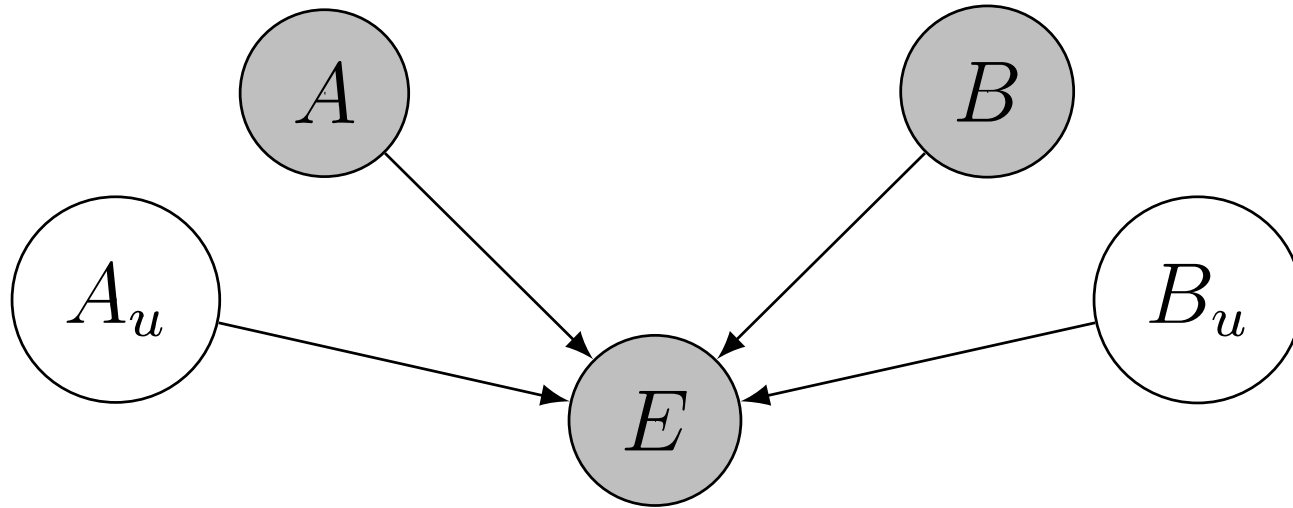


Counterfactual effect size model of an unreliable collider

Stephanie Droop and Neil Bramley

Situation



A and B are observed.

Each is accompanied by an unobserved noise variable. Only the rates are known.

For A to work, both A and A_u must $==1$.

For B to work, both B and B_u must $==1$.

In the conjunctive case, all four nodes must $==1$.

In the disjunctive case, either A and A_u , or B and B_u , must $==1$.

Next we run the CESM to attribute causal responsibility to each node, at different rate settings.

Rate settings

Summary of parameter settings for the 10 slides that follow:

On pattern: $p_A=1$, $p_{Au}=1$, $p_B=1$, $p_{Bu}=1$

1. .1 .5 .8 .5

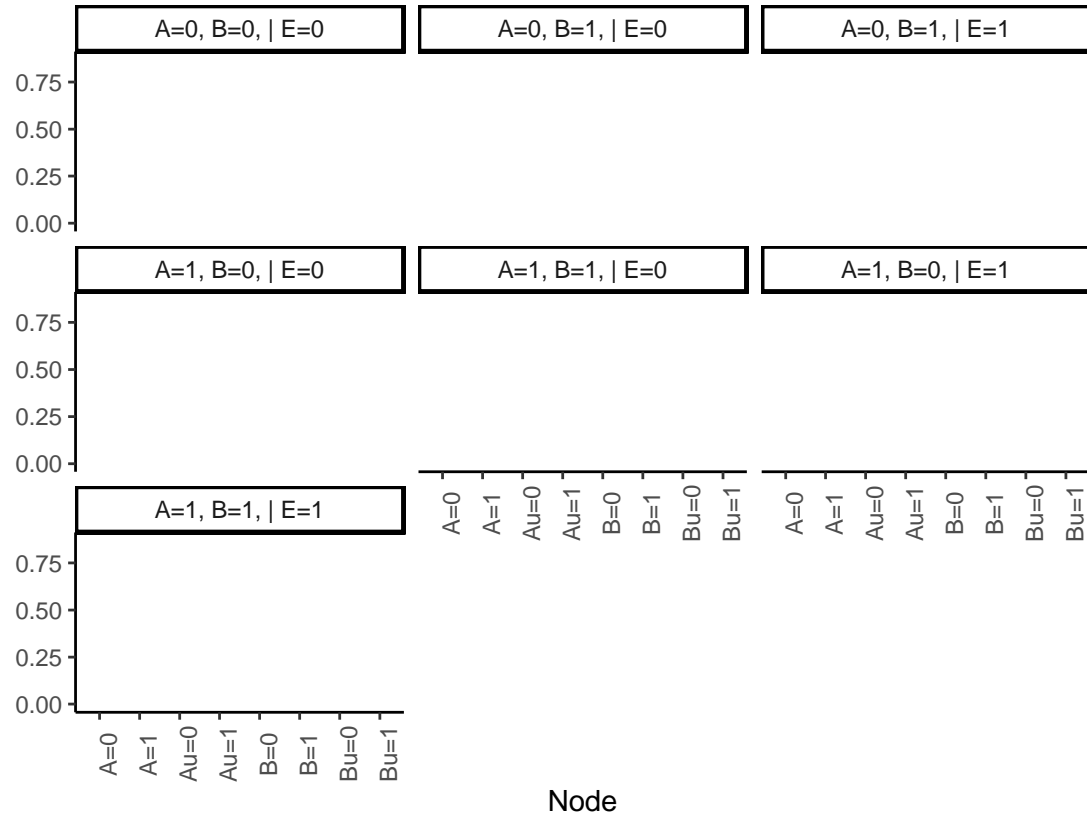
2. .5 .1 .5 .8

3. .1 .7 .8 .5

1. Probabilities 1, dis and con

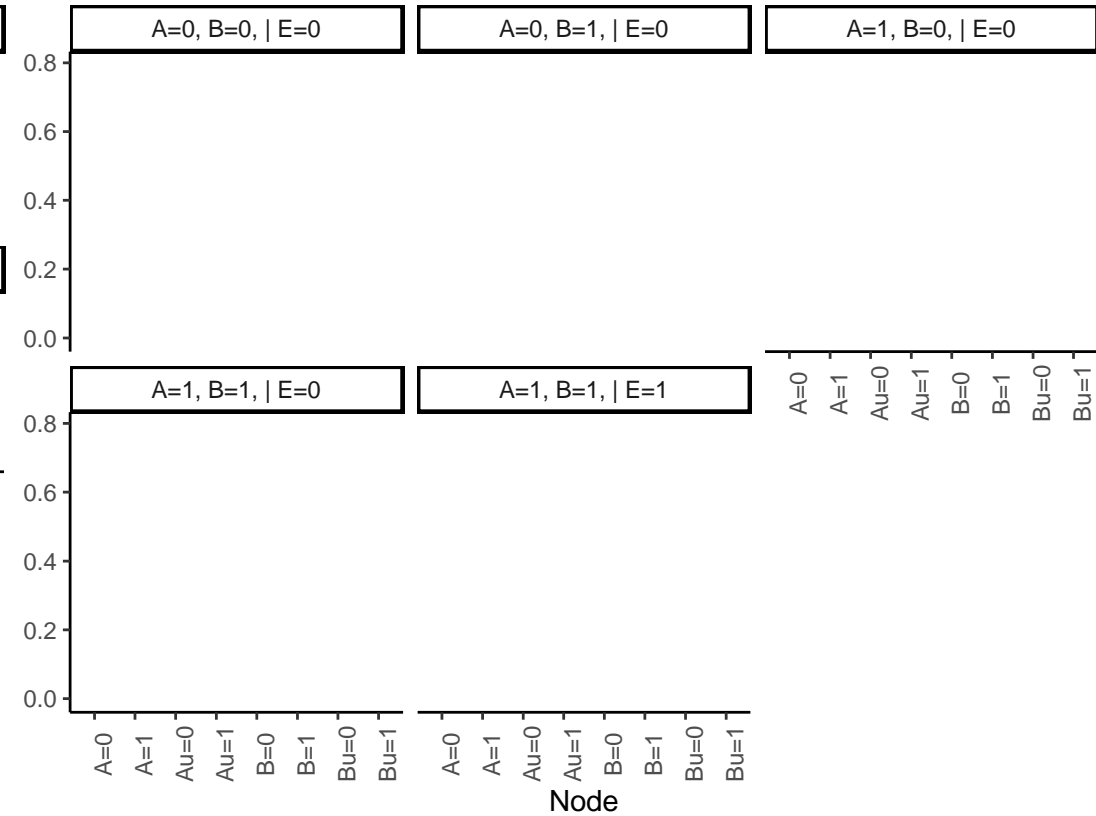
Disjunctive collider: $pA=0.1$, $pAu=0.5$, $pB=0.8$, $pBu=0.5$

Participant choice (bars) against weighted average
CESM model prediction (dots)



Conjunctive collider: $pA=0.1$, $pAu=0.5$, $pB=0.8$, $pBu=0.5$

Participant choice (bars) against weighted average
CESM model prediction (dots)



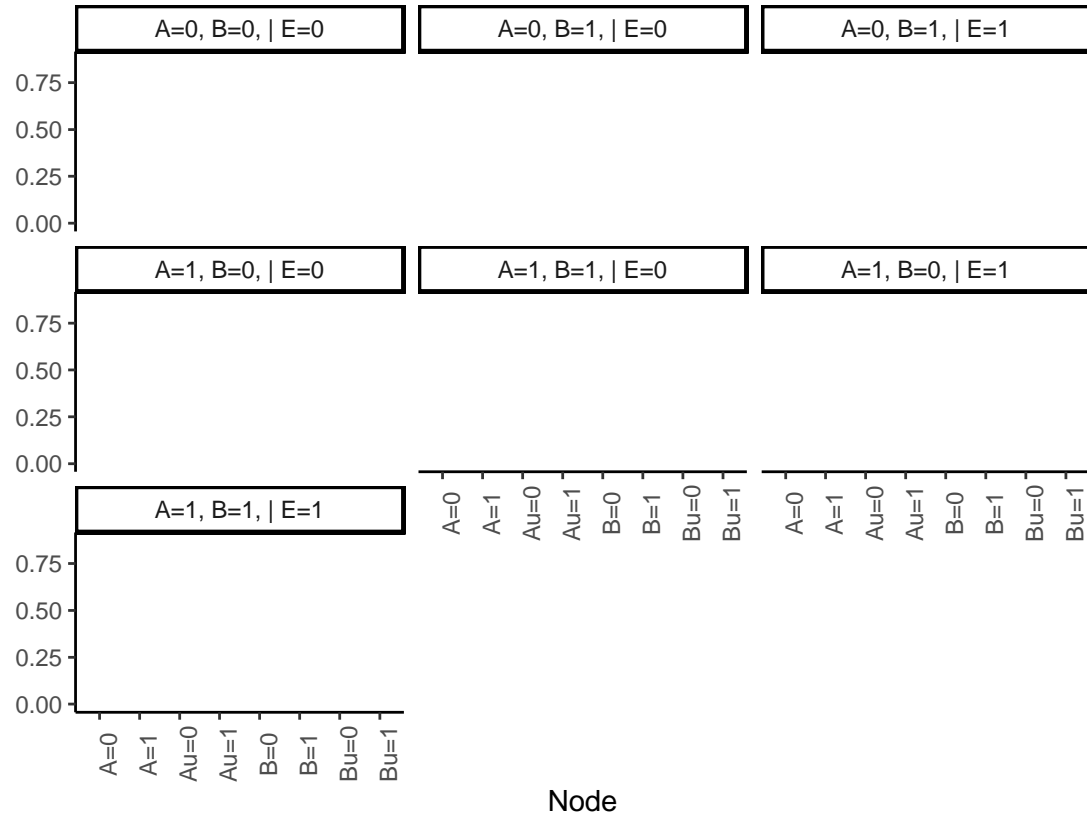
Explanation
selected as
best by y% of
participants

A=0
A=1
Au=0
Au=1
B=0
B=1
Bu=0
Bu=1

2. Probabilities 2, dis and con

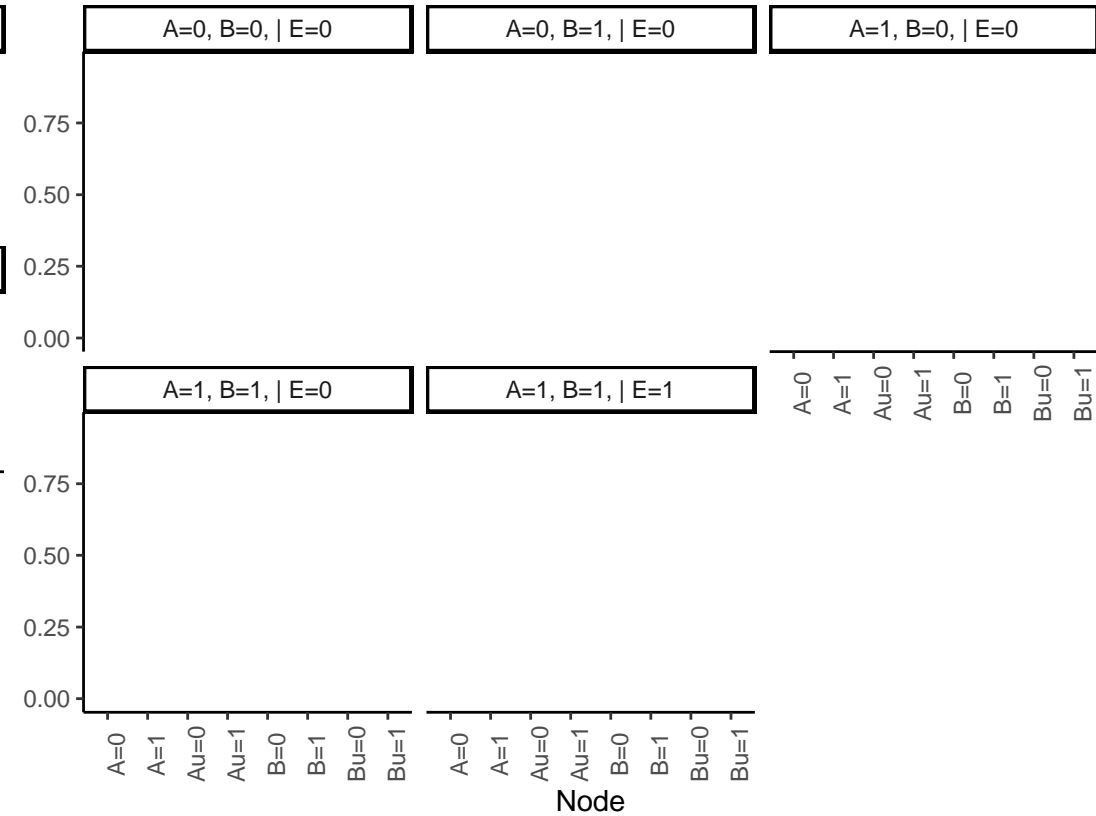
Disjunctive collider: $pA=0.5$, $pAu=0.1$, $pB=0.5$, $pBu=0.8$

Participant choice (bars) against weighted average
CESM model prediction (dots)



Conjunctive collider: $pA=0.5$, $pAu=0.1$, $pB=0.5$, $pBu=0.8$

Participant choice (bars) against weighted average
CESM model prediction (dots)



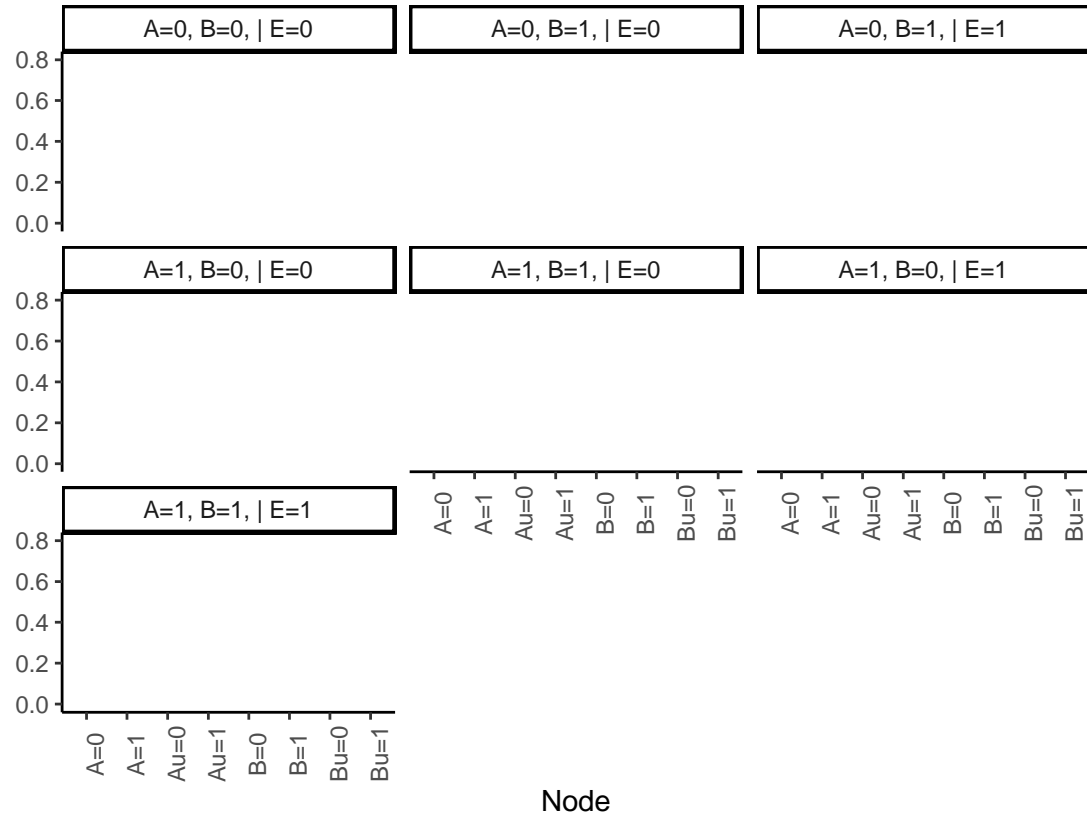
Explanation
selected as
best by y% of
participants

- A=0
- A=1
- Au=0
- Au=1
- B=0
- B=1
- Bu=0
- Bu=1

3. Probabilities 3, dis and con

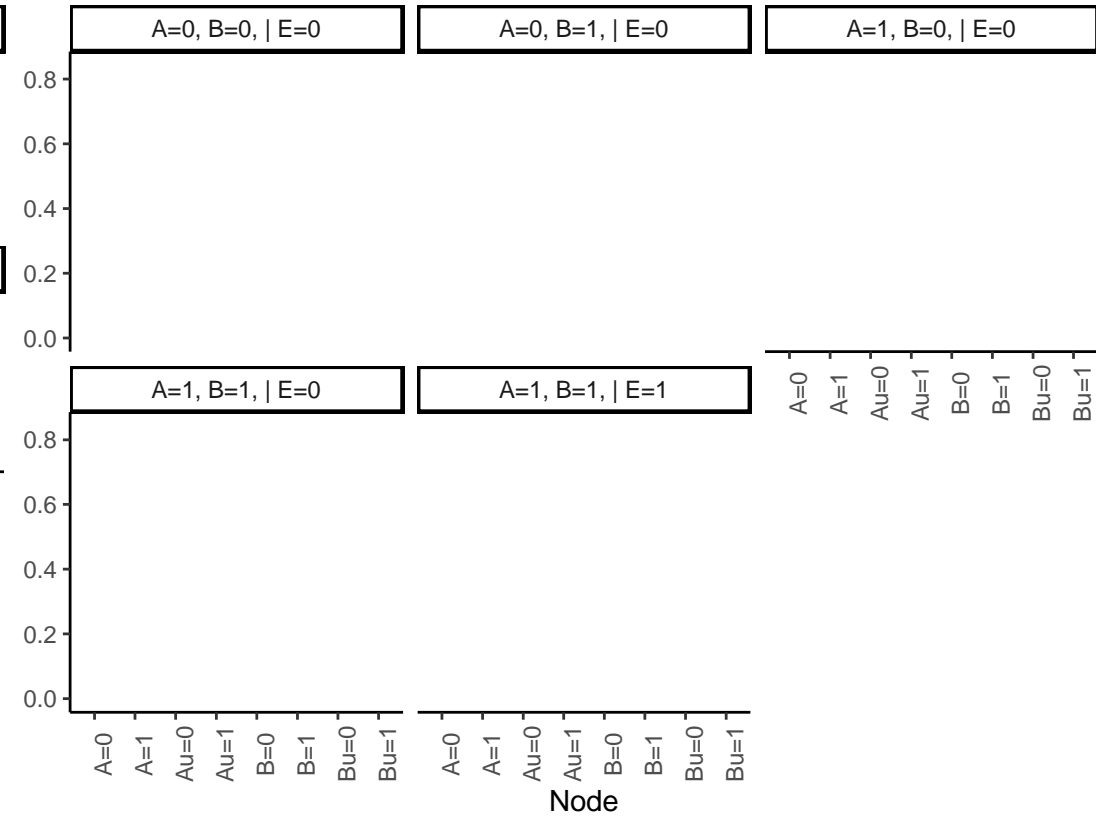
Disjunctive collider: $pA=0.1$, $pAu=0.7$, $pB=0.8$, $pBu=0.5$

Participant choice (bars) against weighted average
CESM model prediction (dots)



Conjunctive collider: $pA=0.1$, $pAu=0.7$, $pB=0.8$, $pBu=0.5$

Participant choice (bars) against weighted average
CESM model prediction (dots)



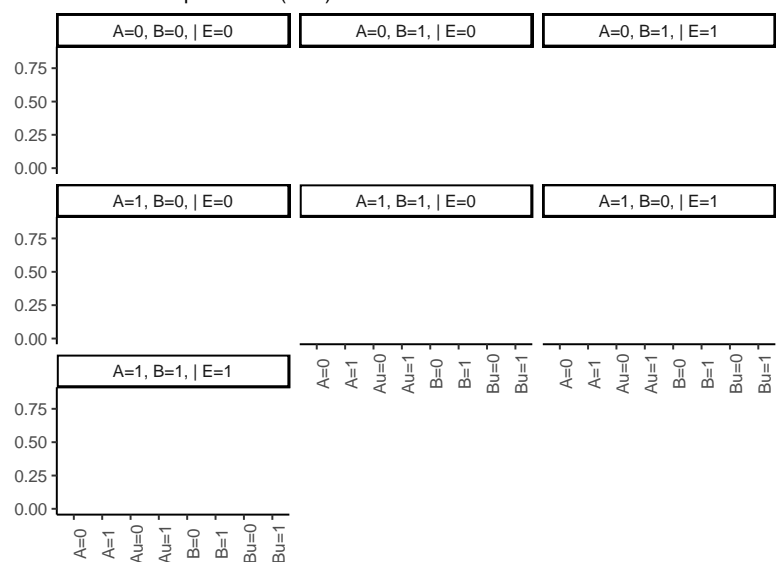
Explanation
selected as
best by y% of
participants

A=0
A=1
Au=0
Au=1
B=0
B=1
Bu=0
Bu=1

Disjunctive case: three different rate settings

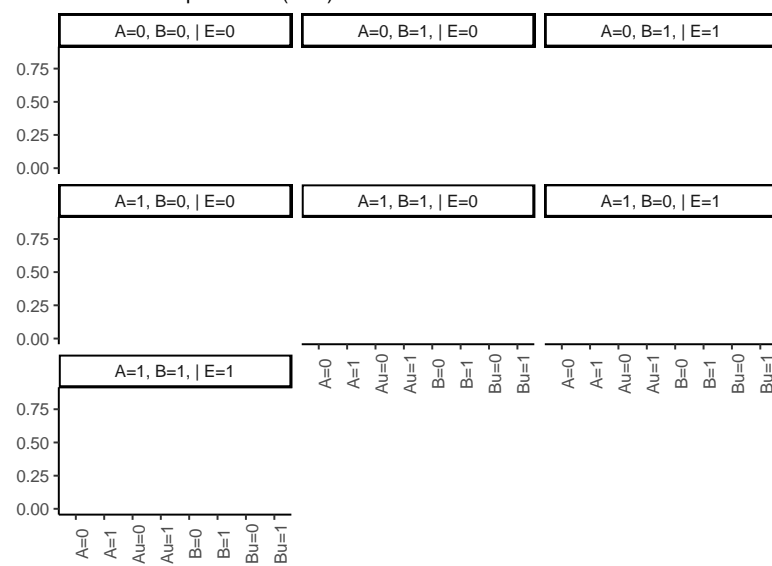
Disjunctive collider: $pA=0.1$, $pAu=0.5$, $pB=0.8$, $pBu=0.5$

Participant choice (bars) against weighted average
CESM model prediction (dots)



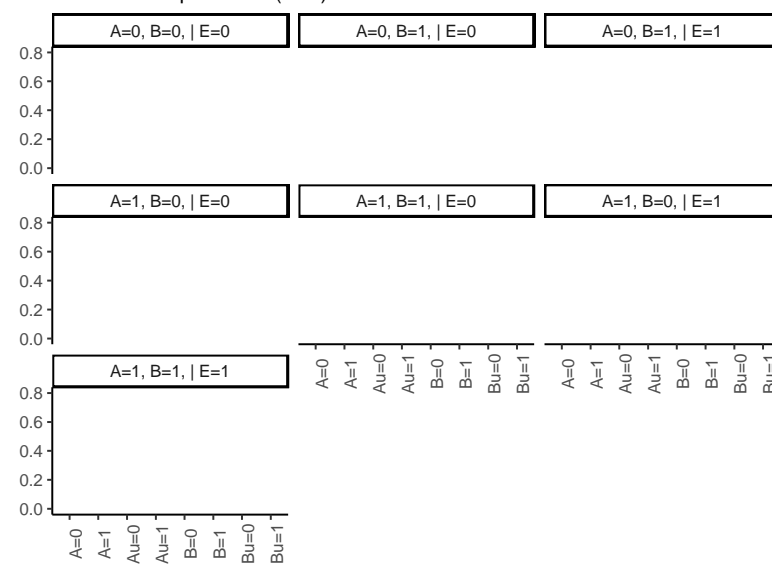
Disjunctive collider: $pA=0.5$, $pAu=0.1$, $pB=0.5$, $pBu=0.8$

Participant choice (bars) against weighted average
CESM model prediction (dots)



Disjunctive collider: $pA=0.1$, $pAu=0.7$, $pB=0.8$, $pBu=0.5$

Participant choice (bars) against weighted average
CESM model prediction (dots)



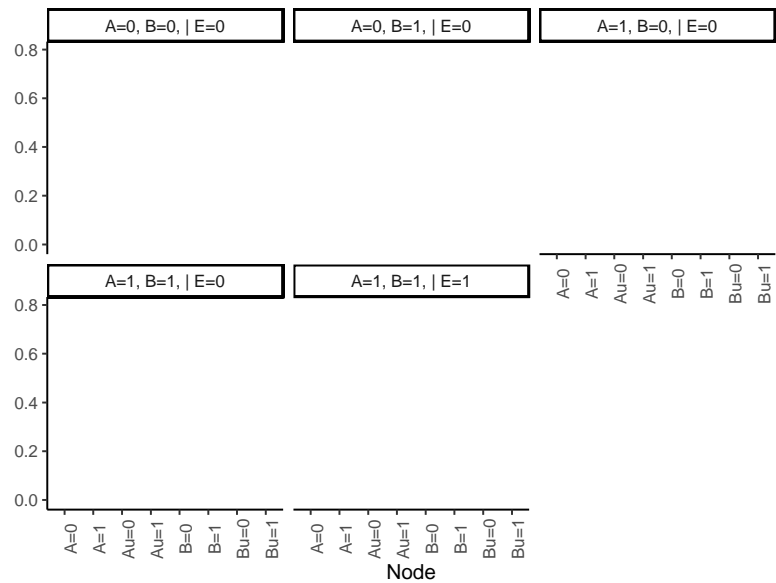
Explanation
selected as
best by y% of
participants

A=0
A=1
Au=0
Au=1
B=0
B=1
Bu=0
Bu=1

Conjunctive case: three different rate settings

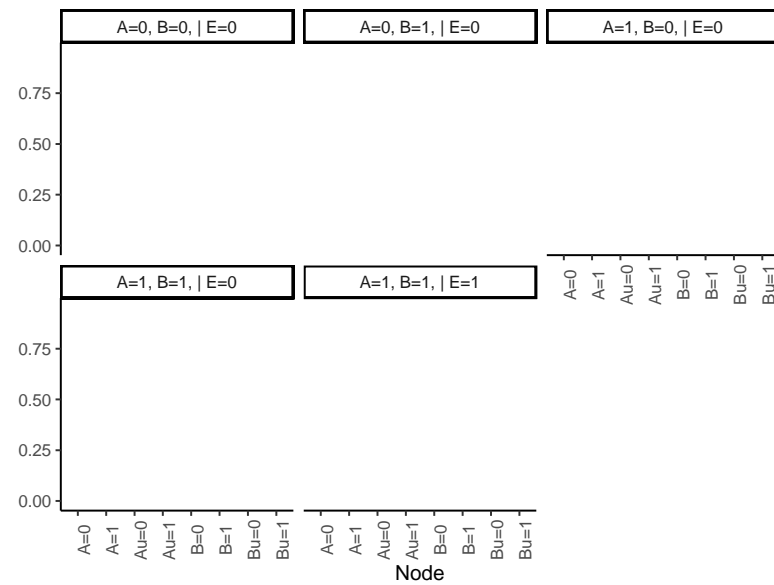
Conjunctive collider: $pA=0.1$, $pAu=0.5$, $pB=0.8$, $pBu=0.5$

Participant choice (bars) against weighted average
CESM model prediction (dots)



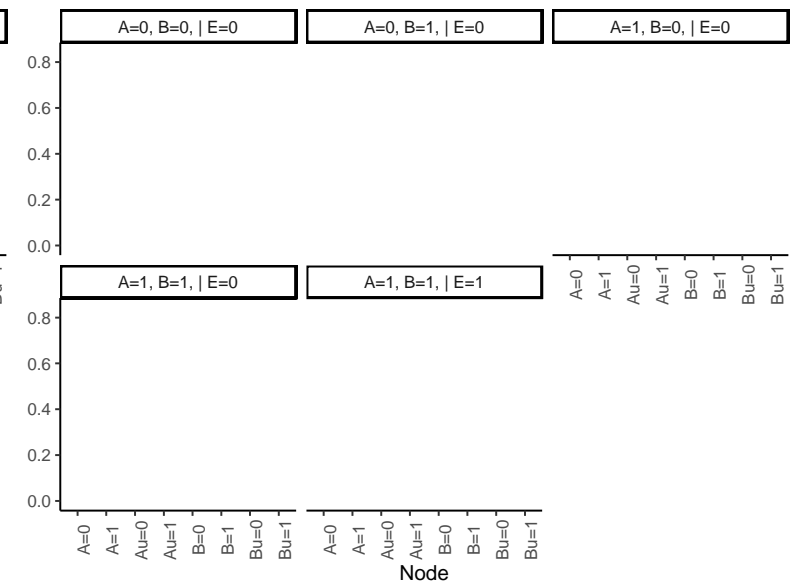
Conjunctive collider: $pA=0.5$, $pAu=0.1$, $pB=0.5$, $pBu=0.8$

Participant choice (bars) against weighted average
CESM model prediction (dots)



Conjunctive collider: $pA=0.1$, $pAu=0.7$, $pB=0.8$, $pBu=0.5$

Participant choice (bars) against weighted average
CESM model prediction (dots)



Explanation
selected as
best by y% of
participants

A=0
A=1
Au=0
Au=1
B=0
B=1
Bu=0
Bu=1