Supplementary exercise 2.67 of IPS7e

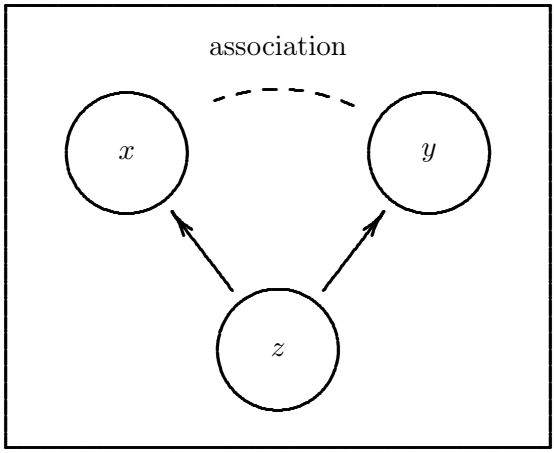
A negative association is said to exist between the number flu cases and the amount of ice cream sold across the weeks of a year (no data are provided).

It would be a simple example of an association derived from common response situation. This means that a third variable, here the season or weather corresponding to the weeks, affects both the variables of interest (number of flu cases and ice cream sales). The season/weather is clearly a confounding variable, and we would think that there is no real relation between the number of flu cases and the ice cream sales.

If we let,

$$\begin{aligned} y &= \text{ice cream sales,} \\ x &= \text{flu cases,} \\ z &= \text{season/weather,} \end{aligned}$$

we could draw a causal diagram of the type used in the PSLS and IPS textbooks as follows:



The lack of an arrow from x to y represents our thinking that there is no causal relation between the two variables.

Added note: There is almost no end to examples of this type. Here is another example (from the IPS textbook) — a positive association between the number of firefighters at a fire and the damage the fire does. Explain why we should not conclude from this information that sending more firefighters to a fire causes more damage.