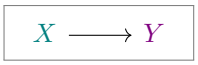
4.2.2.1 The simplest path

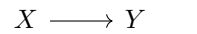
Don't know where to start? Start with the simplest possible path, connecting the *intervention*, X, with the *outcome*, Y.

What are you interested in measuring the effect / impact of?
(Understanding what X is.)
What is the outcome / result you are trying to change?
(Understanding what Y is.)

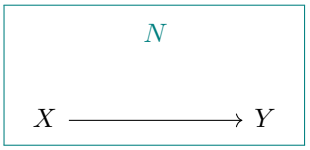


4.2.2.2 Adding a node

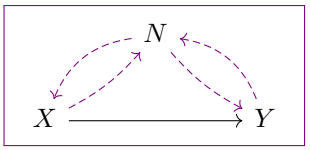
Beginning with any graph:



What else might be important to include? Let's call it N
(N is the new node, or variable, or blob. It could be something in the data, or just a concept / construct that is important.)

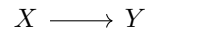


What things might N influence? What things might influence N?
(This question can be stepped through each existing node in the graph.)

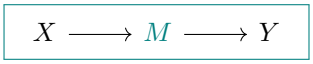


4.2.2.3 Adding causal chains

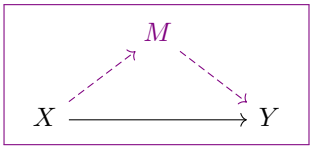
Beginning with any two causally connected nodes in the graph:



Does X influence Y ***directly****, or is there some other variable (M) in between?*
(M is called a *mediator* which we are inserting into the path $X \to Y$)

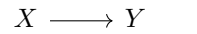


Are there other things (M) that X changes that in turn change Y?
(Adds a new path with a mediator in it)

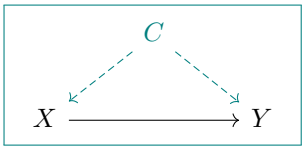


4.2.2.4 Adding a common cause

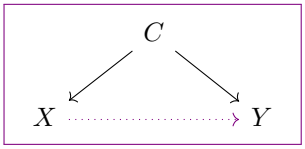
Beginning with any two causally connected nodes in the graph:



Is there anything else (C) that we haven't added that might influence both X and Y?
(C is called a *confounder*.)



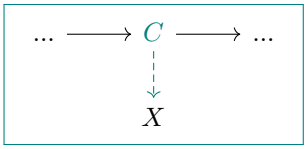
Could C explain all the association between X and Y?
(This is a common source of *spurious association*.)



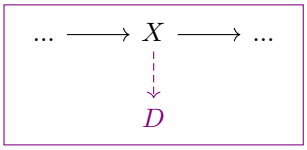
4.2.2.5 Distinguishing constructs and data

Beginning with any node in the graph:

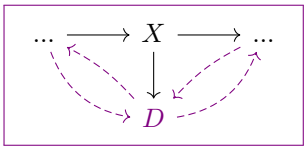
Is X the causal mechanism here, or is it just the data we have? Is X actually a proxy for some causal construct C?
(X is the data we have representing a construct, C.)



Do we have any data, D, that might represent X?
(In this case X is the construct, and D the data representing it.)

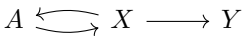


This new data D - does it influence (or is influenced by) anything else in the model?

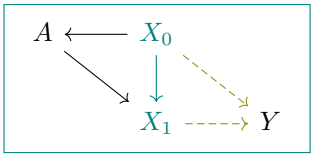


4.2.2.6 Adding an epoch

With any graph, but this works well to untangle loops:



*Can we split X into **before** and **after** some event?*
(X_0 denotes before the event, at epoch $t = 0$, and X_1 after at $t = 1$)



***When** do the other variables occur, relative to this event?*
(If Y is **before**, then use the path $X_0 \to Y$, but more likely it is **after** and you would use the path $X_1 \to Y$)

Do other variables also need to be split into before and after this event?
(Each of the paths connecting $X_{0,1}$ to $Y_{0,1}$ will need to be questioned.)