

Philosophy 12: Introduction to Causal Reasoning

Study questions for Lecture 4: “Causal Graphs”

For questions 1 through 4, use the response structure for the malaria example found in the course notes.

1. Which of the following pairs of causal assignments do we need to compare to see whether INOCULATED is a direct cause of MALARIA? (Note: not all of the pairs we need to check are on this list.)
 - (a) Assignments 1 and 3
 - (b) Assignments 2 and 6
 - (c) Assignments 4 and 7
 - (d) Assignments 9 and 13
2. Should there be a directed edge from INOCULATED to MALARIA?
 - (a) Yes
 - (b) No
3. Which pairs of causal assignments should we compare to determine whether DRINKER is a direct cause of MALARIA?
 - (a) Assignments 1 and 2
 - (b) Assignments 15 and 16
 - (c) Assignments 5 and 7
 - (d) Assignments 11 and 12
4. Should there be a directed edge from DRINKER to MALARIA?
 - (a) Yes
 - (b) No
5. Causal graphs represent:
 - (a) Event causation claims.
 - (b) Variable causation claims.
 - (c) Neither
6. If there is a directed edge in a causal graph from X to Y , then that means (choose the best possible answer):
 - (a) X is a cause of Y .
 - (b) X is a cause of Y relative to the other variables in the graph.
 - (c) X is a direct cause of Y .
 - (d) X is a direct cause of Y relative to the other variables in the graph.

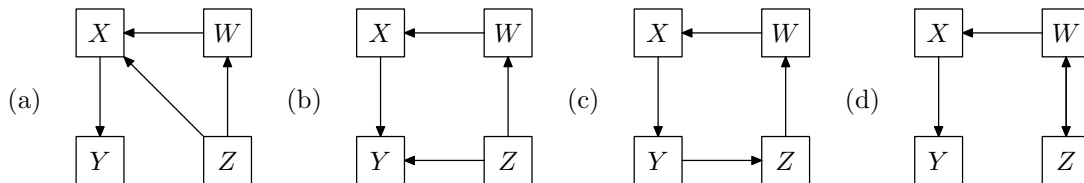
7. Consider the following causal system:

Causal Assignment	GENDER	EXPERIENCE	HIRED
1	Female	Yes	20%
2	Female	No	10%
3	Male	Yes	20%
4	Male	No	10%

If we drew a causal graph for the system: {GENDER, EXPERIENCE, HIRED} and used the response structure above, which variables should have a directed edge into HIRED?

- (a) GENDER
- (b) EXPERIENCE
- (c) Neither GENDER nor EXPERIENCE

8. In which of the following causal graphs is there an indirect cycle but no direct cycle?



9. Which of the following does a causal graph contain? (Choose all that apply.)

- (a) Causal assignments
- (b) Response structures
- (c) Variables
- (d) Directed edges

10. Consider the three variables HAS A CHIPPED TOOTH, PAIN, and TAKES ASPRIN. Using common sense, check all that apply:

- (a) There is a directed edge from TAKES ASPRIN to PAIN because taking aspirin reduces pain.
- (b) There is no directed edge from TAKES ASPRIN to PAIN because taking aspirin reduces pain.
- (c) There is a directed edge from PAIN to TAKES ASPRIN because being in pain causes you to take aspirin.
- (d) None of the above

11. Which of the following must be true if there is an edge from variable X to variable Y ?

- (a) X is part of a jointly sufficient set for Y .
- (b) Bringing about some value of X is individually sufficient for Y .
- (c) There is a test pair for X such that Y varies across the pair.
- (d) None of the above

12. In which of the following situations should we add an edge from variable X to Y in a causal graph for a system including X and Y ?

- (a) Bring about some value of X only changes Y by changing the value of another variable.
- (b) Bringing about some value of X is sufficient for bringing about some value of Y , no matter what values are assigned to the other variables in the system.
- (c) Z is a common cause of X and Y , and W is a common effect of X and Y .
- (d) Changing the value of X , while holding the other variables constant, changes the probability of Y .
- (e) None of the above

13. Suppose that we are considering a causal system that involves the variables X , Y , Z , and W . Which variables must we consider when deciding whether X is a direct cause of Y ?

- (a) X and Y
- (b) X , Y , and Z
- (c) W and Z
- (d) X , Y , Z , and W
- (e) None of the above

14. In which of the following causal graphs is Z an indirect, but not a direct, cause of Y ?

