Is overdetermination a possible experiment?

Abstract

Overdetermination scenarios (Lewis [1986]) present well known problems to various analyses of causation, showing that, in some cases (e.g. counterfactual theories), the definitions do not present necessary conditions for causation, and, in others, they might not even present sufficient conditions (e.g. regularity accounts) to clarify the notion of cause. Some of the solutions to overdetermination problems involve fine-graining of events, structural fine-graining and even fine-graining of the theory (Spohn [2012], p. 364). Although the three sorts of fine-graining seem to be independent from each other, it can be suggested that modifications of one sort may involve changes of the other.

It will be assumed that any solution belongs to at least one of such categories. *My aim is to show how solutions to the overdetermination problem either imply a direct experimental adjustment to the scenario or restrict experimental design through conceptual change.* It will be discussed whether such strategies ignore the real challenge presented by overdetermination. Overdetermination cases taken from the natural and social sciences may help to understand the issue (e.g. Aizawa & Gillette [2009]; Crotty [2009]; Ortix, Rijnbeek & van den Brink [2011])

I Overdetermination problems as a cluster

I will think of overdetermination as a cluster of problems, instead of making the correspondent distinctions between each scenario, in order to grasp general aspects and the relevant similarities between the different cases, like symmetric overdetermination, early preemption, late preemption or preemption by trumping. This cluster can be described as a group of experimental settings associated with causal hypotheses, one example of which is the following:

Overdetermination experimental setting:
Hypothesis 1: A causes Y and B causes Y.
Hypothesis 2: Some theory of causation (e.g. a naive counterfactual analysis of causation).
Setting: Set A and B, such that both cause Y.
Problem: Some definition in hypothesis 2 fails (e.g. Y neither depends on A nor on B).
Revision: Either hypothesis 1 or hypothesis 2 must be revised.

Classical solutions to overdetermination involve, among others, isolating intrinsic

replicates of the causal process from the overdetermined process; including mediating variables to show the disconnectedness between preempted events and the effect; increasing the number of values for some variables; and modifying basic causal concepts. From a causal model approach, every solution, except for conceptual modifications, involves a change in the specific causal model considered originaly.

II Solutions and setup modification

Solutions to overdetermination through model interventions are straightforward in symmetric overdetermination scenarios as well as in asymmetric ones (Halpern & Pearl 2005). These can be considered as structural fine or coarse graining.

For instance, isolating one of the causal processes by eliminating one of the overdetermining causes implies changing the set of variables in the causal structure, i.e. structural fine-graining. And when A and B overdetermine Y, fine-graining of events can be applied by increasing the possible values of the effect variable (Y) and changing the set of equations, such that, for example, Y=2 when A=1 and B=1, but Y=1 when either A=1 or B=1. In such a case, one assumes that neither of the overdetermining events is alone a sufficient cause of the effect in question (Y=2) and that overdetermined effects are different from the effects of the involved causes taken separately. Overdetermination reduces to joint causation.

III Solutions as experimental corrections

If all solutions to overdetermination involve changes in a model and if causal models are sometimes analogous to factual experiments, it can be suggested that overdetermination cases are ill-designed experiments. Questions about overdetermination turn out to be unanswerable. This is why typical solutions to overdetermination negate the overdetermining factors, arguing for a modification of the experimental setup.

Although they clarify the ambiguities, these strategies change the scenario itself at the risk of ignoring the problem they are supposed to tackle. It can be replied that at least theoretical fine-graining solves overdetermination without changing the experimental setting and considering a broader variety of types of causation. But, by putting new causal notions into work, either the structure or the events might also get fine-grained. It will be suggested that expanding the group of causal concepts and thus considering the causes involved in overdetermination cases as, for example, joint causes, can impliy fine-graining of the effect.

Apparently, every clarification of overdetermination requires a change in the experimental setting of the scenario, even if the strategy consists in avoiding structural alterations by conceptual fine-graining. If this is true and if typical solutions to the problem are considered satisfactory, the only verdict left for overdertermination is that it is an ambiguous, badly designed experiment. In other words, it is an impossible experimental

setting. This result might be confronted with criticism (especially if actual experimental series are considered), which must be discussed according to the alternative approaches and particular scenarios.

References

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