

Philosophy 12: Introduction to Causal Reasoning

Study questions for Lecture 5: “Interventions”

1. Which of the following are actions under your direct control?
 - (a) Turning off the computer at which you are working.
 - (b) Removing corruption from politics.
 - (c) Not getting a cold.
 - (d) Taking 200% of your daily allowance of Vitamin C.
 - (e) All of the above.
 - (f) None of the above.
2. Which of the following are possible (if hypothetical) interventions, as opposed to actions that are too vague to discuss sensibly? Check all that apply.
 - (a) Making all residents of New Jersey move to Nevada.
 - (b) Treating men and women the same.
 - (c) Putting a full-time police officer in charge of every apartment in New York City.
 - (d) Eliminating racism.
3. Consider a causal graph involving the variables X , Y , and Z , with $X \rightarrow Y \rightarrow Z$. Which of the following hold?
 - (a) An ideal intervention on X is a structure-preserving interaction.
 - (b) An ideal intervention on Z is a structure-preserving intervention.
 - (c) An ideal intervention on Y is a structure-altering intervention.
4. Suppose that you are interested in discovering the causal relations among the system $\{X, Y, Z\}$. Which of the following apply?
 - (a) What you can discover depends on which variables you can ideally intervene upon.
 - (b) If you can ideally intervene on X , then you can discover whether X is a cause of Y .
 - (c) If you can ideally intervene only on X , then you can discover whether Y is a cause of X .
5. Which of the following are interventions that are completely effective at determining whether your car is running properly tomorrow?
 - (a) Hire a competent mechanic to spend a day fixing anything wrong with your car.
 - (b) Hire a competent mechanic to spend a day breaking your car.
 - (c) Remove the battery from your car.
 - (d) Buy a new car.
6. Consider a system involving three wireless intercoms that run on normal household power (not batteries): DOWNSTAIRS INTERCOM [Working, Not Working]; SECOND FLOOR INTERCOM [Working, Not working]; ATTIC INTERCOM [Working, Not Working]. Which of the interventions targetting the second floor intercom that are not ideal:
 - (a) Snipping the power cord to the second floor intercom.
 - (b) Turning off the power to the house.
 - (c) Removing the microphone to the second floor intercom.
 - (d) None of the above.

7. Assume that $X \rightarrow Y \rightarrow Z \rightarrow W$ is a causal graph that describes the relations among X , Y , Z , and W . An ideal intervention on Z (several of the following choices may be correct):
- Changes the relationship between Y and Z .
 - Changes the relationship between X and Z .
 - Changes the relationship between Z and W .
 - Changes the relationship between X and W .
8. Suppose that smoking causes nicotine stains and lung cancer, and that no other causal relations obtain between smoking, nicotine stains, and lung cancer. An ideal intervention on nicotine stains does which of the following:
- Changes the relationship between smoking and nicotine stains.
 - Changes the relationship between smoking and lung cancer.
 - Determines the value of nicotine stains.
 - Changes the value of smoking.
 - All of the above.
9. Consider the causal graph $Z_1 \rightarrow X$, $Z_2 \rightarrow X$, and $X \rightarrow Y$. Which of the following variables are exogenous?
- Z_1
 - Z_2
 - X
 - Y
 - None of the above
10. Consider the causal graph $Z_1 \rightarrow Z_2$, $Z_2 \rightarrow X$, $X \rightarrow Y$, and $Y \rightarrow Z_1$. Which variables are endogenous?
- Z_1
 - Z_2
 - X
 - Y
 - None of the above
11. Consider the graph $Z_1 \rightarrow X$, $X \rightarrow Z_2$, $X \rightarrow Y$, and $Z_1 \rightarrow Y$. Suppose we ideally intervene to change the value of X . Which of the following is the post-manipulation graph?
- $Z_1 \rightarrow X$, $X \rightarrow Z_2$, $Z_1 \rightarrow Y$
 - $X \rightarrow Y$, $Z_1 \rightarrow Y$
 - $X \rightarrow Y$, $Z_1 \rightarrow Y$, $X \rightarrow Z_2$
 - $Z_1 \rightarrow X$, $X \rightarrow Z_2$, $X \rightarrow Y$, $Z_1 \rightarrow Y$
 - None of the above
12. Consider the graph $X \rightarrow Y$, $Y \rightarrow X$. Suppose that we ideally intervene to change the value of X . Which of the following is the post-manipulation graph?
- $X \rightarrow Y$
 - $X \rightarrow Y$, $Y \rightarrow X$
 - The null graph over X and Y ; i.e., the one with no arrows connecting them.
 - $Y \rightarrow X$
 - None of the above