

# Workshop on Interventionism and Non-Causal Dependence

UFR de philosophie, Université Paris 1 Panthéon-Sorbonne  
IHPST, salle de conférence  
13 rue du Four  
75006 Paris  
France

## Thursday, March 12

**8:50** – Welcome and introduction

**9:00** – **Michael Baumgartner (University of Bergen)**, *“The Prospect of Avoiding Interventionist Exclusion by Variable Set Pruning”*

**10:00** – **Alexander Gebharter & Zhitao Zhang (Marche Polytechnic University)**, *“Causal Models and Interventions for Multi-Level Systems”*

**11:00** – Short break

**11:15** – **Lorenzo Casini (University of Bologna)**, *“Realization Independence and the Epiphenomenalist Revenge”*

**12:15** – Lunch at CROUS Mabillon

**14:30** – **James Woodward (University of Pittsburgh, Emeritus)**, *“Interventionism and Non-Causal Dependency Relations”*

**15:30** – **Max Kistler (Université Paris 1 Panthéon-Sorbonne)**, *“Integrating Constitution into Causal Models”*

**16:30** – Short break

**16:45** – **Thomas Kroedel (University of Hamburg) & Thomas Blanchard (Université Bordeaux Montaigne)**, *“Causal Complications for Explainable AI”*

**17:45** – **Bram Vaassen (Umeå University)**, *“No, but Really, What Is So Bad About Overdetermination?”*

**18:45** – End of day

**19:30** – Conference dinner at La Boussole, 12 rue Guisarde, 75006 Paris

## Friday, March 13

**9:00** – **Stephan Leuenberger (University of Glasgow)**, *“Exclusion and the Variety of Apt Models”*

**10:00** – **Vera Hoffmann-Kolss (University of Bern)**, *“Causal Indeterminacy: Interventionism Meets Supervaluationism”*

**11:00** – Short break

**11:15** – **Toby Friend (SUNY Buffalo)**, *“Just Cause: The Only Criterion for Intervention?”*

**12:15** – Lunch at CROUS Mabillon

**14:30** – **Jennifer McDonald (Columbia University)**, *“Causal Distinctness for Extrinsic Relata”*

**15:30** – **Samuel Lee (University of Hamburg)**, *“Multi-Level Causation: Threading the Needle”*

**16:30** – Short break

**16:45** – **Kenneth Aizawa (Rutgers University, Newark)**, *“Compositional Abduction and Non-Causal Dependence”*

**17:45 – Brian Ortmann (University of Hamburg), “Spurious Versus Genuine High-Level Causes: Can Interventionism Capture High-Level Causes?”**

**18:45 – End of workshop**

## ABSTRACTS

**Kenneth Aizawa** (Rutgers University, Newark)

*“Compositional Abduction and Non-Causal Dependence”*

How do scientists confirm or disconfirm hypotheses regarding non-causal dependence? In the first part of the talk, I sketch a theory of compositional abduction that I think characterizes what is going on in four historical cases. In the second part, I indicate how my theory of compositional abduction differs from some familiar versions of inference to the best explanation.

**Michael Baumgartner** (University of Bergen)

*“The Prospect of Avoiding Interventionist Exclusion by Variable Set Pruning”*

Ever since the debate on interventionist causal exclusion began, a frequently adopted strategy to reconcile non-reductive physicalism with interventionism has been to impose constraints on modeled variable sets, to the effect that the interventionist machinery must only be applied to variable sets that are free of supervenience relations. The idea is that exclusion arguments rely on variable sets that must be suitably pruned prior to interventionist modeling. Once all supervenience relations are eliminated, exclusion worries dissolve—or so it is claimed by, e.g., Eronen (2012, 2014), Polger et al. (2018), Stern & Eva (2023), and Weslake (2024).

In this talk, I critically assess this pruning strategy. Pruning a modeled variable set  $V$  only stops a classical interventionist exclusion argument if accompanied by a notion of intervention that is relativized to  $V$ . Relativizing the notion of intervention to  $V$ , in turn, requires that certain aptness conditions are imposed on  $V$ , in particular, that  $V$  satisfies Causal Sufficiency. I show that satisfying Causal Sufficiency in pruned variable sets is far more demanding than is currently recognized in the literature. Moreover, I argue that, in a pruned variable set that truly satisfies Causal Sufficiency, it is not possible to intervene on a macro-level variable in such a way that downstream variables change while all off-path variables are held fixed. I conclude that the prospects of avoiding interventionist exclusion through variable set pruning are very dim.

**Lorenzo Casini** (University of Bologna) (joint work with Alexander Gebharter)

*“Realization Independence and the Epiphenomenalist Revenge”*

For two decades, James Woodward has defended mental causation against epiphenomenalism using interventionism. Recently, he introduced a “realization independence” condition to address an underdetermination charge raised by Michael Baumgartner. If successful, this proposal would promise a resolution of a longstanding metaphysical debate via ideal experimental evidence. We argue that the proposal faces a dilemma: either it contradicts core interventionist commitments and yields absurd consequences, or it fails to escape the underdetermination charge. The most plausible resolution is what we call the epiphenomenalist revenge: abandoning mental causation. More generally, our argument challenges the claim that the mental causation problem can be resolved on purely evidence-based grounds.

**Toby Friend** (SUNY Buffalo)

*“Just Cause: The Only Criterion for Intervention?”*

This presentation defends an interventionist theory of causation employing streamlined criteria for intervention. A previously defended Modified Interventionist Theory (MIT) requires only that an

intervention (i) be a cause of its target with respect to some candidate effect, and (ii) not directly cause the effect. After rehearsing the case for MIT, I propose further streamlining by removing the second criterion. I present examples showing that interventions can be probative even if they causally influence the candidate effect. Finally, I argue that this additional simplification allows interventionism to probe possible causal relations between constitutively related variables.

**Alexander Gebharter & Zhitao Zhang** (Marche Polytechnic University)

*“Causal Models and Interventions for Multi-Level Systems”*

How to adequately model causation in systems spanning more than one level, and how interventions into such systems operate, are lively debated topics in both metaphysics and the philosophy of science. Despite this lively debate, no systematic account for computing post-observation and post-intervention probabilities in multi-level systems currently exists. We close this gap by developing such an account that acknowledges the most important intuitions about multi-level systems while remaining neutral with respect to broader metaphysical controversies.

**Vera Hoffmann-Kolss** (University of Bern)

*“Causal Indeterminacy: Interventionism Meets Supervaluationism”*

Cases in which many agents contribute to an outcome, such as individuals contributing to climate change, pose puzzles for theories of causation. One problem is that such cases may lead to indeterminacy in causation, since it is sometimes indeterminate whether individual actions can make a difference to an effect. This result is consistent with earlier arguments that causal claims are sometimes indeterminate. In this paper, I show how one can capture cases of causal indeterminacy by combining Woodward’s interventionist approach with the conceptual tools of supervaluationism.

**Max Kistler** (Université Paris 1 Panthéon-Sorbonne)

*“Integrating Constitution into Causal Models”*

According to Craver (2007), constitutive relevance can be discovered by mutual manipulability. However, the requirements on interventions make mutual manipulability of mechanisms and their constituents impossible. Both Baumgartner and Casini’s “no-decoupling” account and Craver, Glennan, and Povich’s analysis of constitutive relevance as “causal betweenness” take into account the fact that constitution, a non-causal dependence relation, cannot be analyzed as difference-making of the same sort as causation. However, none provides a complete analysis of the scientific construction of models of mechanisms with constituents at different layers.

It is possible to construct models of multi-level mechanisms representing constitution although the relevant experiments directly provide only information on causal relations, because causal information can bear on variables at different levels. Multi-level models can be built in two steps: (1) partial purely causal models are built for each hypothetical constituent variable on the basis of top-down and bottom-up experiments; (2) these partial models are merged into a comprehensive model containing both causal and constitution relations based on level information and spatio-temporal constraints.

**Thomas Kroedel (University of Hamburg) & Thomas Blanchard (Université Bordeaux Montaigne)** (joint work with Michaela Regner)

*“Causal Complications for Explainable AI”*

How can we explain the behaviour of AI agents such as large language models? A prominent approach appeals to the interventionist theory of causation. On this view, explaining a system’s behaviour amounts to identifying its internal representations and establishing their causal roles by examining how (actual or hypothetical) interventions on them would affect the system’s outputs. However, the nature of these representations gives rise to significant challenges for this strategy. As a result, standard interventionist tests can yield misleading verdicts about the causal roles of these states. We examine two potential fixes, reject one of them, and suggest that the other may provide a promising solution.

**Samuel Lee** (University of Hamburg)

*“Multi-Level Causation: Threading the Needle”*

Interventionist accounts of multi-level causation face a dilemma. Standard principles for controlling confounding create a tension between causes at different levels: strict adherence compels us to exclude causes at one level to preserve those at another (Baumgartner 2009), while relaxing these controls invites spurious, parasitic causal relations. To resolve this, I propose a conservative amendment to Woodward’s (2003) theory. The core innovation is a revised definition of intervention that distinguishes between transmissive and nontransmissive paths. I argue that variables linked by noncausal, vertical determination act as confounders only when they lie on transmissive paths.

This framework successfully threads the needle: it validates genuine multi-level causal relations (avoiding undergeneration) without validating spurious correlations (avoiding overgeneration). Finally, I apply this approach to Kim’s (1998) causal exclusion problem. I argue that a lower-level variable and the higher-level variable it underlies do not overdetermine their common effect. Instead, because the only transmissive path from the lower level to the effect runs through the higher level, the relationship is akin to the multiple causation found in a causal chain.

**Stephan Leuenberger** (University of Glasgow)

*“Exclusion and the Variety of Apt Models”*

To ensure that our theory does not count a variable as its own cause, or the cause of some conceptually related variable, it is tempting to impose the constraint on an appropriate or apt causal model that all its variables be metaphysically independent. However, this thought leads to the familiar problem that metaphysically related causes exclude each other. A promising approach is to allow that metaphysically dependent variables may both be causes even though no single apt model represents them as such. The talk explores and evaluates different logics of causation that arise from this proposal.

**Jennifer McDonald** (Columbia University)

*“Causal Distinctness for Extrinsic Relata”*

The relata of causal dependence, qua causal relata, are independent of each other aka. ‘distinct’. This feature plays a key role in differentiating causal from metaphysical dependence – dependence underwritten by mereology, functional realization, determinable/determinate hierarchies, etc. But what exactly constitutes causal distinctness? A mere negative stipulation, that causal distinctness is satisfied just in case relata don’t stand in any metaphysical dependence relation, is just a placeholder. Yet, as I argue, all extant accounts of distinctness fail in the face of certain extrinsic properties – such as being married, being an invasive species, or being one meter long.

In response, I propose a friendly amendment to extant theories that renders them adequate to extrinsic properties. I argue that distinctness involves consideration of preconditions – an ontic analogue of presuppositions. An event,  $e$ , is a precondition of  $f$  just in case  $e$  occurs in every world where  $f$  occurs or  $\sim f$  occurs. Then, on an amended, preconditional account,  $e$  must continue to be distinct from  $f$  even when holding fixed each of  $f$ ’s preconditions. Along the way, I take a stand on what it means to ‘negate’ an event, drawing lessons from how causal models represent.

**Brian Ortman** (University of Hamburg)

*“Spurious Versus Genuine High-Level Causes: Can Interventionism Capture High-Level Causes?”*

This paper evaluates whether interventionism can adequately capture high-level causation. After presenting Woodward’s (2003) theory and Baumgartner’s interventionist exclusion argument, I argue that standard interventionism faces serious difficulties with high-level causes. Woodward’s (2015) revision solves only some problems and misclassifies spurious causes as genuine. Zhong’s (2020) account classifies them correctly but entails the inertness of realisers of efficacious high-level variables. Woodward’s (2022) synthesis improves matters but still yields counterintuitive results and reintroduces

Kim's exclusion problem. I conclude that interventionism cannot accurately capture high-level causes, either extensionally or intensionally.

**Bram Vaassen** (Umeå University)

*"No, but Really, What Is So Bad About Overdetermination?"*

Non-reductionist positions are often thought to entail widespread overdetermination. Some respond that if the relevant causes stand in tight non-causal dependence relations, such as "benign" overdetermination need not be metaphysically costly. Thus, composite objects and mental, aesthetic, or moral properties might count as causes without problematic overdetermination. However, Zhong has revised interventionist accounts to avoid systematic overdetermination. I argue that properly understood difference-making accounts of causation undermine motivations for rejecting systematic benign overdetermination. What remains is at most a verbal dispute about which correlations to label "causal."

**James Woodward** (University of Pittsburgh, Emeritus)

*"Interventionism and Non-Causal Dependency Relations"*

This talk assumes that there are non-causal explanations (and associated non-causal dependency relations) in science, as well as causal explanations. It argues that an interventionist framework can help, in some cases, capture the causal/non-causal distinction and, when appropriately extended, provide insight into how certain non-causal explanations work. Two key features of causal claims are that interventions must be possible and that cause and effect variables satisfy a distinctness condition. In some cases, dependency relations exist where we can meaningfully consider how one variable would differ if another were different, yet these conditions are not satisfied. This provides a way to draw the causal/non-causal boundary while retaining the core interventionist insight that explanation involves dependency relations.