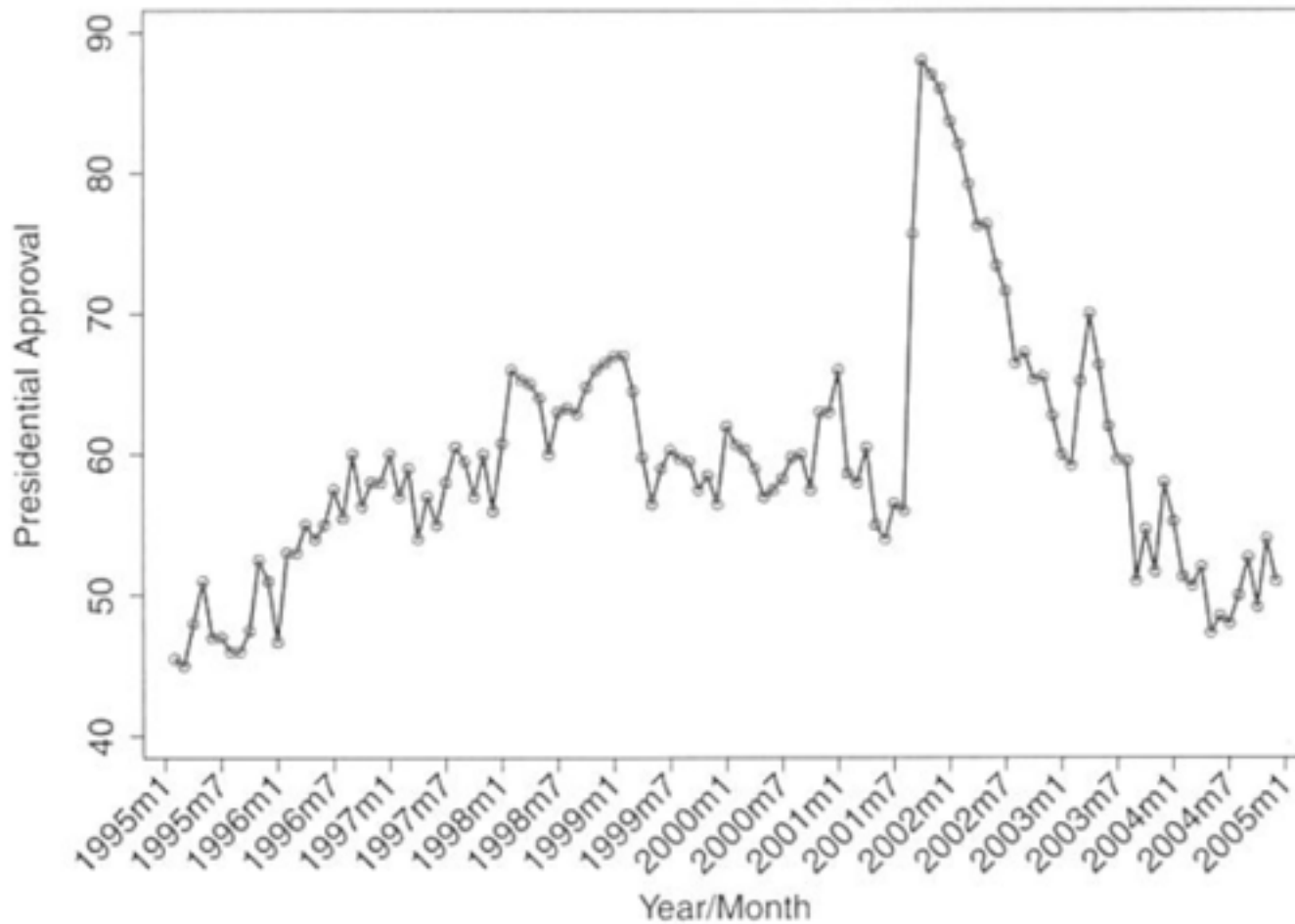
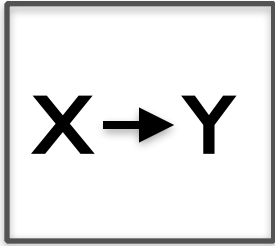


Figure 2.1. Presidential approval, 1995–2005. (U.S. President, from Kellstedt and Whitten p. 28)



# Gallery of designs: regression analysis (cross-sectional)

## Comparison:

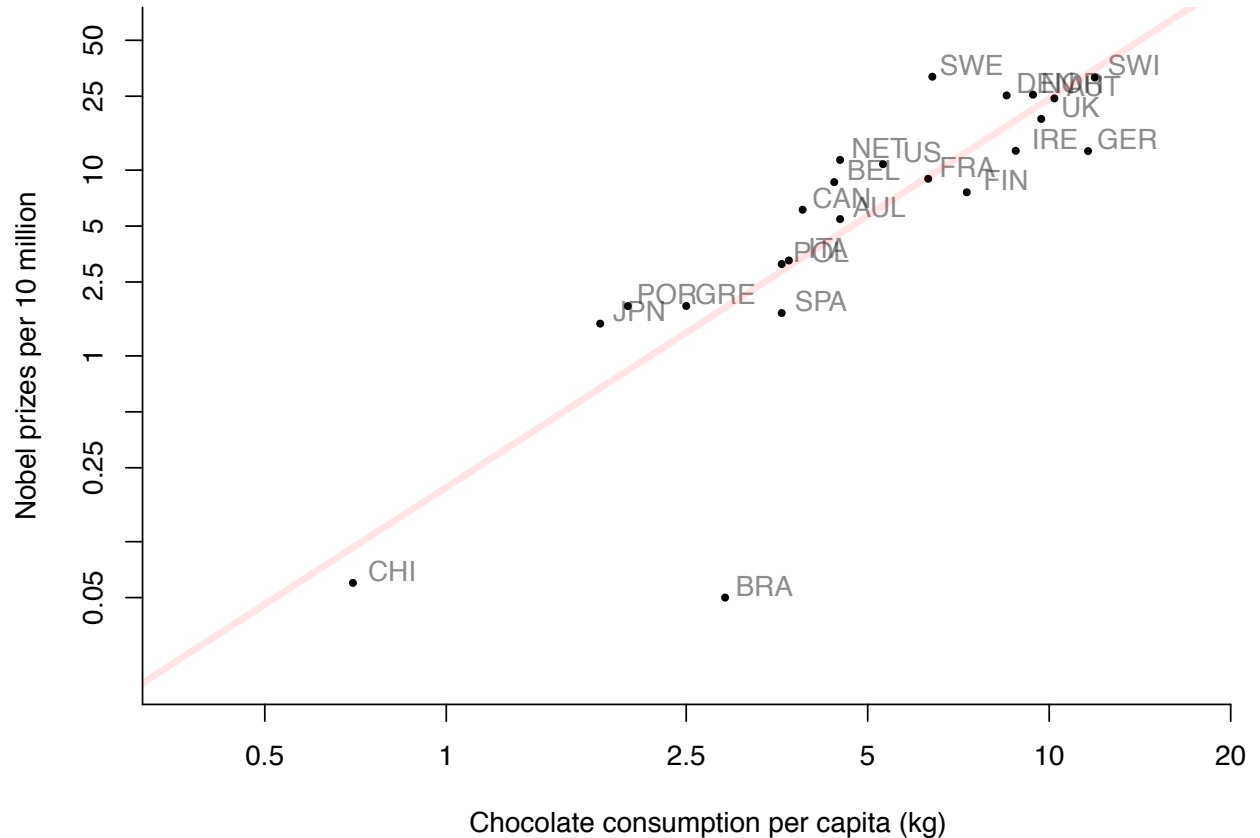
Different units at the same point in time, possibly controlling for other variables.

(see Week 7)

## Key assumption:

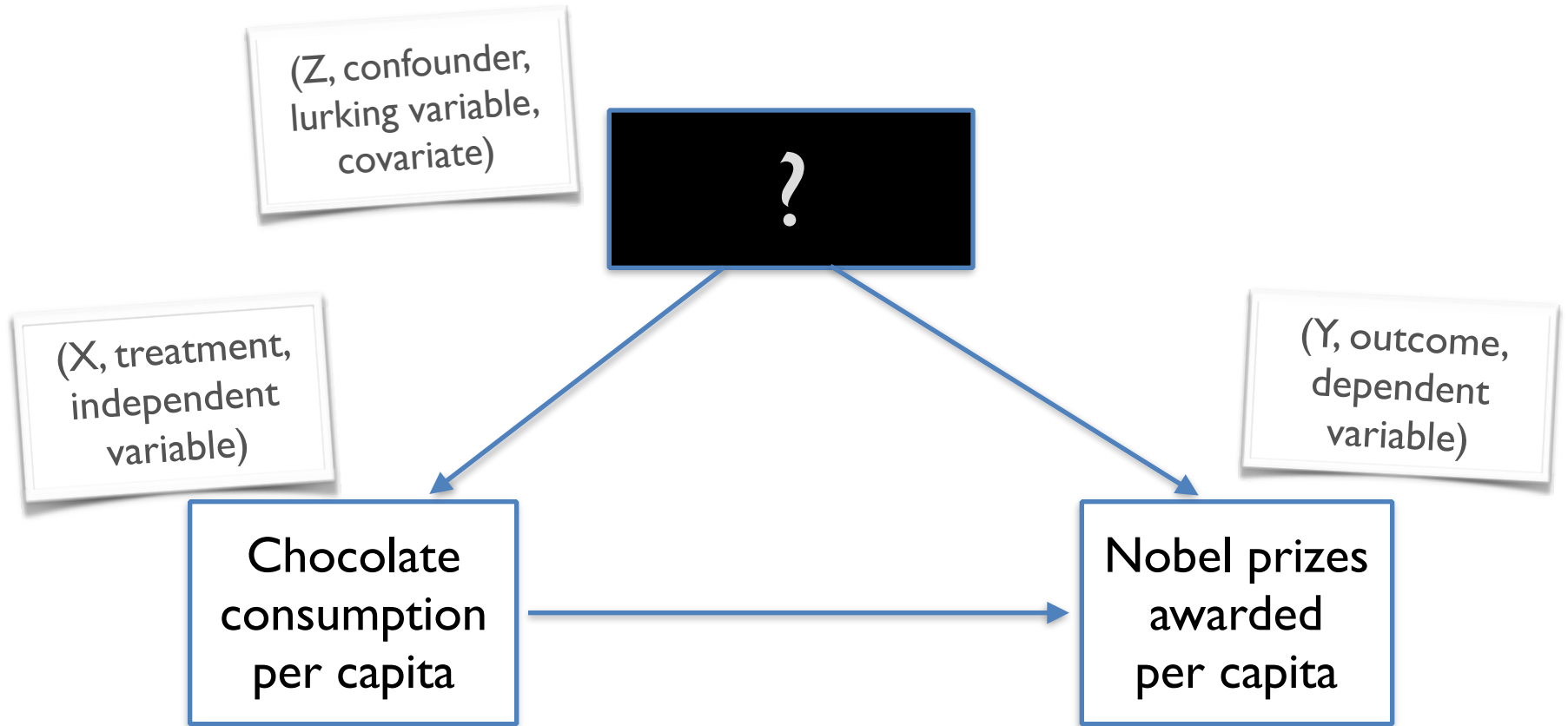
*Confounding variables* (a.k.a. *selection bias*) are properly accounted for.

Nobel Prizes and chocolate consumption  
(slope = 2.09)





# What else might explain this relationship?



Confounding variables are everywhere!

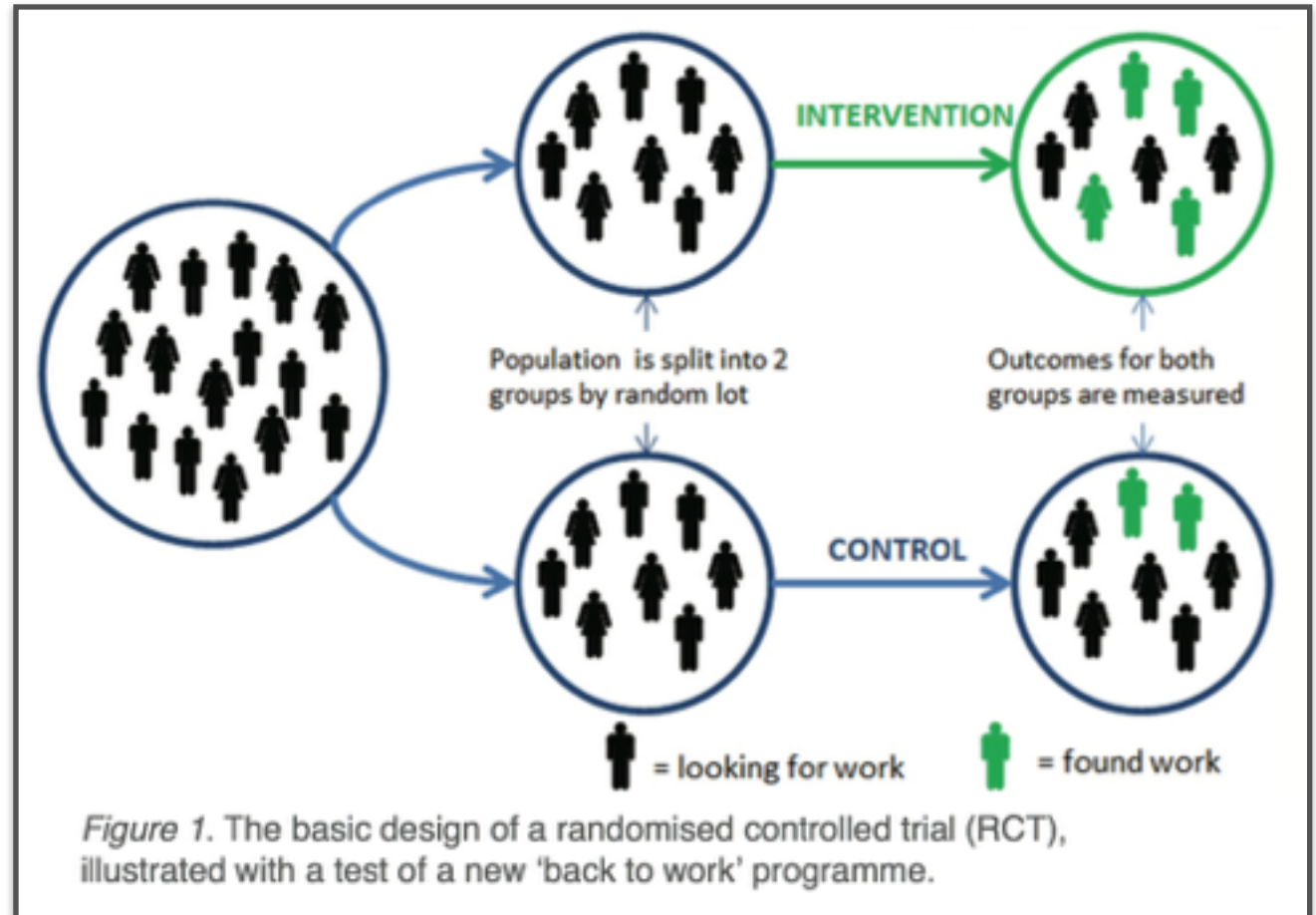
Selection bias is everywhere!

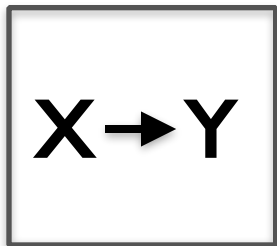
$X \rightarrow Y$

# Gallery of designs: randomized controlled trial

**Comparison:**  
Groups randomly  
assigned to  
receive different  
treatments

**Key assumption:**  
Groups are  
comparable  
because of  
randomization





# Why we love randomized controlled trials

**Research question:** Does reading the *Guardian* make voters more supportive of the Labour Party?

Consider these designs:

- A. **Raw comparison:** Compare average support for the Labour Party among people who currently read the *Guardian* and those who do not
- B. **Regression:** Same as A, except “control” for age, education, occupation, sex
- C. **Randomized controlled trial:**\*
  1. Identify group of citizens who do not subscribe to the *Guardian*
  2. Give free subscriptions to half
  3. Two months later compare support for Labour Party in the two groups

\*See similar experiment in US by Gerber, Karlan, Bergan “Does Media Matter?”

**X→Y**

# Why we can't always do RCTs

## 1. Practicality:

- A. Some treatments are difficult or impossible for the researcher to control
- B. Some questions relate to an inaccessible context, e.g. the past

## 2. Ethics: Some manipulations would have bad effects in society:

- C. Direct harm: Milgram's experiments
- D. Indirect harm: deception in experiment reduces trust outside of experiment

**X → Y**

**An RCT: “Can learning constituency opinion affect how legislators vote?” Butler and Nickerson (2011)**

- A. Research question:** Do legislators vote according to their own fixed policy preferences, or do they try to represent the opinions of their constituents?
- B. Subjects:** New Mexico state legislators
- C. Treatment:** Exposure to survey indicating public opinion on key bills among constituents

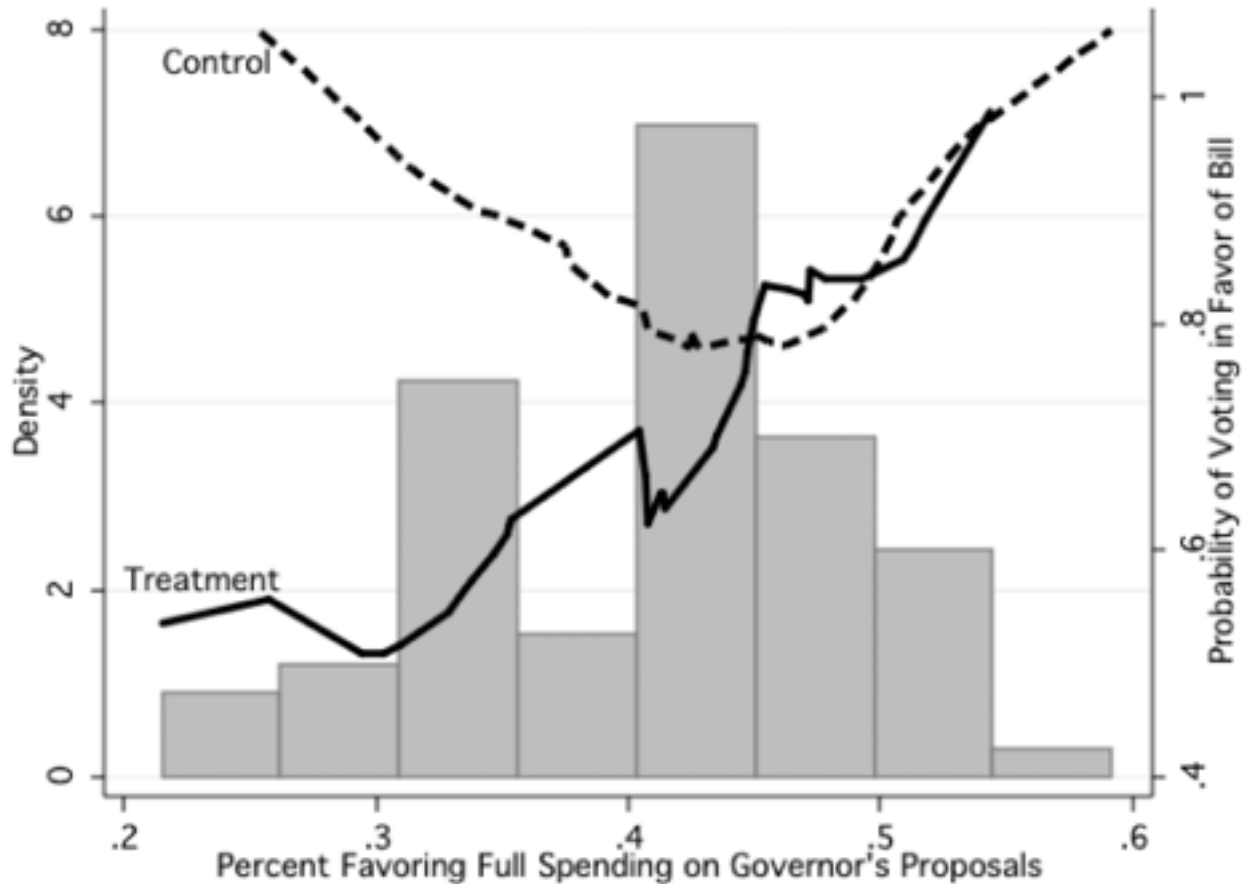


Edmund Burke

(Delegate vs trustee model of representation)

$X \rightarrow Y$

# Butler and Nickerson (2011) main result



$X \rightarrow Y$

# Deception in experiments

Some experiments seek to assess how elites respond to different messages:

- A. When a constituent in U.S. emails local representative asking for help with registration, does it matter if he gives name as “Jake Mueller” vs. “DeShawn Jackson”?\*
- B. When Chinese citizen contacts local authorities asking for help with welfare benefit, does it matter if he says he is loyal party member or threatens to talk to neighbors about the problem?\*\*\*

Is the deception justified? What effects might it have?

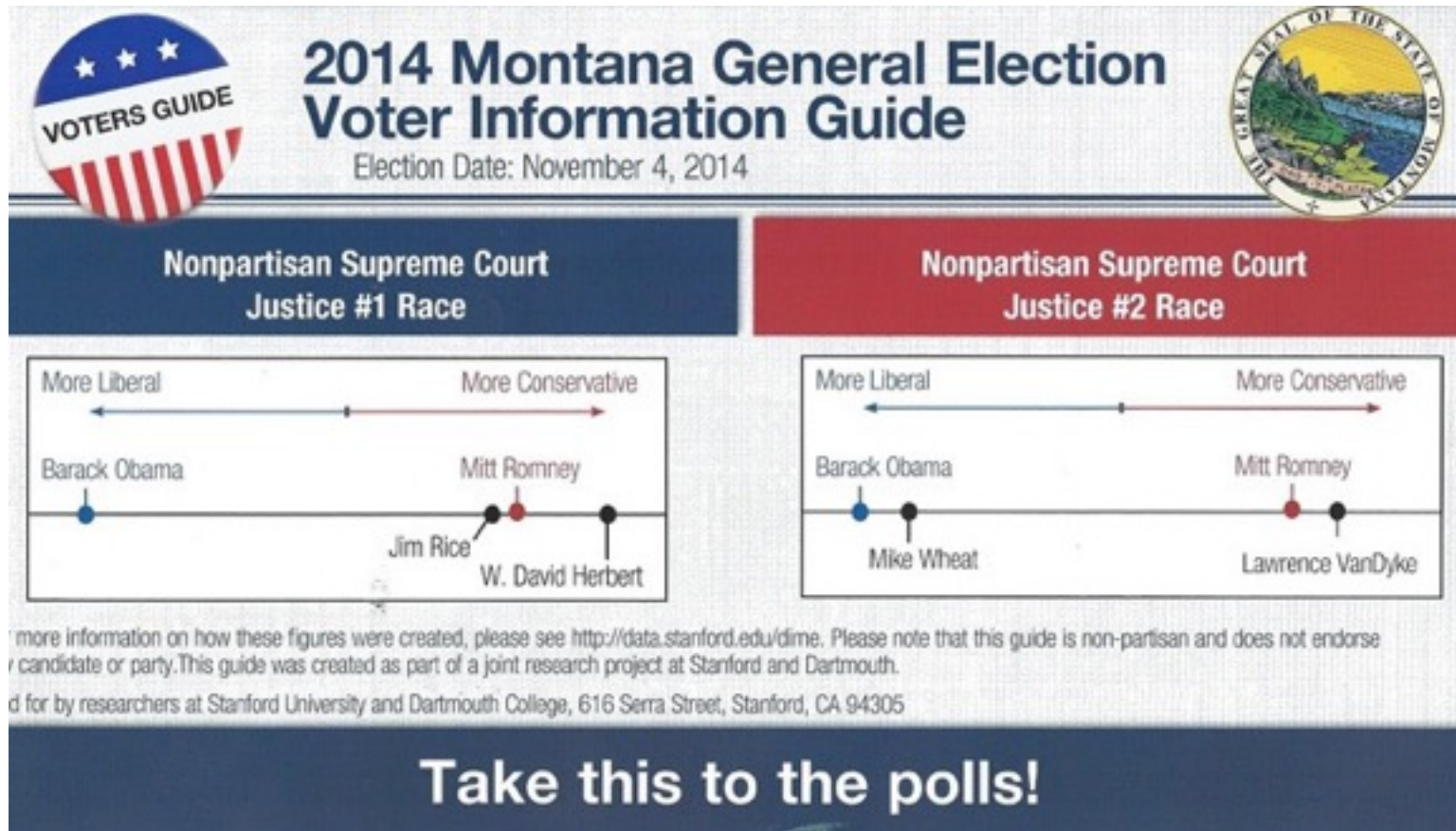
\* “Do Politicians Racially Discriminate Against Constituents? A Field Experiment on State Legislators” Butler and Broockman, AJPS 2011

\*\* Chen, Pan, and Xu (2014 [working paper](#)) “Sources of Authoritarian Responsiveness: A Field Experiment in China”

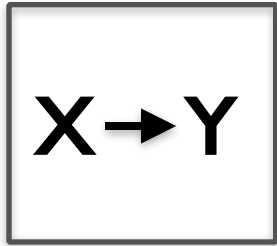
**X→Y**

# When experiments go wrong

Letter sent to 100,000 Montana households in 2014 election:





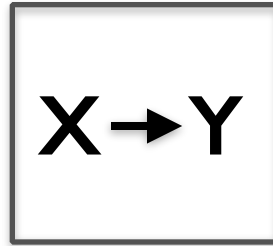


# Gallery of designs: natural experiments

**Natural experiment:**  
Situation in which treatment and control groups are comparable (as if in an RCT) even though treatment was not assigned by the researcher.

## Examples:

- A. Different electoral system in French cities above and below 3,500 inhabitants
- B. Fox News (U.S. cable channel) is channel 5 in some places, 45 in others
- C. Some French territory occupied by Germany, other areas ruled by collaborationist French regime (Vichy)
- D. Some parliamentary candidates win narrowly, others lose narrowly



# Summary

Different research questions require different designs.

- A. For **descriptive questions** (*what is relationship between X and Y?*), (randomly) sample and summarize
- B. For **explanatory questions** (*why is X related to Y?*), clarify logical relationship and/or account for pattern with new variables, new data
- C. For **causal questions** (*what is effect of X on Y?*),
  - A. Fundamental problem of causal inference => must make **comparisons and state assumptions**
  - B. RCTs are best: randomly assign X, observe later differences in Y
  - C. Before-and-after, regression, natural experiments all valuable



## John Stuart Mill says: social science is hard!

“Nothing can be more ludicrous than the sort of parodies on experimental reasoning which one is accustomed to meet with, not in popular discussion only, but in grave treatises, when the affairs of nations are the theme. . . . ‘How can such or such causes have contributed to the prosperity of one country, when another has prospered without them?’ Whoever makes use of an argument of this kind, not intending to deceive, should be sent back to learn the elements of some one of the more easy physical sciences.”

# Looking ahead

- Rest of this week: data labs!
- Next week: Catherine de Vries on “Case Selection”