

Dispositional modality vis-à-vis conditional necessity

Anna Marmodoro, University of Oxford

There is an ongoing debate in the metaphysics of dispositions regarding which type of modality governs their manifestation. How the question is addressed has broad implications for various core areas in philosophy where dispositions are assumed to play a crucial explanatory role (first and foremost, the free will problem). This paper assumes as its default position the view that dispositions manifest *by conditional necessity*; that is: when in appropriate circumstances, dispositions manifest necessarily. In defense of this view, the paper engages critically with an existing alternative in the literature, put forward most prominently by Mumford and Anjum, and known as *dispositional modality*. According to this latter view, even when in appropriate manifestation conditions, dispositions *merely tend* toward their manifestation. The paper concludes that Mumford and Anjum's view, as it stands, is prey to difficulties, while their own criticisms against the conditional necessity view can be rebutted. Their position cannot seek support from such arguments as Lowe (2011)'s, from spontaneous radioactive decay to the effect that some dispositions might not need triggering. The so called 'spontaneous decay' has been shown to be triggered by "vacuum fluctuations" which induce the atom to undergo spontaneous emission¹. Thus in conclusion, although I do not find the arguments for the dispositional modality view cogent, the conditional necessity view might itself need more extensive discussion of various cases that appear to invite readings of unpatterned, spontaneous behavior of dispositions.

I would like to initially clarify that my arguments are not an objection to the theory of propensities of complex arrangements of dispositions. For example, although it is not dispositionally erratic whether an electric charge will repel a similar charge, it is probabilistic whether an electron will escape the Coulombic attractive pull of a metal. Arrangements of dispositions are not governed by conditional necessity, but by statistical effects of the dispositional arrangement. Conditional necessity does not regulate the behavior of sets of initial conditions.

Finally, I will not discuss the vagueness of any specified triggering conditions, which allow for borderline cases as to whether there are triggering conditions or not in a particular case. The uncertainty here is whether the triggering conditions obtain or not in this case, rather than whether they trigger the disposition, which is what I am concerned with in this paper.

1. The defeasibility of dispositions

While there is broad agreement in the literature that dispositions are such that they may or may not manifest, there is much ongoing discussion on the mechanism that allows or prevents the manifestation of a disposition. On this

¹ See for instance H. Yokoyama and K. Ujihara (1995: 6).

issue, Mumford and Anjum take a unique stance, which is the subject of this paper.² Their starting point is a thought by and large shared by the other players in the debate; namely, in their words:

Suppose that, whether known or unknown, there is just nothing that can prevent a certain disposition from manifesting. The logic of dispositions nevertheless allows that if there were, counterfactually, some such process of prevention, then this disposition *need not* manifest itself. (2011: 178, my emphasis)

This is the difference between outright necessity and physical necessity; the latter can be interfered with. Even if there is nothing actually preventing the manifestation of a disposition, still, dispositions are essentially preventable. But Mumford and Anjum further hold that dispositions *never* manifest *of necessity*, in the following sense; even “when a power is in all the right conditions for its manifestation, it still ‘*only*’ *tends*, and no more than tends, to produce its effect, where such tendencies can come in greater and lesser strength” (2014: 112, my emphasis). Here Mumford and Anjum part ways with the conditional necessity account; they think that dispositions are governed by their own *sui generis* modality, which they call *dispositional modality*. By contrast, on the conditional necessity view here assumed as the default position, when in appropriate conditions, dispositions do *more than tending* to manifest; they *will* manifest by (physical) necessity.³ Conditional necessity is not indefeasible necessity; dispositions on this view too *can* be prevented from manifesting. But the reason is that the external conditions might be such that they are not appropriate for allowing the disposition to manifest as it would if unimpeded.

The contrast between the two views – dispositional modality on the one hand, and conditional necessity on the other – might be drawn this way: for Mumford and Anjum, it is as if a disposition had its own defeaters somehow ‘built’ into the very nature of the disposition and operating unconditionally (and even temperamentally, one might say, as we shall see below); while on the opposing position, the defeaters for the disposition in question are the external conditions, and are unfailing if satisfied. What does it mean that a disposition’s defeaters are built into the very nature of the disposition? What is the mechanism of operation of such dispositions? In the key quotation already given above, they claim that, ‘When a power is in all the right conditions for its manifestation, it still ‘only’ tends, and *no more than tends*, to produce its effect, where such tendencies can come in greater and lesser strength’ (2014:112, my emphasis). I take this to mean that dispositions may fail to manifest, not because there may be other external causal factors that prevent the dispositions from manifesting; but because their very nature is such that they merely tend to manifest; their manifestation is not guaranteed even in optimal circumstances. (Similarly, dispositions *may succeed* in manifesting because of their own mere tending to

² This paper does not include an exhaustive review of all there is in press about dispositional modality to date. It aims to challenge some of the most well known argument in support of that view that, surprisingly, have not been much critically discussed yet.

³ See Marmodoro ‘Aristotelian powers at work: reciprocity without symmetry in causation’, forthcoming in J. Jacobs (ed.) *Causal Powers*, OUP, forthcoming.

manifest, and not because of the external conditions being 'right'.) The question then is: when dispositions actually manifest, what accounts, metaphysically, for the change they undergo from mere tending to manifesting? (More on this in section 3.)

2. In support of dispositional modality

Is there any evidence that there are such states of mere tendency in nature, as Mumford and Anjum posit them? They refer to our direct experience of our own volitions, intentions etc. as evidence that we understand well what the nature of tendencies is, and are acquainted first hand with dispositional modality. We all have experience of intending to do something but failing to achieve it, and this awareness according to Mumford and Anjum reveals to us the nature of dispositional modality.⁴ However, direct experience of our volitions might at best serve to give us only *by analogy* understanding of the nature of physical tendencies. When we experience heat, this does not reveal to us the nature of molecular motion. Can acquaintance with human intentions and goals in the realm of the mental reveal the nature of dispositions in the realm of the physical? Are all these tendencies, mental and physical, of the same kind? On what grounds should we countenance our experience of our plans, efforts and endeavors as evidence for the existence of tendencies of dispositional modality in nature? Mumford and Anjum argue for their claim that we are directly acquainted with dispositional modality by means of analyzing our experience of e.g. walking in a gale, in these terms,

You walk in a gale, for instance ... Proprioceptively, you feel that you have to strain against the wind and lean into it, otherwise it may blow you over. But in one and the same experience, you feel that you can resist it by adjusting your body weight and tension in certain muscles. There is a definite disposition in the action of the wind, towards a certain outcome, but that outcome is not necessitated because it can be resisted by you. (2011: 210-211)

The idea is that one experiences one's own resistance to the wind, and one knows that it could go either way; one is experiencing the wind's as well as one's own tendencies to prevail. But is this example apt for establishing that dispositional modality exists in nature and is known to us? Is it a case of a disposition's tending, but falling short of manifesting? Or does it rather, contrary to how Mumford and Anjum present it, illustrate how *external* defeaters (e.g. the power of the wind) succeed in preventing other dispositions (your own weight) from manifesting? There is a conceptual distinction to be drawn here. Tending to act is different from having a preventable intention to act. When we form an intention to act and make a plan, but have not acted yet, many factors can play a role in preventing the fulfillment of our intention. Suppose I decide to play squash in the afternoon; if a friend calls in, I might change my mind; if I cannot

⁴ See for instance 2011: 212.

find my racket at home, I might not be able to play; if an emergency occurs with friends or family, the plan will be abandoned. All these and countless many more factors can prevent me from acting on my decision to play squash, through interference. By contrast, suppose I feel a little thirsty; there is a glass of water on my desk, and I am conscious of the feeling of thirst, but I do not act on it to drink the water. My tendency to quench my thirst does not manifest in my drinking some water from the glass. It could have, but in fact it does not. What is relevant to the present discussion is that, to my knowledge, nothing prevented my drinking water in this case; nothing interfered, blocking my action. Rather, my tendency did not lead to action. This failure to act is, on the face of it, different from a prevented intention to act.⁵ In view of this distinction, it comes as a surprise to the readers to find most of the examples by Mumford and Anjum involve prevention and interference; prevention cases do not illustrate tendencies, and could not help us understand their nature. Although examples from desires are not explanatory of the nature of physical dispositions, nonetheless they may be helpful analogies for presenting the *directionality* towards a goal that dispositions have, and for illustrating how the manifestation of mental or physical dispositions can be blocked. On the other hand, such examples as that of thirst above, do not establish that there are ‘wavering’ dispositions, either in the human mind or in nature. Dispositions are defeasible, but not ‘wavering’.

3. The modal spectrum of dispositional modality

Mumford and Anjum speak of dispositional modality as a modality that is, as it were, on a modal spectrum that has at the two extremes necessity on the one hand, and pure possibility on the other. In their words, it is ‘a primitive, unanalyzable modality that is intermediate between pure possibility and necessity’ (2011: 193). In fact, although Mumford and Anjum use necessity and possibility to explain the dispositional modality of tending, they argue that tending is the fundamental modality, of which necessity and possibility are only limiting cases: ‘We think dispositionality is the core modality from which the other two standard modal operators draw their sense as being limiting cases on a spectrum’ (2011: 182). Do indeed the extremes of the modal spectrum reveal for us what type of modality the spectrum delineates, namely the stretch from ‘pure possibility’ to ‘necessity’? Consider a disposition-type, e.g. the disposition to cool, along the modal spectrum. What is it that is different at the various points on the spectrum? As we consider the same type of disposition, when its token is located on the spectrum closer to pure possibility, and then again when it is closer to necessity, how are the two tokens of this type of disposition different? Are the token dispositions of the given type on the spectrum different

⁵ My view is that even in the case of my feeling thirsty, I did not act on it because there were other current desires that overpowered the desire for drinking. It was not a winning desire. Nevertheless, on account of our possibly not being aware of any defeaters, the example helps illustrate for us the difference in the behavior of a tending disposition (if there were any) and a defeated disposition.

by degree of tendency to manifest, or by strength? I turn now to examine how Mumford and Anjum address such questions.

They write that ‘We have ... suggested how such [dispositional] modality may fall on a spectrum, of there being stronger and weaker dispositions towards an outcome, which gives us an idea of there being remote possibilities and highly likely possibilities’ (2011:194). So it seems that a stronger disposition makes its manifestation more likely and a weaker disposition makes its manifestation less likely. If so, it appears that the strength of a disposition is identified with its tendency to manifest. But is this correct? Strength and tendency of a disposition certainly need to be teased apart, if dispositional modality is different from conditional necessity. This is because the conditional necessity account allows for, and explains that dispositions have different degrees of strength, without countenancing tendencies. For example, increasing the pressure of the chisel on the wood results in a deeper incision in the wood. The explanation for this is straightforward. As the conditions for a deeper incision in the wood are met with the increase of pressure on the chisel, the chisel manifests its disposition to carve deeper into the wood. If the conditions had not been met, namely, if the pressure on the chisel had not increased, the incision would have been slighter, resulting from a different set of conditions. Dispositions come with degrees of strength; yet this does not invite tendencies into the account; simply, *different strengths* involve *different manifestation conditions*. So it is not an option for Mumford and Anjum to identify the strength of a disposition to what they claim is the tendency of a disposition to manifest.

Mumford and Anjum’s account, too, needs to be able to explain why increasing pressure on the chisel results in a deeper incision. If they explain it by saying that the increasing strength of the chisel’s disposition to carve results in a deeper incision, then the *strength* of disposition will determine the *type* of manifestation possible. The disposition’s *tendency* to manifest or not is a different matter. To see this, let us assume that dispositions have tendencies to manifest that are independent of their strength; then the example just offered would go as follows. Suppose that, given a particular thrust, the chisel’s disposition to cut the wood is of strength-1 x ; but as an instance of dispositional modality, the chisel’s disposition to cut the wood also has a strength-2 y of tendency to cut the wood (which is not governed by the presence of the right conditions for cutting the wood; as per Mumford and Anjum (2014: 112), quoted above). What then does the strength-1 x of a disposition have to do with its strength-2 y of tendency to manifest? Strength-1 relates to defeaters; strength-2 to dispositionality. If the two are one and the same, then dispositions do not tend, *contra* Mumford and Anjum; rather, they can only be defeated (or not), as per conditional necessity. If the two are different, then strength-2 must be strength of tendency to manifest independently of conditions for manifesting.

If dispositional modality is different from conditional necessity, as Mumford and Anjum advocate, then as argued above, strength-2 of the tendency to manifest is independent of strength-1 to overcome defeaters of a disposition. A disposition will tend to manifest, and also face external defeaters, if any. Its strength-1 will determine how it will fare against defeaters. For instance, in the example above,

increasing the strength-1 of the disposition does not make it more likely to manifest. Even if the thrust on the chisel is stronger, if the chisel hits a knot, it will abruptly stop carving, despite the high pressure with which the chisel is exerted against the wood. The strength-2 of tendency of the disposition is supposed to explain the disposition's behavior (as captured by the statistical profile of the disposition's manifestation). But how does it explain it, if not through enabling and defeating conditions? If the thrust on the chisel is strong and there is no knot on its carving path, what does it mean to say that its disposition to cut will nevertheless waver, 'only tend' to manifest? Why would it only tend? What more does it take, or does it depend on, to manifest? If there is regularity in the disposition's manifestations (as captured by statistics), tending cannot be governed by chance; and if tending is not governed by the right conditions for manifestation either, nor by the strength-1 of the disposition, what is tending to manifest governed by? Would we really understand the phenomenon of the thrust of the chisel failing to carve the wood when there is nothing blocking its path, just because the 'wavering' of the disposition to cut went the other way? These are compelling questions that remain unaddressed in Mumford and Anjum's account.

4. Existing challenges against conditional necessity

The conditional necessity view goes back to Aristotle⁶ (on whose views his successors, from Aquinas⁷ onwards, lean), and is now mainstream in power metaphysics.⁸ Yet, it has been challenged, not only by confronting it with an alternative and supposedly sounder view, dispositional modality; but also with direct objections. So far, I have raised difficulties for the account of dispositional necessity; in this section I will respond to the objections moved against conditional necessity. Unsurprisingly, the objections are by same authors who argue for the dispositional modality view.

Mumford and Anjum challenge the coherence of the conditional necessity view by claiming that 'the very idea of necessity seems to mean unconditional necessity' (2014: 111). By and large metaphysicians take unconditional necessity to be necessity obtaining in all metaphysically possible worlds. But conditional necessity is *physical* necessity, namely, necessity in the actual world.⁹ The burden of proof is with Mumford and Anjum to show that the two necessities (physical and metaphysical) are one and the same and cannot be teased apart; that the metaphysically possible worlds are the same as the

⁶ See Marmodoro 'Potentiality in Aristotle's Metaphysics', forthcoming in K. Engelhard and M. Quante (eds.) *The Handbook of Potentiality*, Springer, 2015

⁷ See e.g. S. Brock (2002).

⁸ Among its most recent supporters, there is for instance, in addition to myself [self-identifying reference deleted], John Heil (in Jacobs (ed.) *Causal Powers*, forthcoming): 'Whether various reciprocal powers are on hand at a given time can be probabilistic, but, given the powers at *t*, causings at *t* are thoroughly deterministic'.

⁹ D. M. Armstrong for instance put forward a theory of nomological necessity, based on his theory of universals, as characterizing physical necessity by contrast to regularity in nature (1983:99-107).

physically possible worlds. Only if this were the case would their objection against the conditional necessity account hold. Secondly, Mumford and Anjum move an objection to the conditional necessity view, with regards to its consequences for truths. They write: ‘if we allow necessity to be conditional — something that operates when all conditions are right — then every truth will turn out to be likewise necessary, destroying any distinction between contingent and necessary truths’ (2014: 111). Their idea is that if we take necessity to mean that a truth is the case because the conditions for its realization obtain, then this does not distinguish between types of necessity. This is so because for every type of necessity, when it obtains, it does so because ‘what it takes for it to obtain’ is the case – its own conditions of realization are met. Although this is so, it does not follow, *pace* Mumford and Anjum, that we lose the distinction between necessary and contingent truths. We can still distinguish between truths in the actual world whose conditions of realization are met in all metaphysically possible worlds, and truths whose conditions are met in some, only possible, worlds; or in very similar possible worlds, etc. Thus the distinction between contingent and necessary truths is not destroyed, if we allow necessity to be conditional. The final objection to conditional necessity I will examine is a counterexample Mumford developed against it (in personal correspondence). He put it in these terms: ‘Consider the disposition of the contraceptive pill to cause thrombosis. This is medically significant and there is a clear tendency towards that outcome rather than all the other logical possibilities. But only 1 in 1,000 women taking the pill get thrombosis’. For Mumford, this confirms his own account, that even when all conditions are satisfied, which in this example they are by the women’s bodily conditions, the pill’s disposition to cause thrombosis only tends to manifest, as captured in the 0.1% manifestation statistic of the pill’s disposition for thrombosis, among the pill taking women. But, the objection against conditional necessity goes, if one follows the conditional necessity route, then since the women take the pill under the same conditions, why is it that thrombosis is necessitated only in some cases and not in others? The example that Mumford gives can however be straightforwardly explained by the conditional necessity account. The pill can cause thrombosis in women of a particular body type, *w*. Among an average 1000 women taking the pill, there is only one woman of body type *w*. This is what the 1:1000 statistic tells us. For all we know the statistic would be exactly the same for men taking the same type of pill; the manifestation conditions of the pill’s disposition to cause thrombosis may be bodily features common to both men and women. The adult women taking the pill are not selected to activate the pill’s disposition to cause thrombosis. Rather, their bodily systems provide the appropriate external conditions for activating the pill’s contraceptive disposition. The reason why the pill causes thrombosis in 1 out of 1000 women is not that the pill tends to be activated in 1 out of 1000 cases; rather it is that there was only one woman with the type of organism that satisfies the requisite conditions for the pill to manifest its thrombosis-causing disposition. If the pill had been given selectively to women of just *this* type, *w*, the statistics of the activation of the pill’s disposition to cause thrombosis would have been of total success (barring other complications) the reverse. The methodology of science speaks here in favor of the conditional necessity approach: if we discover that 1:1000 women taking the pill get thrombosis, we would naturally look for what is

similar in those women who *do* get thrombosis. We would try to work out what the body type *w* is so as to warn women with that body type. This process assumes that the pill doesn't simply 'tend' to produce thrombosis, otherwise any further research would be pointless.

Conclusions

I submit that Mumford and Anjum have given us no compelling reasons to abandon the assumed default position that the modality governing the manifestation of dispositions is conditional necessity. The default position explains both why a disposition is not always activated (because its activation depends on the external conditions); and the modal 'imperative' of its activation (the activation is necessary when the appropriate external conditions do obtain). On this account, there is a normative pattern to the behavior of dispositions that ensues in the necessity of the activation of a disposition, in appropriate circumstances. Tendencies, on the other hand, of the kind Mumford and Anjum commend to us, are wavering and therefore also unpredictable. There is nothing they explain over and above what conditional necessity explains. If we are to be persuaded that tendencies have to be admitted into the ontology, more cogent arguments than the ones examined in this paper need to be put forward.

Corpus Christi College
Oxford
England, UK

*

Bibliography

Armstrong, D. M. (1983), *What is a Law of Nature?* Cambridge University Press.

Brock, S. (2002), 'Causality and Necessity in Thomas Aquinas', *Quaestio* 2, pp. 217-240.

Jacobs, J. (ed.) (forthcoming), *Causal Powers*, Oxford University Press.

Heil, J. (forthcoming), 'Causing' in Jacobs J. (ed.) *Causal Powers*, Oxford University Press.

Yokoyama H. and Ujihara K. (1995). *Spontaneous emission and laser oscillation in microcavities*. Boca Raton: CRC Press.

Hüntelmann R. and Hattler J. (eds.) (2014), *New Scholasticism Meets Analytic Philosophy*, Editiones Scholasticae.

Lowe E. J. (2011), 'How Not to Think of Powers', *The Monist* 94 (1): 19-33.

Marmodoro, A. (forthcoming), 'Potentiality in Aristotle's Metaphysics', in K. Engelhard and M. Quante (eds.) *The Handbook of Potentiality*, Springer.

Marmodoro, A. (forthcoming), 'Aristotelian powers at work: reciprocity without symmetry in causation', in J. Jacobs (ed.) *Causal Powers*, OUP.

Mumford S. and Anjum R. L. (2011), *Getting Causes from Powers*, Oxford University Press.

Mumford S. and Anjum R. L. (2014), 'The Irreducibility of Dispositionalism' in Hüntelmann R. and Hattler J. (eds.) *New Scholasticism Meets Analytic Philosophy*, Editiones Scholasticae, pp.105-28.

Schrenk M. (2010), 'The Powerlessness of Necessity' *Noûs* 44:4, 725–739.

Williams N. (2014), 'Powers: Necessity and Neighborhoods', *The American Philosophical Quarterly* 51:4, 357-372.
