

On the Causal Nature of Time

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The question

Temporal notions and causal notions play important roles in our thinking.

Questions: Is there a relation of conceptual dependence between these two kinds of notions? If so, is it symmetric or asymmetric? If asymmetric, in which direction?

Standard view: causal notions are dependent on temporal notions, but not the other way around.

I will argue that this is wrong.

Time in contemporary theories of causation

Contemporary theories of causation almost always take the form of a decision procedure that works like this:

- **As input, we require the full non-causal description of a possible world; i. e., a space-time fully filled with events.**
- **Then, for any two events *a* and *b* in this space-time, our theory of causation decides whether *a causes b* is true or false.**

Time in contemporary theories of causation

This makes a lot of sense against the background of Lewisian neo-Humeanism.

Causation cannot be a fundamental ingredient of the world, which is fundamentally a Humean mosaic: point properties in a space-time.

So all causal truths must supervene on and be derivative of facts about spatio-temporal relations between point properties.

So causal notions are dependent on temporal notions but not the other way around.

Time in contemporary theories of causation

It is far less clear why other philosophers cling to the same model, yet most seem to do so.

The assumption that we can *first* describe the world as a set of events in a space-time and *then* start thinking about causal relations is widely made, though almost always implicitly.

But this requires the standard view be true: it requires temporal concepts not to depend on causal concepts.

Some epistemology of time

I want to look at an extremely basic example. Right now, I have the experience of giving a lecture.

I also have the memory of arriving at this building, ready to give my lecture.

Supposedly, I know that the latter was earlier than the former. But how do I know that?

Some epistemology of time

There's nothing in the memory itself that makes this evident. Memories do not carry intrinsic time stamps.

(What if I remember looking at a clock? We'll talk about that in a moment.)

The *content of the memory as such* does not determine its place in the time order.*

**So why can't it have been a memory of the future?
Maybe a memory of 3410 AD?**

*** Here the secret Kantian machinery starts running.**

Some epistemology of time

Two obvious reasons I can give:

- **My present memories have been caused by the event I remember in them, and thus those events must be earlier than the present.**
- **Arriving at the place where I am to give a lecture is a necessary causal antecedent to giving that lecture; so the arriving must have happened before the lecturing.**

Both reasons depend on the idea that causes always temporally precede their effects.

Some epistemology of time

What if I had looked at a clock, with year and date, both in the remembered episode and in my present experience? Wouldn't that 'time stamp' the memory and the experience?

Only on the assumption that the clock accurately reflects the time, which in turn is based on a story about how clock states causally succeed each other plus the assumption that causal succession equals temporal succession.

Clocks can only tell the time because this claim holds.

Some epistemology of time

Suppose somebody claimed that our theories of the world are completely right, including all causal claims... except that we are wrong about where events are located in time.

According to him, the 19th century and the 20th century occurred in the reverse order.

We reject this out of hand. Why? Because we don't acknowledge gappy and reverse causation. Without relying on an a priori relation between time and causation, there's no argument we can bring against him.

The dilemma and the principle

This means that we face the following dilemma:

- **either we accept as an a priori principle that the order of causal succession is the order of temporal succession;**
- **or we have to be complete and utter skeptics about where events are located in time.**

This skepticism is surely unpalatable, so we have to accept the principle.

(We could accept a slightly weaker principle, but never mind.)

What kind of principle is it?

But this does not by itself show that the standard view is wrong.

For a defender could say:

“Of course the order causal succession and temporal succession are the same. That is part of the *definition of causation*: of two causally linked events, by definition the earlier is the cause.”

What kind of principle is it?

But this can't be the right interpretation of the principle. If it were, we would have no purchase on the causal order of the world except through a purchase on the temporal order of the world.

And this is clearly not the case.

But can the defender of the standard view give an account of the principle that does not suffer from this problem? It seems unlikely.

What kind of principle is it?

In fact, the reverse account seems much more plausible. Given the causal ordering of the world, we can identify temporal coordinates with the simplest way of assigning a number to each event such that the number of any cause is always lower than the number of its effect.

Such a causal theory of time seems to fit our epistemic observations much better than the standard view.

Conclusion

There may be good reasons for rejecting such a causal theory of time.*

But if we reject it, it seems we should accept that temporal and causal notions are dependent on each other.

The standard view is at least suspect.

In giving a temporal location to events, we are already making implicit causal claims.

*** Time might have an indispensable role to play in explaining why causal processes happen at the same 'speed'.**

Appendix: the Eleatic Principle

There may seem to be a powerful counter-argument against the position defended here.

Surely it is possible that there is an event E such that E is causally unconnected to everything else; and yet E must have a specific location in space and time.

But this proves that temporal locations are not in any way dependent on causal relations.

Appendix: the Eleatic Principle

However, and for mostly unconnected reasons, I embrace the Eleatic Principle:

- **“X is real if and only if X is causally connected to me.”**

Anything that is causally unconnected to the rest of the universe simply isn't part of the universe, and *a fortiori* doesn't have a temporal location.

Of course, if the Eleatic Principle is true, the standard view is completely inadequate. So there is a strong connection here.