CAUSATION AND NECESSITY HANDOUT: Sunday June 15 2003

Can one defend the notion of causation at all? - *the **inevitability** of e following c.*
This is what Hume challenged.
Aim of this talk.: to defend *If c, then **necessarily** e*

1. HUME'S VIEW OF CAUSATION

In the world, we observe events of *type a* always being followed by events of *type b.*
We experience the *constant conjunction* of certain types of event.

This conditions the mind to think that there is a necessary connection between *type a* and *type b* events.
The idea of necessity is therefore in the mind not in the world. All we have in the world are 'regularities'.

2. IMPLICATIONS OF HUME'S VIEW OF CAUSATION

2.1. Causal v. accidental regularities

If causation in the world is nothing more than constant conjunction, an effect cannot follow *necessarily* from a cause. How, then, to distinguish between the following regularities?

a. two clocks always chiming five seconds apart – an accidental or coincidental regularity.
b. water solidifying whenever placed in the freezer – a causal one.

The claim made is that a causal sequence instantiates a 'law of nature', and is explained in terms of it.

2.2. Problems with 'laws of nature'

2.2.1. Induction

Placing water in the freezer causes it to solidify because there is a *law* that water freezes at 0^0C.

But this 'law' is insecure if it has to be based on observation alone, since we can never observe all possible instances of water freezing to see if there are any counterexamples.

We have no *guarantee* that what has always happened in the past will continue to happen in future.

2.2.2. Laws of nature as 'regularities'

Laws of nature are simply regarded as exceptionless regularities. So if all metals expand when heated, it is because there is a regularity according to which when a metal gets heated, it expands.

There is no necessity in this regularity - so it is claimed - because:

a. it is *logically* possible that a metal be heated (under constant pressure) and it fail to expand, just as it is logically possible for the laws of nature to change.
b. there is nothing in the nature of a metal that makes it the case that *necessarily*, it will expand when heated.

3. POSSIBLE RESPONSES

Philosophy of science has responded in 3 broad ways - gross over-generalisations follow!

3.1. The Humean response. Causation is *extrinsic* since it depends on facts outside the individual cause and effect i.e laws or regularities between event-types. And since it rejects any kind of necessity in the regularities, it has a real problem with explanation. (Logical positivists, David Lewis)

3.2. Causation as relations between universals, i.e between properties. (Armstrong, Tooley, Dretske)
Singular causation is an *intrinsic* relation between c and e, so seen as *nomologically* necessary.
BUT laws of nature regarded as contingent, since there are possible worlds where they might be different from the actual world.

3.3. Essentialism: (Brian Ellis) The physical world behaves as it does because the fundamental properties of matter, whatever they may turn out to be, *determine* or *dispose* it to do so.
Offers a more realistic picture of the physical world than the push-and-pull mechanical universe of Hume and Newton, where inert objects are acted upon by mysterious external forces.

If essentialism is true, a metal expands when heated because the causal powers inherent in its microstructure determine it to do so.

Essentialism is intuitively the most appealing picture. So we need to find a *philosophical* justification for the physical necessity claimed by the essentialists.
Kripke provides this by challenging the logical basis of Humean empiricism.

4. HUME V. KRIPKE

4.1 Hume's argument against causal necessity

- Anything one can imagine is not a priori impossible.
- One can imagine a cause not being followed by its customary effect.
- Therefore it is not a priori impossible for a cause to occur without its customary effect occurring

So it is not a priori impossible for me to put water in the freezer and it to stay liquid!

4.2 Categories of truth: definitions

Analytic – A vixen is a female fox. . Predicate concept contained within subject concept.
Synthetic – The vixen killed the chickens. Subject and predicate not semantically connected.
A priori – true in virtue of reason, without experience of the world, prior to observation.
A posteriori – observation of world required to verify truth of statement.
Necessary – what must be the case, cannot be otherwise
Contingent – what could be or could have been otherwise. What is possible, i.e not impossible

Kripke's realignment: rows across **Traditional alignment: columns 2 & 3 down**

	Logical truths	***Empirical truths***
semantic / linguistic	analytic	synthetic
epistemic	a priori	a posteriori
metaphysical	necessary	contingent

The traditional alignment

Hume's justification of the *contingency* of causation and natural laws is based on the following assumptions

a. All truths knowable *a priori* are *necessary* truths, and all *necessary* truths are knowable *a priori*.
b. All truths knowable only *a posteriori* are *contingent* truths, and all contingent truths are knowable *a posteriori.*

4.3.1. Logical truths:

Or: What one can know to be *necessarily* true or false simply by sitting in one's armchair and thinking!

a. Something is logically impossible (necessarily not the case) *iff* we cannot conceive or imagine it *a priori*
Examples: a square circle, the same item in two places at once.
[something is logically impossible *iff* you can't imagine it – so not very much is logically impossible!]

b. The contrary (counterfactual) of every empirical fact is imaginable, so is not a priori impossible.
[nothing one can imagine is logically impossible]

c . One can imagine *or* conceive a cause *not* being followed by its customary effect - ice dropped on a hot pavement staying frozen. Therefore it is not a priori impossible.

d. There is no necessary connection between cause and effect, because if there were, separation of cause and effect would be inconceivable, thus a priori impossible.
[so if we can imagine the laws of nature changing, this means it is not impossible that they could change!!!]

4.3.2. Empirical truths:
a Only *experience* can enable us to draw inferences regarding matters of fact.
Examples: Adam in Eden encountering water for the first time does not know a priori that it can drown him. Nothing in the concept of a stone tells one a priori that it will fall, not rise or stay put.

b. If the laws of nature were necessary, they would be discoverable a priori, by simple reflection on the logical relations of ideas. Since they are discovered a posteriori, they must be contingent. They represent states of affairs which could possibly have been otherwise.

4.4. Kripke's realignment: epistemology v. metaphysics

Look at the table. The traditional alignment conflates epistemology and metaphysics by identifying the a priori with necessity. This leads to illusions of possibility which are fundamentally mistaken – illusions about what is possible in the *physical* world - in this case, a cause not being followed by its customary effect.

What is wrong is the assumption that *all and only* necessary truths are a priori truths.
There can be contingent a priori truths and necessary a posteriori ones. If Kripke can show that the laws of nature are not contingent but *a posteriori necessary truths*, the case is made for causal necessity.

4.5. Kripke's argument: scientific identities and causal necessity

Scientific identities like:

Water = H_2O
Gold = the element with atomic number 79
Hesperus = Phosphorus

are *necessarily* true although they are discovered *a posteriori*.
The terms flanking the identity sign are *rigid designators.*

[Def. A rigid designator is a labelling device whose function is to pick out the same object or natural kind in every possible world, that is, in every possible counterfactual situation.]

Identity statements between rigid designators are necessarily true *if they are true*. Each term *independently* picks out the same thing in every possible world.

Although these identities cannot be known a priori, they are necessary empirical truths, discovered a posteriori, like all scientific identities.

Once we know that 'water' and 'H_2O' refer to the same thing, we treat both terms as rigid designators. They have different uses or connotations – a chemist would use the former, an ordinary speaker the latter – but they denote the same natural kind.

If water is *necessarily* H_2O, there is no possible world (i.e . situation) in which pure water at normal pressure, if it is the natural kind we designate by that term, is not H_2O, does not have the molecular structure it does, does not freeze at 0 ^{0}C.

This supports the essentialist picture. If a thing's identity depends on what it is made of, its microstructure will necessarily determine its disposition to behave in particular ways, i.e. its causal powers.

5. THE ILLUSION OF CONTINGENCY IN THE PHYSICAL WORLD

5.1. Conceptual v. nomological (physical) possibility.

Recall that Hume claimed that there was no necessary connection between cause and effect because it was possible to imagine a cause not being followed by its customary effect, so this was not *a priori impossible*.

If we imagine water freezing instead of evaporating on a hot pavement, we are imagining something which is conceptually possible but nomologically impossible - impossible in any world where the laws of physics are as they are in the actual world. We are not imagining *water*, but something else - an imaginary substance with some but not all of the properties of water or H_2O. We are imagining properties which cannot exist in our world.

We are confusing conceptual possibility with nomological (physical) possibility. We are imagining unicorns – but with unicorns, we never claim that they exist!

5.2. Epistemic v. metaphysical possibility

Prior to the discovery that water is composed of hydrogen and oxygen, we did not know what its intrinsic nature might turn out to be. *For all we knew then*, water might have turned out to be an element as the ancients thought, or XYZ, or…...

But in fact, it could never have been anything but H_2O, given that it is the substance it is. To claim otherwise is to confuse the following:

epistemic possibility – how things might turn out to be for all we know.
metaphysical possibility – how things *are*.

It is not metaphysically possible for anything to be other than it is, once it exists. (Its existence may be contingent though!)
What is contingent is our *knowledge* of the physical world.

6. IMPLICATIONS

6.1. If causal necessity is an intrinsic part of nature, it enables us to be realists about the physical world. The processes of nature are out there in the universe regardless of our knowledge of them. They do not change (the speed of light, the gravitational constant, the periodic table). What changes is our knowledge and understanding of them as we make new discoveries.

6.2. Causation means determinism. This is very threatening if causation is extrinsic, as in the Humean mechanistic picture of a universe where inert objects are buffeted about by mysterious forces. It undermines the autonomy of human beings. Traditional solutions are: God, a rational soul and free will for human beings, dualism.

6.3. The essentialist view of causation is equally deterministic - dispositional properties of matter (or whatever) which determine our brain states, hence our reasoning, our qualia…But on this view, we are an intrinsic part of the causal processes. Since we too do the determining, we do have autonomy.

Bibliography

Stathis Psillos, *Causation & Explanation* (Acumen 2002)
Alex Rosenberg, *Philosophy of Science* (Routledge 2000):
(Also phil. of science books by Alan Chalmers, James Ladyman, Alexander Bird)
Saul Kripke, *Naming and Necessity* (Blackwell 1980)
Brian Ellis, *The philosophy of nature: A Guide to the New Essentialism* (Acumen 2002)
Gendler and Hawthorne (eds.) *Conceivability and Possibility* (OUP 2002)