

INTERVENTIONIST THEORIES OF CAUSATION AND FREE WILL

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Outline

2

1. Introduction: Interventionism – an option for libertarians?
2. Woodward's Concept of an Intervention
3. A Counterexample
4. Two Arguments against Interventions
5. Conclusion: Get rid of interventions !

1. Introduction: Interventionism – an option for libertarians?

Indeterminism Ltd.

4

- “... we aim to show how a notion of limited indeterminism can help to dispel many worries about the role of an open future for free will. The notion of intervention, which is prominent in research on causality, is almost completely absent from the free will debate; we will fill this lacuna.”

Interventionism

5

- “X causes Y” is true iff
- there is a possible intervention on X such that Y changes.
 - ▣ Example: “an increase in the supply of a commodity is a cause of a decrease of the price” is true iff there is an intervention on the supplied quantity such that the price changes subsequently.
- Interventionist counterfactuals: “if there were an intervention $I = i^*$ on X such that $X = x^*$, then $Y = y^*$ ”
- *Comment*: Interventions are **causes** of the cause X
- *Modal character*: Interventions are required to be **merely logically possible**.

Benefits (for libertarians)

6

- Interventionism is compatible with **indeterminism** and **probabilistic causation** (w.r.t. our free decisions).
- Interventionism does **not require universal laws**, i.e. causal notions can be applied to a domain that is governed by **ceteris paribus laws**.

Possible Interventions?

7

- I will argue that Woodward's notion of an intervention is problematic because of the modal character of possible interventions.
- Hence, libertarians should not rely on Woodwardian interventions.

Two problems for Woodward

8

- **Either** merely logically possible interventions are **dispensable** for the semantic project of providing an account of truth-conditions of causal statements. The interventionist theory collapses into (some sort of) counterfactual theory of causation.

Two problems for Woodward

9

- **Or**, if one maintains that merely logically possible interventions are indispensable, then interventions with this modal character lead to the fatal result that interventionist counterfactuals are **evaluated inadequately**. Consequently, interventionists offer an inadequate theory of causation.

2. Woodward's Concept of an Intervention

Intervention Variables

11

- A variable I is an intervention variable for X (with respect to Y) iff
 1. I is a cause of X
 2. There is at least some value of I such that if I takes this value, then X depends *only* on I and X depends on no other variables, i.e. I is the only cause of X .
 3. I is not a direct cause of Y , and if I is a cause of Y then I is an indirect cause of Y via a causal path leading through X and a – possibly empty – set of intermediate variable Z_1, \dots, Z_n .
 4. I is probabilistically independent of other causes W_1, \dots, W_n of Y , which are not on a causal path leading from X to Y . (cf. Woodward 2003: 98)

Interventions

12

- Any value i_i of an intervention variable I (for X relative to Y) is an *intervention on X* iff
- it is the case that the value of X counterfactually depends on the fact that I has the value i_i (cf. Woodward 2003: 98).

3. A Counterexample

Practical possibility & agency theory

14

- Could the required kind of **possibility** simply refer to the **abilities of human agents to intervene**?
- Woodward objects that agency theories are committed to two problematic metaphysical claim
 - ▣ the capacity of agents to intervene is “a fundamental and irreducible feature of the world and not just a variety of causal interaction among others” (Woodward 2003: 123), and
 - ▣ an agency theory “leads us toward an undesirable kind of anthropomorphism or subjectivism regarding causation” (Woodward 2003: 123).

Premise: Objectivity

15

- **Woodward's premise:** causal facts are entirely objective and mind-independent.
- This can, of course, be denied – as advocates of agency theories do (von Wright, Menzies, Price, Ismael).
- **Reason to opt for one of these theories:** Neo-Russellian worries of locating causation in world as described by acausal fundamental dynamical laws.

Premise: Objectivity

16

- **Slight Worry concerning the dialectic role of agency theories for a libertarian:** these theories of causation **already rely on the existence of a free agent.**
- Hence, they are compatible with but **do not support** libertarian free will **independently.**

Physical possibility??

17

- **So, possible = physically possible? - Woodward: No**
 - “Suppose that [...] [X]s occur only spontaneously in the sense that they themselves have no causes. There are no further factors [I_1, \dots, I_n] that affect whether or not [X] happens, and this is a matter of physical law. (I take this at least to be a logically coherent possibility.) Thus, it is physically impossible to carry out an intervention that changes whether [X] occurs. Nonetheless, it seems quite possible that the [X]s themselves might well have further effects [Y].” (Woodward 2003: 130, my emphasis)
- **general form:** X is a cause of Y but there is no **physically** possible intervention I on X.

No-Deterministic-But-Indeterministic Intervention Case

18

- **Example:** Uranium decays “only spontaneously” in the sense that there is **no deterministic, physically possible way** to manipulate Uranium such that it *surely* decays at a time t .
- Nonetheless, the decay of Uranium causes a flash on a screen (as a measurement in an experimental setup).
- Yet, one *can* raise the probability for the decay of Uranium (e.g. by increasing the energy of the nucleus of the Uranium atom).
- In other words, there is a **physically possible indeterministic intervention** on Uranium decay.

Neither-Deterministic-Nor-Indeterministic Intervention Case

19

- Tim Maudlin (2002: 149f) presents the Big Bang as a case where there is **neither a deterministic physically possible way to intervene, nor an *indeterministic way to intervene*** (i.e. there is no physically possible *indeterministic cause* of the Big Bang which raises or lowers the probability of the occurrence of the Big Bang).
- Yet, the Big Bang – if anything – has a plentitude of direct and indirect effects.

Uranium > Big Bang

20

- Obviously, the Big Bang case is a **stronger** than the Uranium case,
- because Woodward can admit that interventions **need not be deterministic** as assumed in Uranium case (this is, however, a controversial issue).

Woodward's strategy

21

- **Woodward rejects the counterexample:** interventions need **not even be physically possible**.
- Instead, interventions are possible in the sense that they are **“logically possible”** or not **“ill-defined for conceptual or metaphysical reasons”**.
- But is this strategy really convincing?
- I think it is not because of two arguments

4. Two Arguments against Logically Possible Interventions

Dialectic

23

- **The first argument** aims to establish that interventions are **dispensable** for Woodward's semantic project as long as one allows for them to be merely logically possible. **(a promise only ... sorry)**
- **The second argument** supports the claim that interventions with this modal character lead to the fatal result that interventionist counterfactuals are **evaluated inadequately**.

24

First Argument

Argument 1

25

- the first argument is a **dispensability argument**.
- I use the notion of dispensability in analogy to its use in indispensability arguments in philosophy of mathematics (cf. Putnam 1975, Field 1980):
- a term in a theory (in our case, the notion of an intervention) is **dispensable if this term can be eliminated without compromising the strength of the theory** (that is, the adequacy of an explication of causation).

Argument 1: The Big Bang Theory

26

□ **Maudlin's Scenario:**

□ “God might decide, for example, to employ the following scheme: if He is forgiving the universe will be open, ever-expanding; if He is jealous the universe will be closed (and if He is malicious we won't be able to tell whether the universe is open or closed).” (Maudlin 2002: 150)

□ **Maudlin's key idea can be reconstructed as follows:** Although there is no physically possible intervention on the Big Bang, *God* is a logically possible intervention variable on the *Big Bang* relative to the *Evolution of the Universe* (after the Big Bang).

The Scenario (skip)

27

- The variable **God** ranges over the set of possible values {forgiving; jealous};
- the variable **Big Bang** ranges over the set of possible values {1, 2};
- the variable **Evolution of the Universe** ranges over {open, closed}.
- Let me describe Maudlin's divine intervention scenario in terms of interventions on *Big Bang*.

God as Intervention on the Big Bang (skip)

28

1. **God** is a cause of the **Big Bang**.
2. There is at least some value of **God** such that if **God** takes this value, then **Big Bang** depends *only* on **God** and **Big Bang** depends on no other variables, i.e. **God** is the only cause of **Big Bang**.
3. **God** is not a direct cause of **Evolution of the Universe**, and if **God** is a cause of **Evolution of the Universe** then **God** is an indirect cause of **Evolution of the Universe** via a causal path leading through **Big Bang** and a – possibly empty – set of intermediate variable Z_1, \dots, Z_n .
4. **God** is probabilistically independent of other causes W_1, \dots, W_n of the **Evolution of the Universe**, which are not on a causal path leading from the **Big Bang** to **the Evolution of the Universe**.

Argument 1

29

- the existential claim “there is a logically possible intervention on *Big Bang*” does not add anything substantial to the following counterfactual
- “if it were the case that *Big Bang* = 2, and other causes of *Evolution of the Universe*, W_1, \dots, W_n had been held fixed (if there are any), then it would be the case that *Evolution of the Universe* = closed, and it is not a logical contradiction to say that the *Big Bang* = 2”.

Reasons for dispensability (sketch)

30

1. We can find several **successful semantics for counterfactuals** that does not rely on Woodwardian interventions.
2. A **counterfactual theory of causation** – that makes use of these (improved) standard semantics for counterfactuals – **is able to satisfy the criteria of adequacy** for a theory of causation *at least as well as* the interventionist theory (e.g. features and kinds of causes, causal scenarios etc.).
3. I will argue in the second argument that **there is no easy way out for interventionists**: it is unfortunately not the case that interventions are dispensable but harmless.

31

Second Argument

Argument 2

32

- Woodward's definitions of causation imply a specific kind of counterfactuals: **If the value of X were x_i as the result of an intervention, then the value of Y would change to y_i** (cf. Woodward 2003: 15).
- **Question:** What are the **truth conditions** for these interventionist counterfactuals?
- It is not entirely clear which semantics interventionist favor.

Argument 2

33

- **Problem:** worlds were merely logically possible interventions are carried out are **inadequate** for the evaluation of counterfactuals ...
- ... at least, by three **standard semantics**
 - **Possible worlds semantics** (Stalnaker, Lewis)
 - **Meta-linguistic semantics** (Goodman, Maudlin, Pearl)
 - **Suppositionalist view** (Adams, Skyrms, Edgington)
- **Why?**

Argument 2

34

- **Because** merely-logically-possible-intervention-worlds instantiate **truly** different (non-actual) laws
- **Note:** an intervention on Big Bang can clearly be distinguished from a small miracle
- A small miracle is a local violation of a law (that is a set of counterfactual initial conditions).

Argument 2

35

- Intervention-worlds instantiate **physically impossible nomic connections** between the intervention and the occurrence of the Big Bang.
- **Woodward seems to be committed to this claim:** Woodward (2003: 146f, 244) argues that true (singular and general) **causal statements are “backed up” by at least non-strict** (or, invariant, cf. Woodward 2003: 245-255) **generalizations**.
- **Thus**, there is an invariant (or, in some cases, nomic), *repeatable* connection between a type of intervention and a type of cause in the intervention-world w .

Argument 2

36

- **Thus**, interventions differ from small miracles.
- And (merely logically possible) intervention-worlds are worlds with *truly different, non-actual laws*
- **This result is quite problematic:** According to the three standard semantics ...

Argument 2

37

- According to Lewis's (1979: 47f) **possible worlds semantics**, worlds that differ in laws (in higher degree than small miracle worlds) are not among the closest antecedent-worlds.
- Thus, (merely logically possible) intervention-worlds are *distant* worlds.
- ... Similarly for the meta-linguistic and suppositional account

6. Conclusion

Conclusion

39

- Interventionists require that interventions be merely logically possible.
- I have argued against this requirement by establishing two claims:
 - ▣ **first**, merely logically possible interventions are dispensable for stating the truth conditions of causal claims. If this is true, then the interventionist theory, as it stands, collapses.
 - ▣ **Second**, counterfactuals involving merely logically possible interventions lead to the fatal result that interventionist counterfactuals are inadequately false. This is likewise an unwelcome result for interventionists.

Conclusion

40

- I conclude: if we attempt to master the tasks of explicating causal concepts and stating the truth conditions of causal claims **we best get rid of Woodwardian interventions.**
- This conclusion suggests that **libertarians ought not to adopt interventionism.**

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