

# ***The combinatorial puzzle***

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The faulty of the idea of monocausation becomes apparent when we enter into the Mekka of “monocausation” - the laboratory - where we typically would like to keep the conditions in such a state that we can see how one factor makes its causal contribution. What we are evidently doing, however, is to accept the other factors as equally causal when we assure that they are kept in “a *ceteris parabus* position”. The other causal factors is by this not removed as such. They are only removed “mentally” by the fact that we call them background conditions and not causal factors.

In other words: A discussion about causation should take the starting point that causation is always multicausal in some sense, and that we should go for the theory that can explain multicausation in the best way, rather than comparing our (multicausal) theory against theories of monocausation. This is important in itself and it is important for biology in particular.

In my PHD-thesis I used quite a lot of space and time to develop Stephen Mumfords and Charlie Martins idea that dispositions are relational. I did this in a way that went beyond Stephen Mumford relational view, and I did this in a way that Stephen disagrees with. So this is something that should be kept in mind during this presentation.

What I am indirectly suggesting by this is that a dispositionalist should see the discussion on (multi)causation in the light of the discussion on whether dispositions could be understood as relational and what that eventually means. This is at least what I will do in the following.

## **Dispositions are relationally defined?**

Normally we would say that real properties of things are real if they belong to them independently of everything else.<sup>1</sup>This is also what we normally think of as a kind of hallmark of their existence. Even the idea that organizes our epistemological intuitions, also today, is itself taking this “hallmark of existence” (realityprinciple) as its startingpoint. To call for objectivity is to call for a description on how the objects is and behaves independently of the observer.

Dispositions, I would claim, is however something that cannot belong to their bearer in this “intrinsic way”. They depend on other dispositional partners *a priori*, at least for their manifestation and I believe, also for their existence. Dispositions are neither intrinsic nor extrinsic, they are relational. So, the disposition to dissolve is clearly a disposition to dissolve in some liquid. The dissolvability of the sugar cube depends on the dissolvent powers of water or other liquids to even have that disposition or power to dissolve. To understand properties as dispositions or as dispositional means that we

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<sup>1</sup> Brian Ellis 2002, p. 51. There has been a debate about this question in “Philosophy and Phenomenological Research”. (See esp. Sept 2001). My own view on this issue is that the question of intrinsicity is really about belonging and not about independence. Lie 2010, ch. 5.5.3.

accept that properties stretch beyond their bearer. The question is therefore: Would not this change the whole situation of causation upside down?

Initially, the talk about causation is launched as a way to establish a *relationship* between things and/or properties that are separate and have their existence independently of everything else. Because: If we think of the world as composed of singular things and independent properties we would nevertheless have to admit that they are related somehow, and a way to establish this relation is by causation of course. By saying this we can hold on to the idea that things are discrete and we can also put modality into this relationship by saying that things and their properties are related by necessity or contingency. It also enables the sheer possibility of talking about causation as being monocausal of course.

The relational view on dispositions however, entails that things and properties are already related in the first place, and that the specific relationships come to light whenever a disposition is manifested. If we think that the foundation of causation is to be found in the relationship between dispositions and their manifestations, we would also have to admit that this very manifestation already includes other dispositions if we are relationalists. So whenever something is happening in the world - whenever some dispositions manifest - we see a world that is already related. From a dispositional and relational point of view it would therefore be meaningless to talk about singular causation in the first place. It remains however to see how or whether the dispositional ontology can provide a detailed and trustworthy account of multicausality beyond this initial argument relating multicausality with a relational ontology of dispositions.

### **Singular manifestations?**

Because --- the fact is that the dispositional ontology has an internal problem which makes it difficult to account for multicausality. This problem is called the combinatorial puzzle. Georg Molnar, Charlie Martin, Stephen and Stephen and Rani have all tried to solve this problem. And I also had my try in my PHD-thesis. What I will present here is basically a version of this attempt, worked out in more detail.

The main problem is this: The way to identify a disposition is by its manifestation. Dispositionalists say that there is an isomorph relation between the disposition and the manifestation. You cannot have same disposition different manifestations. So, if you see a "different manifestation", then you would not have the same disposition either.

If you are not a "full" relationalist like I am you will therefore get the following problem. In situations where you have more than one disposition coming together in a manifestation (*polygeny* – after Molnar who has this from John Dupré) you would not see the same manifestation as in a situation where allegedly only one disposition is manifested. Hydrogen and oxygen both have the power to explode, but when they are put together they constitute a unit that is actually one of the best naturally occurring fire-extinguisher there is. So alone - as we say - the oxygen has one manifestation and together with something else, in this case hydrogen we see a different manifestation, even though the same disposition is involved, allegedly. The Barge-example...

A fullblown relationalist will however say that the problem is not posed correctly. The relationalist would argue that nothing is able to have a disposition or do what it does independently of anything else in the first place. Manifestations of singular dispositions does not exist. What something does is in each and every case a joint action. What Stephen says in this case is therefore simply not plausible:

“Powers sometimes work with each other, and sometimes against each other, to produce jointly the events we find in the world around us . . . Each power makes exactly the same contribution to the production of an event, irrespective of the other accompanying powers. . . . If we want to know exactly what contribution a particular power can make, the best way would be to screen off all the other factors that could interfere.” (2009, 103-104; see also Mumford 1998, 211 and 229; 2004, 172; 2007c).

For a relationalist, a situation where all the other factors are screened off, would be just another situation with *new* dispositional partners present, (or a situation where you would not know if the same partners were present if you did not take all the other contributing factors into consideration as well). A relationalist would never admit to a situation where “all the other factors are screened off”. (A relationalist cannot escape the relational cage.). What is forgotten here is that it is the bearer that is “in the situation”, not the properties as such.

This is extremely important when it comes to the *in-vivo/in-vitro* question. The laboratory brings about certain manifestations, while the *in-vivo* situation will (often) manifest other dispositions of the bearer. If we think that the object will manifest the same property independently of the situation, i.e., bring the same contribution (as Martin and Mumford say) then we would be essentialists, because we would have to assume that the bearer would always contribute certain essential properties<sup>2</sup>: that it will do so in virtue of the *kind* it is (a kind constituted by the ‘intrinsic properties’), which continuously produces these properties (necessarily and independently of the situation). (This essentialist view is argued for excessively by Brian Ellis). Under this regime it will be a mystery whenever you know that you have a certain contributor, but you don’t see the right manifestation, because that would mean that the same disposition could have different manifestations.

The alternative view that I propose here is to say that whenever the contributors get into new configurations they might or might not contribute with different dispositions, but to see their contributions you would need to see the contributions from the other partakers (e.g., to see the contribution of the structure — reflecting light — you would need to know the contribution of the sun/light bulb/etc., emitting light). This does not mean that they change dispositions in accord with the situation, only that different dispositions are manifested! The disposition manifested in *situation1* does not disappear or change in *situation 2*. It is still there; *ready to go* in *situation2*, but it is not manifested. So in the case with hydrogen and oxygen, hydrogen brings to the forth a manifestation that oxygen did not have together with the partners that made it flammable or explosive. (We never see the manifestation of the powers of oxygen alone). What we see is not “the same disposition different manifestation” and therefore an identity-crisis of dispositions. What we see is “different manifestation, different disposition”.

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<sup>2</sup> Mumford does not side with essentialism if essentialism means that kinds have essential properties. (See Mumford 2005).

With fullblown relationalism, the point is that you cannot talk about dispositions as if they occur independently of everything else in the first place. Rather the manifestations of the dispositions are relationally defined, and every manifestation is of course always a manifestation of more than one disposition. It is the other dispositional partners and the joint manifestation that literally defines a specific contribution. With other dispositional partners the contribution of the *same* bearer in question might be different. To believe that contributors could be screened off would therefore be a contradiction in terms.

### How to pick out the manifestation?

In an unpublished paper (*Mutual Manifestation and Martins Two Triangles*), Stephen and Rani writes: “The problem with polygeny is that **most** effects are typically produced by many different powers acting together, which is of course entirely consistent with a notion of mutual manifestations”, (my emph.). Are there any effects that are not “typically produced by many different powers acting together”. This is the way I interpret this: They cannot say that *all* effects are typically produced by many different powers acting together, because that would imply some deep changes in their ontology elsewhere. (I doubt that their vector-model would survive). I believe this is why they in their attempt is trying to solve the problem as if there was a conflict between “singular manifestations” and polygenic manifestations – although as I say, they argue in general for (in this paper) that *all* dispositions are mutually manifesting. It seems to me that they have a twisted situation.

So what I will do now is to define the problems that occur if we really believe that dispositions are relationally defined. And hopefully this will contribute to some solution as well.

The main and obvious problem is this: if every manifestation is *always* a coproduction by many dispositions, how can we pick out one disposition? We said earlier that the identity of a disposition is fixed by its manifestation, but what I am saying here is that there are never any such single manifestation in the first place. Isomorphism therefore seems impossible. And by that some would say that the dispositional ontology is just falling into pieces. If it’s not possible to pick out single dispositions by their single manifestations, there would be no real dispositions either. This is, I believe Stephen Mumfords (I am not sure about Rani) main worry about relationalism in this case. But I hope that the following might reassure him and others that his worries are in vain.

I have said that to know the particular contribution of one part or bearer you would have to know the contribution of the other parts, because the contribution of one part *de facto* depends ontologically on the contribution of the other. In other words: to see that the contribution “structure disposed to reflect light” (colour) is the contribution of some surface you need also to know what kind of contributions that light and the perceiving eye has. It is *de facto* the contributions of the light and the eye that “makes” it possible for the surface to have this dispositional contribution. A realist description of the contribution of one dispositions always involves the description of the other that takes part, in any case. But the question is still: How do we know what contributes with what, if every manifestation is a manifestation of many powers at the same time. The answer is variation and

inference. Because we cannot according to this theory actually observe “a single manifestation”, since there are no such thing as a manifestation of single dispositions. But how do we even know in the first place that there is something that might be called single contributors and not just a big structural field where the relata has disappeared into the relations? (Structural realism). You know this because the **manifestation** is always single: A single object-in-process. (I have not got time or space to elaborate on this issue here. See Lie 2010, section 5).

So what I am saying is that the following is the condition for the one who wants to know the world it is living. We know that there are single contributors, but we can never know exactly how they contribute, because we can never observe this directly. We can only infer from variation and comparison. This is of course something that is done continuously in a way that is almost not noticed in our daily life but which is systematically done within science, especially in the laboratory. So, when we say that “sweet water” is the manifested state of affairs that shows us that the sugarcube have the disposition of being dissolvable this is not strictly correct, because what we also see is the dissolving disposition of water. The reason for this is that we cannot *observe directly* whether it is the water that is dissolving or the sugarcube that is dissolved. What we observe is “sweet tasting water”, and we infer *eventually* that this is a manifestation of dissolvability or whatever disposition we may have in mind. It is in the (after)light of the inference we have *already done* that we may eventually say that the dissolved sugar cube is a manifestation of its dissolvability. If a 1 year old child sees a sugarcube that dissolves he or she would not “observe the dissolvability” like we “do”. An alien would maybe be very worried if it had to put its finger into the same water afterwards. It seems that it is whenever we overlook this order of things that we are fooled to think that sweet water is a direct observable manifestation of dissolvability only. It is because we as humans have certain interests, I guess, that we interpret a joint manifestation as a manifestation of a singular disposition. And this is at the bottom of this problem: We are comparing singular manifestations with conjoined ones as if there were single ones. “What is it for manifestations to combine” Georg Molnar (2003, 196) asks, and by this question he stages the problem in a way that makes us look for solutions at wrong places.

Now it looks like if the manifestation is unimportant for picking out the contributors, because it does not tell our senses directly which is the contributors. But this is not correct. To single out the contributors we *need* to start with the manifestation. It is from the manifestation that we can start to pick out (or put forward hypotheses on) the single contributors. The manifestation of “one horse, one barge” points to a different contribution of the horse compared to the manifestation of “one barge two horses”. Our talk is upside-down when we say that “I know that there is a disposition working here, but it is not manifested”. (Which is what is essentially stated as the combinatorial puzzle). You need to look at the manifestation and you need to know something about the other contributors to say that. And this is exactly what *is* so difficult in science, because you, in reality, need to know something about other things - which you don't know yet - to know something about this thing that you want to know about.... I guess this is why there are something called “unknown unknowns”. (The question: how do we even get into this circle if contributors depend on each other in this way is, I think, very well thematized and “answered” by Heidegger and Gadamer. And I take their philosophy of knowledge to be a sort of indirect support for the ontology that I am trying to put forward here: “If the world was not like this the hermeneutical process of understanding would not have been such a good and plausible theory...”)

So what I am saying is that you don't start with intrinsic properties that you have firstly seen singularly manifested. You start with an observable manifestation and then you vary, compare and infer from there. What are the real contributors and what do they contribute with? How accurately this may be done is another question however. In science we would like to know the exact contribution of e.g. a medical substance, but for a dispositionalist it is enough to say that "this pill has a disposition to cure a headache".

### **Science cannot escape metaphysics.**

To close the circle we may add the following. Metaphysical theories are *theories* on how contributors behave in general. A scientist cannot assume that he or she can just go out there to find the contributors. He or she will also need to have theories or assumption about how these contributors are related in general!! And some theories on how things are related may leave the question of emergence or the question of the identity of the contributors unanswered, which eventually would lead to different misguided strategies in the search for the contributors. Either stubborn reductionist strategies or strategies where you would look for supernatural contributor or something like that. (I would mention phlogiston, I would mention string theory, I would mention the theory of multiple universes, I would mention Dawkins and many others idea of the overpowered gene).