Nick (To Glen)

Notice, FWIW, that the original gen-phen distinction was understood to forbid any information traveling from phen to gen.

Glen

I don't know quite how to parse this. By "original gen-phen distinction", do you simply mean DNA->RNA? What do you mean by "original"? And would reverse transcription imply information flow from phen to gen?

FWIW, when I talk about downward causation, I'm not assuming irreducible phenomena (strong emergentism). Mostly, I think of landscape change. Just to prove I am reading it [⍢], I'll cite EricS' (and Morowitz') hierarchy of matter phases, wherein as the temperature goes down, prior freezes set the context for what \*could\* be the case for future freezes. That's a macro thing constraining the micro thing. It doesn't seem so much to me like "information traveling" as limited freedom ... a weak kind of forcing structure. But if we talk in terms of variability/uncertainty/wiggle, then it sounds a bit like a \*loss\* of information. Downward causation from macro to micro might map well to a reduction in the information content of the micro. There would have to be some transient, though. Before the macro constraints were strong enough, the information content was high. After they are strong enough, the micro content is lower. Is a reduction in information, itself, information? 2nd order information?

[⍢] [In]Comprehension notwithstanding.

Nick

Yes.  And that is why reverse transcription was such a big deal --

Because it violates Weismann's Doctrine. See this abstract: <<https://link.springer.com/article/10.1007/s00114-014-1164-4>>.

I think most contemporary biologists still think that those violations are the province of the very small, but with all we know about epigenetics these days, the whole argument is starting to feel cranky and old-fashioned.

When I try to think about “downward-causation” my imagination always fails.  Think of four sticks, arranged in a square.  They are very flimsy.  Now add a fifth stick, a diagonal.  The whole becomes much more sturdy, right  Now, this is a clear instance of an emergent property, no?  And the freedom of motion of the other four sticks has been constrained by the configuration of the whole, right?  But where is “downward-causation”, here?  Or choose your own example.  How exactly does “downward causation” work?  It puts my mental knickers in a twist.

Glen

Excellent! Thanks for the link to Weismann's doctrine.

As for the 4-5 sticks, I don't at all like calling "sturdiness" an emergent property. In fact, I don't really like the phrase "emergent property" at all. And I resist using the word "emergent". I'm OK with the word "attribute" because that word can imply an observer that \*ascribes\* the quality to the collection of things. And then that ascriber of the attribute is the source of any ignorance or (faulty) abstraction that allows us to believe in non-reducible phenomona.

As for the particular of the 4-5 sticks, I'd argue that sturdiness is completely reducible to the \*angles\* and the arrangement of the sticks. You can take 4 sticks, put one to the side, and make a triangle out of the other 3 and you get "sturdiness". It's still a graph, just not a fully connected graph. So, the 5th stick isn't all that important. What's important is the graph.

To apply downward causation to an arrangement of sticks, you'd have to identify what variable was being constrained. If the variable is some form of "connectivity" or arrangement, then it's VERY easy to go from 0 sticks to 1 stick. Then it's easy to add a 2nd stick. Then it gets a little tougher to add a 3rd stick ... e.g. does it have to line up? Can it just touch on the ends? In the middle? Does it have to connect with both the other 2 sticks. Etc. Then adding the 4th stick is more constrained. Etc.

That is what I mean by downward causation. There's got to be a controlling variable limiting what the sticks can do and the collective, the present arrangement of sticks, then defines that limitation.

Frank

There are many systems with causal graphs with feedback loops.  In genetic regulatory networks, for example.  Is that downward causation?

A classic example is the case if two ladders leaning against each other so that neither one falls.  Each causes the other not to fall.

Glen

In the 2-ladder system, if there's downward causation, I would not say "each causes the other not to fall". But I would say something like "the attribute of non-falling constrains the valid arrangements of the ladders". The point of rewording it like that is to remove the emergentism woo and talk more closely about the freedom of 2-ladder arrangements. As with the sticks, it's easier to place 1 ladder than it is 2 ladders. The requirements to be met circumscribe a space of possible arrangements. And if you cherry-pick some special set of constraints, then it can \*seem\* magical that, in some arrangements, some requirements can be met that no/few other arrangements meet.

But objectively, all we're talking about is the space of possible ways to place ladders, given some set of requirements. Obviously, if you inscribe the conclusion into the premises by setting your requirement to be "the ladders must extend by their lengths up into the air", then the set of arrangements of 1 ladder that meet that requirement will be smaller than the set of arrangements of 2 ladders that will meet it. But if you pick \*another\* requirement, say, "all ladders must be perpendicular to all other ladders", then laying the 1st ladder is trivial and the 2nd becomes more difficult.

A minimal conception of downward causation is \*only\* that the collective constrains the space of arrangements of the parts.

There is a debate we could have whether \*some\* systems (parts and the ways they compose) about whether or not collectives can \*facilitate\* (enlarge) the space of possible arrangements. I call that concept "scaffolding". Your ladder example is a good foil because it allows us to argue that the \*size\* of the valid 1-ladder arrangements that meet the criterion is 0. But the size of the 2-ladder arrangements that meet it is larger (2 or 3 ways to arrange the ladders such that they stick up into the air). But I'd argue it's an imputation. That cherry-picked arrangement (so that they don't fall) is NOT downward causation because that requirement was installed from the outside, imputed, not an inherent property of ladders and their possible arrangements. (I.e. 2 ladders leaning against each other is not a special state of 2-ladder arrangements.)

We might be able to argue that EricS' and Morowitz' hierarchy of matter phases might qualify as scaffolding, too ... a little bit of freezing might facilitate regions of the space so that we can get weirdo things like fish or plants. Remove any of the prior freezing layers and life may not "emerge" at all.

But none of this extra conversation is necessary to get that minimal conception of downward causation

JON

Maybe I am misremembering (which clearly happens), but didn't the discussion of gen-phen-like maps arise in the context of goal-function distinctions? In this latter class, we included the thermostat system where constraining systems to Weismann's doctrine would not be meaningful. Clearly, in the goal-function system, an individual that changes the thermostat dial because they prefer the house to be at 60 degrees rather than 80 degrees (a variation on function) performs downwardly to affect the tolerance of the piece of metal or mercury switch (a variation on goal). Are we breaking the semantic game by now demanding that our admissable gen-phen-like maps preserve Weismann's doctrine? I understood Glen's evocation to not be so constrained.

Nick (to Jon)

Re Gen Phen: That’s the Whole Point, here. There are two different distinctions, here, one apparently arising form computation (?) and one arising from biology. Glen originally mentioned a **GEN**erator/ PHENomenon distinction which seems to be the broader of the two and does not forbid downward causation. More recently we have been talking about the GENotype/PHENotype distinction which is narrower and does – historically—forbid downward causation. So, I think we need to spell the words out completely from now on, so we know which game we are playing.

Your reference to language games raises the question of what sort of “game” are we playing when we talk about causation. One rule of that game, I think, which I may have violated, myself, in this discussion, is that things cannot cause things. Only events can cause events. The reason is that the notion of cause involves temporal order and things (as opposed to the arrival of things or the placement of things or the removal things) cannot be in a temporal order. I am wondering if adherence to this discipline might make the whole problem of downward causation disappear. So, the addition of the 5th stick (an event) to previous four sticks CAUSES the other 4 sticks not to rotate (an event) and CAUSES the structure to be strong (another event). Notice that this formulation appears to forbid us to say that the constraints on the rotation of the other four sticks provided by the fifth stick CAUSES the strengthening of the structure because those two events are temporally inextricable. What IS the relation between those two facts if not a causal one? I think I would argue that it’s a constitutive relation; ie, the rotational constraints constitute the greater strength of the square with the fifth stick.

Frank (to Nick)---

Nick, you are correct in saying that causation is a relation between events.  The most useful definition of causation that we found in our statistical causal reasoning research (viz Spirtes, Glymour, and Scheines) was event A is a cause of event B if the occurrence of A is followed by a change in the probability density over the possible values of B.  Modulo obsessional tweaking.

Nick (to Frank)

Thanks, frank, for that affirmation.

However, I am sitting here, on this hot day, looking at the tree across the street, and saying to myself, am I REALLY going to get away with telling Glen he cannot say, “That tree is causing the yard to be shaded.” Something not right about that. Modulo obsessive thinking.

Frank to Nick

Well, most people say that the moon is the prime cause of the tides.

Nick to Frank

Yes, that does not bother me. The arrival of the moon is followed by the arrival of the tide. And I would be happy with, “The arrival of the sun over the yard causes the yard to be sunny.” But the problem with the shade is that the tree has been there all along. I suppose we could say that the presence of the tree causes the yard to be shaded, but “presence” doesn’t sound so much like an event. We could say the planting of the tree 25 years ago caused the yard to be shaded today, but that seems a bit lame. It’s the best I got.

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