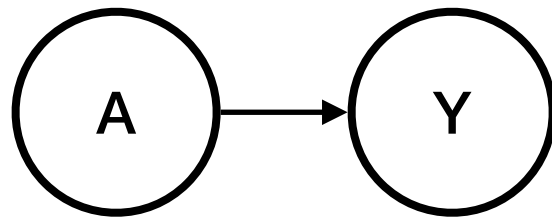
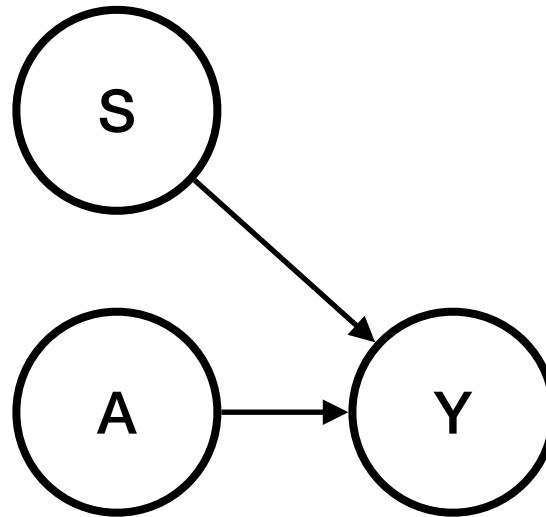


Randomized Experiment



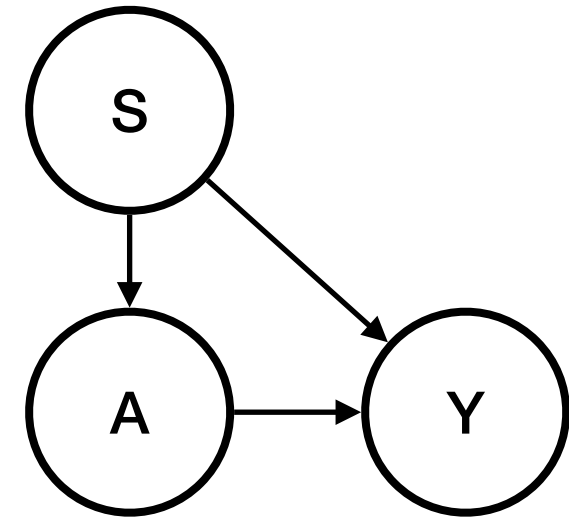
$$E[Y|A]$$

No Confounding



$$E[Y|S, A]$$

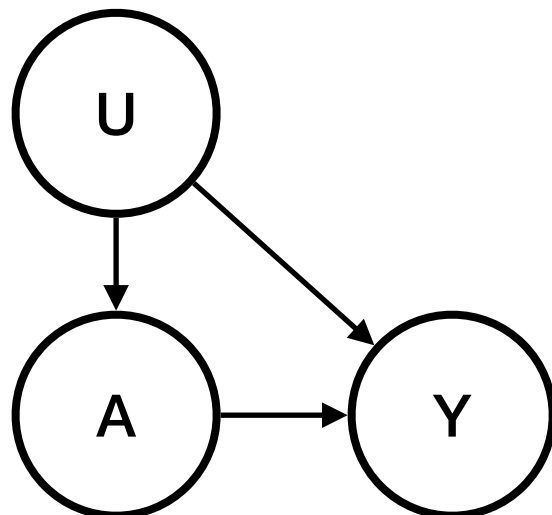
Observed confounders (we chose A!)



$$E[Y|S, \text{do}(A)]$$

Special DAGs where we have full knowledge of treatment assignment mechanism

Confounded DAG



- Action was not under our control.
- We don't know how action was chosen.
- Confounding means we could be arbitrarily wrong.
- When is this actionable?

What about mechanisms?

- Does A cause Y via mechanism M1 or M2?
- Big implication for whether we should invest in A1 or A2.
- Gets at the heart of what graphs are useful for: they give us a pointer toward generating actions via intuition.

