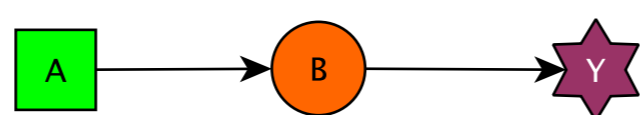


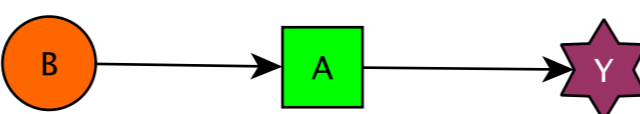
Let \star be our dependent variable (outcome variable), and assume that both A and B are substantially correlated with \star

Expected

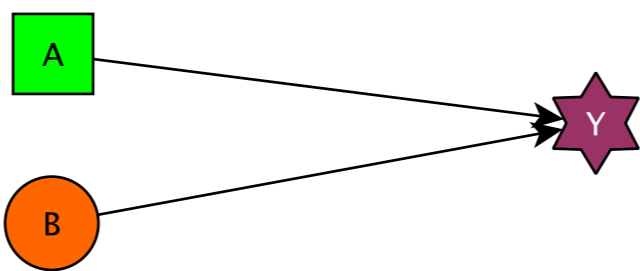
A & Y uncorrelated controlling for B
 an intervention causing B to increase should change Y but not A



B & Y uncorrelated controlling for A
 an intervention causing A to increase should change Y but not B

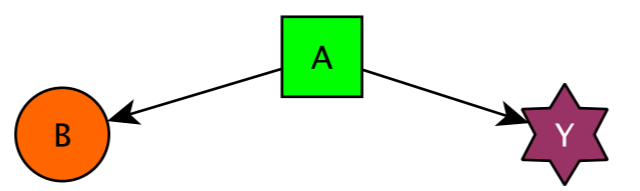


A & B uncorrelated
 an intervention causing A or B to increase should change Y

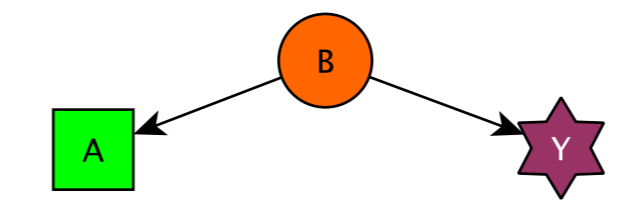


Simple Confounder

B & Y uncorrelated controlling for A
 an intervention causing A to increase should change both B and Y

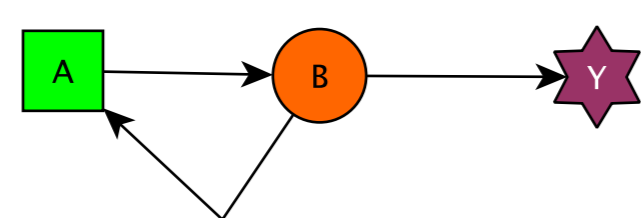


A & Y uncorrelated controlling for B
 an intervention causing B to increase should change both A and Y

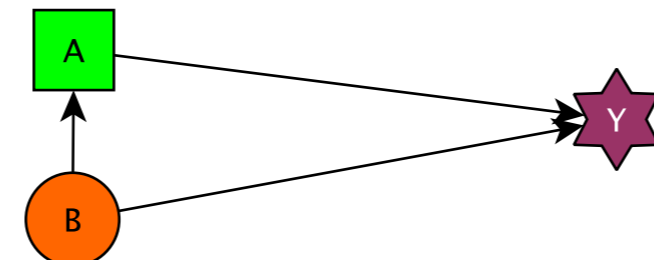


Interconnected

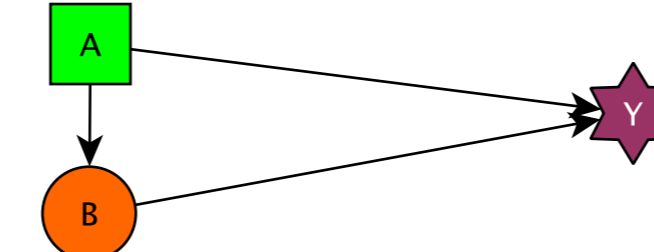
A & Y uncorrelated controlling for B
 an intervention causing B to increase should change both A and Y
 an intervention causing A to increase should change both B and Y



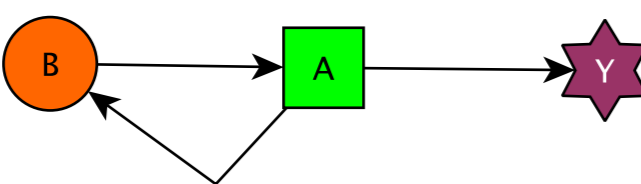
all pairwise correlations exist no matter what is controlled for
 an intervention causing B to increase should change both A and Y



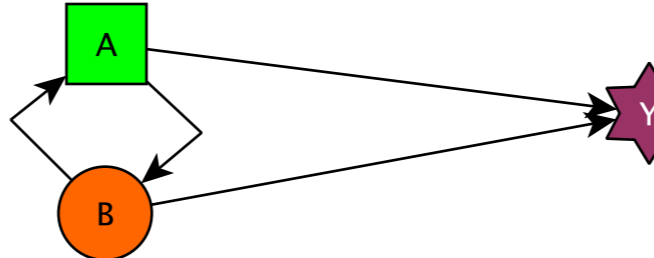
all pairwise correlations exist no matter what is controlled for
 an intervention causing A to increase should change both B and Y



B & Y uncorrelated controlling for A
 an intervention causing A to increase should change both B and Y
 an intervention causing B to increase should change both A and Y

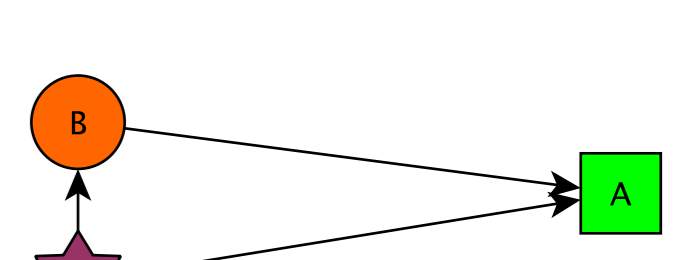
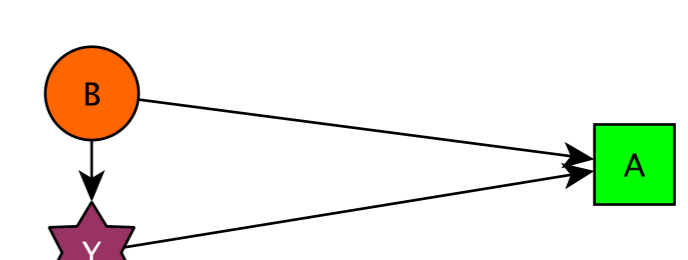
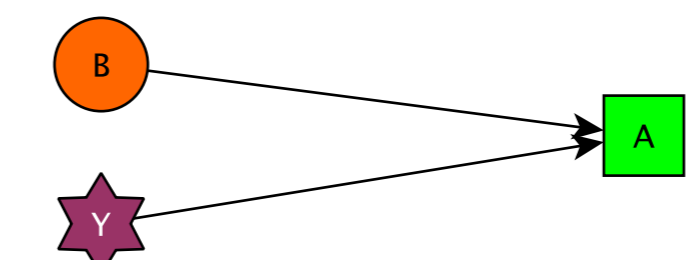
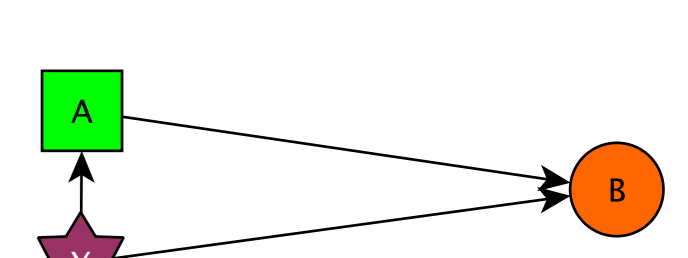
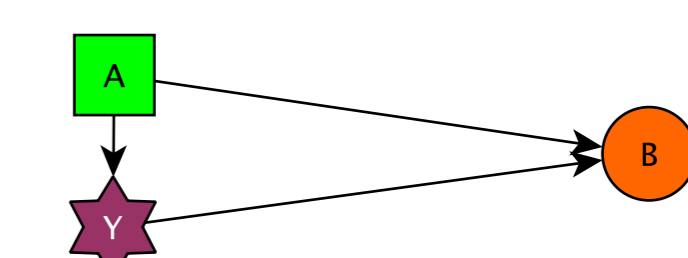
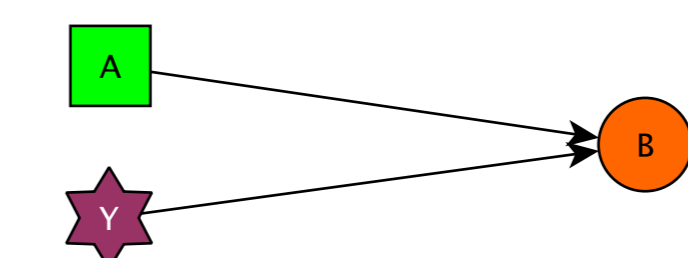
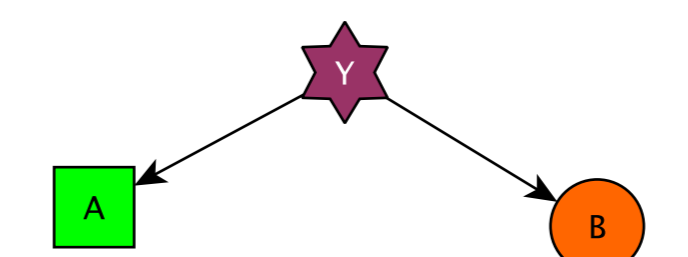
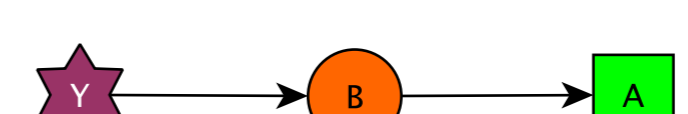
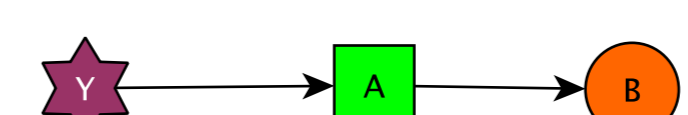
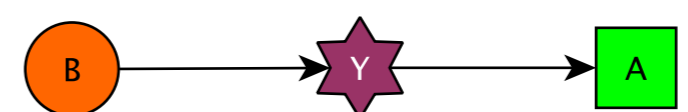


all pairwise correlations exist no matter what is controlled for
 an intervention causing A or B to increase should change the other two



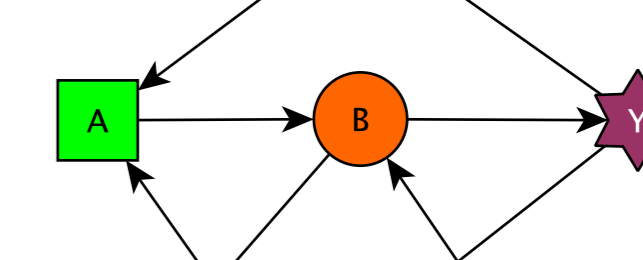
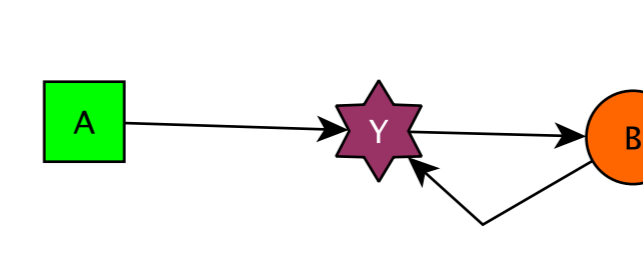
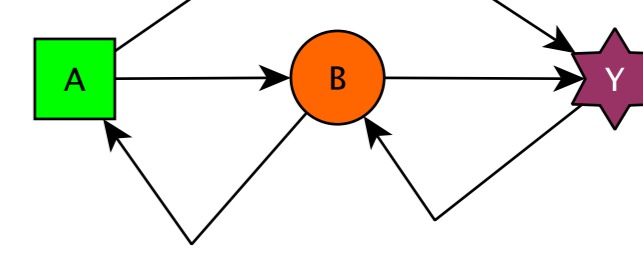
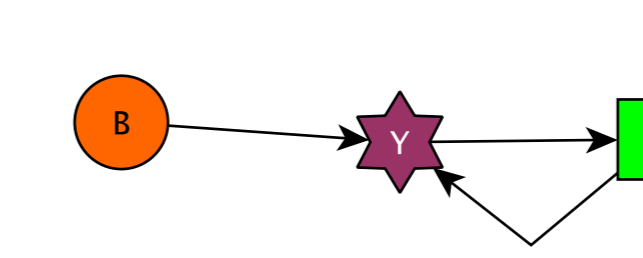
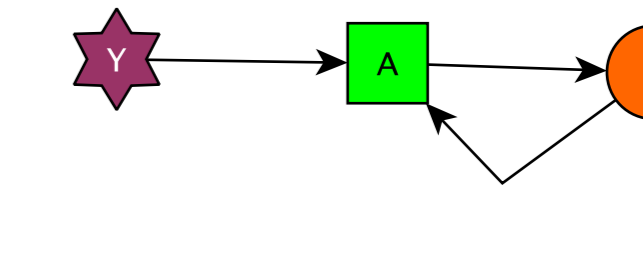
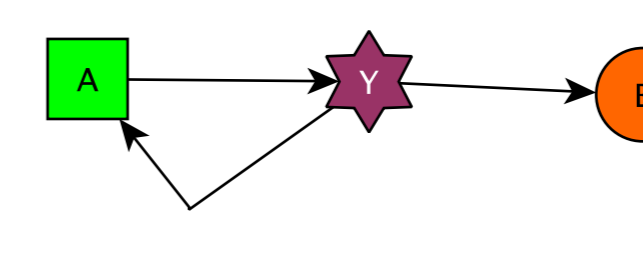
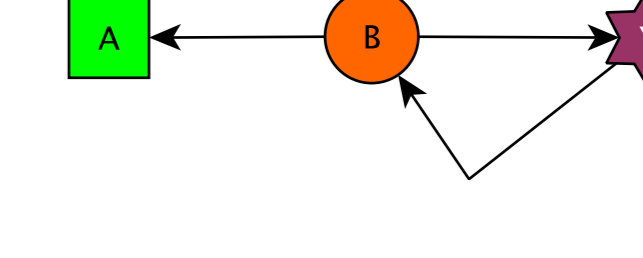
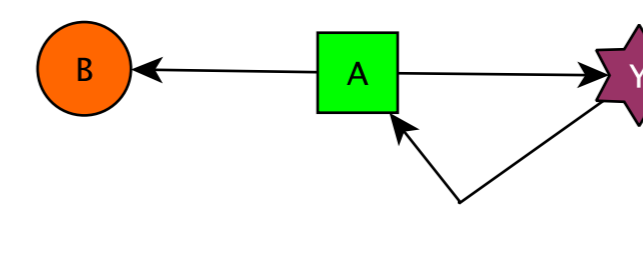
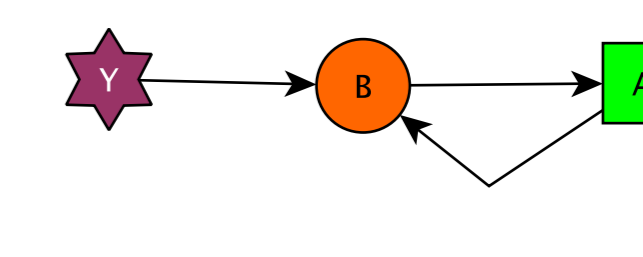
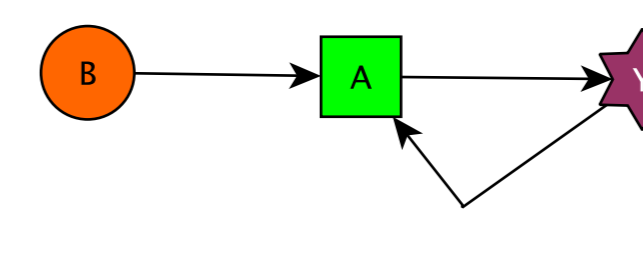
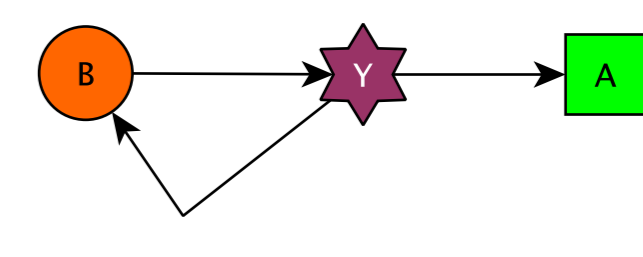
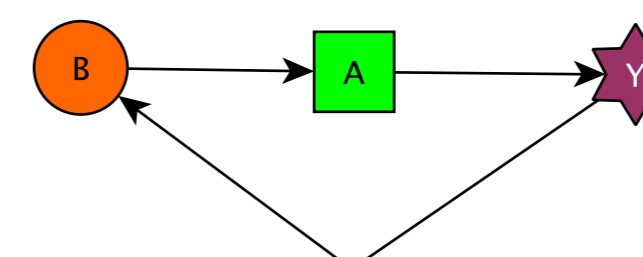
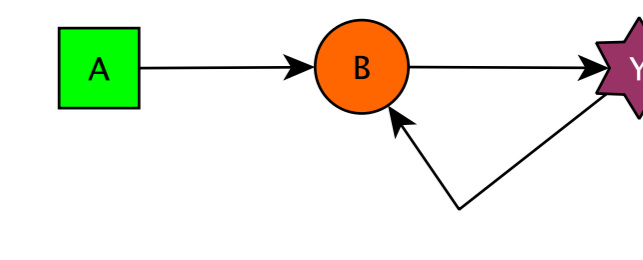
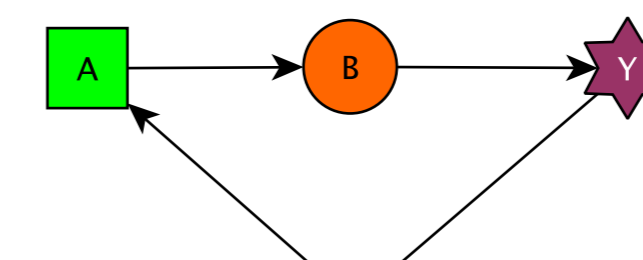
Can we rule out Y being a cause instead of just an effect?

Cause and effect confused



Can we rule out Y being both a cause and an effect?

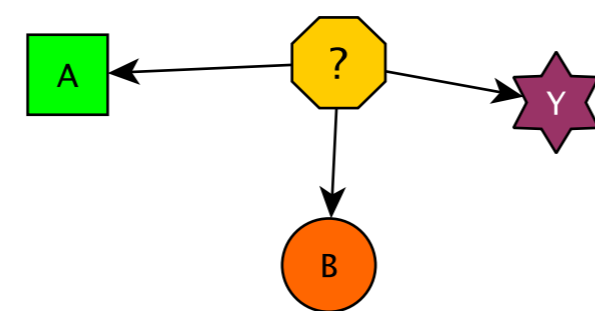
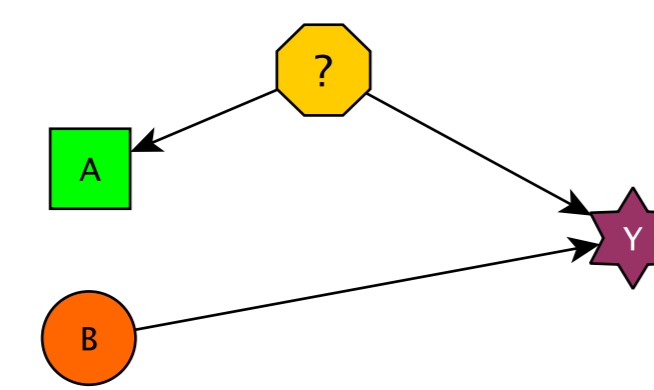
Cyclical



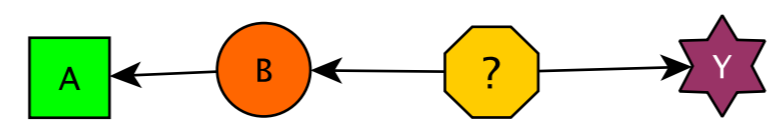
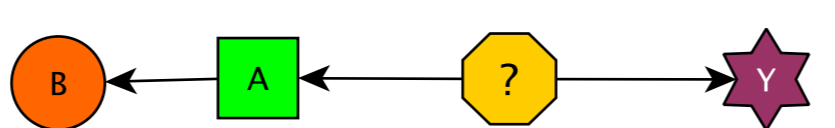
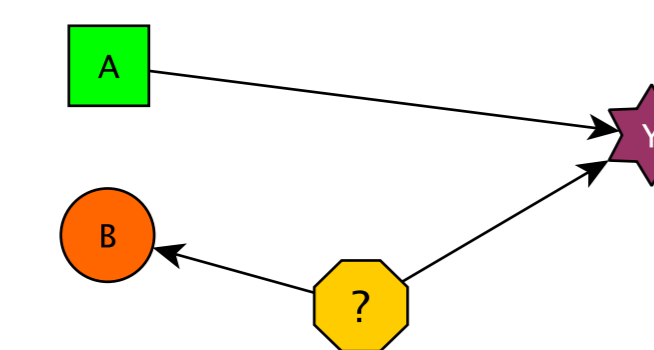
Can we rule out there being important variables we haven't measured?

Missing Confounder(s)

A & B are uncorrelated
 A & B become correlated controlling for Y



A & B are uncorrelated
 A & B become correlated controlling for Y



A & B are uncorrelated
 A & B become correlated controlling for Y

