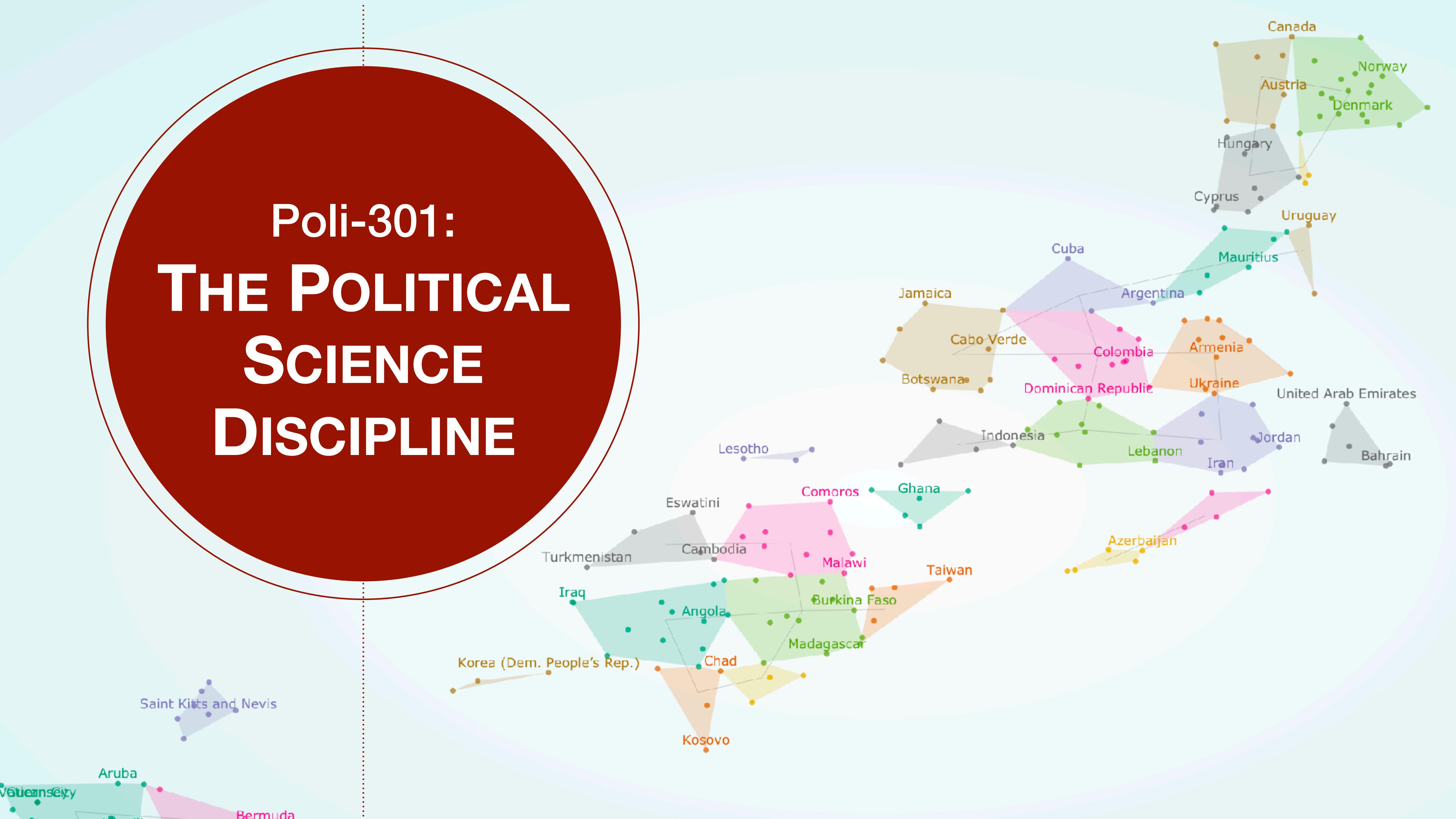


Poli-301: THE POLITICAL SCIENCE DISCIPLINE



TODAY'S AGENDA

- 1 Colliders
- 2 Front-door and back-door paths

Ye Olde Causal Alchemy

The Four Elemental Compounds

The Fork

$$X \leftarrow Z \rightarrow Y$$

The Pipe

$$X \rightarrow Z \rightarrow Y$$

The Collider

$$X \rightarrow Z \leftarrow Y$$

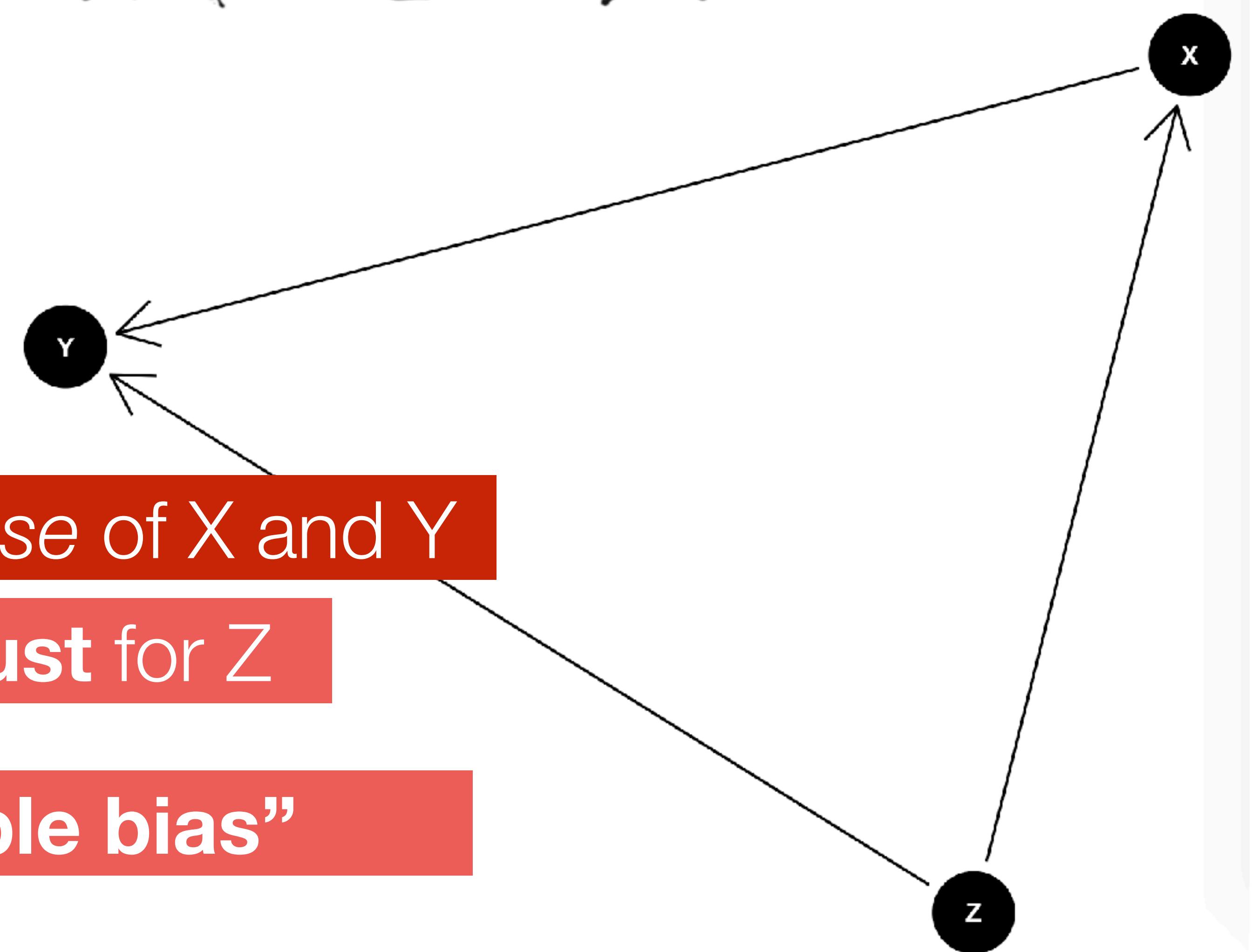
The Descendant

$$X \rightarrow Z \rightarrow Y$$

$$\downarrow A$$

The Fork

$$X \leftarrow Z \rightarrow Y$$



Z is a *common cause* of X and Y

Control or adjust for Z

“omitted variable bias”

The (other) pipe

$X \rightarrow Z \rightarrow Y$

X causes Z causes Y

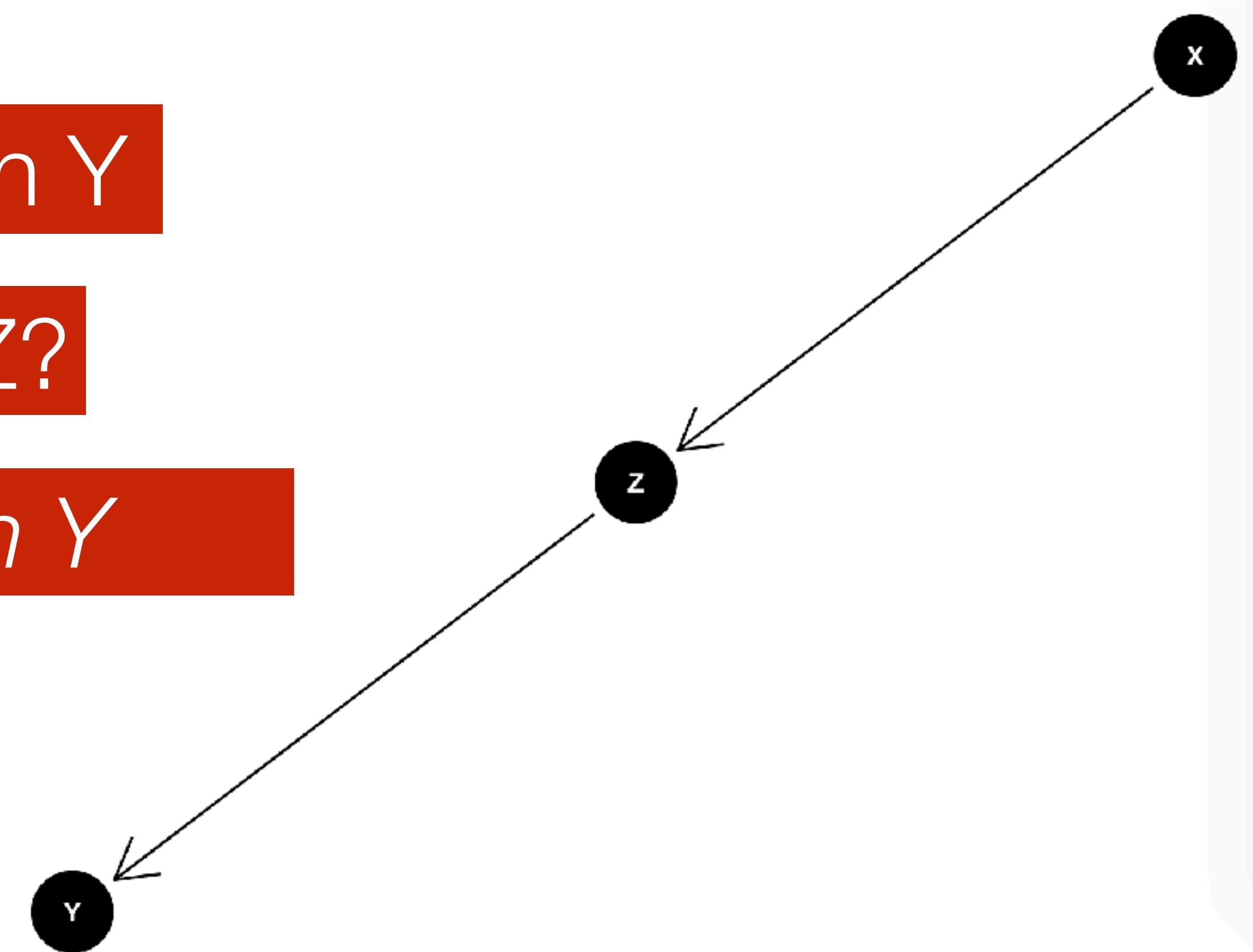
Z mediates the effect of X on Y

What happens if we block Z?

We remove the effect of X on Y

Leave Z alone in most cases

“post-treatment bias”



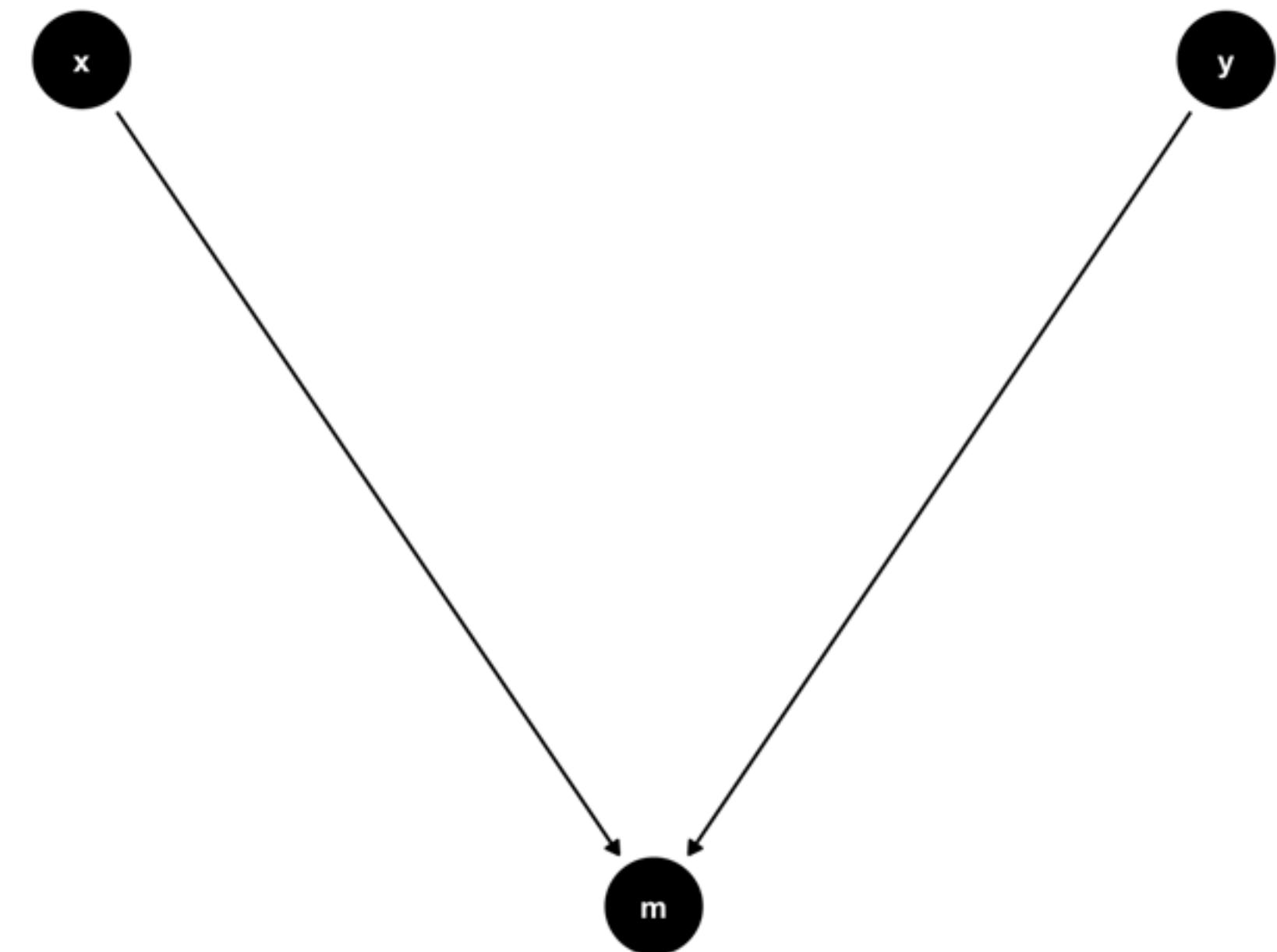
The Collider

$$X \rightarrow Z \leftarrow Y$$

X and Y both have a common **effect**

Left alone, it's no problem

But conditioning on Z opens up correlation that **isn't really there**



Female hurricanes are deadlier than male hurricanes

Kiju Jung^{a,1}, Sharon Shavitt^{a,b,1}, Madhu Viswanathan^{a,c}, and Joseph M. Hilbe^d

^aDepartment of Business Administration and ^bDepartment of Psychology, Institute of Communications Research, and Survey Research Laboratory, and ^cWomen and Gender in Global Perspectives, University of Illinois at Urbana-Champaign, Champaign, IL 61820; and ^dDepartment of Statistics, T. Denny Sanford School of Social and Family Dynamics, Arizona State University, Tempe, AZ 85287-3701

Edited* by Susan T. Fiske, Princeton University, Princeton, NJ, and approved May 14, 2014 (received for review February 13, 2014)

Do people judge hurricane risks in the context of gender-based expectations? We use more than six decades of death rates from US hurricanes to show that feminine-named hurricanes cause significantly more deaths than do masculine-named hurricanes. Laboratory experiments indicate that this is because hurricane names lead to gender-based expectations about severity and this, in turn, guides respondents' preparedness to take protective action. This finding indicates an unfortunate and unintended consequence of the gendered naming of hurricanes, with important implications for policymakers, media practitioners, and the general public concerning hurricane communication and preparedness.

gender stereotypes | implicit bias | risk perception | natural hazard communication | bounded rationality

violence and destruction (23, 24). We extend these findings to hypothesize that the anticipated severity of a hurricane with a masculine name (Victor) will be greater than that of a hurricane with a feminine name (Victoria). This expectation, in turn, will affect the protective actions that people take. As a result, a hurricane with a feminine vs. masculine name will lead to less protective action and more fatalities.

Archival Study

To test this hypothesis, we used archival data on actual fatalities caused by hurricanes in the United States (1950–2012). Ninety-four Atlantic hurricanes made landfall in the United States during this period (25). Nine independent coders who were blind to the hypothesis rated the masculinity vs. femininity of historical hurricane names on two items ($1 = \text{very masculine}$, $11 = \text{very$

Female hurricanes are not deadlier than male hurricanes

Jung et al. (1) assert that hurricanes that made landfall in the United States killed more people when they had female names rather than male names. The article has stirred much controversy. Criticisms range from the

tolls had smaller death tolls when the hurricanes were strong (lower pressure), but higher death tolls when the hurricanes were weak (higher pressure). The latter result is driven by the pre-1978 sample (model 5). In

safety infrastructures and more reflective of other characteristics for weaker storms and after 1978. Even though a lower importance of safety infrastructures during weaker storms and an overall improvement in or a con-

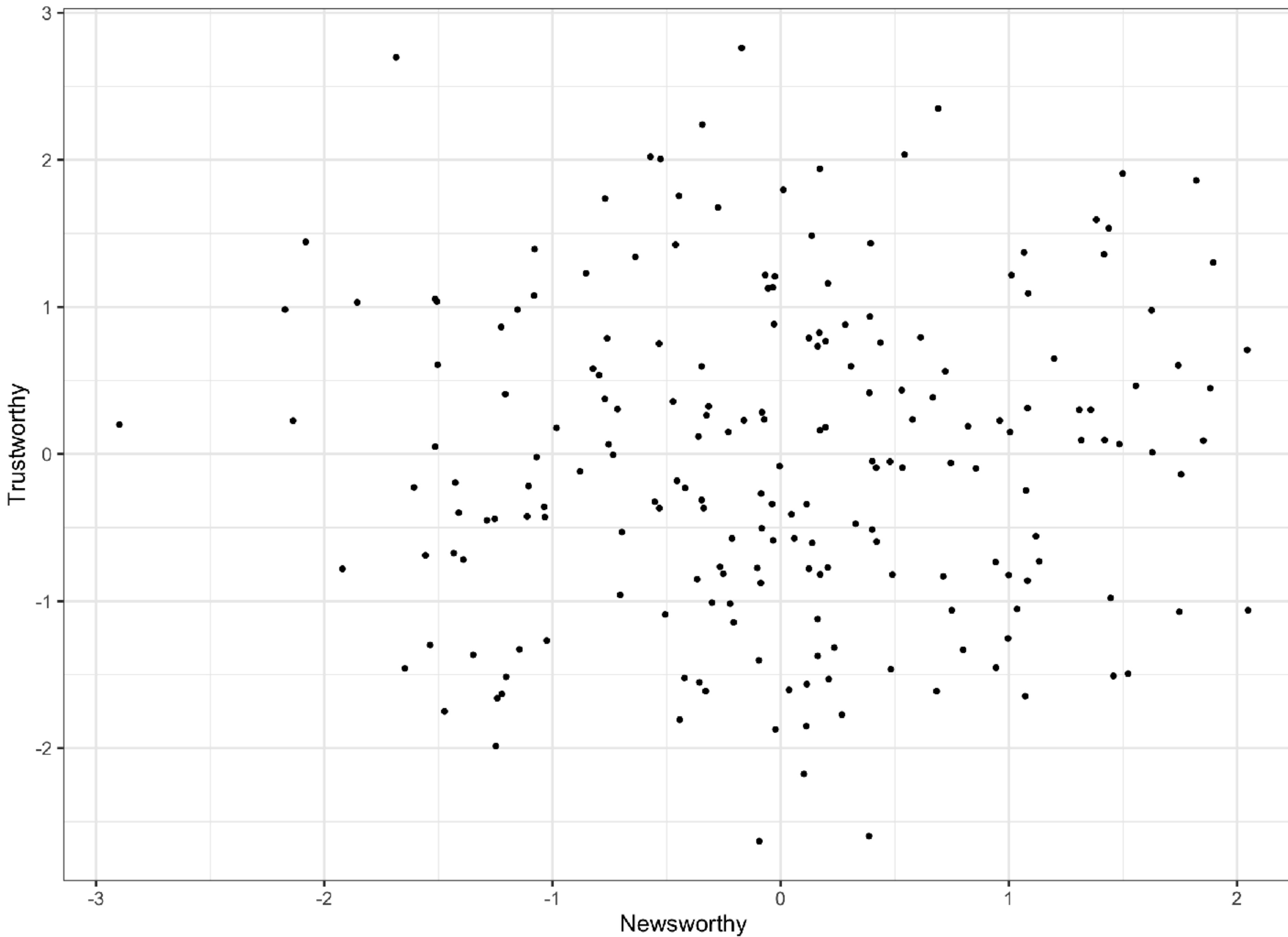
Richard McElreath: “Why aren’t surprising things true?”

Monkey Cage

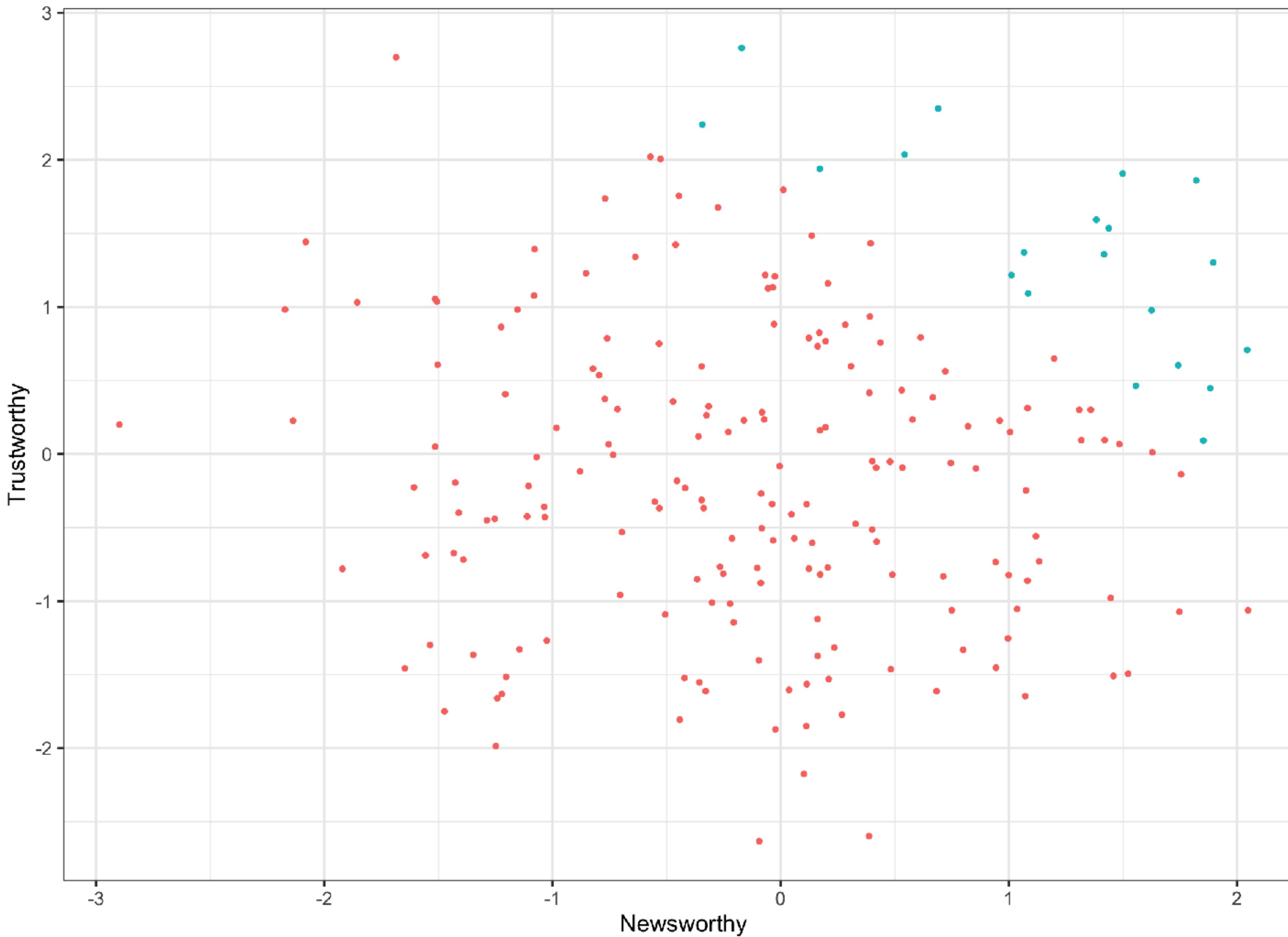
Do shark attacks swing elections?



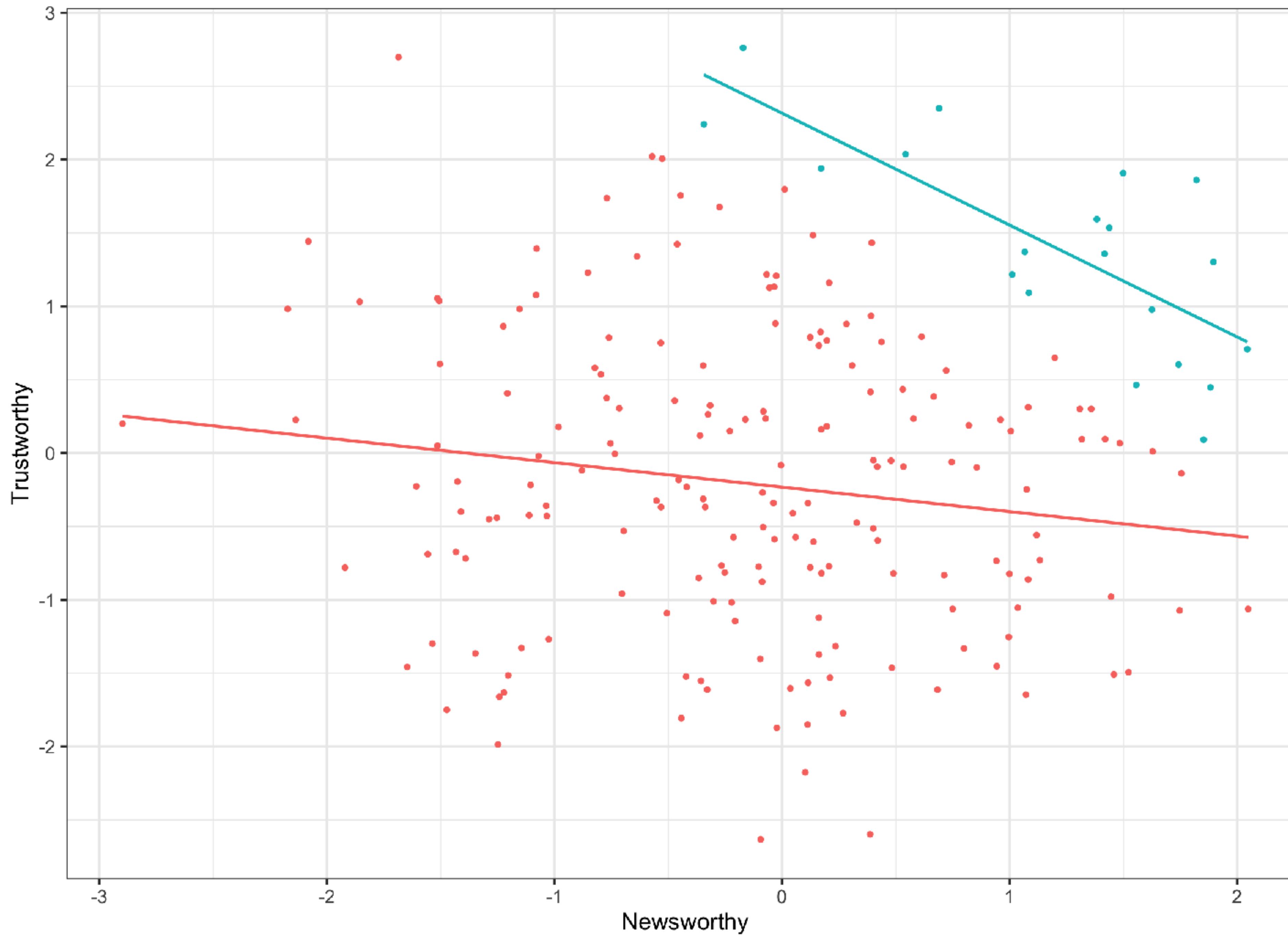
Why Newsworthy Studies Aren't Trustworthy



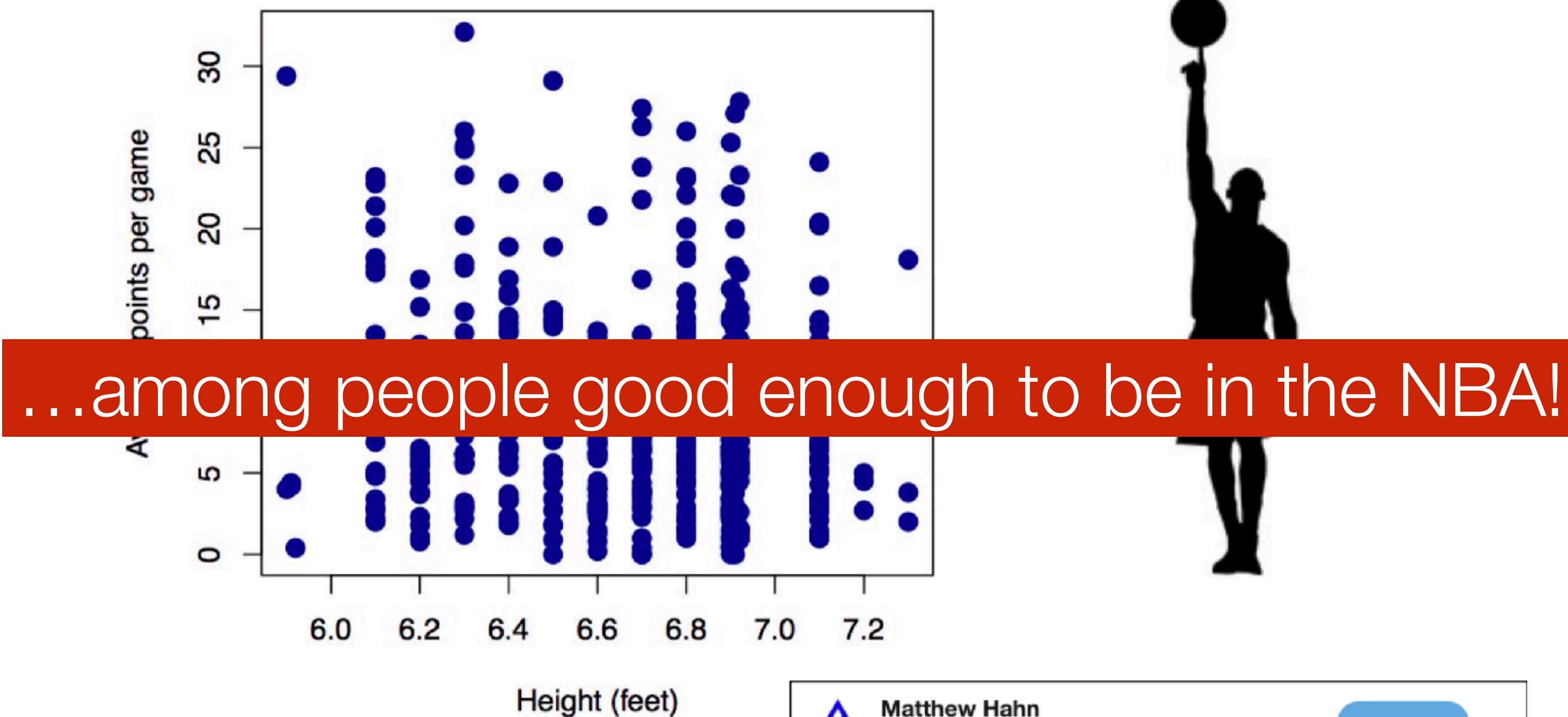
Why Newseworthy Studies Aren't Trustworthy



Why Newseworthy Studies Aren't Trustworthy



Are taller people better at basketball?

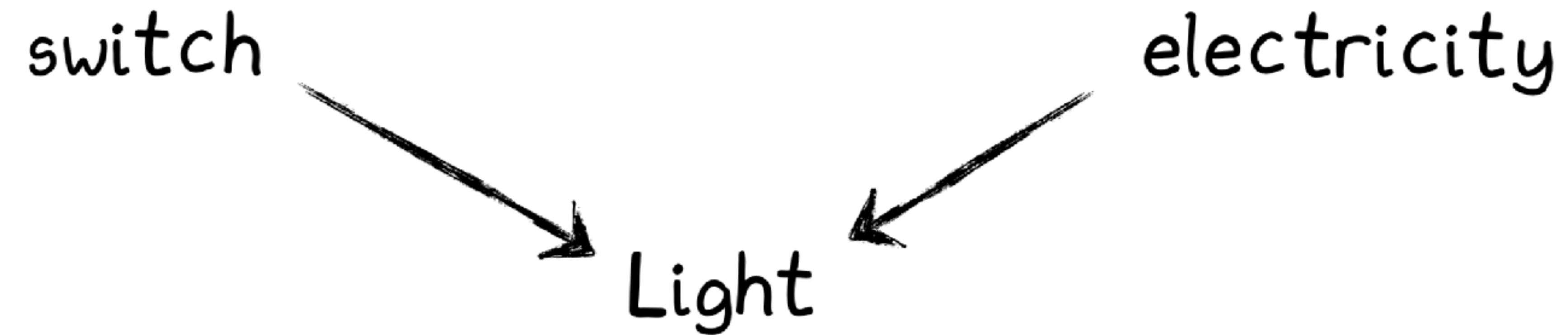


473 NBA players, 2016-2017 season

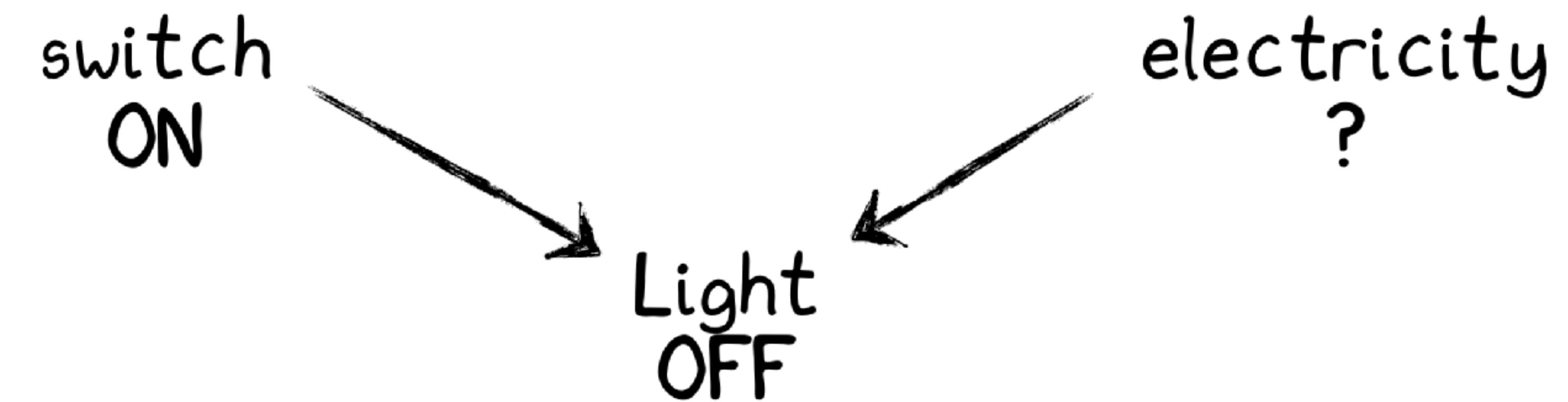
 Matthew Hahn
@3rdreviewer Following ▾

You can be a professional basketball player,
no matter how tall you are!
No correlation between height and scoring
success in the NBA:

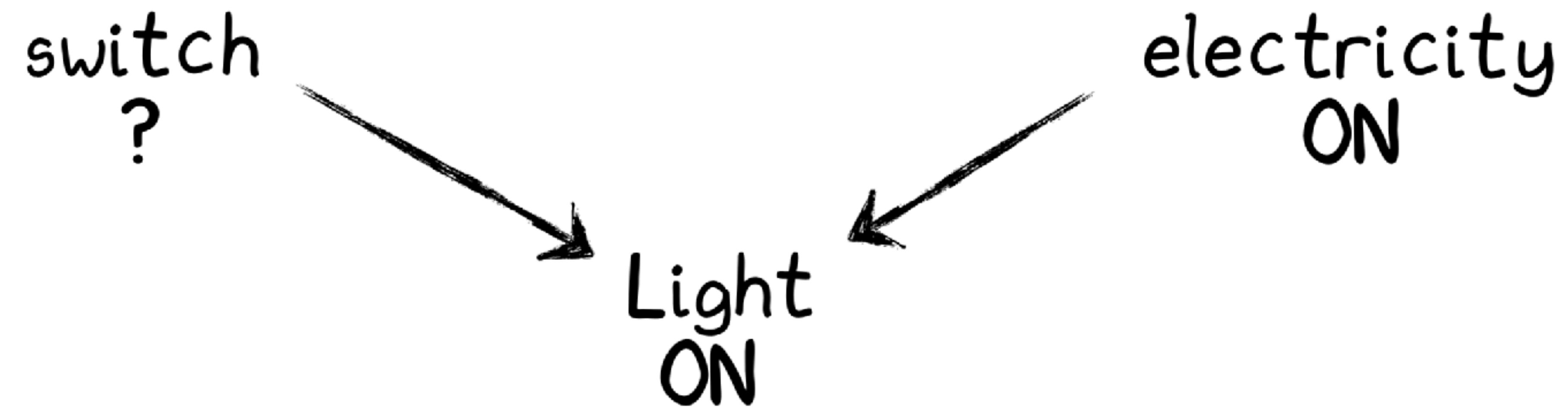
Why?



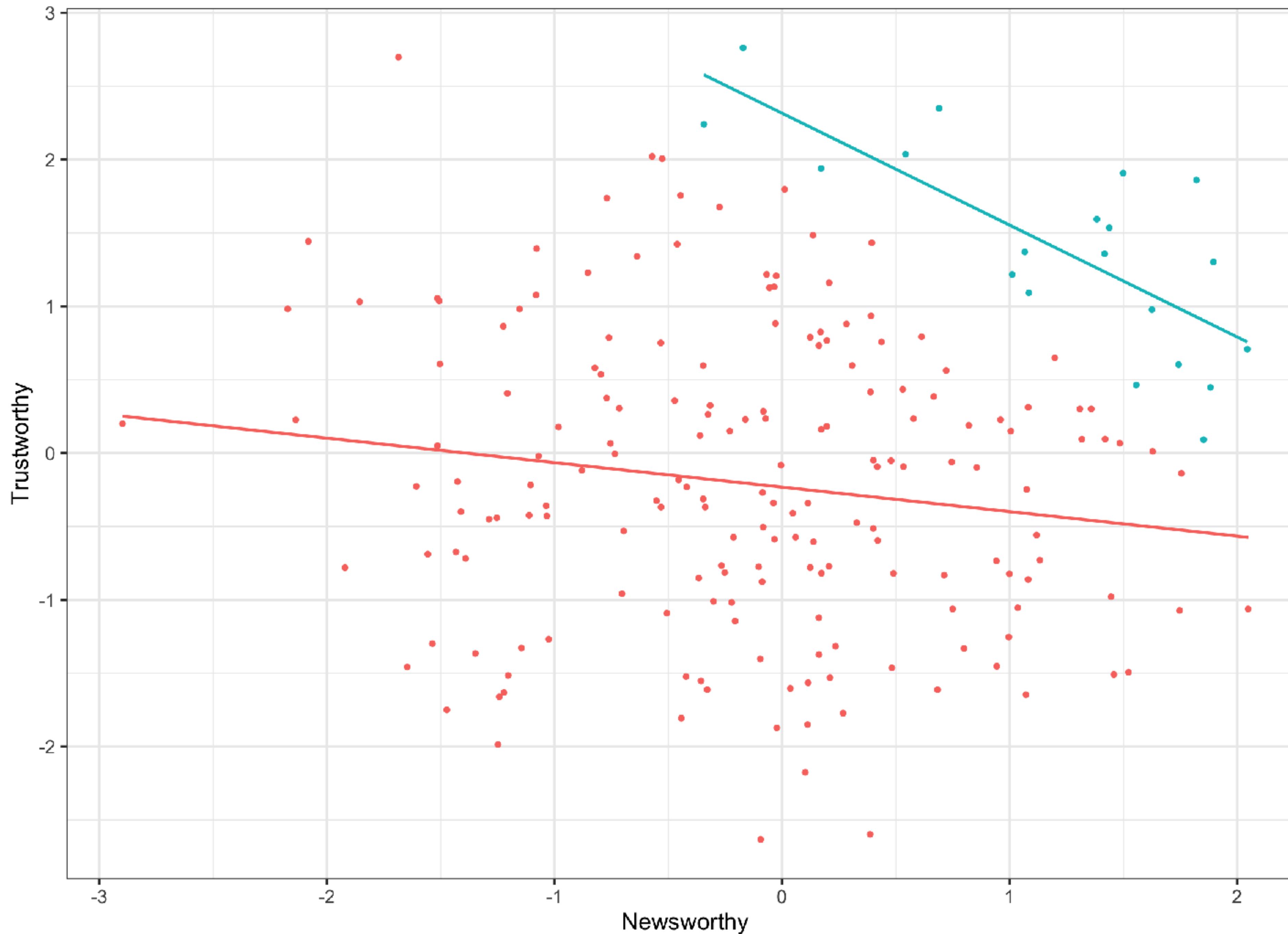
Colliders



Colliders



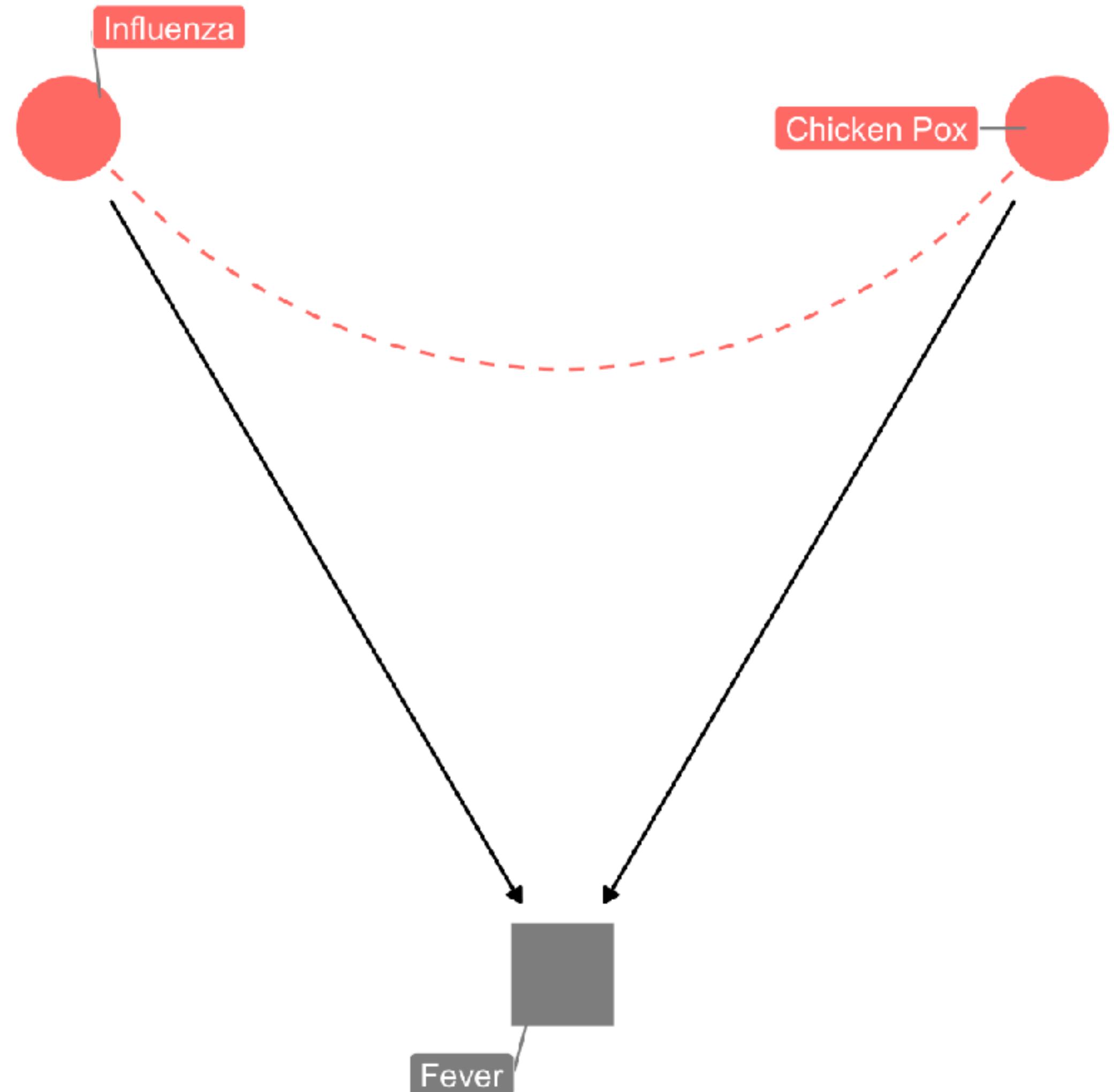
Why Newseworthy Studies Aren't Trustworthy



Why?

The flu and chicken pox are causally unrelated

But **conditional on having a fever**, if you don't have chicken pox it's more likely you have the flu



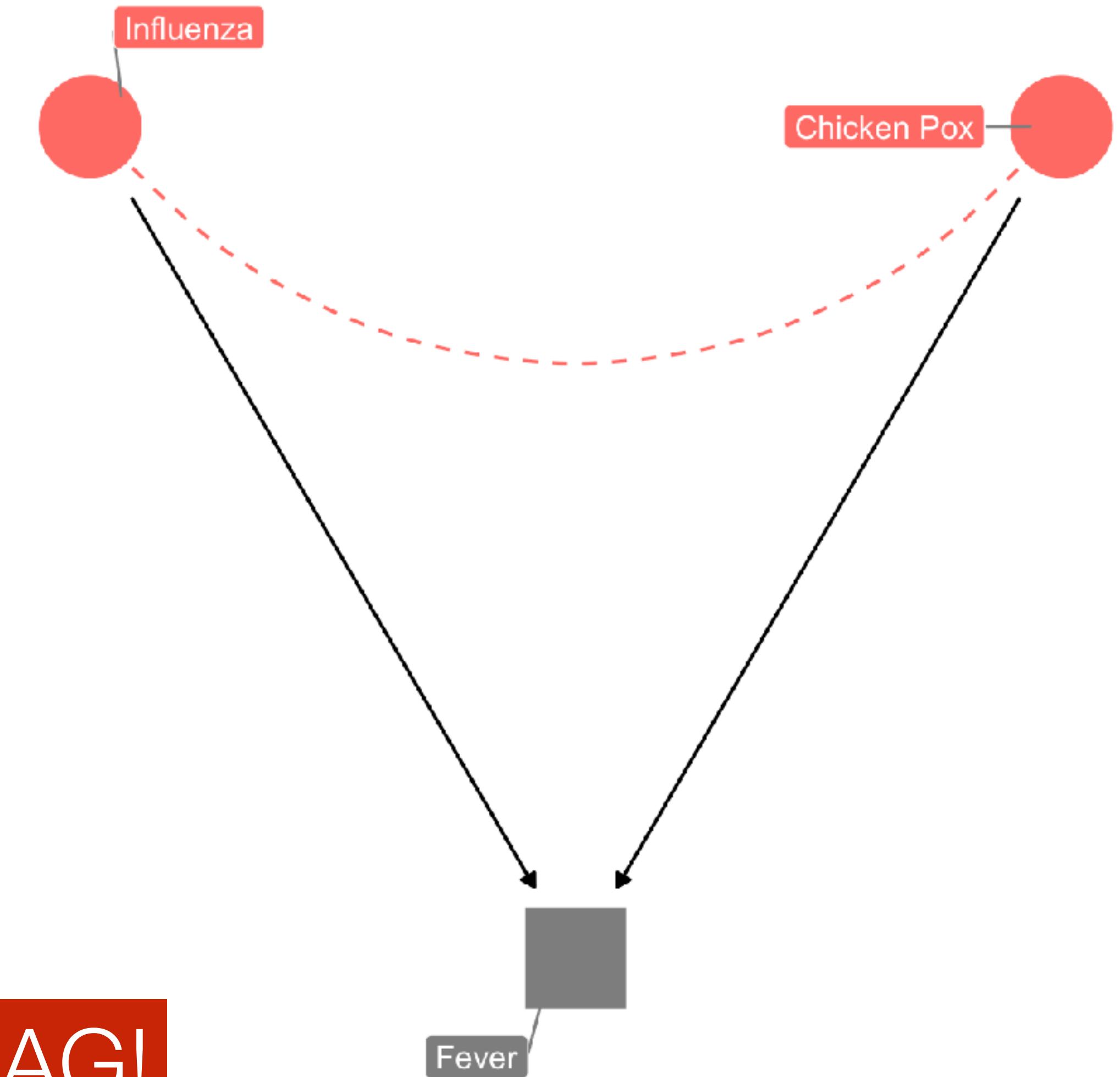
Colliders

Colliders arise from controlling for
the wrong thing

opens up flow from X to Y that
used to be closed

frequently arise from **selection**
(who or what is in our data)

Sample selection is also part of the DAG!



Front-doors and back-doors

The **back-door criterion** ties these all together

Confounding caused by existence of an open
“back door” from X to Y

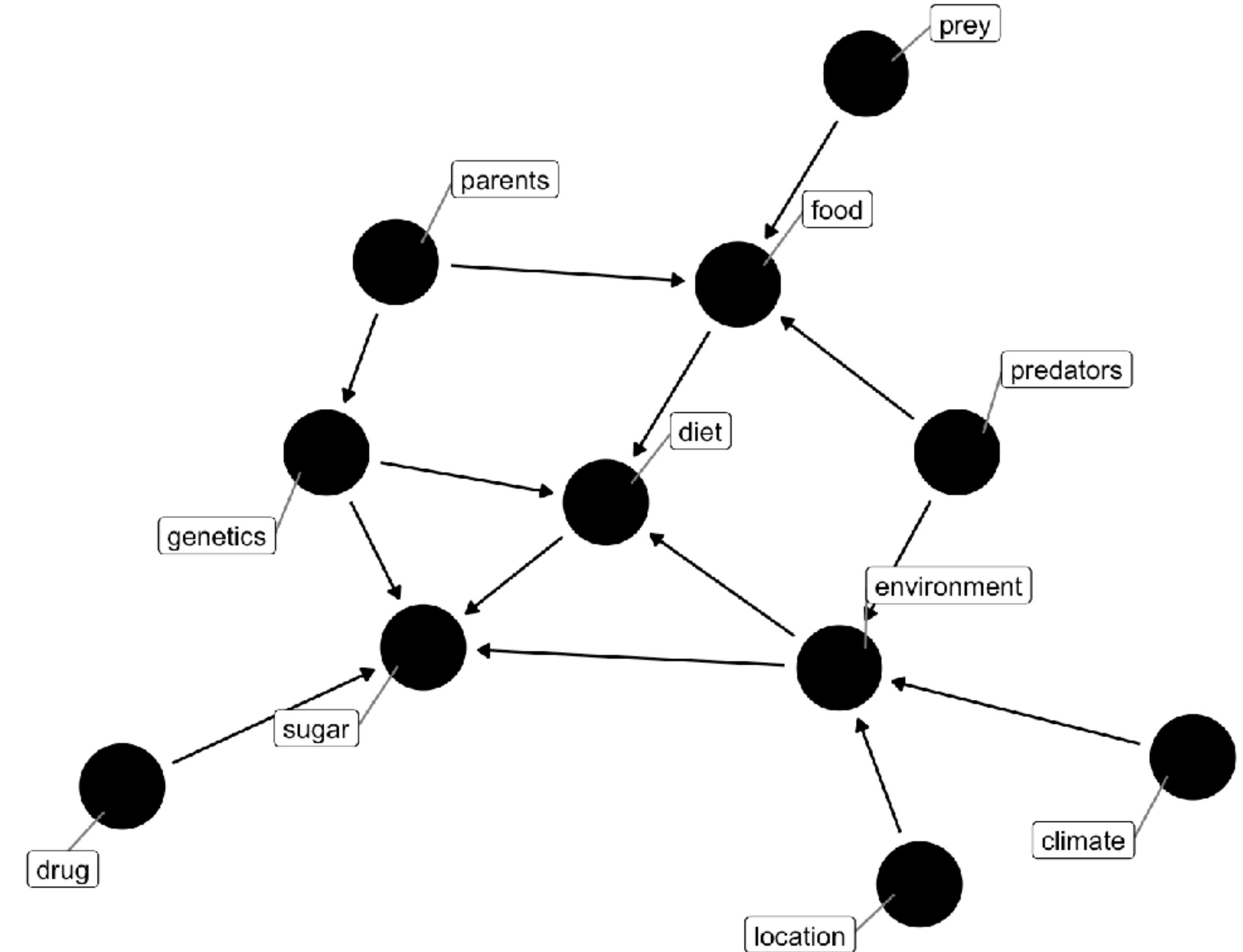
A backdoor path is a non-causal path from X to Y

Understand elemental confounds to close back-
doors

If randomization works, guarantees no back-doors!

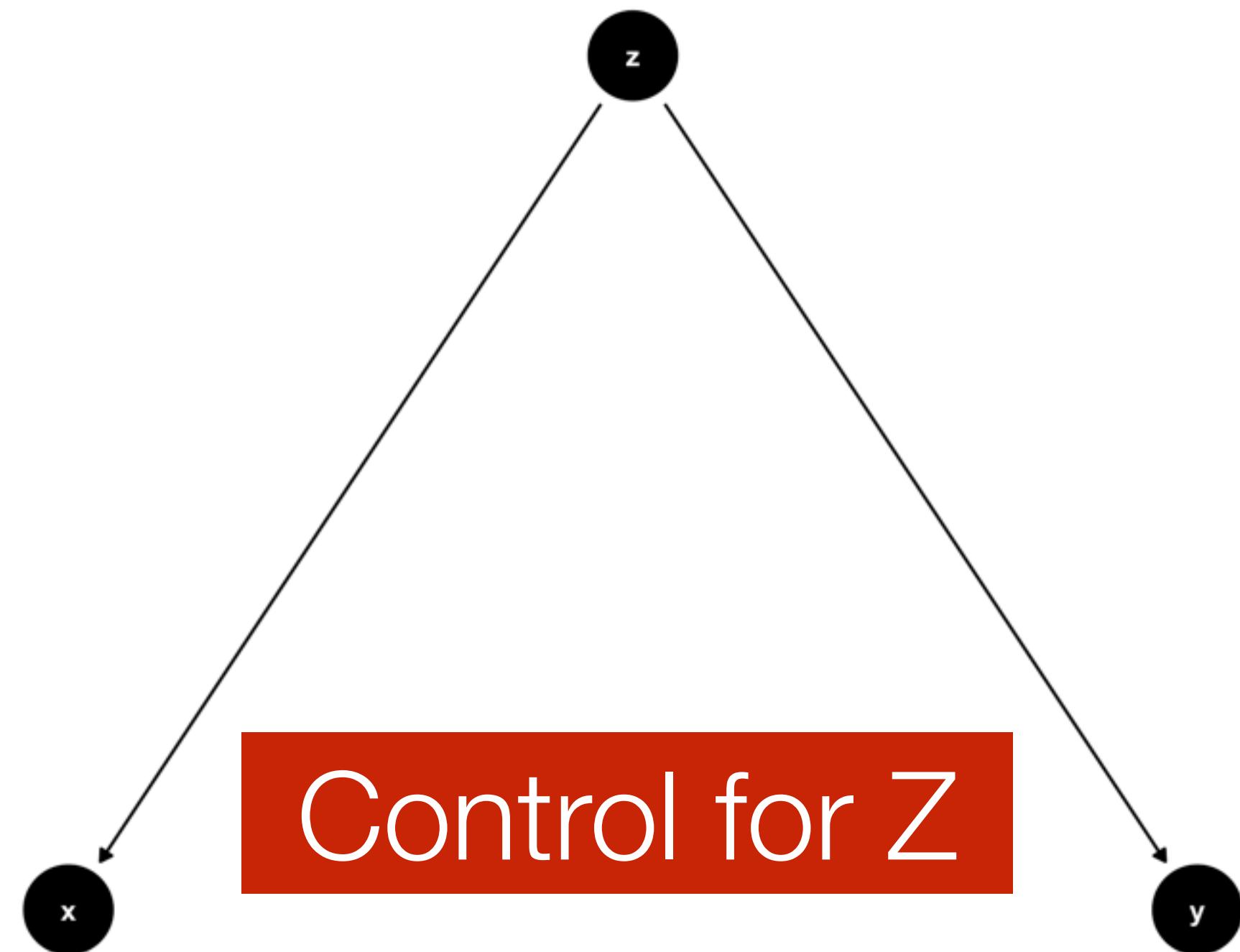
A tibble: 100 × 3		
	rat	drug
	<int>	<fct>
1	1	drug
2	2	placebo
3	3	placebo
4	4	placebo
5	5	drug
6	6	drug
7	7	drug
8	8	drug
9	9	placebo
0	10	drug

		blood_sugar
1		-2.97
2		-0.823
3		1.26
4		-1.22
5		-2.53
6		-1.94
7		-0.934
8		-1.83
9		0.785
0		-1.91

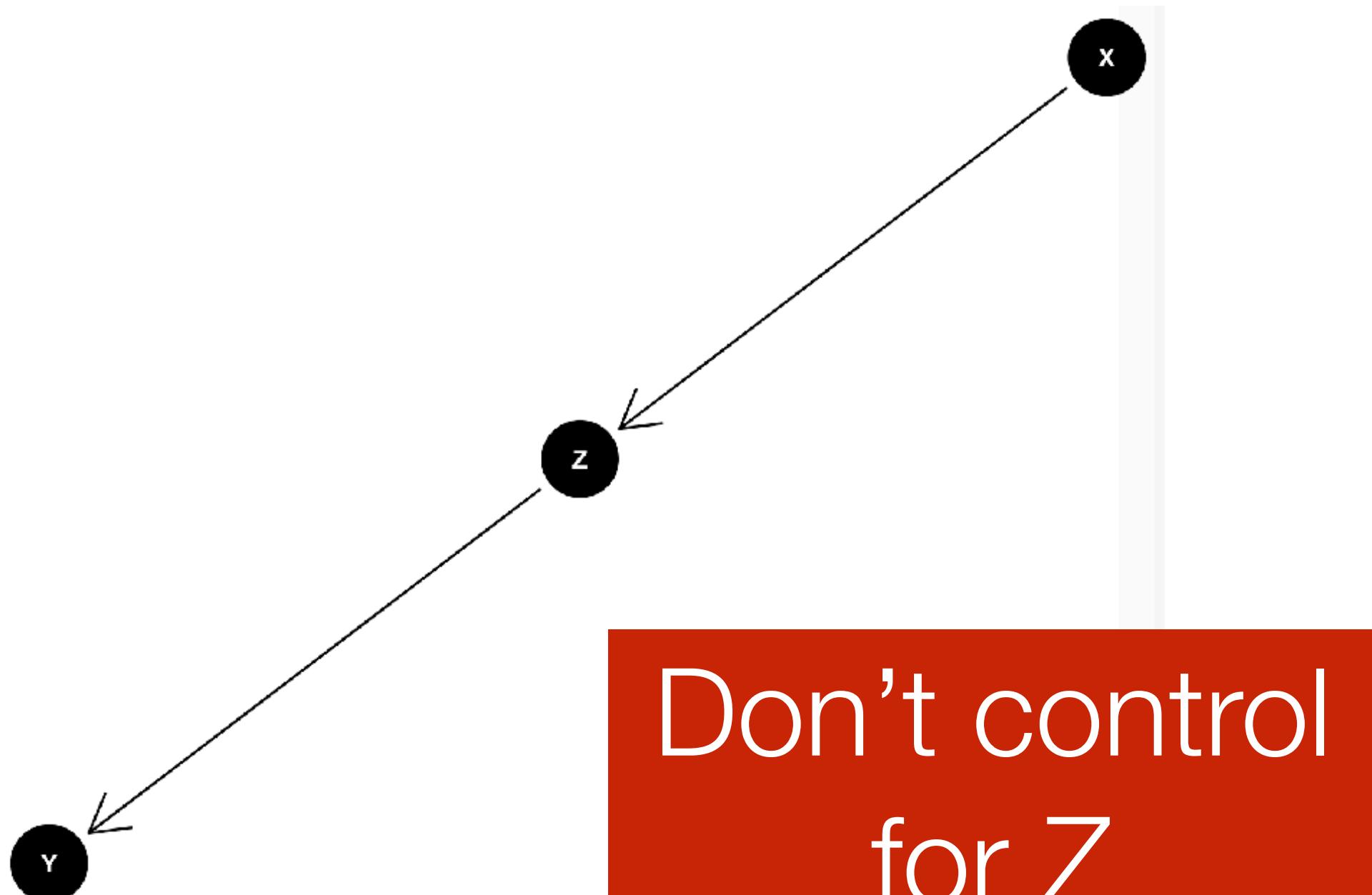


Opening and closing

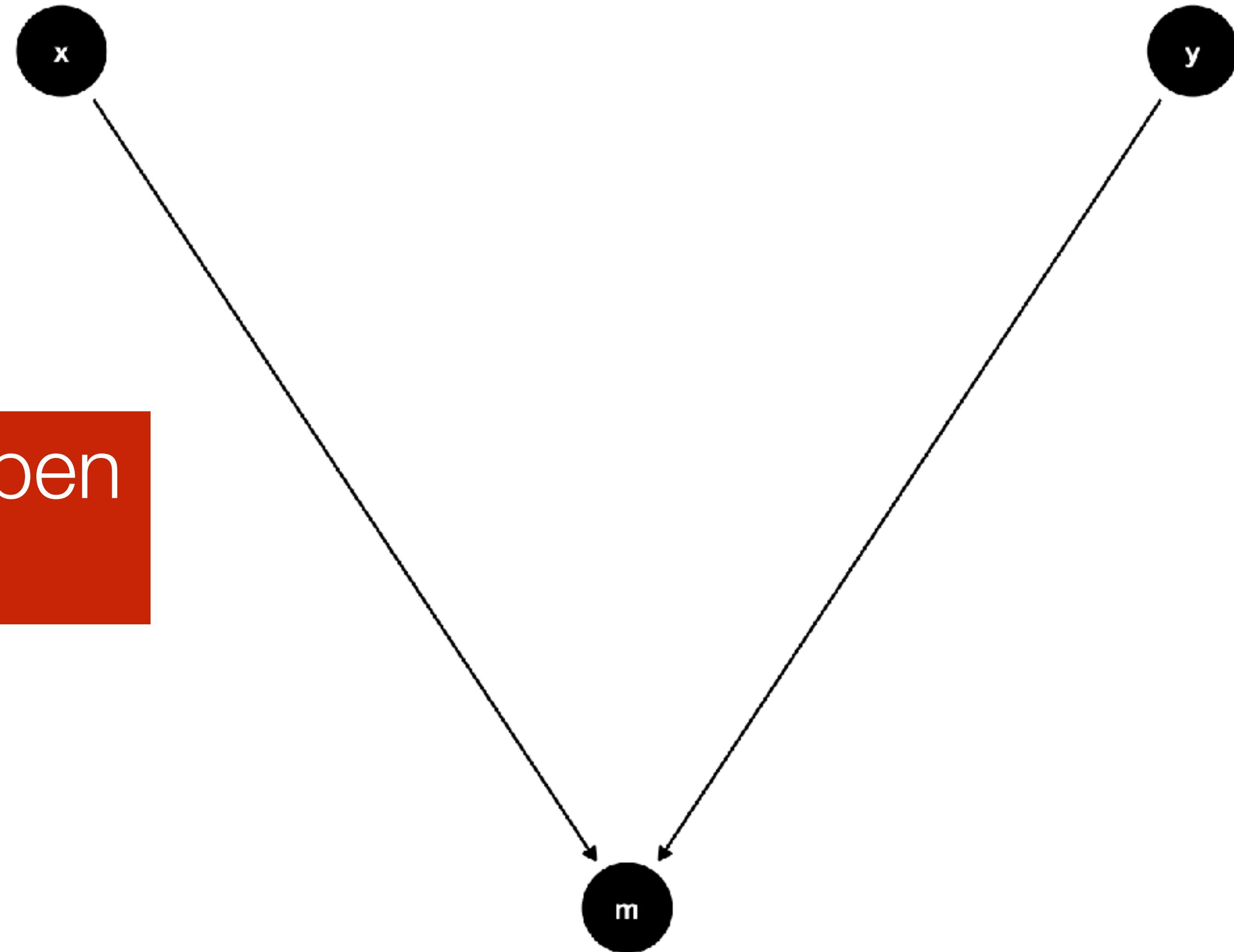
We want to close backdoors, or indirect paths, from X to Y



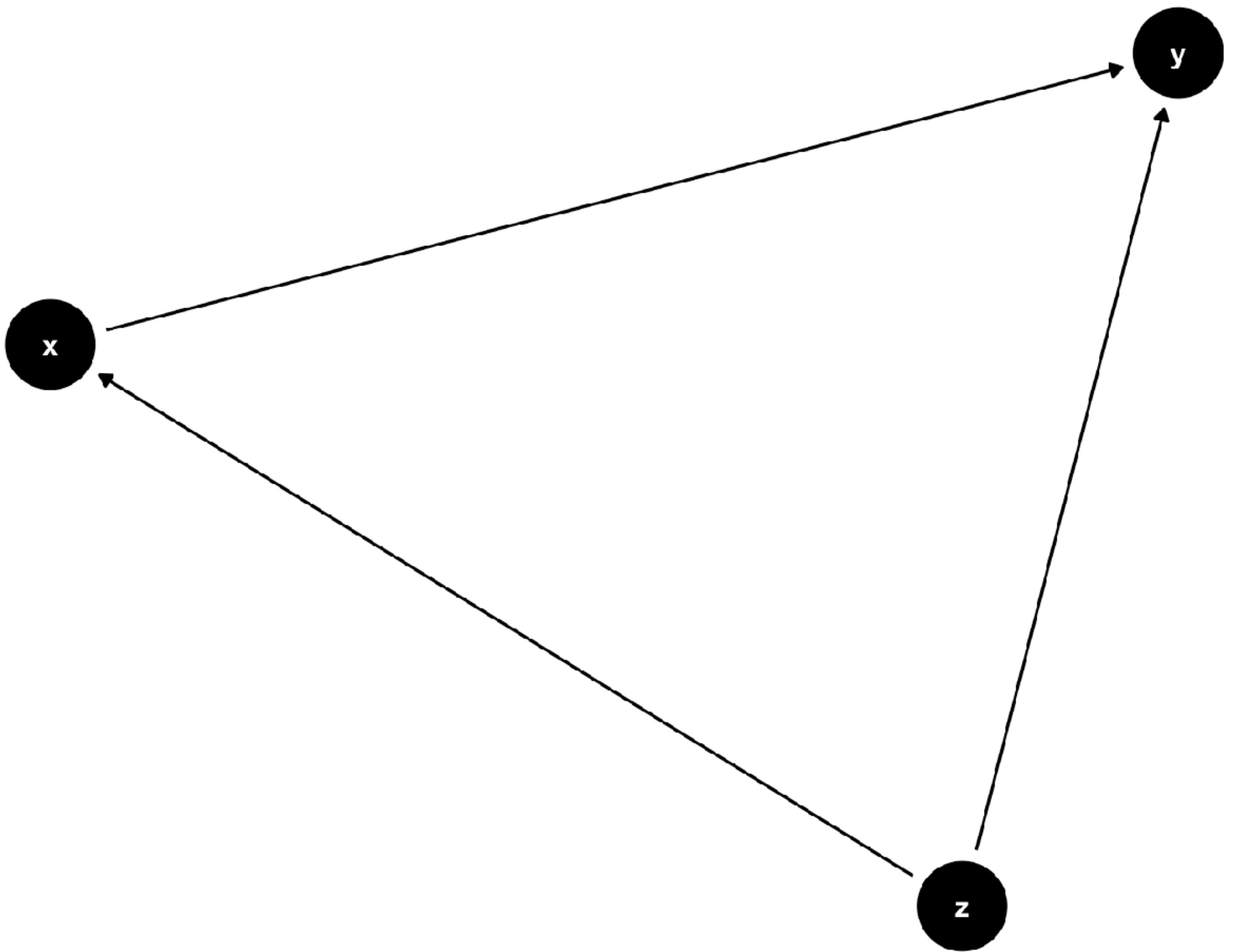
We want to leave front doors open, or direct paths from X to Y



Opening and closing

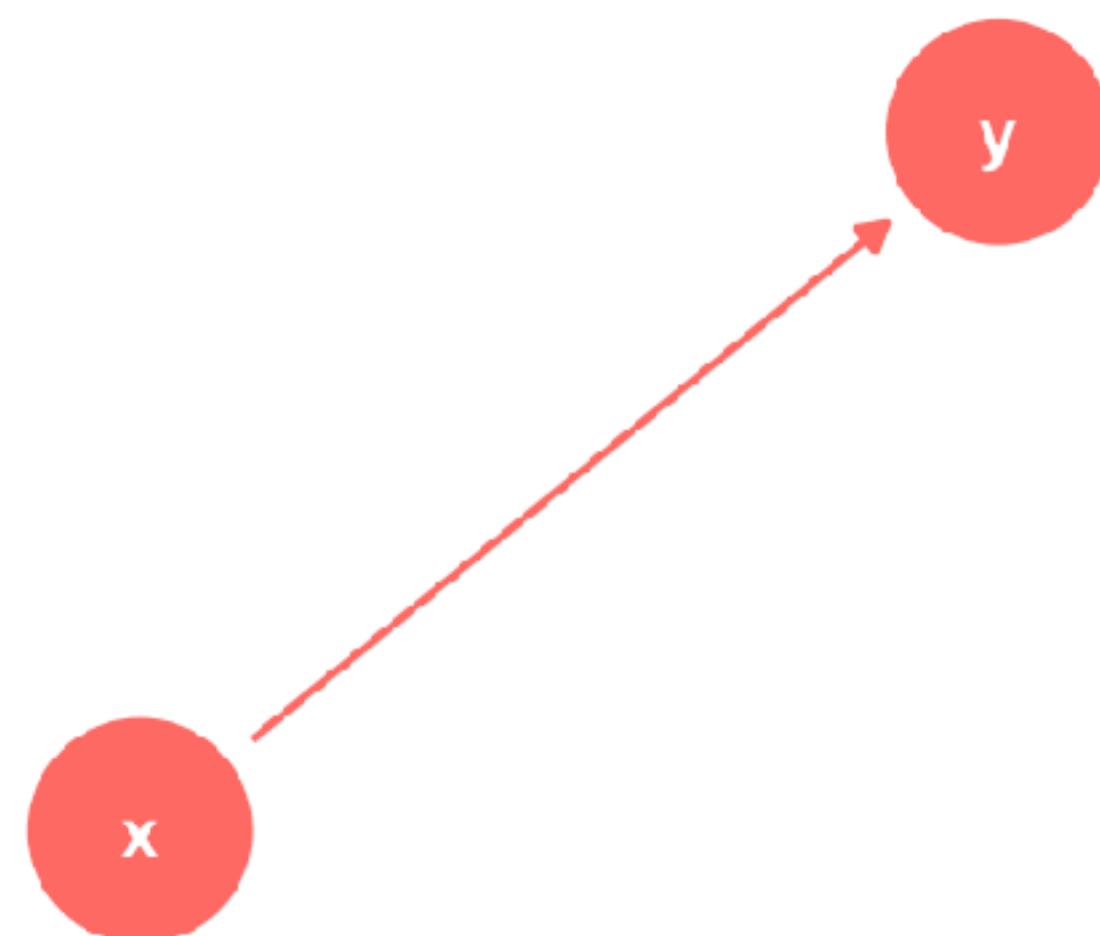


Collider bias can also open
“back-door” paths

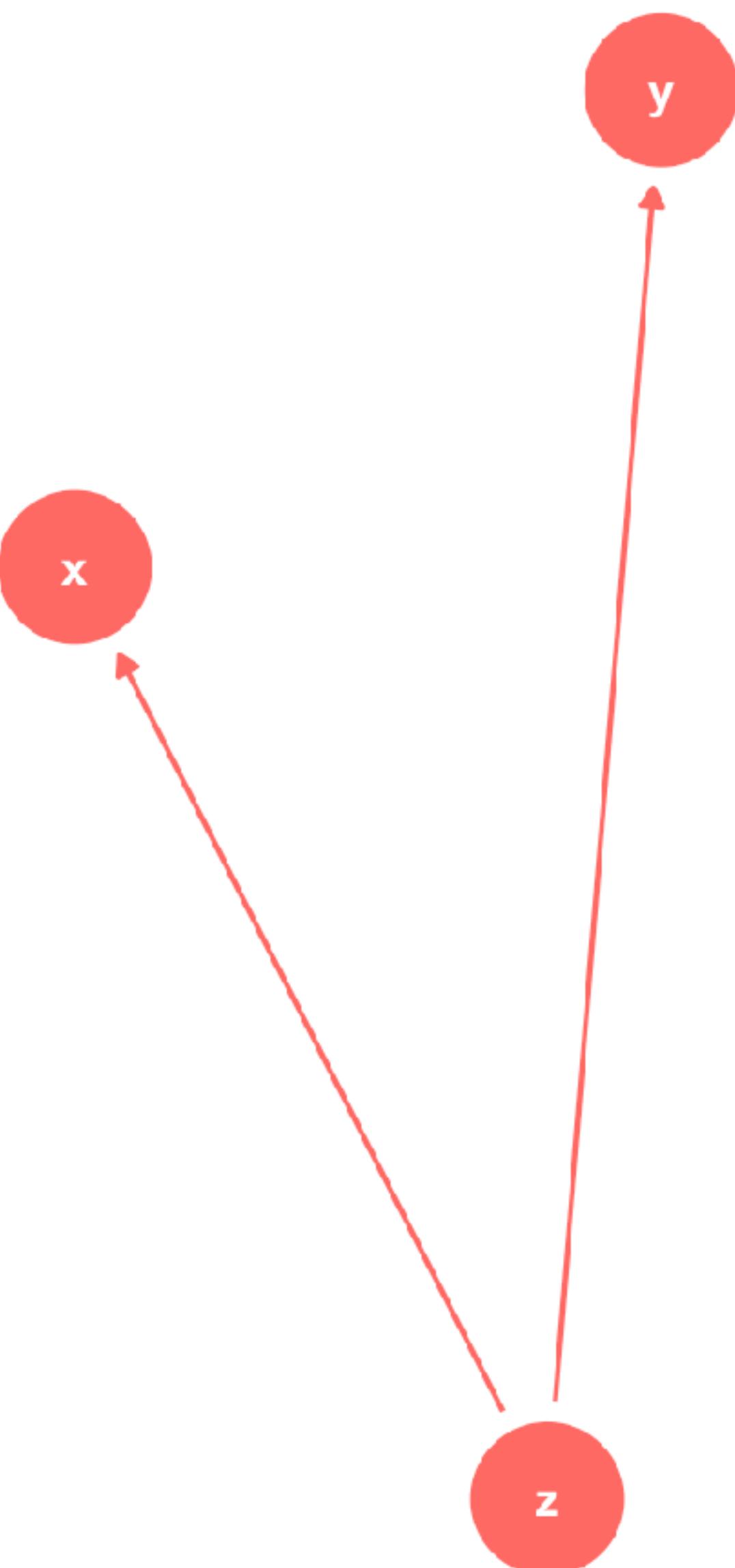


Two paths from X to Y

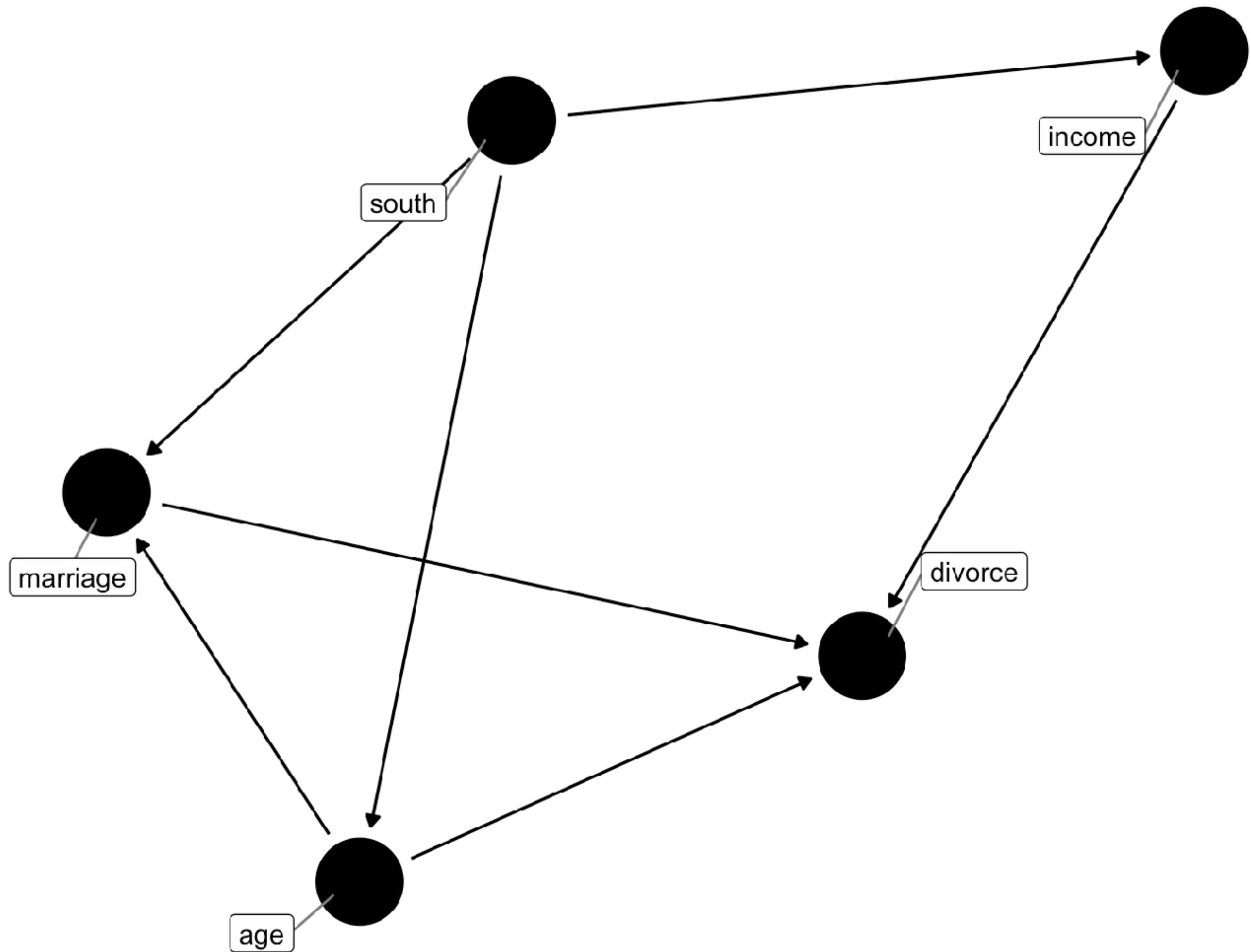
1

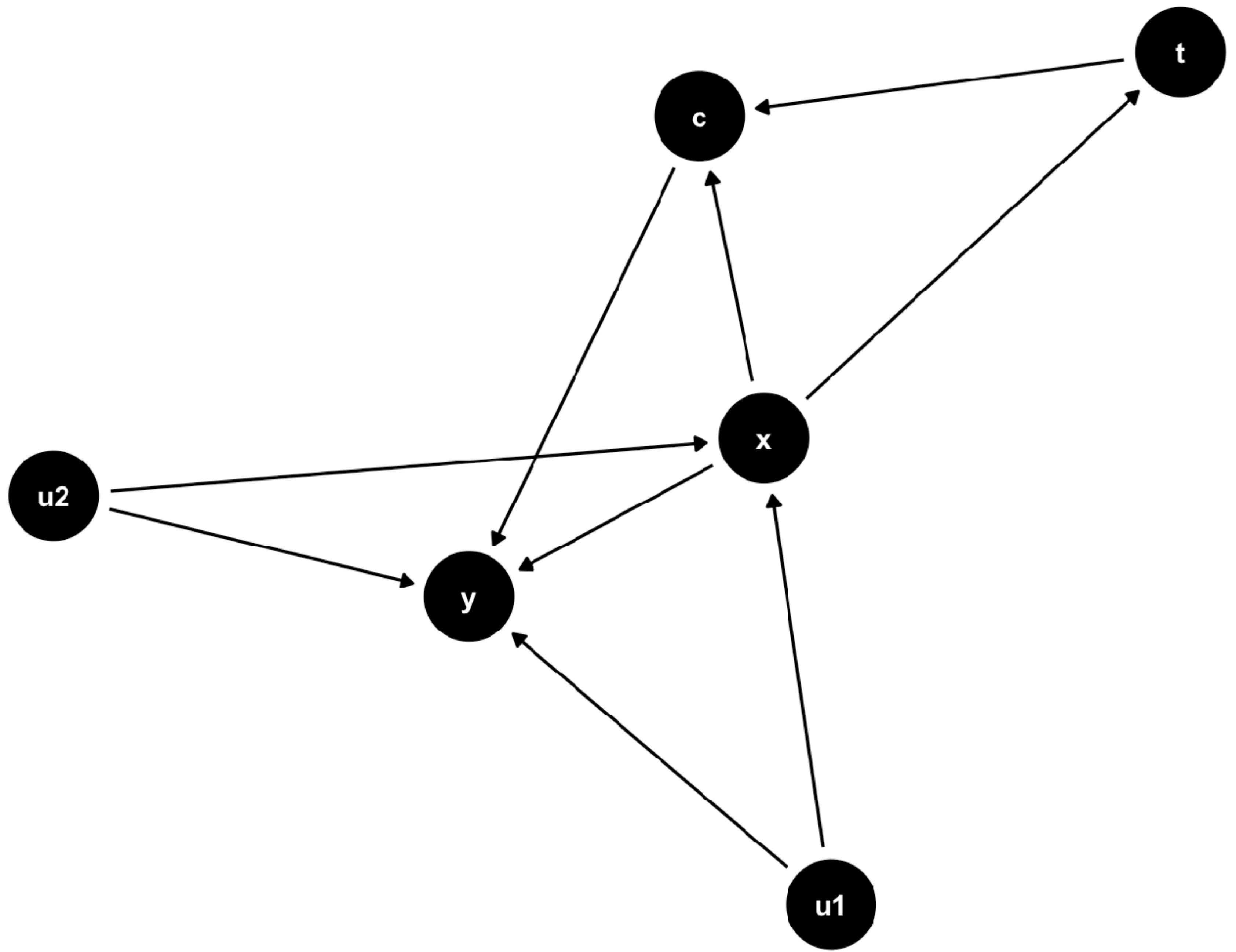


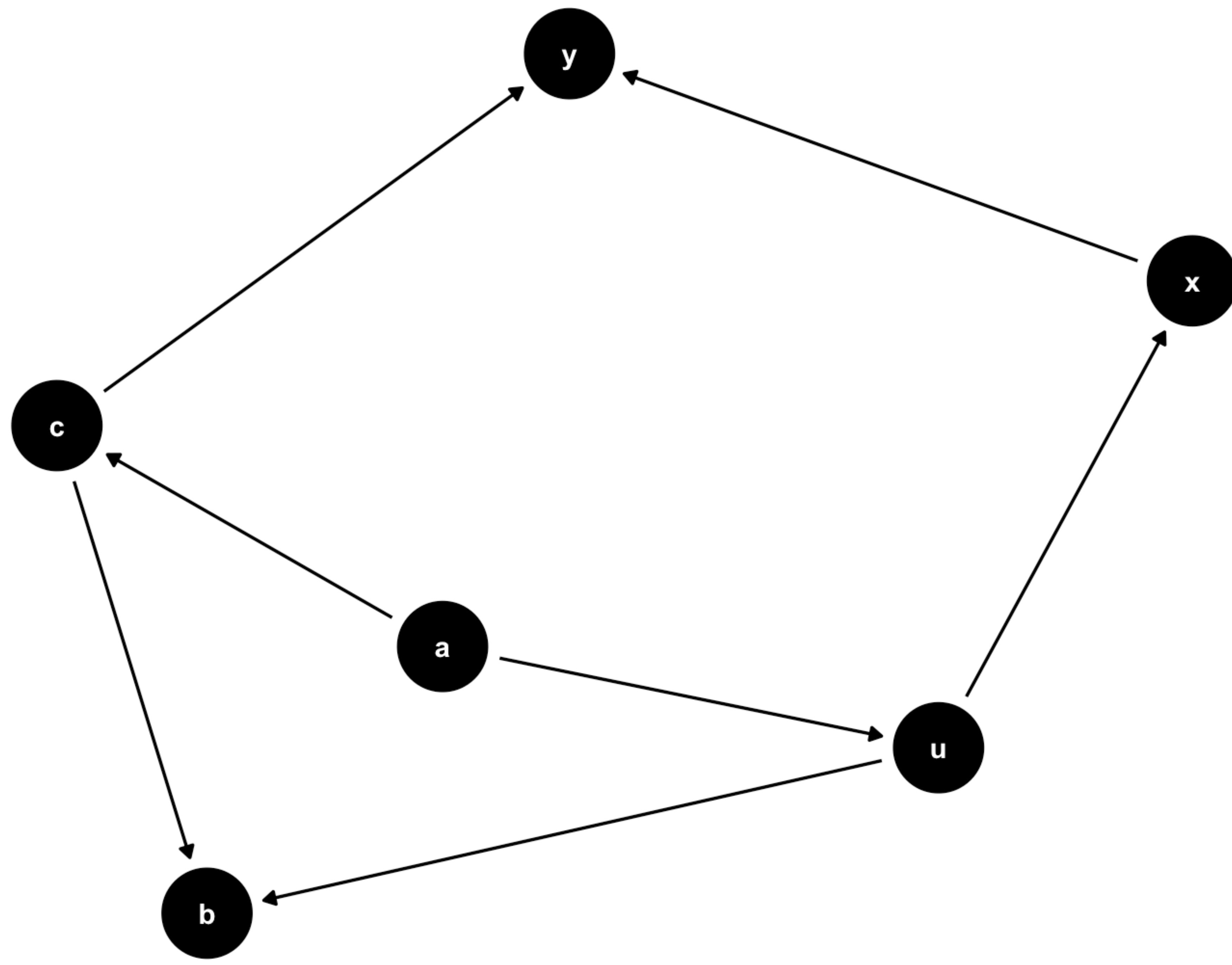
2

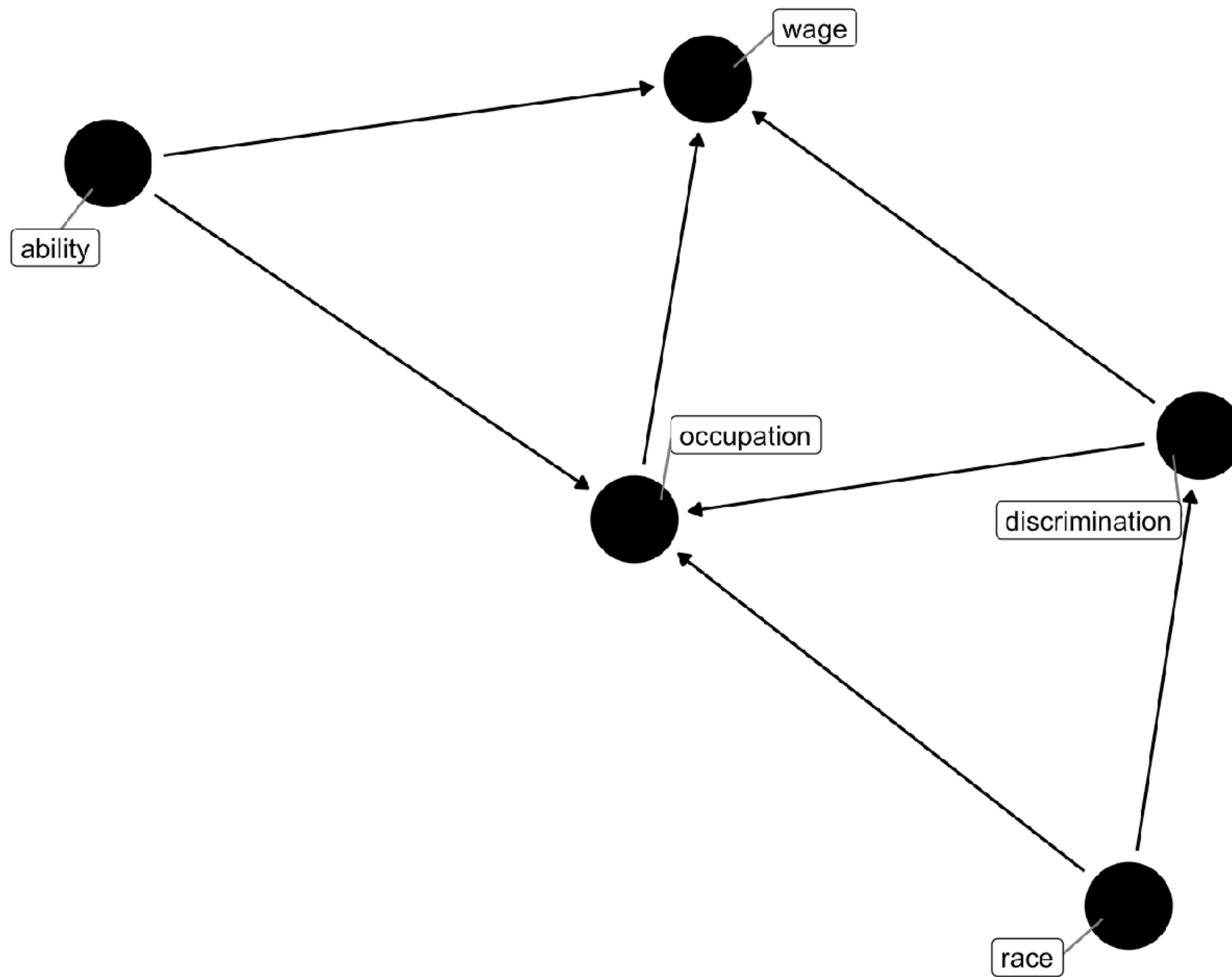


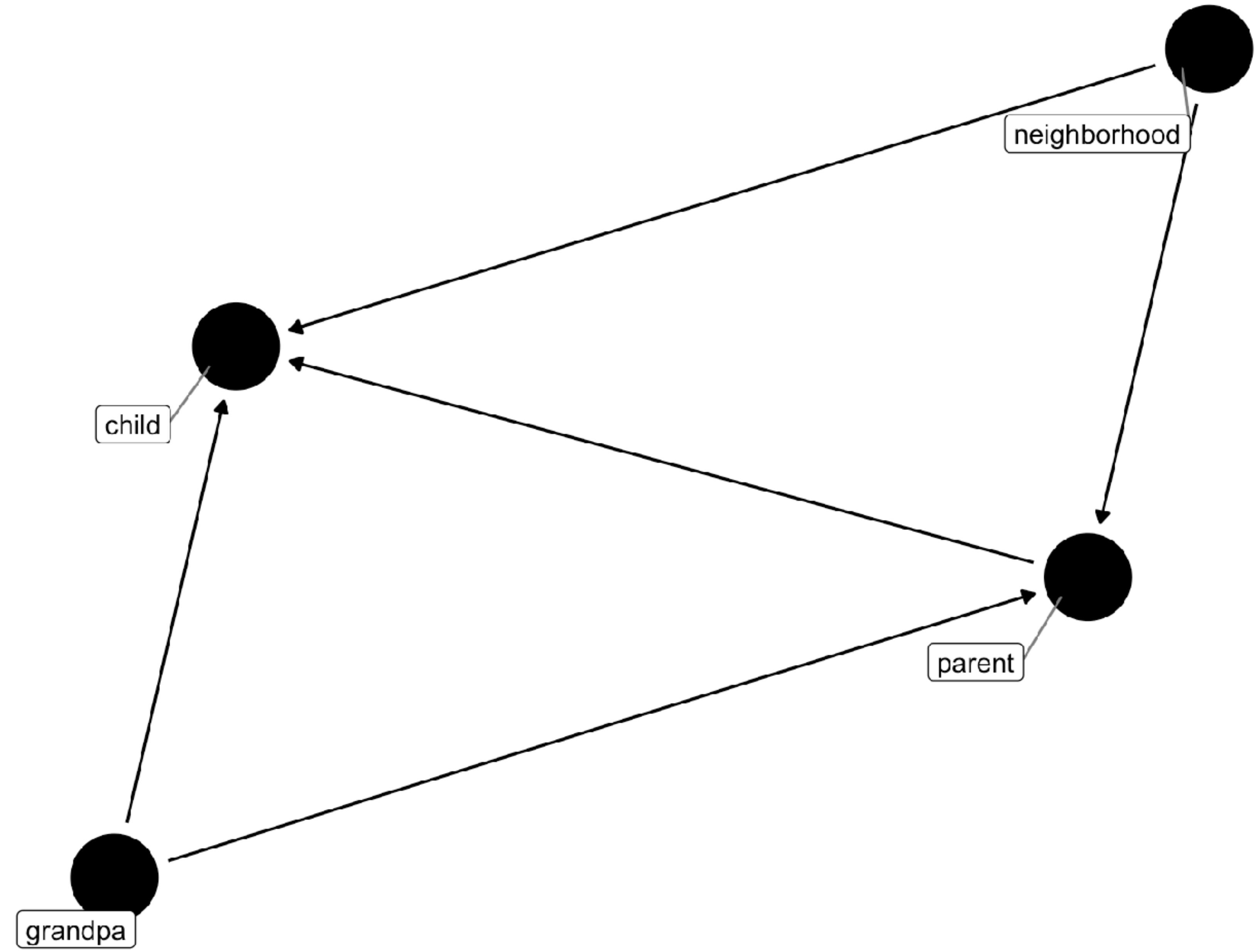
Close second path by conditioning on Z,
closing the backdoor











Recap

We want to know if $X \rightarrow Y$

We want to close backdoor paths from X to Y that will **confound** our inferences

Understanding how **forks, pipes, and colliders** work can help us make right adjustments

Homework: practice DAGs, no coding

Next week: controls and multiple regression