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Causal inference is not statistical inference

Many methods for testing causal claims are couched as statistical methods: e.g., randomised controlled trials, various kinds of observational study, meta-analysis, and model-based approaches such as structural equation modelling and graphical causal modelling. I argue that this is a mistake: causal inference is not a purely statistical problem. When we look at causal inference from a general point of view, we see that methods for causal inference fit into the framework of Evidential Pluralism: causal inference is properly understood as requiring mechanistic inference in addition to statistical inference.

Evidential Pluralism also offers a new perspective on the replication crisis. That observed associations are not replicated by subsequent studies is a part of normal science. A problem only arises when those associations are taken to establish causal claims: a science whose established causal claims are constantly overturned is indeed in crisis. However, if we understand causal inference as involving mechanistic inference alongside statistical inference, as Evidential Pluralism suggests, we avoid fallacious inferences from association to causation. Thus, Evidential Pluralism offers the means to prevent the drama of science from turning into a crisis.