

## Observational Studies

### What are observational studies?

Observational studies are those in which investigators don't intervene but only measure. In other words, these are studies of things in the wild.



### Why are observational studies important?

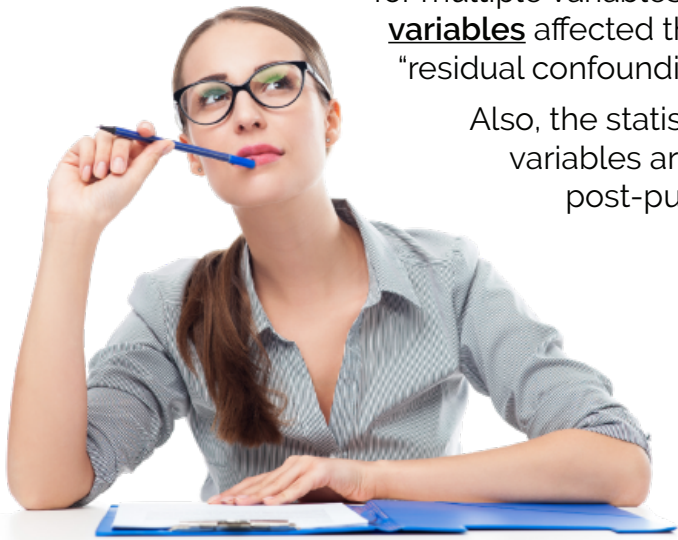
They can illuminate paths for future research, rule out theories, and estimate effects if the evidence is overwhelming. Also, observational studies may be the best available evidence in cases where randomized controlled trials are impossible or unethical to conduct.

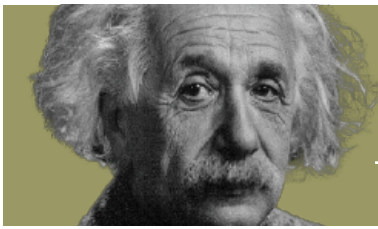
### What is the core weakness of observational studies?

They can seldom measure what people really want to know: causes and effects. That's because observing variables in uncontrolled settings can only reveal associations, and **association  $\neq$  causation**.

Even though researchers often try to get around this fact by using regressions to control for multiple variables, there's usually a great risk that **unmeasured variables** affected the outcome. This is called "omitted variable bias," "residual confounding," or the "Phantom Menace."

Also, the statistical methods used to control for multiple variables are highly subjective, and peer review and post-publication critiques "rarely" fix these problems.





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### How can you use observational studies in your research?

1. Never forget that observational studies can rarely determine causes or effects, despite what many politicians, journalists, and scholars will tell you. This applies regardless of how many observational studies come to the same conclusion.
2. Don't be fooled into thinking that observational studies with lots of control variables must be accurate. Even if a study controls for a hundred variables, there are others it likely missed.
3. Be on the lookout for **included variable bias**, or when the authors of observational studies control for variables in ways that conceal what their studies purport to measure.
- 4) Be aware that an observational study is hopelessly confounded when an association seemingly appears before an intervention has time to take effect.
5. Know that there's a good possibility an observational study has identified a cause if it finds a dose-dependent relationship. But even so, be aware that observational studies still can't accurately quantify the effects of that cause in most cases.
6. Watch out for reverse causation. Observational studies can't prove whether crime causes poverty, poverty causes crime, or other factors cause them both.



7. Don't take any of this to absurd extremes. Observations are fine for determining that jumping out of a plane without a parachute isn't great for your health. However, this kind of certainty is a rare exception, not the rule.



**REMEMBER:** Put observational studies in their proper place. Use them, don't abuse them.