

De este modo, el libro logra sumergir al lector en la mayoría de las cuestiones centrales de la epistemología actual con un resultado tanto exitoso como de gran calidad. Si bien se echan de menos algunos temas, como la reciente epistemología del desacuerdo, ciertas cuestiones metaepistemológicas, la epistemología pragmatista, un énfasis mayor en el bayesianismo, las lógicas epistémicas, huelga afirmar que siempre tiene que quedar algo fuera. Quizás sobresalga la ausencia de dos temas importantes, uno de los cuales se menciona lateralmente y otro que de plano no se toca: el primero es el debate entre fundacionismo y coherentismo, que si bien no ocupa el primer plano actualmente, ha dejado valiosas enseñanzas para la tradición; el segundo, los debates relativos a la epistemología del testimonio, área que no sólo posee una larga tradición desde Thomas Reid y David Hume, sino que se ha visto felizmente reavivada en la última década. Pero la deseabilidad de que estas temáticas se hubieran abordado no opaca en absoluto el logro que cada artículo, y el libro en su conjunto, representa para la filosofía en lengua hispana.

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Stephen Mumford and Rani Lill Anjum, *Getting Causes from Powers*, Oxford University Press, Oxford, 2011, 256 pp.

The main purpose of this work is to give an account of causation based on dispositionalism. It does not present an analysis of the causal relation, but rather an ontological description of it and a model, under which particular situations and problems can be considered. The account presented is contrasted with other theories in order to explain differences, motivations and benefits.

The most general aspects of the theory are clarified at the beginning. This is a dispositionalist theory of causation, according to which causes do not necessitate, but dispose towards their effects. The fundamental causal relations are neither facts nor events, as in other accounts of causation, but rather properties. Mumford and Anjum acknowledge that the dispositionalist theory of causation does not pretend to give an explicit definition of what it means to be a cause. It is not an analysis of causation, but a theory that aims to handle and explain most of the cases in which causal relations occur.

Nevertheless, in several cases connected to temporal distinctions in the causal relation, the account seems to be dependent on a process theory of causation. The concept of *causal power* is, anyway, taken to be a primitive one. It is also indicated that such a notion already involves the notion of cause, for powers somehow *produce* their manifestations. Mumford and Anjum criticise David Lewis's idea that causes are only some indispensable part of the circumstances that are followed by the effect. The dispositionalist theory of causation considers the causal relation as a complex process, consisting of many interacting factors. There is thus a polygeny in causation. This realist account attempts to analyse cases of particular causation as cases of general causation, which is another difference in relation with other accounts, such as the counterfactual analysis or the regularity account. In any case, if one entity type disposes to cause another, then that is also true with regard to their instances. David Armstrong defended a theory of causation based on facts, but distinguished categorical properties from dispositional ones. One of the novelties of an account based on powers is that it establishes the dispositionality of all properties. Some authors, like Molnar, have already offered analyses of causation based on dispositions, but, according to Mumford and Anjum, the results remain unsatisfactory.

In order to describe particular cases of causation, the theory uses a vector model (Ch. 2). This model is built, in the simplest case, on a one-dimensional quality space, divided in two areas,  $F$  and  $G$ , representing properties. The model can also be constructed on multi-dimensional diagrams. Different vectors, representing the powers, go from the division towards either of the two sides. Each property has a threshold that has to be surpassed by the vector for the disposition to be manifested. The property  $F$  might symbolise, for instance, the fact that a certain fluid boils because of its rising temperature. The middle of the quality space represents the initial state, i.e. in which the fluid is not boiling. If the addition of vectors towards property  $F$  surpasses the threshold, the boiling of the fluid has been caused. The causes in such examples build a whole group of vectors, some of which tend towards  $F$  while others tend against it. Some dispositions taken individually, like the atmosphere's temperature for example, might not be enough to go beyond the threshold, but the addition of the totality of them will do, if the fluid is in fact boiling. An important aspect of this model is the mutual manifestation of powers. The fluid manifests its disposition to boil only when the disposition to produce heat is also manifested. The theory establishes that not only the resultant dispositions are real, but also the constituents.

Although they dispose towards their effects, causes do not necessitate them (Ch. 3). This means that talking about causes is not talking about sufficient conditions. But according to Mumford and Anjum's account, nor is causation a relation between effects and their necessary conditions to produce them. On the one hand, a cause can be just an insufficient component disposition of an effect and, on the other hand, a cause can always be replaced by another to produce the same effect, making it unnecessary. The cause can also be accompanied by an already sufficient set of dispositions, which would make it redundant. It is also argued that the existence of preventions, represented by zero resultant vectors, leaves out the idea that causation is a necessary connection. When a particular  $c$  is disposed to produce  $e$ , it can always be interrupted and whenever that possibility exists, it is not necessary for  $c$  to produce  $e$ . Accordingly, this account supports a non-monotonic reasoning about causation, because it is not true that  $c$  will always manifest its disposition to  $e$ , independent of the fact that other dispositions could be added to it. A preventive disposition could be added. It is thus argued that the antecedent strengthening test can always fail. According to this test, antecedent  $c$  necessitates  $e$  if and only if  $c$  implies  $e$  for every additional antecedent that is added to  $c$ . Given that preventers can be found in any situation, the test fails in causal contexts.

This dispositionalist account also supports *compositional pluralism*, which is the idea that dispositions can compose in many ways in order to produce the effect (Ch. 4). Thus, it is not only argued that there can be a plurality of factors that dispose towards the effect, but that such factors join in a plurality of forms too. There are cases where dispositions simply add together in a linear way, and other cases based on non-linearity, like overdose scenarios. Others are escalatory cases, where small dispositions cause greater effects along a process, and antipathetic cases, where two powers dispose towards some effect when considered separately, but dispose against it when they are composed. These have an emergent aspect, for composition might produce effects that are qualitatively different from the components, even in a way that truths concerning the former cannot be deduced from truths about the latter. The dispositionalist account does not simply reduce effect manifestations to the composed dispositions that produce them, and that is why emergent powers explain compositional pluralism in a proper manner.

Do causes precede their effects? According to this account there is no temporal priority between dispositions that are causally related (Ch. 5). Mumford and Anjum argue that causation is a process in

which the cause actually becomes the effect. The disposition, together with some stimulus, produces an effect in such a way that the effect is nothing more than the disposition manifested. Some problems about theories that stand for temporal priority of the cause are criticised, mainly for the following reason: when a cause is described as preceding its effect, there sometimes exists an intermediary gap before the effect and after the cause, which can be filled with further factors that explain the occurrence of the effect more precisely. Another possibility is that there are no additional factors required and the effect just takes more time to occur. In such cases the cause might occur at  $t_1$  and the effect at  $t_3$ . The lapse  $t_2$  would not contain other factors; it would be just the time that the effect takes to occur. This empty gap does not seem plausible. It is argued instead that causation is a process in which something gradually turns into a manifestation of dispositions. In this way, cause and effect coincide temporally. I think that this is, as I have already mentioned, one of the main weaknesses of this account. It is acknowledged that it is not an analysis of causation and therefore does not reduce causation to dispositions. But a consequence of that is the need to appeal to a more fundamental term anyway, the notion of temporally extended process, in order to solve some problems, such as temporal priority. In such situations, the dispositional account of causation can be reduced to a theory of causal processes. If a process is defined as a set of consecutive events, then the way in which two processes are temporally related to each other can be described more clearly than by using dispositions. There is no doubt that a causal situation can be the joint set of two processes, one being the cause and the other the effect. But in other cases they might only overlap or they might sometimes even be completely disjoint. The examples that Mumford and Anjum show in order to avoid causal priority are just some cases of process causation that can be explained with more clarity outside a dispositionalist account. A theory of causal processes is not only able to describe scenarios in which cause and effect overlap, but also in which they constitute a causal chain. Cases of the latter type are excluded by this dispositionalist approach. Furthermore, it is a mistake to think that overlapping processes are never related by temporal precedence in any way, for processes are by definition sets of consecutive events. This means that if cause and effect overlap, then at least the earlier parts of the cause precede the later parts of the effect.

The dispositionalist theory of causes has not only an ontological side, but also an epistemological one (Ch. 6). One of the issues re-

lated to the latter is explanation. A fact is explained when at least one of the dispositions that produced it is described. According to this point of view, a single disposition might play the role of the explanans. There are, thus, no privileged causal explanations. Apart from the explanation, the notion of prediction is also relevant. A prediction occurs when an outcome is described, based on the causal information about the powers involved in the particular situation. Explanation and prediction in this account are not based on a deductivist point of view, such as that  $A$  explains  $B$  if and only if  $A$  entails  $B$ . They are rather a kind of defeasible reasoning, because the premises can always be revised if the information changes. Thus, universal premises are only of the form “For any  $x$ , if  $x$  is  $F$  then  $x$  is disposed to be  $G$ ”. For a similar reason it is argued that there is no induction problem in this account. The notion of causation by absence and its relation with causal counterfactuals is furthermore analysed. Absences are not literally considered as causes. For saying that the absence of some power’s manifestation produced an effect just means that other powers resulted in that effect. If that power had not been absent, the effect would not have been produced. This counterfactual is not false. However, its truth does not depend on possible worlds, as is normally the case, but on powers. They are the truthmakers. Mumford and Anjum mention overdetermination as a problem for the counterfactual theory of causation and say that solutions have been only ad hoc. This means, I suppose, that new conditions are included in the definition of causal dependence only with the aim of solving the overdetermination problem. The alternative of considering high individuation standards for events, which does not seem to be an ad hoc condition, is here forgotten.

After considering the epistemological notions of the dispositionalist account of causation, the authors discuss some logical notions (Ch. 7). Claims about causation are distinguished from non-causal claims. Again, causal claims do not describe how some  $F$  will necessarily cause some  $G$ ; they only say that the former disposes towards the latter. Thus, the distinction is based on the fact that categorical universal claims are usually about logical relations between kinds, while hypothetical claims express the disposition of causes. This is what makes descriptions of preventions or *ceteris paribus* clauses a relevant part of causal claims. While logical implication based on classification is a transitive relation, causation in terms of dispositions is not. However, looking at particular cases might suggest that there are transitive causal chains, although that is not the case for all

situations. This is why the main condition that differentiates causal claims from categorical claims is the context sensitivity of the former.

Hypothetical claims are grounded by some kind of modality. Mumford and Anjum establish that it is actually a very special kind of modality, a primitive one (Ch. 8). One of the principal ideas is that such primitive *dispositionality* is opposed to necessity. Dispositionality neither depends on nor supports necessity. For there can always be a prevention of the manifestation of a particular disposition. Cases about necessary connection are never cases of dispositionality. Regarding possibility, it is argued that dispositionality implies possibility, but that possibility does not imply dispositionality. For pure logical possibility admits even very unfamiliar situations. That is why the dispositionalist account of causation appeals to natural possibility, which lies between pure necessity and pure possibility. This is closely related to normativity, in the sense that when something ought to be *F*, it is also disposed to it. Normativity and intentionality are explored in order to show in which form they are dispositional concepts. Dispositionality is well expressed in terms of selection functions, according to which a set of possibilities is identified among others. Thus, dispositionality selects those possibilities that have a natural disposition. The selection function expresses the fundamental character of dispositionality better than the conditional analysis of dispositions. According to the simplest definition of such analysis, an *x* is disposed to being *F* if and only if the manifestation of *Fx* is implied by the occurrence of a certain stimulus, *S*. It is thus argued that such analysis erroneously treats dispositionality as a non-fundamental notion. But, again, dispositionality is an unanalysable and natural notion of modality.

If this sort of dispositionality is a primitive *sui generis* modality, the way in which it is known must somehow also be an empirically direct fundamental one (Ch. 9). This empirical ground consists in the senses of balance and proprioception, i.e. perceived muscular tension, which are, according to dispositionalist causation, more basic than other senses of experience. The description of these kinds of senses does not pretend to answer questions about the nature of causation but rather to answer whether causation can be perceived. The response is only positive if causation is not defined as a relation between temporally separated events. If causes tend to effect in a simultaneous way, as Mumford and Anjum argue, then it is not so hard to perceive the causal relation. Causation is, so considered, no more than a process in which the cause becomes the effect. The most direct perception of it occurs in a non-external way with bodily

perception. This also explains problems related to the disconnection between volitions and acts, also called the reunification of agency. This would be part of the perception of causation in general. Now, the perception of a power's manifestation is based on the experience of agency, in the sense that actions are confronted by resistance, the possibility of preventions and interactions between dispositions, in a manner that can be directly perceived. Among all direct perceptions, dispositionality is the best known, being present in every kind of causal experience.

After describing the empirical foundations of the dispositional account of causation, its connection with science is considered (Ch. 10). The relation between science and metaphysics is also analysed, according to which there is neither a subsumption of one into the other nor are they totally separate areas. Abstract metaphysical descriptions can always be compared with scientific, empirical ones, maintaining an interaction between both. Descriptions of the field of biology seem to be more adequate for the dispositionalist account of causation. It is argued, firstly, that physics is only one aspect of reality that analyses mostly abstract properties and entities and thus sometimes fails to grasp the complexity of certain causal processes. Secondly, several reasons are given for the fact that the dispositionalist theory of causation works better with biology and genetics. Such reasons are based on the fact that genes, fundamental in biology, dispose towards their manifestations, that biological explanation usually involves dispositions and that biology describes processes where cause and effect can occur simultaneously. Although biology seems to be a great field in which causation can be described through dispositions, it does not mean that the same elements related to dispositionality cannot be found in other scientific areas.

The work of Mumford and Anjum offers a clear theory of causation, explaining fundamental concepts and difficulties related to the field. Models, causal scenarios and empirical examples connect this ontological theory with scientific points of view and with an intuitive understanding of causation. The main weakness of the theory is that it does not give an analysis of causation. It depends therefore at many points on other, more precise and developed accounts, like the theory of causal processes, as has been shown here. The account could be more successful if it managed to deal with such semantic and ontological problems. That task might be achieved by giving up some restrictions, e.g. the condition that causes do not precede their effects. The work is certainly to be recommended to scholars

focused on the matter of causation, and also to readers just approaching this particular topic who are interested in modality, metaphysics, and epistemology. It is one of the best and most complete recent accounts of causation and dispositions.

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