

States, Processes, and Events, and the Ontology of Causal Relations

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Key Questions regarding Causation (after Davidson)

1. What are the elements that are being related by causal relations?
2. Do causal relations relate universals or particulars?
3. What is the relation between causation and causal explanation?

How to Express Causation

- (a) The accident was caused by a lorry-driver.

EVENT caused by **INDIVIDUAL**

- (b) The accident was caused by the driver's braking suddenly.

EVENT caused by **EVENT**

- (c) The accident was caused by the fact that the traffic was heavy and the road was icy when the driver braked suddenly.

EVENT caused by **FACT**

Davidson's view¹

The **cause** of the accident was the driver's braking suddenly.

The heaviness of the traffic and the iciness of the road were not causes but **background conditions** which enable the causation to take effect.

The background conditions feature in **causal laws** invoked in **explanations** of the facts of causation.

¹Or more accurately: APG's interpretation of Davidson

Causation vs Causal Explanation

The “facts of causality” consist in causation relations between token events:

E_1 is the cause of E_2

Causal explanations explain causal facts by reference to causal laws:

Any event sufficiently similar to E_1 , would, if sufficiently similar background conditions obtain, cause an event similar to E_2

where “event similar to ...” has to be made explicit by referring to some event *type*.

The Role of States in Causation

- ▶ The driver's braking is an **EVENT**
- ▶ the heaviness of the traffic and the iciness of the road are **STATES**

On the view presented here causes are always events; states play the role of background conditions which enable causation to occur and which may be invoked in explanations of causation.

States are not themselves causes.

Why States Cannot be Causes

Suppose someone claims that state S causes event E to occur at time t .

Case 1: S already holds over an interval $\langle t', t \rangle$

In this case, why did S not cause E earlier than it did? If S is sufficient to cause E at t , it should be sufficient to cause E at t' ...

unless there is a relevant difference between t and t' ...

in which case the cause of E is the *coming into being* of that difference, and S is merely a background condition.

Case 2 S holds at t but not during some interval $\langle t', t \rangle$

In that case the cause of E is not the state S but the event of S 's coming to hold at t .

State Tokens

State S **allows** (or **enables**) event E_1 to cause event E_2 .

E_1 and E_2 are **event tokens** (i.e., individual occurrences).

So is S a **state token**?

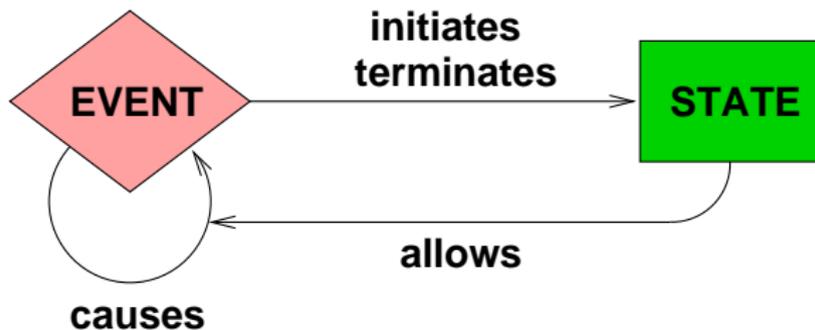
If so, how are state tokens defined?

Provisional answer: A state token is a **continuant particular**, e.g., the state of iciness of the road comes into being at time t_1 and persists until time t_2 . It is wholly present at each time during the interval $\langle t_1, t_2 \rangle$.

Compare a **state type**, such as the state of iciness in general, here understood as the class whose individual instances are the iciness state tokens.

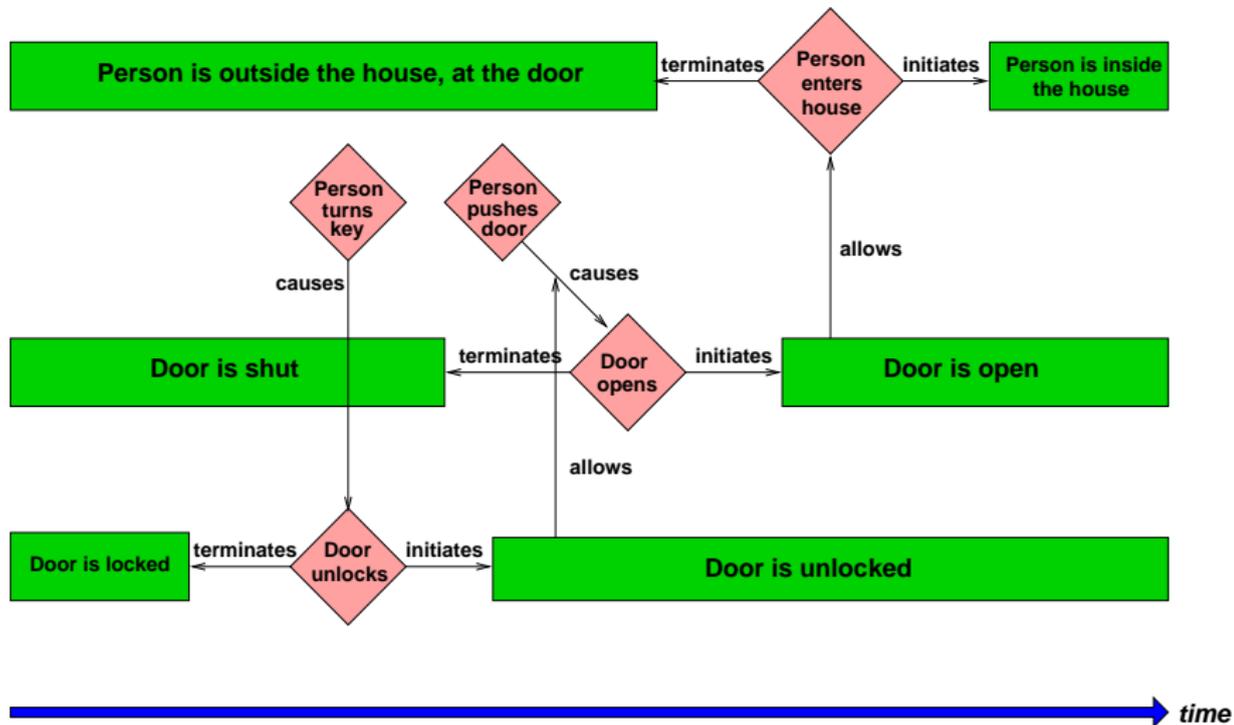
Causal and Causal-like Relations

A freezing event INITIATES an iciness state which ALLOWS a braking event to CAUSE an accident. Later, a thawing event TERMINATES the iciness state.

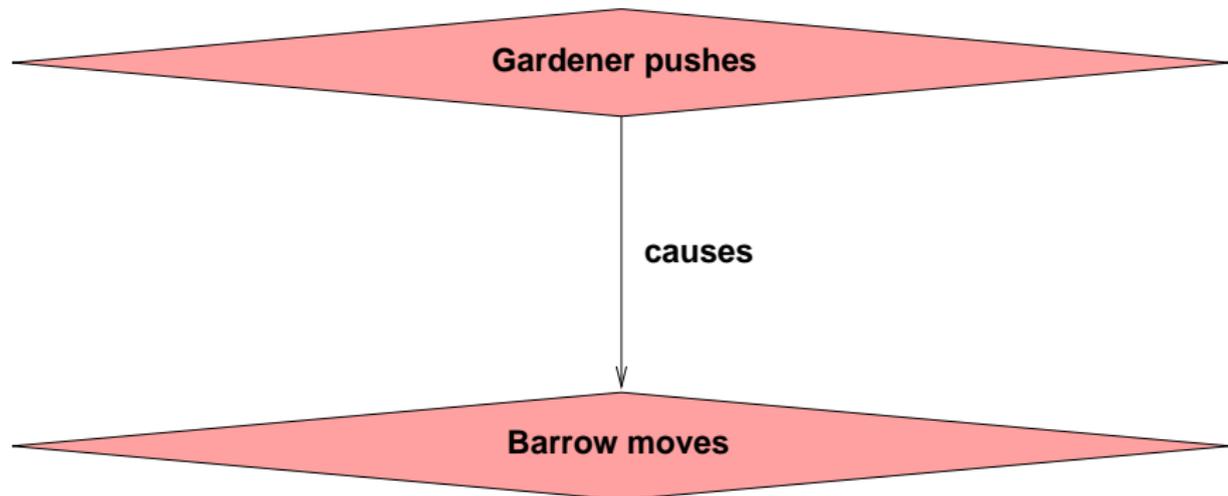


EXAMPLE 1: A person enters a house

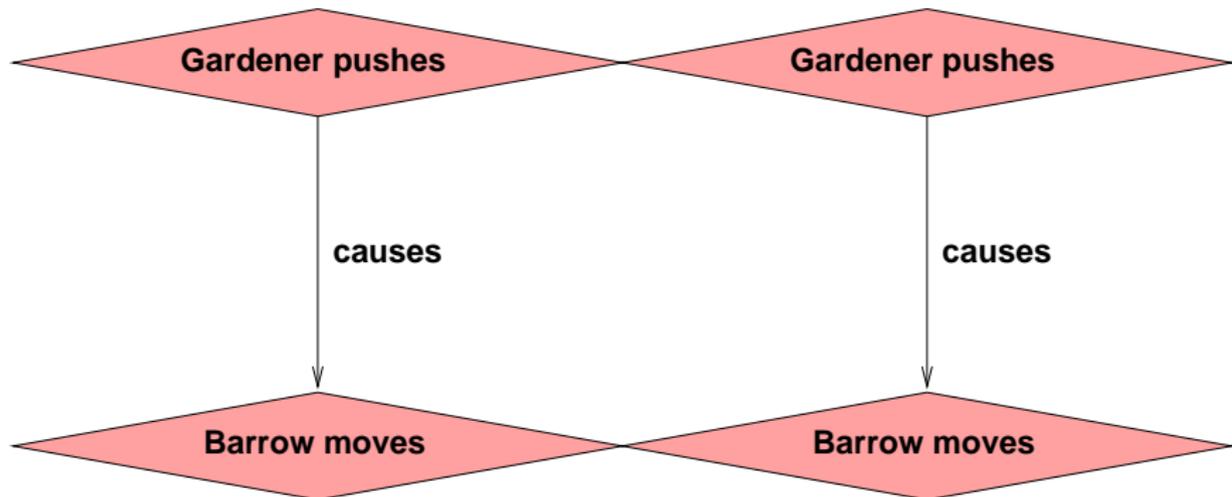
A person is outside a house, at the front door. The door is shut, and locked. The person turns the key, thereby unlocking the door; this allows her to open the door by pushing on it. The result is that the door is then open, which allows her to enter the house by walking forward through the doorway.



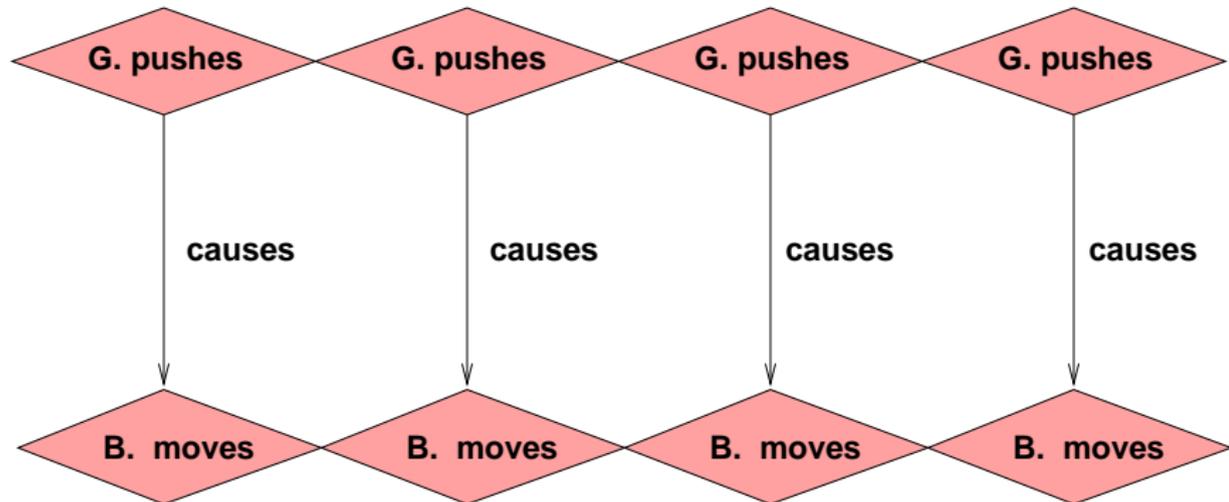
EXAMPLE 2: A gardener pushes a barrow from A to B



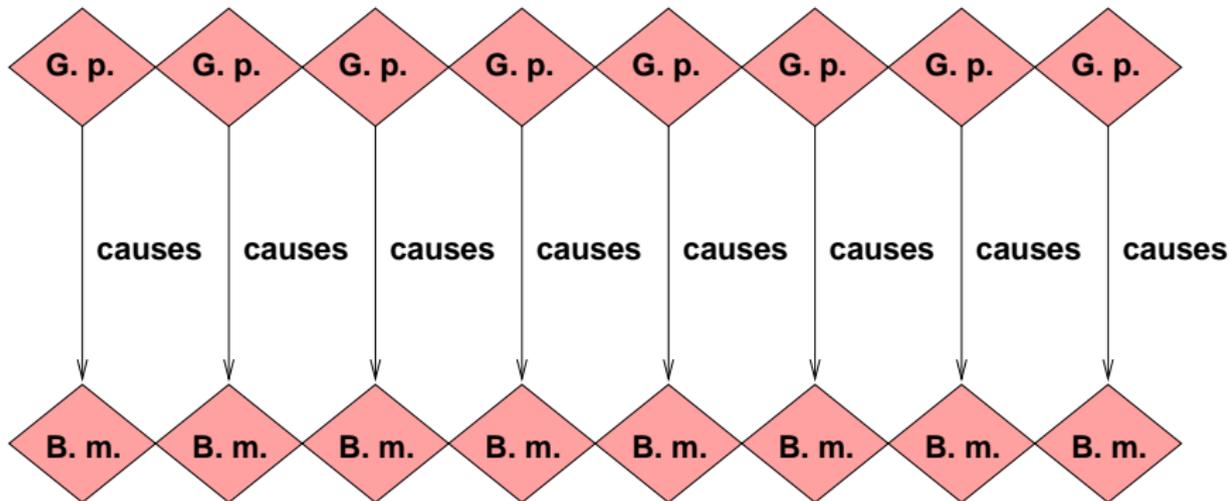
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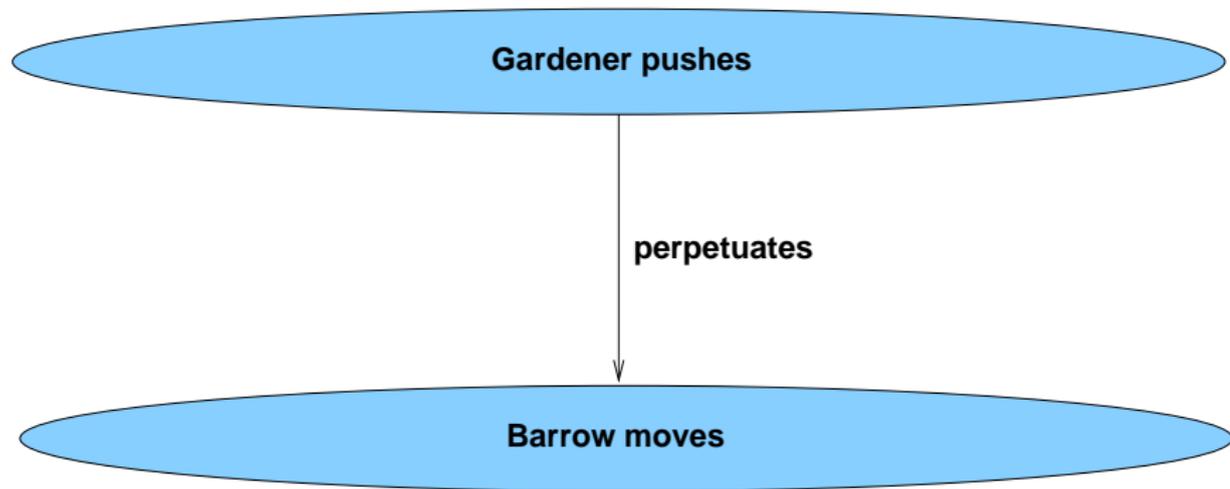
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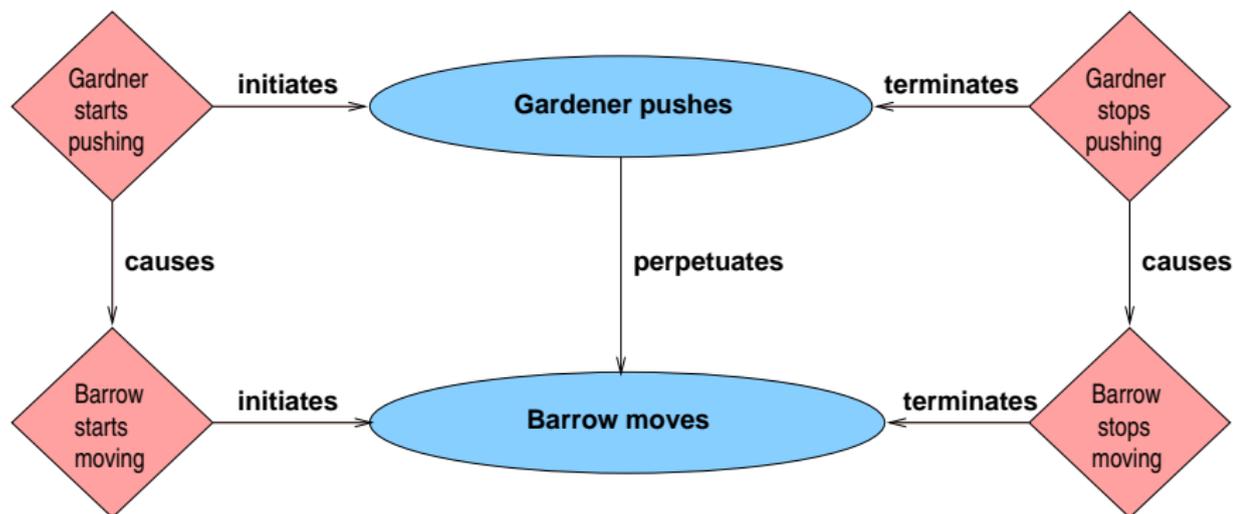
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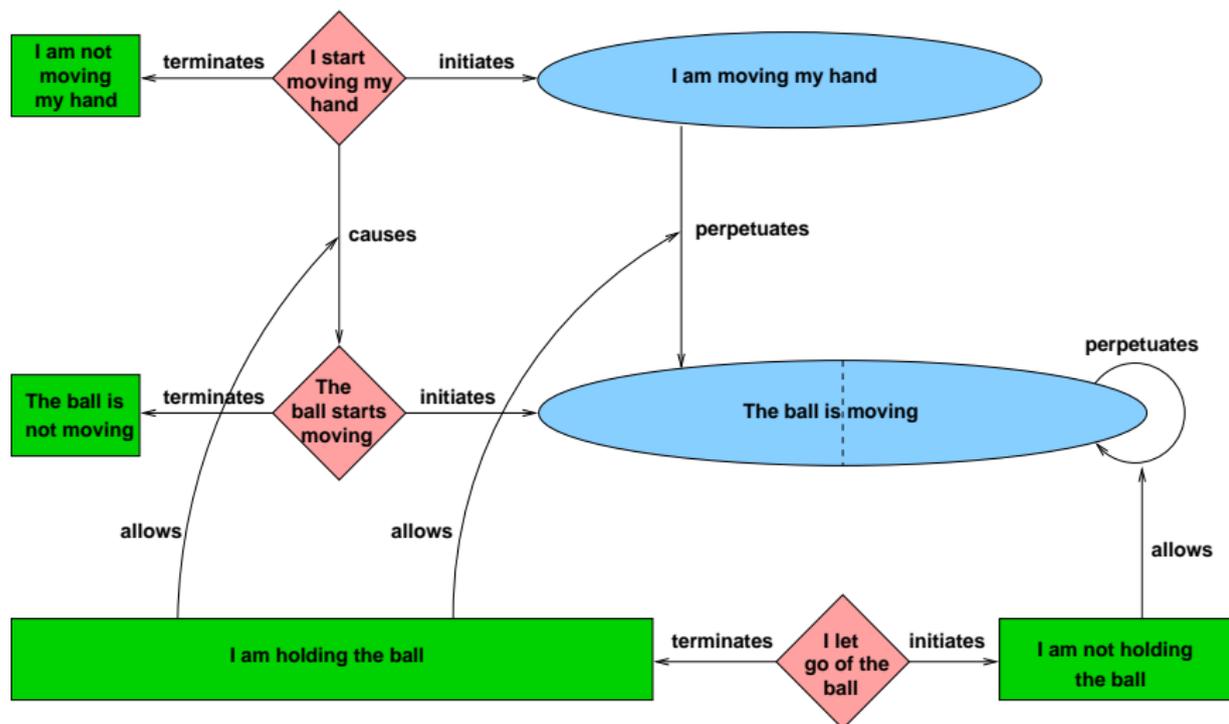
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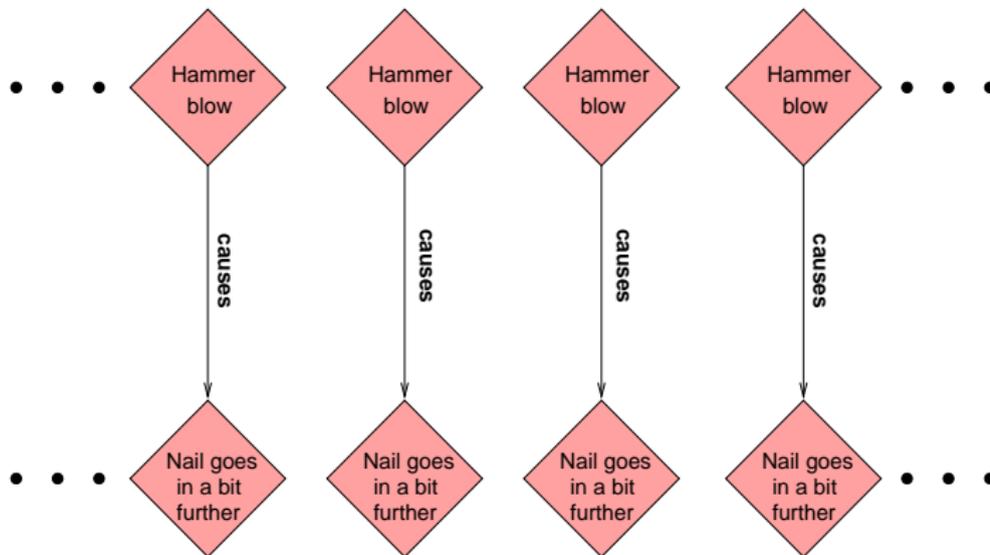
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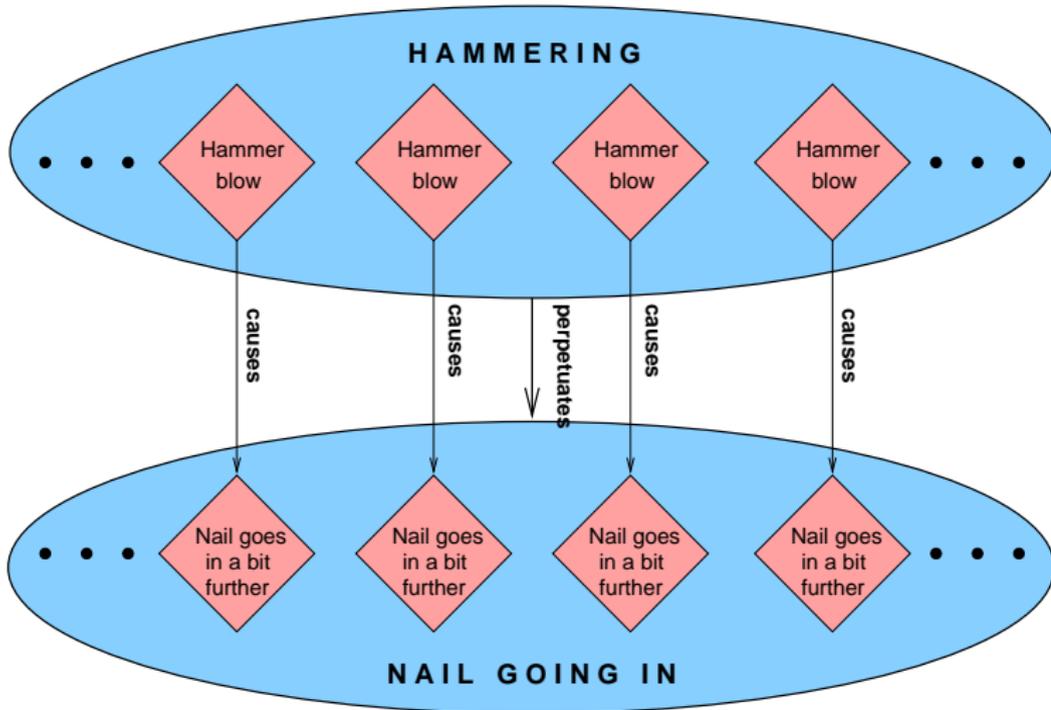
EXAMPLE 3: I throw a ball



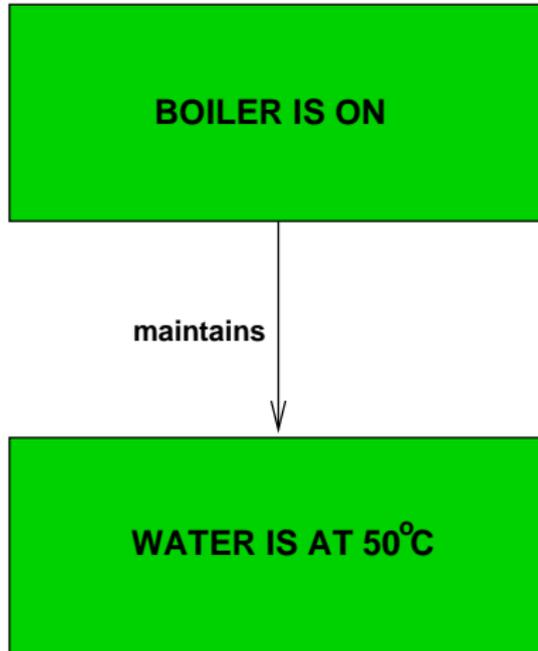
EXAMPLE 4 (Granularity): Hammering in a nail



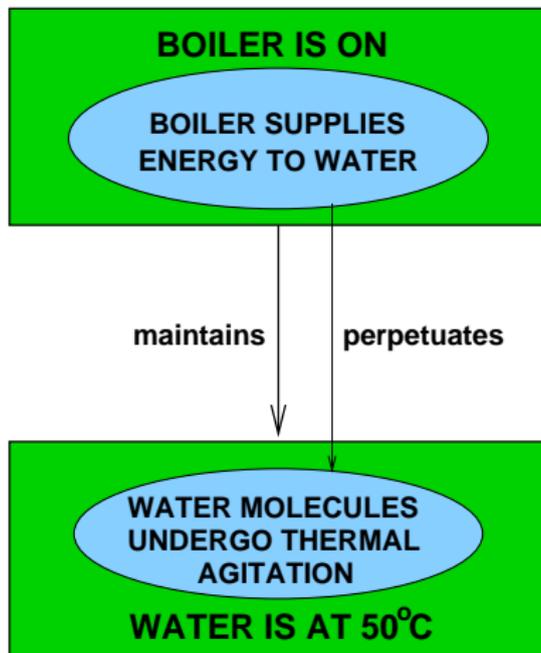
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EXAMPLE 5 (Granularity): Operation of a boiler



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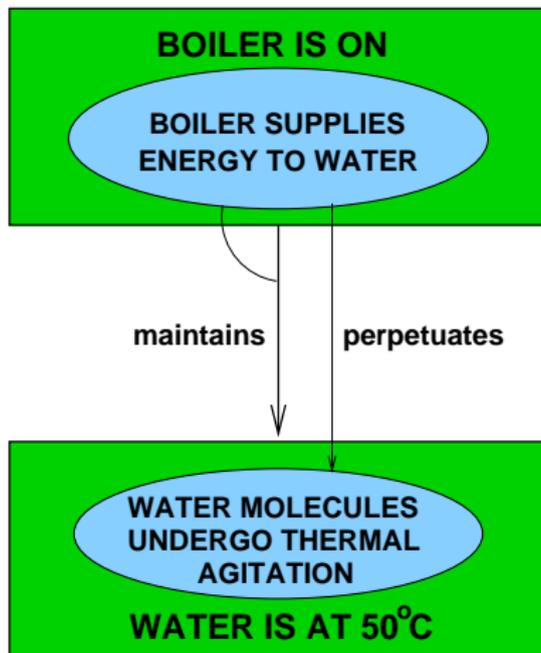
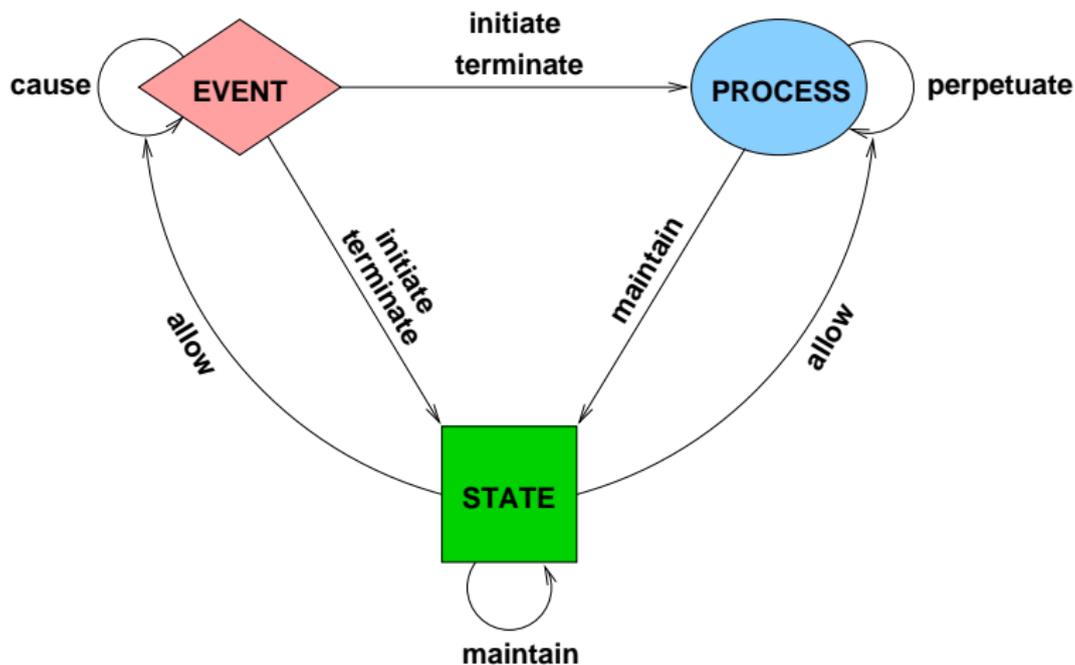


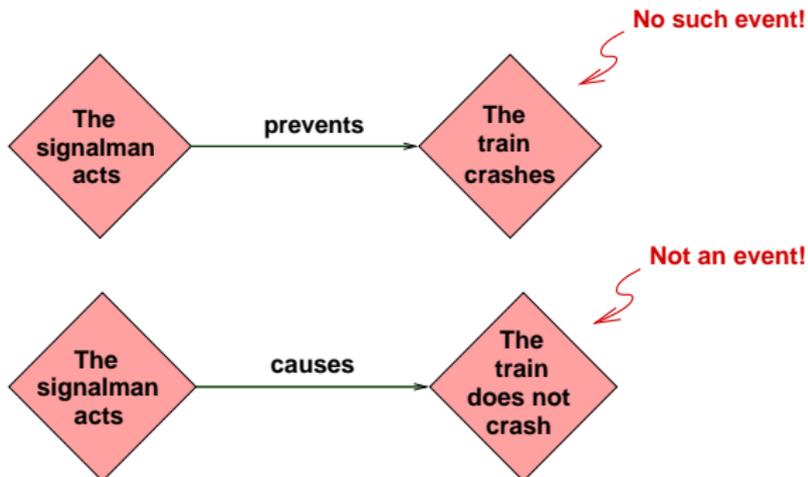
Diagram of Causal and Causal-like Relations



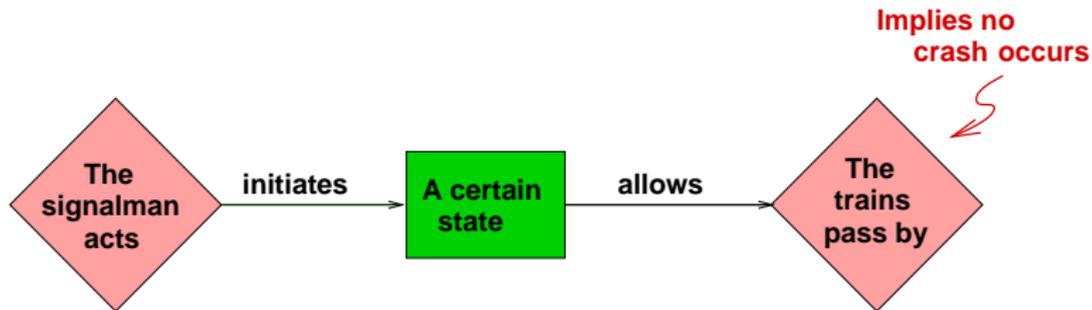
Prevention — another causal-like relation?

The signalman's timely action prevented a train crash.

Two analyses which don't work well:



An analysis which doesn't mention prevention or crashes



Conclusions

- ▶ My aims were
 - ▶ to elucidate the different roles of states, processes and events in causation.
 - ▶ to explore a cluster of causal and causal-like relations exemplified by verbs such as 'cause', 'allow', 'perpetuate', and 'prevent'.
- ▶ I took instance-level relations to be primary: instances of causation and perpetuation exist independently of how we describe them and whether we can explain them.
- ▶ Relations such as initiation and termination do not involve full-blooded causality but express logical connections between states, processes and events.
- ▶ Allowing and prevention relate to the preconditions for causal relations to hold.
- ▶ Prevention is problematic because it does not readily lend itself to analysis at the instance level, requiring reference to event types.

Thank you for listening

ANY QUESTIONS?